Index Page

3.4.4 Number of books and chapters in edited volumes/books published per teacher during the last five years (5)

Year	2021-22	2020-21	2019-20	2018-19	2017-18
Number	85	139	66	57	55

3.4.4 Number of books and chapters in edited volumes/books published per teacher during the last five years (5)								
3.4.4.1: Total number of books and chapters in edited volumes / books published, and papers in national/international conference-								
Sl. No.	**Name of the teacher**	**Title of the book/chapters published**	**Title of the paper**	**Title of the proceedings of the conference**	**Year of publication**	**ISBN/ISSN number of the proceeding**	**Whether at the time of publication Affiliating Institution Was same Yes/NO**	**Name of the publisher**
1	D. Sony, D. Krishna Reddy, P. Naveen, V. Satya Srinivas	National Space Science Symposium (NSSS)	"IRNSS and GPS Satellite User Range Accuracy Analysis for Receiver Autonomous Integrity Monitoring "	NA	2019	NA	Yes	ISRO
2	P. Sathish and D. Krishna Reddy	International Conference on Numerical Optimization in Engineering and Sciences (NOIEAS),	“Predictive Data Optimization of Doppler Collision Events for NavIC System”	NA	2019	978-981-15-3215-3	Yes	Springer

3	P. Sathish, D. Krishna Reddy, N.Alivelu Manga	Second International Conference on Emerging Trends in Science & Technologies For Engineering Systems (ICETSE-2019)	“Development of Raspbian kernel Customization for Automatic Railway Level Crossing Application”	NA	2019	2277-3878	Yes	Blue Eyes Intelligence Engineering & Sciences
4	N. Alivelu Manga	ICETSE2019,	“Performance Analysis of Acquision Algorithms of NavIC”	NA	2019	2277-3878	Yes	Blue Eyes Intelligence Engineering & Sciences
5	M.V.NAGABHUSHANAM	International Conference on Communication and Signal Processing(ICCSP)	“Embedded Zero-Tree Wavelet Coding with Selective Decomposition Bands”	NA	2019	978-1-5386-7595-3	Yes	IEEE

6	Majeti Venkata Sireesha	International conference on Engineering and advancement in Technology - 2019	" Deep learning-basedfire fighting robot"	NA	2019	978-93-81288-18-4	Yes	Organization of Science and Innovative Engineering & Technology
7	Sudershan Reddy Kotla, SameehaFahmeen, D Krishna Reddy and Quddusa Sultana	International Conference on Engineering and advancement in Technology	"Augmentation of NavIC-11 with BEIDOU-3 Over Indian Region"	NA	2019	2278-3091	Yes	WARSE
8	G Mallikharjuna Rao, K Deergha Rao	5th IEEE International Conference for CConvergence in Technology (I2CT)	" A Scheme for Latency Analysis of Different Cryptography Methods for Security in 5G Era"	NA	2019	978-1-5386-8075-9	Yes	IEEE
9	Ayesha Samreen, P. Sathish and N. Alivelu Manga	IEEE iPACT 2019	“Low cost IoT based emission monitoring system for thermal power plan”	NA	2019	978-1-5386-8189-3	Yes	IEEE

10	Sudershan Reddy Kotla, SameehaFahmeen, Quddusa Sultana and D Krishna Reddy	Third IEEE International Conference on Electrical, Computer and Communication Technology (ICECCT)	"Augmentation of NavIC with BeiDou-2 Over Indian Region"	NA	2019	978-1-5386-8158-9	Yes	IEEE
11	B Neeraja	third IEEE international Conference on Electrical, computer and communication technologies, ICECCT,2019	” Design of an area efficient Braun Multiplier using high speed parallel prefix adder in cadence"	NA	2019	978-1-5386-8158-9	Yes	IEEE
12	K Sudarshan Reddy, SameehaFahmeen, D Krishna Reddy and Quddusa Sultana	Third IEEE International Conference on Electrical, Computer and Communication Technology (ICECCT)	Augmentation of Modernized CAPS with NavIC Over Indian Region	NA	2019	978-1-5386-8158-9	Yes	IEEE

13	Narahari Sastry Panyam	International Conference on Electrical, Communication, Electronics, Instrumentation and Computing (ICECEIC - 2019)	Analysis of Telugu Hand Written Characters using Transform based Techniques	NA	2019	978-908-25987-5-9	Yes	IOP Publishing ltd
14	D. Sony, V. Satya Srinivas , P. Naveen and D. Krishna Reddy	"IRNSS User Range Accuracy Evaluation for Receiver Autonomous Integrity"	URSI AP-RASC 2019	NA	2019	978-908-25987-5-9	Yes	IEEE

15	Sujanavan Tiruvayipati, Dr.Y.Ramadevi	IOP Conference Series: Materials Science and Engineering	Feasibility of Soft Real-Time Operations Over WLAN Infrastructure-Independent IoT Implementation by Enhancing Edge Computing	International Virtual Conference on Robotics, Automation, Intelligent Systems and Energy (IVC RAISE 2020)	2019	ISBN: 978-981-15-1097-7	Yes	IOP Publishing ltd
16	Kusumalatha Karre, Dr. RamaDevi. Y	Recommended System for wellness of Autistic Children Using Data Analytics and Machine Learning	Recommended System for wellness of Autistic Children Using Data Analytics and Machine Learning		2019		Yes	ISSN: 1757-8981

17	T. Sujanavan, Dr.Y.Ramadevi	Learning and Analytics in Intelligent Systems b	Viallility of uncomplicated IoT SaaS Development for Deployment of DIY applications over HTTP with Zero Investment	Advances in Decision Sciences, Image Processing, Security and Computer Vision	2019	978-3-030-24322-7	Yes	Springer
18	P.Pramod Kumar, K.Sagar, G.Ranadheer Reddy, S.Shwetha and V.Pranathi	IOP Conference Series: Materials Science and Engineering,	A novel framework for quality of service aware vertical handover process in heterogeneous wireless networks	International Conference on Recent Advancements in Engineering and Management	2019	1757-899X	Yes	IOP Publishing ltd

19	V.Thirupathi, Dr.K.Sagar	IOP Conference Series: Materials Science and Engineering,	Web of Things an intelligent approach to solve interoperability issues of Internet of Things communication protocols	International Conference on Recent Advancements in Engineering and Management	2019	1757-899X	Yes	IOP Publishing ltd
20	T Sridevi	NA	Detection Of Military Targets From Satellite Images Using Deep Convolutional Neural Networks	2020 IEEE 5th International Conference on Computing Communication and Automation (ICCCA)	2019	978-1-7281-6324-6	Yes	IEEE

21	Dr. T. Sridevi	Poisson and Logistics Regression Analysis on Electromagnetic Field Radiation: A Case of Environmental Pollution	Poisson and Logistics Regression Analysis on Electromagnetic Field Radiation: A Case of Environmental Pollution	NA	2019	ISSN: 2755-0281	Yes	Scientific research community
22	Dr.R Ravinder Reddy	Emotion Analysis in Text using TF-IDF	Emotion Analysis in Text using TF-IDF	2021 11th International Conference on Cloud Computing, Data Science & Engineering (Confluence)	2019	978-1-6654-1451-7	Yes	IEEE
23	Morarjee Kolla, T. Venugopal	Lecture notes in Electrical Engineering	Diabetic Retinopathy Classification using Lightweight CNN Model	ICCCE 2021	2019	978-981-16-7985-8	Yes	

24	Mr. K. Prasad Babu	“Fuel oil from plastic waste”Institute of Technology (A), Hyderabad.	“Fuel oil from plastic waste”Institute of Technology (A), Hyderabad.	INTERNATIONAL E-CONFERENCEON MATERIALS PROCESSING & CHARACTERIZATION	2019	ISBN: 978-81-946476-9-0	Yes	VANDANA PUBLICATIONS
25	Chittepu Obula Reddy	Phytochemistry of Calotropis gigantea	Phytochemistry of Calotropis gigantea	NA	2019	978-620-0-29522-4	Yes	Lap Lambert Academic publishing
26	Dr Y Srinivasa Reddy	GIS-based Evaluation of Watershed Management in Medak District, India	GIS-based Evaluation of Watershed Management in Medak District, India	NA	2019	ISBN: 9786200232328.	Yes	Lambert Academic Publishing
27	Dr. G. N. R. Prasad	Artificial Intelligence & Data Science Engineering	Artificial Intelligence & Data Science Engineering	Book	2019	978-93-92992-39-1	Yes	SIP internatiaonal publishers

28	Dr. Suresh Pabboju	Advances in Decision Sciences, Image Processing, Security and Computer Vision	Text Steganography: Design and Implementation of a Secure and Secret	ICETE 2019	2019	978-3-030-24322-7	Yes	Springer
29	Dr. M. Venu Gopalachari	Data Engineering and Communication Technology	Real Time Aspect based sentiment analysis on consumer reviews	Advances in Intelligent Systems and Computing	2019	978-981-15-1097-7	Yes	Springer
30	Ms. K. Sugamya	Advances in Intelligent Systems and Computing	Realistic Handwriting Generation Using Recurrent Neural Networks and Long Short-Term Networks	Proceedings of the Third International Conference on Computational Intelligence and Informatics	2019	978-981-15-1480-7	Yes	Springer

31	Dr. T. Pratima	Advances in Intelligent Systems and Computing book series (AISC,volume 1090)	Rough Set-Based Classification of Audio Data	Proceedings of the Third International Conference on Computational Intelligence and Informatics	2019	978-981-15-1480-7	Yes	Springer
32	Dr. Suresh Pabboju	System Reliability, Quality Control, Safety, Maintenance and Management	Applications of IoT for Soil Quality. In: System Reliability, Quality Control, Safety, Maintenance and Management.	ICICCT 2019	2019	978-981-13-8461-5	Yes	Springer
33	Ms. E. Ramalakshmi	System Reliability, Quality Control, Safety, Maintenance and Management	Prediction of Employee Attrition and analyzing reasons: using Multi Layer Perceptron in Spark	ICICCT 2019	2019	978-981-13-8461-5	Yes	Springer

34	Mr. P. Vasanthsena	Lecture Notes in Electrical Engineering	An Optimal Heuristic for Student Failure Detection And Diagnosis In The Sathavahana Educational Community Using WEKA	Proceedings of the International Conference on Communications and Cyber Physical Engineering 2018	2019	978-981-13-0212-1	Yes	Springer
35	Ms. A. Sirisha	NA	An approach to mine time interval based weighted sequential patterns in sequence databases	13th International Conference on Signal-Image Technology & Internet-Based Systems (SITIS)	2018	978-1-5386-4283-2	Yes	IEEE

36	Ms. E. Ramalakshmi	Cognitive Science and Artificial Intelligenc	Hexagonal image processing and transformations: A practical approach using R	SpringerBriefs in Applied Sciences and Technology	2018	978-981-10-6698-6	Yes	Springer
37	A. Babu, Dr.Y.Ramadevi	Dynamic Phone Warping - A Method to Measure the Distance Between Pronunciations	6th International Conference of Advanced Computer Science & Information Technology (ACSIT)	International	2018	DOI : 10.5121/csit.2018.80805	Yes	CSCP
38	Dr.Y. Ramadevi, T. Prathima, Sk. Afsar	Automatic Framework of Music Ringtone Extraction from Tollywood Songs	Indian J.Sci.Res	National	2018	ISSN: 0976-2876	Yes	Indian J.Sci.Res. 17(2): 381-386, 2018
39	T.Sridevi, N Rahul Chandra	A Wavelet Based Digital Image Watermarking for Broadcast Monitoring using Genetic Algorithm	6th International Conference on Advanced Computing, Networking, and Informatics [ICACNI - 2018]	International	2018	NA	Yes	NIT, Silchar and Center for Computervision and Pattern Reconition, NIT Rourkela

40	MohdQurram Javeed, A.D. Sarma and A. Supraja Reddy	'Suitability of Ionospheric Coefficients for IRNSS Single Frequency Receivers'	IEEE Indian Conference on Antennas and Propagation (InCAP)	NA	2018	978-1-5386-7070-6	Yes	IEEE
41	K Lakshmanna, N. Alivelu Manga and A.D Sarma	'Analysis of Ionospheric Delay Effects on IRNSS-GPS Receiver Coordinates	IEEE Indian Conference on Antennas and Propagation (InCAP)	NA	2018	978-1-5386-7070-6	Yes	IEEE
42	Manikya Krishna Chaitanya Durbhakula and N.V. Koteswara Rao	"Sierpinski Monopole Antenna Reconfigurable System using Hairpin Bandpass Filter Sections"	IEEE Indian Conference on Antennas and Propagation (InCAP2018)	NA	2018	978-1-5386-7070-6	Yes	IEEE
43	J. Rajeshwar Goud, N. V. Koteswara Rao and A. Mallikarjuna Prasad	"Edge cut Dual-Band Slot Antenna for Bluetooth/WLAN and WiMAX Applications"	Accepted for oral presentation in ICSCSP- 2018	NA	2018	978-981-13-3600-3	Yes	Springer

44	P. Sathish, D. Krishna reddy, A.D Sarma and K. Sudarshan Reddy	“Investigations of Doppler Collision Effects on NavIC”	3rd IEEE international conference on Recent Trends in Electonics, Information & Communication Technology (RTICTE-2018),	NA	2018	978-1-5386-2440-1	Yes	IEEE
45	Kavitha Devireddy, Naveen Kumar P and A.D. Sarma	“Performance Evaluation of IRI-2016 Model Using IRNSS Data over a Low Latitude Station: Preliminary Results”	IEEE ICITE 2018	NA	2018	978-1-5386-5080-6	Yes	IEEE
46	MohdQurram Javeed, A.D. Sarma, A. Supraja Reddy, T. Sridher, N.V. Koteswara Rao and Tarun Kumar Pant	‘Multipath and Thermal noise free Relative TEC Estimation using IRNSS L5 and S1 Signals’	IEEE ICITE 2018	NA	2018	978-1-5386-5080-6	Yes	IEEE

47	GinkalaVenkateswarlu and A D Sarma	‘Analysis of PDFs of Ionospheric Scintillation Index Data due to Low Latitude Station’	IEEE ICITE 2018	NA	2018	978-1-5386-5080-6	Yes	IEEE
48	A.Supraja Reddy	“Performance Evaluation of Mixed-Pair method of Estimation of Ionospheric Gradients on IRNSS L5 Signals”,	International Conference on Innovative Technologies in Engineering (ICITE 2018)	NA	2018	978-1-5386-5080-6	Yes	IEEE
49	G. Mallikharjuna Rao, P. Srinivas Rao	Performance Analysis of Different Spatial Domain Methods for Traffic Control Using Image Processing: A LabVIEW approach"	International Conference on Wireless Communications Signal Processing and Networking (WISPNET 2018)	NA	2018	978-1-5386-3624-4	Yes	IEEE

50	Sri. G. Mallikharjuna Rao, K. Deergharao	"Performance Analysis of Different Transform Methods for Image Steganography : A LabVIEW approach "	Oral presentation at the 4th International Conference on Electrical Energy Systems (ICEES-2018)	NA	2018	978-1-5386-3695-4	Yes	IEEE
51	T V V Satyanarayana, G V Pradeep Kumar,	“Wavelet Packet: A Multirate Adaptive Filter for De-noising of TDM Signal”	IEEE International Conference on Electrical, Electronics, Computers, Communication, Mechanical and Computing (EECCMC)	NA	2018	NA	Yes	NA
52	Rajeshwar Goud Jangampally, Venkata Koteswara Rao Nalamand Mallikarjuna Prasad Avala,	“Corner cut Inset-fed Dual-Band Slot Antenna for PCS and Bluetooth/WLAN Applications”	IEEE Indian Conference on Antennas and Propagation (InCAP2018),	NA	2018	978-1-5386-7070-6	Yes	IEEE

53	K.Praveena, P.Naveenkumar, D.Krishna Reddy and PeddaNaraiah R	"Receiver Bias Estimation of Indian GAGAN System using FRB Technique for Equniox Days: Preliminary Results"	Focal Theme Integrating Science and Society for Global sustainability	NA	2018	NA	Yes	NA
54	Praveena K., Supraja Reddy A., Krishna Reddy D., Naveen Kumar P	"Estimation of GNSS Receiver Bias using Fitted Receiver Bias (FRB) Method"	International Conference on Innovation Smart Culture and Well-Being (ICISW-2018)"	NA	2018	NA	Yes	NA
55	J. Balakrishna, Himamsu M and N. Alivelu Manga	"IOT Based status tracking and controlling of motor in Agricultural Farms"	IEEE UPCON	NA	2018	978-1-5386-5002-8	Yes	IEEE

56	T. Narasimha Murthy, A.V. Narasimha Rao, N. Bala Subramanyam	"A Bandwidth Enhanced U-Slot PIFA with defected ground structure for dual-band mobile Applications"	1st International Conference on Wireless Sensor Networks, Ubiquitous Computing and Applications (ICWSNUCA-2018)	NA	2018	2278-3075	Yes	Blue Eyes Intelligence Engineering & Sciences
57	A. Supraja Reddy	'On the Suitability of Ionospheric Gradient Estimation Techniques for IRNSS based GBAS Applications'	IEEE international Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting	NA	2018	978-1-5386-7105-4	Yes	IEEE

“Comparative Performance Analysis of Galileo and NavIC at a Low Latitude Station

Comparative Performance Analysis of Galileo and NavIC at a Low Latitude Station

Devadas kuna[1], N. Santhosh[1], P. Naveen Kumar[1] and A.D. Sarma[2]

1.Department of ECE, OU, Hyderabad.
2. Department of ECE, CBIT, Hyderabad.
E-mail: dev.navic@gmail.com

Galileo is an emerging civilian controlled Global Navigation Satellite System (GNSS), being developed by European Space Agency (ESA) and European Union (EU). Galileo comprises of 30 MEO (Medium Earth Orbit) satellites constellation. Currently, 17-satellites are operational and are visible from India at different times. The NavIC (Navigation with Indian Constellation) is an independent and indigenous regional navigation system developed by ISRO, India. NavIC is a seven satellites constellation, three are geostationary and four are geosynchronous satellites, and provides continuous visibility over Indian region. The Galileo operates on L-band (1-2 GHz) whereas NavIC operates on both L-band and S-bands (2-4 GHz). The advantage of S-band is ionospheric delay is relatively less, but susceptible to interference. Galileo's received signal power levels are 3dB higher than NavIC. For evaluating the comparative performance of Galileo and NavIC, 24-hours data form two static-mode receivers with 5^0 mask-angle located at Osmania University, Hyderabad (17°24'28.07"N, 78°31'4.26"E) are considered for two continuous days (8 and 9 August 2018). During a whole day, 3-8 Galileo satellites are visible; whereas a minimum 4 satellites are available for about 4-5 hours. Often, Galileo DOP's values (1.5) are better than NavIC DOP's (2.5). A good Galileo satellite geometry results in best GDOP (1.88) and PDOP (1.70) better than NavIC when four or more satellites are visible. For a dual frequency receiver with 99% of service to public, the Galileo horizontal position accuracy (4-meters) is better than NavIC horizontal accuracy (5-meters). The Galileo satellites E3, E7 and E25 are at high elevations (>60^0) and therefore, experience less propagation effects due to troposphere and ionospheres and are useful to obtain better accuracy. In contrast to GPS, the high elevated satellites are useful for low latitude and polar region's weather monitoring. It is likely that, NavIC with Galileo satellites rather than GPS will provide more precise and reliable GNSS applications and services in low latitude regions.

Ref: Devadas kuna, N. Santhosh, P. Naveen Kumar and A.D. Sarma **"Comparative Performance Analysis of Galileo and NavIC at a Low Latitude Station"** on 20th symposium NSSS-2019 **(National Space Science Symposium),** 29-31 January 2019, **Savitribai Phule Pune University, Pune.**

"IRNSS and GPS Satellite User Range Accuracy Analysis for Receiver Autonomous Integrity Monitoring
"

“Predictive Data Optimization of Doppler Collision Events for NavIC System”

"Development of Raspbian kernel Customization for Automatic Railway Level Crossing Application"

Proceedings of Second International Conference on Emerging Trends In Science & Technologies For Engineering Systems (ICETSE-2019) S J C Institute of Technology, Chickballapur, Karnataka, India. 17th and 18th May 2019
Available in SSRN eLibrary of ELSEVIER

International Journal of Recent Technology and Engineering (IJRTE)
ISSN: 2277-3878, Volume-8, Issue-1C, May 2019

Development of Raspbian kernel Customization for Automatic Railway Level Crossing Application

Sathish Pasika, D. Krishna Reddy, N. Alivelu Manga

Abstract: ***In the recent years, the usage of the linux Operating System (OS) becomes very important for the real-time monitoring applications. The performance of embedded application depends on the important factors such as response time, memory size and power consumption. Among these parameters, memory size plays an vital role in kernel implementation. Customizing a general purpose OS to an application-specific OS is a challenging task for real time environments. Raspbian OS is the most recommended, open-source linux based OS for Raspberry pi board. In this paper, the customization of the Raspbian OS for automatic railway level crossing application is discussed. The novelty of this paper is to develop various algorithms for the customization of Raspbian OS and implementation of the application. The application is implemented by using Raspberry pi 3 board, IR sensors, DC motor, LED and buzzer. The railway gate is controlled by using IR sensors and DC motor interfaced through pi board. An IoT based application is to be developed for real time monitoring of the status of train and railway gate. The memory size of the Raspbian OS kernel is reduced by 42.71% after the customization.***

Index Terms: **Raspbian OS, Customization, Web server, Internet of Things**

I. INTRODUCTION

Linux is an open-source operating system in which the source code of the kernel is freely available and can be customized for various applications based on their specifications.

The significance of customization of the kernel is removing the unnecessary modules in order to minimize the memory size and increase the application response time [8,9]. The development of the embedded OS is very important for the IoT (Internet of things) based applications. Raspberry pi board is an OS based board which was developed by Raspberry pi foundation. It has a microSD card support mounted on it. The OS is ported into SD card ported on it.In this paper, to develop automatic railway level crossing application by using raspberry pi the necessary modules of the kernel are considered. The process of implementation of the entire setup is divided into two steps. The first step is customization of Raspbian kernel and second step is development of IoT based application for automatic railway level crossing [1,2]. In the first step, the raspbian OS kernel is cloned from the git repository and is customized by removing unnecessary modules. Acustomized raspbian kernel image is created and is ported into the microSD card mounted on raspberry pi board. In the second step, the raspberry pi board with customized raspbian kernel is interfaced with various components to develop automatic railway level crossing application [5,6,7]. Python language is used for the source code development of the application. An Apache web server and HTML are used for the IoT application development
been accepted, prepare it in two-column format, including figures and tables.

II. RASPBIAN FILE STRUCTURE

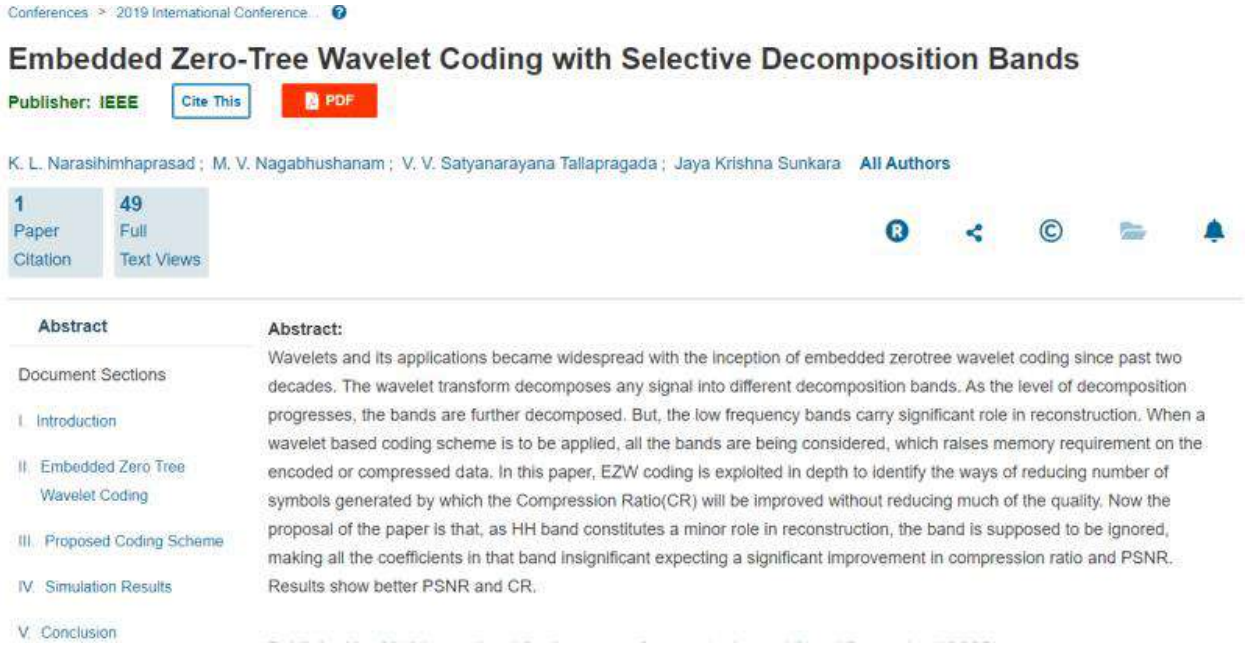
The file structure of the Raspbian OS needs to be considered for the kernel customization process. The various directories and its importance are listed below:

bin - a standard subdirectory that contains executable programs

Revised Manuscript Received on May, 2019.
First Author: Assistant professor, Dept. of ECE Chaitanya Bharathi Institute of Technology, Osmania University Hyderabad, Telangana, India. e-mail-satish35ece@gmail.com
Second Author: Professor and Head, Dept. of ECE Chaitanya Bharathi Institute of Technology, Osmania University Hyderabad, Telangana, India.
Third Author name: Associate Professor, Dept. of ECE Chaitanya Bharathi Institute of Technology, Osmania University Hyderaba

"Performance Analysis of Acquision Algorithms of NavIC"

“Embedded Zero-Tree Wavelet Coding with Selective Decomposition Bands”



Conferences > 2019 International Conference...

Embedded Zero-Tree Wavelet Coding with Selective Decomposition Bands

Publisher: IEEE | Cite This | PDF

K. L. Narasihimhaprasad ; M. V. Nagabhushanam ; V. V. Satyanarayana Tallapragada ; Jaya Krishna Sunkara All Authors

1 Paper Citation | 49 Full Text Views

Abstract

Document Sections

I. Introduction

II. Embedded Zero Tree Wavelet Coding

III. Proposed Coding Scheme

IV. Simulation Results

V. Conclusion

Abstract:
Wavelets and its applications became widespread with the inception of embedded zerotree wavelet coding since past two decades. The wavelet transform decomposes any signal into different decomposition bands. As the level of decomposition progresses, the bands are further decomposed. But, the low frequency bands carry significant role in reconstruction. When a wavelet based coding scheme is to be applied, all the bands are being considered, which raises memory requirement on the encoded or compressed data. In this paper, EZW coding is exploited in depth to identify the ways of reducing number of symbols generated by which the Compression Ratio(CR) will be improved without reducing much of the quality. Now the proposal of the paper is that, as HH band constitutes a minor role in reconstruction, the band is supposed to be ignored, making all the coefficients in that band insignificant expecting a significant improvement in compression ratio and PSNR. Results show better PSNR and CR.

" Deep learning-basedfire fighting robot"

Proceedings of the INTERNATIONAL CONFERENCE ON ENGINEERING AND ADVANCEMENT IN TECHNOLOGY
9th & 10th April 2019, Chennai, India

65. DEEP LEARNING BASED FIRE FIGHTING ROBOT

M.V. Sireesha, Assistant Prof.,
Electronics and Communication Engineering
Chaitanya Bharathi Institute of Technology (Autonomous)
Hyderabad,India
Md. Masiurzama
Electronics and Communication Engineering
Chaitanya Bharathi Institute of Technology (Autonomous)
Hyderabad,India

A.Trivedh
Electronics and Communication Engineering
Chaitanya Bharathi Institute of Technology (Autonomous)
Hyderabad,India
K. RonithRaj
Electronics and Communication Engineering
Chaitanya Bharathi Institute of Technology (Autonomous)
Hyderabad,India

With the advent of technology, humans are replaced with robots in life-threatening situations. Fire accidents are one of the major mishaps threatening the human lives. The project aims to design a robot capable of detecting and suppressing fires. The robot is capable of seeking the location of fire over a defined region and mitigate it before it runs out of control. It can also send the images of fire to the concerned user alarming them. This can be achieved efficiently using a Deep Learning concept called Computer Vision. The proposed model can find its applications in domestic as well as industrial premises.

ISBN 978-93-81288-18-4

"Augmentation of NavIC-11 with BEIDOU-3 Over Indian Region"

Augmentation of NavIC-11 with BeiDou-3 Over Indian Region

Sudershan Reddy Kotla
Department of Electronics and Communication Engineering
Chaitanya Bharathi Institute of Technology
Hyderabad, India
kotla66@yahoo.com

Sameeha Fahmeen
Department of Computer Science and Engineering
Shadan Women's College of Engineering and Technology
Hyderabad, India
samfahmeen08@gmail.com

Quddusa Sultana
Department of Electronics and Communication Engineering
Deccan College of Engineering and Technology
Hyderabad, India
quddusas@gmail.com

D Krishna Reddy
Department of Electronics and Communication Engineering
Chaitanya Bharathi Institute of Technology
Hyderabad, India
dkreddy@cbit.ac.in

***Abstract*—India has developed its domestic navigation satellite system called as Indian Regional Navigation Satellite System (IRNSS) which is renamed as Navigation with Indian Constellation (NavIC). NavIC-7 (with 7 satellites) provides navigation services to Indian landmass with an extension of 1500 km beyond the boundary. NavIC-11 (with eleven satellites) in future will provide an extended service, covering even polar regions. Studying the satellite visibility over Indian region is vital as it is an important parameter to analyze the accuracy of user position. To improve position accuracy, NavIC-7 or 11 can be augmented with other navigation satellite systems, such as Global Positioning System (GPS) of US, Global Navigation Satellite System (GLONASS) of Russia or BeiDou-3 of China. The BeiDou-3 is China's third generation satellite navigation system developed by China National Space Administration (CNSA). This paper focuses, on the augmentation of proposed constellation of NavIC-11 with proposed constellation of BeiDou-3 over Indian Region. Satellite visibility and the respective Dilution of Precision (DOP) values are computed and compared. Satellite visibility and DOP values are found enhanced due to augmentation.**

Keywords*—*BeiDou-3, NavIC, satellite visibility, DOP

I. INTRODUCTION

Recently, India has developed its individual navigation satellite system to cater both civilian and defense requirements, called as Indian Regional Navigation Satellite System (IRNSS) with an operational name of Navigation with Indian Constellation (NavIC). It provides real-time positioning and timing services. Presently, the NavIC, called as NavIC-7, comprises of 7 satellites, with 3 launched in Geostationary Orbit (GEO) and 4 in Inclined Geosynchronous Orbit (IGSO) [1]. The future constellation of NavIC will be of 11 satellites, called NavIC-11. NavIC-11 will increase the coverage to extended regions of northern and southern parts of India, and even the Polar Regions, by placing the new 4 satellites highly inclined in Geo Synchronous Orbits (GSOs). Though, presently NavIC-7 is sufficiently good for social applications but for critical applications it needs to get supplemented with other navigation systems. The other visible global navigation satellite systems visible over India are GPS, GLONASS, Galileo of Europe and Chinese BeiDou-3.

The BeiDou System (BDS) is a navigation system developed by China. It is been developed in three phases. The first phase called BeiDou-1 (since 2000) had only 3-4 satellites which were launched for experimental reason. The second phase is named BeiDou-2 also called as COMPASS. It is a home-grown system with a constellation of 10 satellites which became operational in 2011. Since December 2012, it has been offering services in the Asia-Pacific region [2]. The modernization plan of BeiDou-2 is characterized as BeiDou-3. The first BeiDou-3 satellite was launched on 30th March, 2015. As of January, 2018, nine BeiDou-3 satellites have been launched. By 2020, BeiDou-3 is planned to have 35 satellites in which 5 are Geostationary Orbit (GEO), 27 are Medium Earth Orbit (MEO) and 3 are Inclined Geo Synchronous Orbit (IGSO) [2]. This paper focuses on the augmentation of proposed constellation of NavIC-11 and BeiDou-3 over Indian region. Estimation of DOP value which is a function of satellite geometry is very important in assessing the performance of the navigation system. This aspect is also considered in this paper.

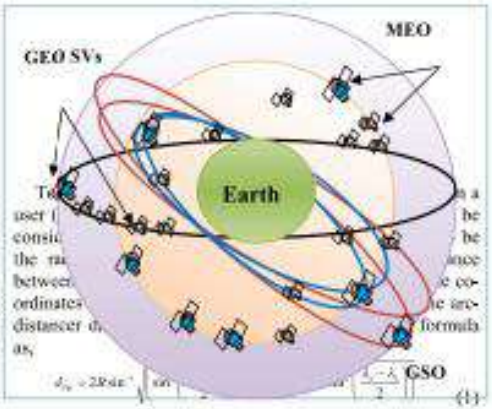
II. OVERVIEW OF NAVIC AND BEIDOU-3

NavIC is a self-governing regional and native satellite navigation system. NavIC-7 provides position precision of < 20 m throughout India. There are future plans to extend NavIC-7 system by escalating constellation size from 7 satellite vehicles (SVs) to 11SVs [3]. NavIC-11 is intended to provide position accuracy of < 10 m over India and beyond it.

China started to build up the third generation BieDou system called BeiDou-3, a global one, in 2015 (Fig. 1). The Beidou-3 uses satellites in MEO, GEO and IGSO. BeiDou-3 SVs are already in operation for the Chinese and Asia-Pacific Area with global availability planned to be completed by 2020 [4]. The details of the BeiDou satellites are mentioned in Table I.

TABLE I. SATELLITE VEHICLES OF BEIDOU-3

Block	Launch Period	Satellite Launches			Currently in Orbit
		Success	Failure	Planned	
BeiDou-1	2000-2007	4	0	0	0
BeiDou-2	From 2007	10	0	0	10
BeiDou-3	From 2015	9	0	26	9
Total		23	0	26	19



IV. RESULTS

NavIC-7 satellite locations are provided in open literature [5]. Data on proposed satellite locations for NavIC-11 is collected from Indian Space Research Organization (ISRO).The data on proposed satellite locations of BeiDou-3 satellites is collected on 15th October, 2018 at four different epochs i.e. 6:00am, 6:00pm, 12:00am and 12:00pm from a website [6]. The NavIC-11 IGSO satellites trace dumbbell shaped orbits, as for the observer on the ground. When the satellites are at maximum inclination they are said to form the best configuration. This configuration forms at two epochs as per Indian Standard Time (IST). They are 06:00am (Best case-1) and 06:00pm (Best case-2). The satellite configuration at four different

" A Scheme for Latency Analysis of Different Cryptography Methods for Security in 5G Era"

A Scheme for Latency Analysis of Different Cryptography Methods for Security in 5G Era

G. Mallikharjuna Rao
Department of ECE
Chaitanya Bharathi Institute of Technology
Osmania University
Hyderabad, India
mallikharjunag@gmail.com

K. Deergha Rao
Department of ECE
Vasavi College of Engineering
Osmania University
Hyderabad, India
korraidrao@yahoo.com

***Abstract*—In this paper, we present a scheme for performance analysis of different cryptography methods namely symmetric ciphers, and asymmetric ciphers to encrypt and decrypt the text, and audio data for online secure data access in the browser window using LabVIEW approach on myRIO hardware module for 5G systems. In this work, the text message with the different payloads is encrypted and decrypted. Similarly, the same process repeated for audio data. First, the text, and audio data are converted into string format; then the data format is encrypted using different cryptography methods from the sender side. On the receiver side, same cryptography method is used to decrypt the data with a generated key associated among the parties. In the case of symmetric ciphers, AES, Blowfish, DES, and IDEA are used to encrypt and decrypt the data. Further, the asymmetric ciphers, RSA, ECC, and DSA are used to encrypt and decrypt the data. LabVIEW programming tools are used to develop a scheme of cryptography methods. Finally, latency analysis is made on text, and audio data with symmetric and asymmetric ciphers.**

***Index Terms*—Symmetric ciphers, AES, Blowfish, DES, IDEA, asymmetric ciphers, RSA, ECC, DSA**

I. Introduction

The Pervasive computation process in the 5G era plays a crucial role to understand data security [1]. The Cryptography methods, namely symmetric and asymmetric ciphers, are used for encryption and decryption on text, and audio data by sharing a private and public key between the sender and receiver. When selecting a cryptography algorithm for 5G user case, low area, low power, and low latency options are to be considered. The first two terms are to be considered for area and power constrained applications. Certain applications are more effected by latency rather than throughput, such applications require low latency. The latency is to be considered for applications that require low latency. The fifth generation (5G) communications have to support a multitude of services. The URLLC (ultra-reliable low latency communications) is one of the services to be supported by 5G. URLLC transmission, that requires a short information block lengths at low code rates with a low BLER (block error rate) at low error flows. URLLC is required for ultra-reliable and latency-sensitive applications and services. In contrast to the current communication systems that are modeled for human-to-human (H2H) interactions, URLLC aim to human-to-machine (H2M) [2] interactions and high reliable machine-type interactions such as telesurgery, factory automation, autonomous vehicles, tactile internet, and remote control. All of these applications have the most strict requirements on low latency, which cannot be accomplished in Long-Term Evolution (LTE) systems. However, the performance analysis of different cryptography methods based on audio files for low latency applications is lacking in literature. Therefore, in this paper, a scheme is proposed for comparative timing analysis of various cryptography algorithms using LabVIEW.

II. Proposed Scheme

The block diagrams of the proposed schemes based on symmetric ciphers and asymmetric ciphers are shown in Figs.1 and 2, respectively.

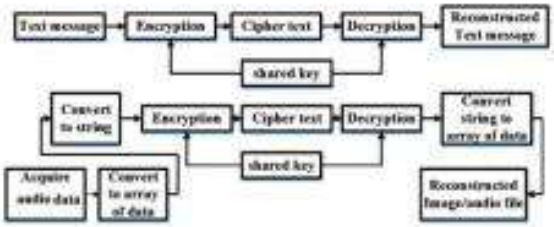


Fig. 1. Block diagram of symmetric ciphers on text, and audio signals

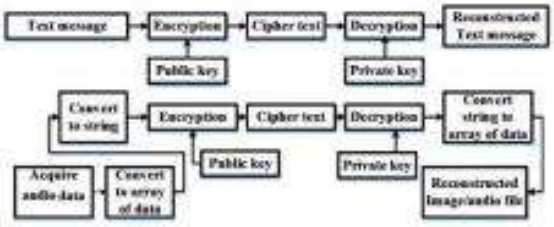


Fig. 2. Block diagram of asymmetric ciphers on text, and audio signals

The text message is encrypted with the shared key, and then converted into a ciphertext; again at the receiver, it is

"Low cost IoT based emission monitoring system for thermal power plan"

2019 Innovations in Power and Advanced Computing Technologies (i-PACT)

Low Cost IoT Based Emission Monitoring System for Thermal Power Plants

Ayesha Samreen
Student B.E. VI SEM, Dept. of ECE
Chaitanya Bharathi Institute of Technology
Hyderabad, India
ayesha.samreen0504@gmail.com

P. Sathish
Assistant professor, Dept. of ECE
Chaitanya Bharathi Institute of Technology
Hyderabad, India
psathish_ece@cbit.ac.in

N.Alivelu Manga
Associate professor, Dept. of ECE
Chaitanya Bharathi Institute of Technology
Hyderabad, India
namanga04@gmail.com

***Abstract*— Nowadays, Internet of Things (IoT)) has turn out to be a part of an Embedded system for controlling and monitoring purposes. Monitoring of gases produced by thermal power plants is very much essential to mitigate their impact on the environment like air pollution also, to prevent health hazards to human beings. In this paper, an attempt is made to design IoT based Embedded application, a prototype, which is specifically developed for monitoring toxic gases released by thermal power plants. This system measures the concentration levels of Carbon Monoxide (CO), Particulate Matter (PM) released by thermal power plants. Various sensors are used to measure the concentration levels of the gases. Node MCU is used, to read data from the sensors and send it to the cloud using ESP8266 module. The data can be monitored by the environmental agency, either by using web application (Thingspeak) or mobile application (Blynk app). If the measured data is greater than the emission standards, an email notification is send to the Power Plant agency and they may initiate to limit the toxic emissions.**

Keywords—Internet of Things, Sensors, ESP8266, NodeMCU

I. INTRODUCTION

Air pollution is the major concern nowadays. It is causing serious effects on human health, animals, environment etc. it can be caused by nature(volcanic erosions) and human activities(industries). Percentage cause of air pollution due to nature is less than the cause of air pollution by human activities. Air pollution challenges facing today include: limiting climate change, reducing risk from toxic air pollutants, meeting health based standards for common air pollutants and protecting the stratospheric ozone layer against degradation [1]. Today, Industries and automobile vehicles are the major cause for air pollution. World Health Organization (WHO) says, ambient air pollution accounts for an estimated 4.2 million deaths per year due to stroke, heart disease, lung cancer and chronic respiratory diseases. Around 91% of the world's population lives in places where air quality levels exceed WHO limits. While ambient air pollution affects developed and developing countries alike, low- and middle-income countries experience the highest burden, with the greatest toll in the WHO Western Pacific and South-East Asia regions [2]. Adverse health consequences to air pollution can occur as a result of short- or long-term exposure. The pollutants with the strongest evidence of health effects are Particulate Matter (PM), Ozone (O_3), Nitrogen dioxide (NO_2), Sulphur dioxide (SO_2), Carbon monoxide(CO), Carbon dioxide (CO2)[3]. To limit the emission of these pollutants in air caused by industries, WHO working with countries to monitor air pollution and improve air quality by setting emission standards and guidelines to industries [4]. Since Monitoring of air quality plays a major role in improving the air quality, the new emerging technologies can be used for monitoring, like Internet of Things with sensors. Internet of things has become the trending technology nowadays, since it connects the devices. It can be used as a system, which connects various computing devices, mechanical and digital machines, objects, to develop specific application. It has the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction [5]. Hence, it is widely used in various applications such as emission monitoring system.

Thus, in this paper a prototype is designed that can be implemented in real world which is of low cost. System uses NodeMCU, which is an open source platform of IOT. By using it, dust sensor (PM2.5) and carbon monoxide (MQ7) is used for measuring the dust particles and CO composition emission by power plants. Thingspeak and Blynk mobile app is used for data display and monitor purpose. An email notification will be send to the client if the CO and PM levels are above threshold values by using If This, Then That (IFTTT) notification service.

Section II says about the related work has been done for air quality monitoring. Section III gives the brief description of the system architecture and Section IV explains about the different hardware and software components which are used in system. Section V shows the experimental setup and the relevant results and discussions. Conclusion is seen in section VI.

II. RELATED WORK

An air pollution monitoring system is introduced in which Nucleo F401RE is used to read data from the sensors and Wifi module for sending the data to application [6]. Raspberry pi 3 is used as a gateway and base station. It receives data, stores it. Using Mean stack data visualization is done.In [7] air quality monitoring system is developed which uses NodeMCU for controlling and it uses DTH11 sensor for temperature and humidity measuring, MQ-135 for measuring smoke, gases and other sensors. In this, NodeMCU acts as publisher for Message Queuing Telemetry Transport (MQTT) broker and NodeRED as subscriber. Node red is used for data receiving purpose as well as data display by using NodeRED dashboard. If the

978-1-5386-8189-3/19/$31.00 © 2019 IEEE

"Augmentation of NavIC with BeiDou-2 Over Indian Region"

Augmentation of NavIC with BeiDou-2 Over Indian Region

Sudershan Reddy Kotla
Department of Electronics and Communication Engineering
Chaitanya Bharathi Institute of Technology
Hyderabad, India
kotla66@yahoo.com

Sameeha Fahmeen
Department of Computer Science and Engineering
Shadan Women's College of Engineering and Technology
Hyderabad, India
samfahmeen08@gmail.com

Quddusa Sultana
Department of Electronics and Communication Engineering
Deccan College of Engineering and Technology
Hyderabad, India
quddusas@gmail.com

D Krishna Reddy
Department of Electronics and Communication Engineering
Chaitanya Bharathi Institute of Technology
Hyderabad, India
dkreddy@cbit.ac.in

Abilash Reddy Kondalwadi
AutoNation, Fort Lauderdale
Florida, US
abhi2242@gmail.com

Abstract—**This paper focuses, initially, on the study of satellite visibility of augmented NavIC with BeiDou-2. Comparative analysis of NavIC and NavIC augmented with BeiDou-2 is also performed in terms of Dilution of Precision (DOP). DOP is a term used in satellite navigation to stipulate the supplementary multiplicative result of navigation satellite geometry on positional measurement precision. The augmentation has caused improvement in the satellite visibility and DOP.**

Keywords—BeiDou-2, NavIC, Satellite Visibility, DOP

I. Introduction

Today, multiple constellations of navigation satellites from the U.S, Russia, China and Europe orbit the Earth, providing numerous location-based services for consumers, businesses, militaries and civil aviation. With the launch of India's IRNSS in orbit, India now has an operational regional satellite navigation service developed by Indian Space Research Organization (ISRO) to meet its security requirements since 2016, and updated in April, 2018 [1] [2]. IRNSS is also known as Navigation with Indian Constellation (NavIC). NavIC provides an absolute position accuracy of better than 10m throughout Indian landmass and better than 20m in the Indian Ocean.

Though NavIC is expected to provide navigation services with sufficient accuracy, its accuracy can be enhanced through a technique called augmentation. For augmentation, other satellite navigation systems visible over India can be taken into consideration. This paper focuses on the augmentation of NavIC with BeiDou-2.

The BeiDou System (BDS) is a Chinese satellite navigation system. It is been developed in three phases [3]. The first phase was for experimental purpose, called BeiDou-1 (since 2000) had only 3-4 satellites. It was decommissioned in 2012 [4]. The second phase is named BeiDou-2 also called as COMPASS. It is a regional system and become operational in 2011 with a constellation of 10 satellites. Since December 2012, it has been offering services to navigators in the Asia-Pacific region [5].

II. Overview of NavIC and BeiDou-2

NavIC provides two levels of service, the Standard Positioning Service (SPS) for open use and a Restricted Service (RS) for authorized users. The space segment of NavIC consists of a constellation of seven satellites [1], orbiting around the earth at an altitude of around 36,000 km. The satellites are launched at various locations to provide navigation primarily over India. Three satellites are placed in Geostationary Orbit (GEO) and four satellites are placed in Geosynchronous Orbits (GSO). Satellites in GSO are inclined at an angle of ±29° with the equator. Due to this inclination, they provide coverage to the higher and lower latitudes near the poles [6].

BeiDou-2 provides two levels of services, a free service to civilians and licensed service to the Chinese government and military. The free civilian service has a 10m location-tracking accuracy. Clocks have an accuracy of 10 ns, and provide speed within 0.2 m/s error. The restricted military service has a location accuracy of 10 cm [7]. Presently, the BeiDou-2 constellation consists of 19 satellites. By 2020, the BeiDou orbital constellation will include 35 satellites [8].

III. Estimation Of Satellite Visibility

To find the number of satellites (SVs), visible from a given point on earth, the sub-satellite point (P) on the ground should be taken into consideration. Assuming 'R' to be the radius of the earth, i.e., 6371km approximately, arc-length d_{PQ} to be the radius of coverage area, on the surface of the earth and arc-length d_{PQ} be the arc-distance between the sub-satellite point (P) and the user (Q). Let the co-ordinates of point P be (λ_1,Θ_1) and the co-ordinates of point be (λ_2,Θ_2). Using Haversine formula, the expression for d_{PQ} can be written as,

$$d_{PQ} = 2R\sin^{-1}\sqrt{\left|\sin^2\left(\frac{\theta_2-\theta_1}{2}\right)+\cos(\theta_1)\cos(\theta_2)\sin^2\left(\frac{\lambda_2-\lambda_1}{2}\right)\right|} \quad (1)$$

XXX-X-XXXX-XXXX-X/XX/$XX.00 ©20XX IEEE

” Design of an area efficient Braun Multiplier using high speed parallel prefix adder in cadence"

Design of an Area Efficient Braun Multiplier using High Speed Parallel Prefix Adder in Cadence

B.Neeraja
Electronics and communication engineering
Chaitanya Bharathi Institute of Technology
Hyderabad,India
email: bandineeraja6@gmail.com
R.Sai Prasad Goud
Electronics and communication engineering
Chaitanya Bharathi Institute of Technology
Hyderabad,India
email: rspgoud24@ gmail.com

***Abstract*— Matrix multiplication is one of the most fundamental part of digital signal processing systems and is also used as a recursive routine in many signal processing and computational problems. The circuit complexity mainly depends on the multiplication count required for developing the system. Parallel array multiplier is the solution for achieving high execution speed demands. A conventional Braun multiplier includes an array of 16 AND gates, 9 Full Adders, and a ripple carry adder (RCA) in the final stage. A new design of Braun replaces RCA with Kogge-Stone Adder (KSA) for performing faster multiplication. Two designs of KSA are proposed using 14T XOR and 12T XOR gates. A conventional Braun multiplier and Braun multiplier with KSA are designed in cadence Virtuoso tool for 180nm technology with 1.8V source. It is observed that the area reduces by 258 transistors and delay is decreased by 4.65 ns.**

Keywords*—*Digital Signal Processors (DSP), Ripple carry adder (RCA), Kogge-Stone adder (KSA).

I. INTRODUCTION

The advances made in VLSI technology both in terms of speed and size, have made possible the hardware implementation of parallel multipliers. The growth of technology further ensures enhanced performance characteristics and widespread use in DSP systems. It performs such operations as accumulating the sum of multiple products much faster than an ordinary microprocessor. The DSP architecture is so designed that it performs parallel operation and thus reduces the computational complexity and enhances the speed for repetitive signal processing required for such applications.[1]. These features are designed in the programmable DSP to higher speed and throughput. For a given application, there is a large number of programmable DSPs to choose from, based on such factors as speed, throughput, arithmetic capability, precision, size, cost and power consumption [2]. The advent of single-chip multipliers and their integration into microprocessor architecture is the most important reasons for the availability of commercial VLSI chips capable of DSP functions. These multipliers are called parallel or array multipliers [3]. Generation of product of two binary numbers requires a single processor cycle. Earlier, either a software based shift and add algorithm or one using micro-coded controllers, which implement same algorithm in hardware were used as popular multiplication schemes. Both these options require several processor cycles to complete multiplication. Kogge-Stone Adder (KSA) is a design of parallel prefix adders using XOR and AND gates [5],[6]. Conventional multipliers designed with 22T XOR or 16T XOR gates. 3T XOR, 6T XOR and 10T XOR models are already available but these have the problem of threshold loss [7],[8].12T XOR gate is preferred for current design of KSA, that gives full swing output[9]. In this work, Braun Multiplier with Kogge-Stone Adder is used for decreasing the area and delay.

II. CONVENTIONAL BRAUN MULTIPLIER

Braun multiplier is built conventionally in CMOS technology. All the basic building blocks that form the multiplier use CMOS technology. It has 16 AND gates and 12 FULL ADDERS FA1 to FA12 .

"Augmentation of Modernized CAPS with NavIC Over Indian Region"

Augmentation of Modernized CAPS with NavIC Over Indian Region

K Sudershan Reddy[1], D Krishna Reddy[2]
Department of Electronics and Communication Engineering
Chaitanya Bharathi Institute of Technology
Hyderabad, India
kotla@cbit.ac.in, dkreddy@cbit.ac.in

Sameeha Fahmeen[2]
Department of Computer Science and Engineering
Shadan Women's College of Engineering and Technology
Hyderabad, India
samfahmeen08@gmail.com

Quddusa Sultana[1]
Department of Electronics and Communication Engineering
Deccan College of Engineering and Technology
Hyderabad, India
quddasas@gmail.com

Abstract— **India has developed its indigenous regional navigation satellite system called as Indian Regional Navigation Satellite System (IRNSS). IRNSS is given an operational name as Navigation with Indian Constellation (NavIC). NavIC satellite constellation is planned in such a way that at least four satellites are visible over India and 1500km outside its boundary. Satellite visibility of NavIC indicates its ability to provide navigation services. Knowledge of satellite visibility is vital as it is a significant parameter to analyze the accuracy of the user position. Moreover, to increase user position accuracy, the NavIC can be supplemented with other navigation satellite systems, such as Global Positioning System (GPS) of US, Global Navigation Satellite System (GLONASS) of Russia and Chinese Area Positioning System (CAPS) of China. The CAPS is a regional navigation satellite system developed by National Astronomical Observatories of China (NAOC). This paper focuses, initially, on the analysis of satellite visibility of standalone CAPS, over India. Eventually, satellite visibility of augmented CAPS with NavIC is paid attention. Comparative analysis of CAPS and CAPS augmented with NavIC is also performed in terms of Dilution of Precision (DOP). DOP is a factor which indicates the accuracy of the user position. The augmentation has caused improvement in the satellite visibility and DOP.**

Keywords—CAPS, NavIC, Satellite Visibility, DOP

I. Introduction

GPS has been considered as a sufficiently good navigation satellite system by the whole world. However, one's nation's security requirements demand independent navigation systems. In this respect, Indian Space Research Organization (ISRO) of India has developed its indigenous navigation satellite system called Indian Regional Navigation Satellite System (IRNSS) and is operational since 2016, and updated in April, 2018 [1] [2]. IRNSS is also known as Navigation with Indian Constellation (NavIC). NavIC provides military as well as civil services.

Though NavIC is expected to provide navigation and guidance with good accuracy, its accuracy can be enhanced through a technique called augmentation. For augmentation, other satellite navigation systems visible over India can be taken into consideration. This paper focuses on the augmentation of CAPS with NavIC.

CAPS is a passive one-way navigation satellite system of China. CAPS development was initiated in 2002 based on a proposal by National Astronomical Observatories of China (NAOC), Chinese Academy of Science (CAS) [3].

II. Overview Of NavIC And CAPS

The NavIC has three segments. They are space segment, ground segment and user segment. Ground segment basically comprises of a Mater Control Station, Monitoring stations and transmitting antennas. The space segment has a constellation of seven satellites (Table 1), orbiting around the earth at an altitude of around 36,000 km. The satellites are launched at various locations to provide navigation anywhere over India, and its neighboring countries. Three satellites are placed in Geostationary Orbit (GEO) and four satellites are placed in Geosynchronous Orbits (GSO). Satellites in GSO are inclined at an angle of ±29° with the equator. Due to this inclination, they provide coverage to the higher and lower latitudes near the poles [4].

CAPS consists of a ground segment, a user segment and an space segment. Space segment broadcasts navigation messages, uploaded from the ground segment [5]. The CAPS constellation consists of six commercial GEO communication satellites and an Inclined GSO (IGSO) satellite [3] [6]. To modernize CAPS, two more satellites are planned in IGSO with a phase difference of 120° each as shown in Fig. 1 and Table II [6]. Further, CAPS uses the communication satellites to assimilate the navigation and communication features.

TABLE I: Satellite Vehicles Of NavIC

	NavIC Satellite Locations			
Sl.No.	*Satellites*	*Longitude*	*Altitude(km)*	*Inclination*
1.	IRNSS-1H	55°E	Perigee:35701; Apogee:35881	27.39°
2.	IRNSS-1B	55°E	Perigee:35714; Apogee:35870	30.57°
3.	IRNSS-1C	83°E	Perigee:35697; Apogee:35889	4.78°
4.	IRNSS-1D	111.75° E	Perigee:35750; Apogee:35884	30.43°
5.	IRNSS-1G	111.75° E	Perigee:35791; Apogee: 35948	28.4°
6.	IRNSS-1E	32.5°E	Perigee: 35716; Apogee: 35872	4.6°
7.	IRNSS-1F	131.5° E	Perigee: 35778;Apogee: 35805	4.7°

"Analysis of Telugu Hand Written Characters using Transform based Techniques"

"IRNSS User Range Accuracy Evaluation for Receiver Autonomous Integrity"

IRNSS User Range Accuracy Evaluation for Receiver Autonomous Integrity

Publisher: IEEE Cite This PDF

D. Sony ; V. Satya Srinivas ; P. Naveen ; D. Krishna Reddy All Authors

Abstract:
Civil aviation is one sector that immensely will get benefited from Indian Regional Navigation Satellite System (IRNSS) services. However, for safety of life applications, integrity of navigation solution is crucial. Integrity of the system depends on Signal-in-Space (SIS) errors. The user range accuracy (URA) transmitted in navigation message for each satellite is a conservative estimate of SIS error and can be mainly used for integrity monitoring. Therefore, investigation of URA is important. Further, for development of receiver autonomous integrity monitoring algorithm for IRNSS, the typical value of URA has to be defined. In this paper, the cumulative distribution of URA is analyzed to over bound SIS errors. The sigma URE for 68% over bound is 2.8m.

Published in: 2019 URSI Asia-Pacific Radio Science Conference (AP-RASC)

Date of Conference: 09-15 March 2019

Date Added to IEEE *Xplore*: 20 June 2019

▸ **ISBN Information:**

INSPEC Accession Number: 18760423

DOI: 10.23919/URSIAP-RASC.2019.8738325

Publisher: IEEE

Conference Location: New Delhi, India

Feasibility of Soft Real-Time Operations Over WLAN Infrastructure-Independent IoT Implementation by Enhancing Edge Computing

Data Engineering and Communication Technology pp 223–230

Feasibility of Soft Real-Time Operations Over WLAN Infrastructure-Independent IoT Implementation by Enhancing Edge Computing

Sujanavan Tiruvayipati & Ramadevi Yellasiri

Conference paper | First Online: 09 January 2020

653 Accesses | **1** Citations

Part of the Advances in Intelligent Systems and Computing book series (AISC,volume 1079)

Abstract

The subsequent generation of IoT devices must work on a multi-protocol architecture to facilitate M2M communication along with endpoint user interfacing to solve the network infrastructure dependencies accompanied by redundant data flow overhead. An ideological solution is proposed to facilitate a change while cutting down infrastructure cost and enhancing the current setups through proper implementation of edge computation. End devices cooperate with each other along with providing GUI and Internet to

Telangana, India

Dr. V. Rajagopal

Rights and permissions

Copyright information

About this paper

Cite this paper

Tiruvayipati, S., Yellasiri, R. (2020). Feasibility of Soft Real-Time Operations Over WLAN Infrastructure-Independent IoT Implementation by Enhancing Edge Computing. In: Raju, K., Senkerik, R., Lanka, S., Rajagopal, V. (eds) Data Engineering and Communication Technology. Advances in Intelligent Systems and Computing, vol 1079. Springer, Singapore. https://doi.org/10.1007/978-981-15-1097-7_19

.RIS .ENW .BIB

DOI
https://doi.org/10.1007/978-981-15-1097-7_19

Published	Publisher Name	Print ISBN
09 January 2020	Springer, Singapore	978-981-15-1096-0

Online ISBN	eBook Packages
978-981-15-1097-7	Intelligent Technologies and Robotics

IVC RAISE 2020 IOP Publishing
IOP Conf. Series: Materials Science and Engineering 1055 (2021) 012101 doi:10.1088/1757-899X/1055/1/012101

Recommended System For Wellness Of Autistic Children Using Data Analytics and Machine Learning

Kusumalatha Karre[1], Dr. RamaDevi.Y[2]
[1]Research Scholar, Department of Computer Science and Engineering, Osmania University and Assistant Professor, Department of Electronics and Computer Engineering, Sreenidhi Institute of Science and Technology, Hyderabad
[2]Professor, Department of Computer Science and Engineering, Chaitanya Bharathi Institute of Technology, Hyderabad

Abstract: Autism is a mental condition which hinders social and communication skills. It's a lifelong disability which makes the child's day to day life very difficult. But in most of the cases early intervention has helped the children to develop the skills which are needed to the fullest to overcome autism. As early the intervention, better the development of the child. Most of the research has been carried out to detect the autism using various machine learning algorithms which consider autistic diagnostic tools such as ADI-R, ADOS or CARS. Once autism is detected, different areas which need to be developed are considered and recommendations are given to the child. In this paper, a system is proposed which uses multi dimensional data collected from facp, DST and Diet to perform analytics using machine learning and provide recommendations to the child.

Keywords: Autism, Functional Assessment Checklist for Programming (facp), Developmental Screening Test (DST), Diet.

1. Introduction

Autism is a spectrum condition which hinders with the daily activities. The child will not be able to communicate properly, lack of fine motor skills and poor eye contact. They will be more interested in rotating objects such as fans, wheels etc. It's a lifelong disability but the early intervention plays a major role. If the disease is detected early, the child can develop the skills required and overcome the symptoms of autism. Most of the research has been carried out to detect autism is in the direction of developing machine learning algorithms which uses autistic diagnostic tools such as ADI-R,ADOS and CARS to check the accuracy of the machine. But there can be other factors which can be the cause for the existing condition. So, In this paper we are considering multi dimensional data collected from facp, DST and Diet to do the analysis. The rest of the paper is organized as follows: Autism, Machine learning in autism, facp, DST, Diet, Recommended system, Conclusion and Future scope.

2. Autism

Autism is a spectrum condition which causes different disabilities such as lack of communication skills, social skills and fine motor skills. The symptoms include unable to utter a word by the age of 2, not responding to name calling, strict compulsion of daily routine, repetitive movements like head banging, spinning, and hand flapping, no sitting tolerance, not aware of danger, and echolia. The child will be assessed by the pediatrician during their regular visit and if any of the symptoms are found will be referred to the experts. The psychologists will examine the child behavior and use various screening tools like Ages and Stages Questionnaires (ASQ)(1 month to5.6 years),Communication and Symbolic Behavior Scales (CSBS)(6 months and 24 months),Parents' Evaluation of Developmental Status (PEDS)(birth to 8 years),Modified Checklist for Autism in Toddlers (MCHAT)(16 to 30 months of age),Screening Tool for Autism in Toddlers and Young Children (STAT) (24 and 36 months of age) to initially check for the

Viality of uncomplicated IoT SaaS Development for Deployment of DIY applications over HTTP with Zero Investment

Advances in Decision Sciences, Image Processing, Security and Computer Vision pp 206–213

Viability of an Uncomplicated IoT SaaS Development for Deployment of DIY Applications Over HTTP with Zero Investment

Sujanavan Tiruvayipati & Ramadevi Yellasiri

Conference paper | First Online: 13 July 2019

581 Accesses

Part of the Learning and Analytics in Intelligent Systems book series (LAIS,volume 3)

Abstract

IoT administrations are ordinarily conveyed of IoT as physically disconnected vertical arrangements, in which all framework segments running from tangible gadgets to applications are firmly coupled for the prerequisites of each explicit venture. The productivity and versatility of such administration conveyance are naturally constrained, presenting noteworthy difficulties to IoT arrangement developers. In this context, we propose a novel SaaS structure that gives basic stage administrations to IoT

Dr. Margarita N. Favorskaya

Rights and permissions

Reprints and Permissions

Copyright information

About this paper

Cite this paper

Tiruvayipati, S., Yellasiri, R. (2020). Viability of an Uncomplicated IoT SaaS Development for Deployment of DIY Applications Over HTTP with Zero Investment. In: Satapathy, S.C., Raju, K.S., Shyamala, K., Krishna, D.R., Favorskaya, M.N. (eds) Advances in Decision Sciences, Image Processing, Security and Computer Vision. Learning and Analytics in Intelligent Systems, vol 3. Springer, Cham. https://doi.org/10.1007/978-3-030-24322-7_27

.RIS .ENW .BIB

DOI
https://doi.org/10.1007/978-3-030-24322-7_27

Published	Publisher Name	Print ISBN
13 July 2019	Springer, Cham	978-3-030-24321-0

Online ISBN	eBook Packages
978-3-030-24322-7	Intelligent Technologies and Robotics

A novel framework for quality of service aware vertical handover process in heterogeneous wireless networks

IOP Conference Series: Materials Science and Engineering

A novel framework for quality of service aware vertical handover process in heterogeneous wireless networks

IOP Conf. Series: Materials Science and Engineering **981** (2020) 022019 doi:10.1088/1757-899X/981/2/022019

A novel framework for quality of service aware vertical handover process in heterogeneous wireless networks

P Pramod Kumar[1], K Sagar[2],GRanadheer Reddy[3], S Shwetha[4] and V Pranathi[5]
[1]School of Computer Science and Artificial Intelligence, SR University, Warangal, Telangana, India
[2]Department of Computer Science and Engineering,ChaitanyaBharathi Institute of Technology, Hyderabad,Telangana, India
[3,4,5]Department of Computer Science and Engineering, Sumathi Reddy Institute of Technology for Women, Warangal, Telangana, India
E-mail: pramodpoladi111@gmail.com

Abstract. The evolution of wireless communication technology and the growing number of mobile users with various applications together have formed a heterogeneous environment of wireless communication networks with real-time availability and high bandwidth preferences. Everyone in the world wants consistent mobility to connect seamlessly to the best available network anytime and anywhere. Therefore, an efficient and Quality of Service (QoS) aware Vertical Handover (VHO) techniques are needed when the mobile connections have to switch from one network to another network to provide effective mobility performance, seamless connectivity, and high availability of connections. Applying efficient VHO process in a heterogeneous wireless network is still a big topic of interest in research field. It has been observed that existing handover techniques are not much capable of providing user preference and QoS aware mobile communication and network selection process. This problem incorporates various unwanted factors such as communication delay, inconsistent mobility, security towards the communication process. This paper discusses various existing research works that have been carried out to improve the VHO process to boost overall communication performance and to raise QoS of wireless mobile communications in the heterogeneousnetworks.

Keywords: wireless communication, vertical handover, heterogeneous networks, quality of service.

Web of Things an intelligent approach to solve interoperability issues of Internet of Things communication protocols

IOP Conference Series: Materials Science and Engineering

Web of Things an intelligent approach to solve interoperability issues of Internet of Things communication protocols

IOP Conf. Series: Materials Science and Engineering **981** (2020) 032094 doi:10.1088/1757-899X/981/3/032094

Web of Things an intelligent approach to solve interoperability issues of Internet of Things communication protocols

V. Thirupathi[1,2] **Dr K. Sagar**[3]

[1]Research Scholar, OU
[2]Dept of CSE, S R University, Warangal, Telangana, India
3Dept of CSE Chaitanya Bharathi Institute Technology, Hyderabad, Telangana, India

Email: v.thirupathi@sru.edu.in

Abstract. Internet of Things (IoT) is an emerging technology now in a days. It allows each and every physical thing to communicate with each other through internet. To establish communication among physical things they require some communication protocols like hypertext transfer protocol (http). But these devices have constrained computational resources like RAM and processor speed. Due to constrained resources they cannot able to communicate using http. So they require special communication protocols like CoAP, MQTT and AMQP. Various manufactures can build their products using their proprietary architectures and communication protocols, when they try to communicate problems raised due to proprietary architectures and protocols. This is called interoperability problem. To solve this problem we propose a solution using Web of Things (WoT), WoT enables each and every device can connect to a server as web pages. So that we can access any device through web using internet as simple as we access web pages.

1. Introduction

Internet of Things (IoT) [8] enables every device (Thing) to communicate with each other through internet. Every device/thing has a sensor node which is capable of gathering data, processing and transferring to other nodes with the help of sensors, actuators and communication protocols. Different vendors manufacture variety of devices by using their proprietary architectures and communication protocols. Due to different architectures and communication protocols, devices cannot establish successful communication with other devices. ioT devices have less computational resources like Random Access Memory (RAM) and processor speeds. So they require special protocols at each layer. For instance, 6LowPAN being used at network layer, TCP/UDP at transport layer and COAP/MQTT at application layer.

IoT reference model uses CoAP, MQTT, AMQP, XMPP and DDS protocols at application layer to transfer messages among different devices as communication protocols. If a sender wants to send a message using CoAP protocol, receiver wants to receive using MQTT protocol then communication problem will be raised due to heterogeneity between sender and receiver protocols.

Web of Things (WoT) defines an established group of principles by the W3C consortium to solve the interoperability problems of various IoT (Internet of Things) applications at different levels. Web of Things enables every physical thing to be added to a server. So that it can be accessed from

2020 IEEE 5th International Conference on Computing Communication and Automation (ICCCA)
Galgotias University, Greater Noida, UP, India. Oct 30-31, 2020

Detection of Military Targets from Satellite Images using Deep Convolutional Neural Networks

Harika Bandarupally[1]
Student, Computer Science and Engineering
Chaitanya Bharathi Institute of Technology
Hyderabad,India
bandarupallyharika@gmail.com

Harshitha Reddy Talusani[1]
Student, Computer Science and Engineering
Chaitanya Bharathi Institute of Technology
Hyderabad, India
harshitha.reddy3599@gmail.com

Dr. T Sridevi[2]
Associate Professor, Computer Science and Engineering
Chaitanya Bharathi Institute of Technology
Hyderabad, India
tsridevi_cse@cbit.ac.in

Abstract*—Due to the varying size, orientation, and background of images in the defense sector, it is a daunting task to discern and distinguish the military targets in them. Multitudes of solutions have been proposed in this arena, yet there is a significant need for much better and flawless outputs. In this chapter, we expound on a two-level solution –Edge Boxes and Convolutional Neural Network (CNN) for the detection of targets in satellite imagery, Super resolution of the image using Dense-skip-connections. In the first level, the military objects are detected from the satellite image using Edge Boxes. In satellite imagery, the edge data of targets contains very prominent and concise attributes. The traditionally engineered features such as Histogram of Oriented Gradients, Hough transform and Gabor feature do not work well for huge datasets. However, the Edge Boxes technique generates contours around the target objects and discards the remaining. The output of this level is fed to the second level, wherein, the proposed targets undergo image super resolution. The presented deep learning model tends to inherently learn an end-to-end mapping between images of lower resolution and higher resolution. This level can be portrayed as one which takes a low-resolution input image and constructs an up-sampled high-resolution image as the output. Unlike traditional methods (sparse coding based method, bicubic method) that handle each component separately, this method aims to optimize all the layers at once. Furthermore, for assuaging the vanishing gradient problem that is common to very deep networks, Dense-skip-connections are employed. These enable the building of shorter paths directly within multiple layers. Though the proposed model has a light weighted structure, it exhibits state-of-the-art restoration quality.

Keywords— Super resolution of image, Dense-skip-connections, EdgeBoxes, Deep CNN, HOG, Gabor feature, Hough transform.

I. INTRODUCTION

Detection of target patches such as aircraft, tankers, artillery, etc. in satellite images is extremely important in military applications like surveillance and security where these applications require accurate identification and tracking of vehicles. Due to these intricacies, it has become an active research topic in computer vision. Because of different size, orientation and background of the target object, it often becomes a significant challenge to detect the military vehicles and differentiate them from non-military vehicles. Identifying individual target patches from the image would be difficult and the results might be ambiguous due to the size and resolution of the image. Hence, it becomes important to super-resolved the image to get better results. Diverse fields like medical image processing, remote sensing pose in numerous technically challenging use cases that make it necessary to achieve super resolution imaging. For image classification, convolutional neural networks have become state-of-the-art models and are regarded as one of the potential solutions for image super- resolution. Recently, convolutional neural networks classify objects with many clear or slightly blurred images with around 90 percent classification rates, even if there are variable-sized images [1]. Usually, large datasets are required for training. In this chapter, we address vehicle identification and recognition for imaging in defense applications. We propose the use of EdgeBoxes algorithm for extracting individual aircraft patches from the satellite image and a deep CNN model using dense skip connections for image super-resolution of the aforementioned patches.

II. RELATED WORKS

Satellite imagery has a very high significance in military applications. Various techniques and features have been proposed to date for automatic target detection in satellite imagery. There are several traditionally engineered models such as Histogram of oriented gradients, Hough transform, Gabor feature, etc. They tend to produce inaccurate results for huge data of low resolution. Computationally efficient and robust systems are required that can learn presentations from massive satellite imagery. Zhang et al [2] developed a hierarchical algorithm based upon the Adaboost classifier. This approach entails the use of HOG and Depth-First-Search (DFS) to detect the targets.

Another hierarchical classification algorithm is proposed by J.W Hsieh et al in [3]. This approach includes several image pre-processing techniques to remove the variations in the input image. It then employs a booting algorithm and uses the area feature to identify the targets.

[4] Proposes a method based on graph search strategy and improved Hough Transform for the detection of oil tanks in satellite imagery. In [17] symmetric properties of oil tanks are leveraged for their detection. In [5] Gabor filter was

978-1-7281-6324-6/20/$31.00 ©2020 IEEE

Poisson and Logistics Regression Analysis on Electromagnetic Field Radiation: A Case of Environmental Pollution

Journal of Pediatrics Research Reviews & Reports

SCIENTIFIC Research and Community

Research Article Open Access

Poisson and Logistics Regression Analysis on Electromagnetic Field Radiation: A Case of Environmental Pollution in Healthcare

Iyyanki Muralikrishna1 and Prisilla Jayanthi2*

Former Professor, JNTUH Hyderabad, India

Abstract

The universal study reveals that Electromagnetic Frequency (EMF) exposure is upsetting the environment. It focuses keenly on the people residing in the neighboring of the base stations / mobile towers were affected by environmental radiation pollution. The effect of EMF radiation on human life is unusually increasing on day-to-day basis. As the number of customers using mobiles rises, one would see the mobile phone towers / base trans-receiver station (BTS) increases; and this has a great and huge impact on radiation hazards. Mobile phones have the capability of emitting radiations that would affect human tissues and it runs a two-way communication paradigm. Radio Frequency (RF) wave establishes communication around the globe in the mobile network. However, the radiations emitted by RF waves are harmful if absorbed into the human tissues. The most side effects experienced when nearer to these towers are headaches, discomfort, anxiety and other diseases. The radiation hazards are found to be extraordinarily more where the cell towers were installed nearer to educational institutes, healthcare and few residential areas. They were recommended to move / stay away from such areas, the radiations can cause tumors, disturbance of the nervous system and other diseases. The study is to understand the radiation exposure limits that would protect the public health from the EMF exposure. RF radiations were mapped by geographic information system (GIS) based measuring approach that helps in detecting places where users are in health hazards in exposed areas. This helps government and health organization to estimate the distribution of radiation in areas nearer to the location of mobile towers. Realization among the people was made to live and spend less time based on the radiation levels of exposure with the mobile towers. The analysis was carried out by STATA software to measure the poisson exposure of confidence interval. The poisson regression calculated for the mobile towers is 47473.38 and -0.00001 for Andhra Pradesh state respectively. Similarly, the poisson exposure is 19.2096 and CI is found to be 0.0013 to 0.2900 in Telangana state of India.

Corresponding author: Prisilla Jayanthi, Former Professor, JNTUH Hyderabad, India, Email: prisillaj28@gmail.com

Received: December 20, 2019, **Accepted:** December 23, 2019, **Published:** December 31, 2019

Keywords: Poisson Regression, Logistics Regression, Geographical Information System, Electro Magnetic Field, Radiation, Mobile Towers.

Introduction

The mobility location-based service includes three components, namely Geographic Information System (GIS) technology, position tracking, and visualization. Two ever reliable techniques for identifying and locating various EMF radiation sources are Global Positioning System (GPS) and GIS. GIS-based approach is that which a user utilizes and mobile tower locations to detect the exposure area. The factors that influenced the exposure level includes the frequency of the radiation,

Emotion Analysis in Text using TF-IDF

Varun Sundaram
Department of Computer Science and Engineering
Chaitanya Bharathi Institute of Technology
Hyderabad,India
vaasha99@gmail.com

Saad Ahmed
Department of Computer Science and Engineering
Chaitanya Bharathi Institute of Technology
Hyderabad,India
saad_a1999@yahoo.com

Shaik Abdul Muqtadeer
Department of Computer Science and Engineering
Chaitanya Bharathi Institute of Technology
Hyderabad,India
afraz99@gmail.com

R.Ravinder Reddy
Department of Computer Science and Engineering
Chaitanya Bharathi Institute of Technology
Hyderabad,India
rravinderreddy_cse@cbit.ac.in

2021 11th International Conference on Cloud Computing, Data Science & Engineering (Confluence) | 978-1-6654-1451-7/20/$31.00 ©2021 IEEE | DOI: 10.1109/Confluence51648.2021.9377159

***Abstract*—A myriad of the population has adapted to the evolving technology, which includes text communication. Users advertently or inadvertently share emotions. As we know, emotions are one of the most critical aspects of human life; they impact human's behavior, thinking, compelling of action, and most important, decision making. There are many alleged emotions known to us, and each having its significance. In this era of modern technology, it is hard to find any unexplored area; this applies to emotion. People express their emotions through text a lot nowadays, which has led the Emotion Recognition as an important research area. Extracting emotion is a very complicated task. This paper shows a new approach to detect emotion based on TFIDF, and it is a measure that reflects the value a word holds in a document. In this method, emotion is classified into six types. There are other researches on the simple distinction between positive and negative emotion, but this does not add much to understanding human emotion. Emotion is extracted from different sentences, and data representation is based on semantic structure. It generalizes each sentence into six major predefined emotion sets. The evaluation shows that this method is well accomplished to categorize a sentence into different emotion categories and with a reasonable accuracy rate.**

Keywords—TF-IDF, Random Forest Classifier, Emotion Recognition

I. INTRODUCTION

The process of identifying human emotion is known as emotion recognition. It is vital for the human to human communication in daily life. People often use social media applications to share their emotions and feelings with others. Recognizing an emotion has always been a major challenge both for humans as well as machines. Often it is found that people may fail to recognize their own emotions at a certain instance. Ekman [1] classified emotions into six types: anger, fear, disgust, joy, surprise, sadness. Earlier, people used to express themselves using face to face interaction, but now most people have started using technologies to express themselves. These include the emergence of social media applications. Artificial Intelligence has always been tireless towards solving human problems and also understanding them better. Eventually, AI is pushing boundaries to obtain what is possible and efficient than ever before, so it has entered emotion analysis. Hopefully, this paper can be a minuscule contribution to this vast field of Artificial Intelligence.

Emotion detection [2] plays a key role in human-computer interaction. People express their emotions through speech, facial, and text. Much research has been done concerning facial recognition and speech recognition, but identifying a person's emotional state on looking at a person's face is missing key information. Emotions depend not only on facial expression but also on the present situation, whereas in speech recognition, the feature extraction is often complex as it consists of several acoustic time-based characteristics like amplitude, frequency, and formant.

On the contrary, emotion recognition in the text is playing a promising role in the field of AI. The primary reason behind this is the availability of an immense amount of data. An analysis done by Slick Text [3] shows that 80% of North America's total population prefers text-based communication. Text-based emotion recognition has a variety of applications. For example, suicidal prevention and depression applications detect the emotion present in the user's text. Another area where emotion detection can be used is in the recommendation system by improving a customer's perception to increase brand reputation. The government can also use it to gauge how happy its citizens are, which can be considerable input for the happiness index.

This paper aims to propose an efficient solution to the existing emotion analysis method. Furthermore, to study the problem in-depth and suggest an alternate algorithm that is logical and tends to obtain good accuracy. A dataset that consists of a set of sentences, and its corresponding emotion has been chosen. This dataset is then subjected to an algorithm that helps the machine to understand the relation between the sentence and the emotion-based on specific terms. On successful implementation of the algorithm on the dataset, emotion recognition rules are generalized. For example, consider the sentence "This is the first time I won the competition" to depict the emotion "happy." This model is tested on many sentences similar to this sentence and achieved an F score of 85%.

978-0-7381-3160-3/21/$31.00 ©2021 IEEE

ICCCE 2021 pp 1263–1269

Diabetic Retinopathy Classification Using Lightweight CNN Model

Morarjee Kolla & T. Venugopal

Conference paper | First Online: 16 May 2022

Part of the Lecture Notes in Electrical Engineering book series (LNEE,volume 828)

Abstract

Diabetic Retinopathy (DR) is a dangerous disease nowadays, which may cause vision loss. Current deep learning models are successful in classifying different stages of DR effectively. Still, there is a memory bottleneck to deploy these models into mobile-like devices. The computational cost of existing deep learning models needs to reduce for commercial medical applications. Existing lightweight models facing challenges with parameter reduction, minimizing quantization loss, and gradient error. To combat these challenges, we proposed a lightweight

Department of CSE, Chaitanya Bharathi Institute of Technology, Hyderabad, Telangana, India
Morarjee Kolla

Department of CSE, JNTUH College of Engineering Jagtial, Nachpally, Telangana, India
T. Venugopal

Editor information

Editors and Affiliations

BioAxis DNA Research Centre (P) Ltd., Hyderabad, India
Dr. Amit Kumar

Dynexsys, Sydney, NSW, Australia
Dr. Stefan Mozar

Rights and permissions

Copyright information

About this paper

Cite this paper

Kolla, M., Venugopal, T. (2022). Diabetic Retinopathy Classification Using Lightweight CNN Model. In: Kumar, A.,

“Fuel oil from plastic waste”Institute of Technology (A), Hyderabad.

AdChE-2020

FUEL OIL FROM PLASTIC WASTE.

G.LokeshSai [1], I.ChaitanyaVamsi Krishna[2], P.Tharunesh[3], Dr.B.Ganesh[4].

1.G.LokeshSai,3rdyear, Department of Chemical Engineering, Chaitanya Bharathi Institute of Technology, Hyderabad, Telangana, India.(e-mail: lokeshsai.grandhi4@gmail.com).

2.I.Chaitanya Vamsi Krishna,3rdyear, Department of Chemical Engineering, Chaitanya Bharathi Institute of Technology, Hyderabad, Telangana, India.(e-mail: chaitanyavamsi9059@gmail.com).

3.P.Tharunesh,3rdyear, Department of Chemical Engineering, Chaitanya Bharathi Institute of Technology, Hyderabad, Telangana, India.(e-mail: tharunponukanti@gmail.com).

4.Dr.B.Ganesh, Assistant professor, Department of Chemical Engineering, Chaitanya Bharathi Institute of Technology, Hyderabad, Telangana, India.(e-mail: ganeshchem@cbit.ac.in).

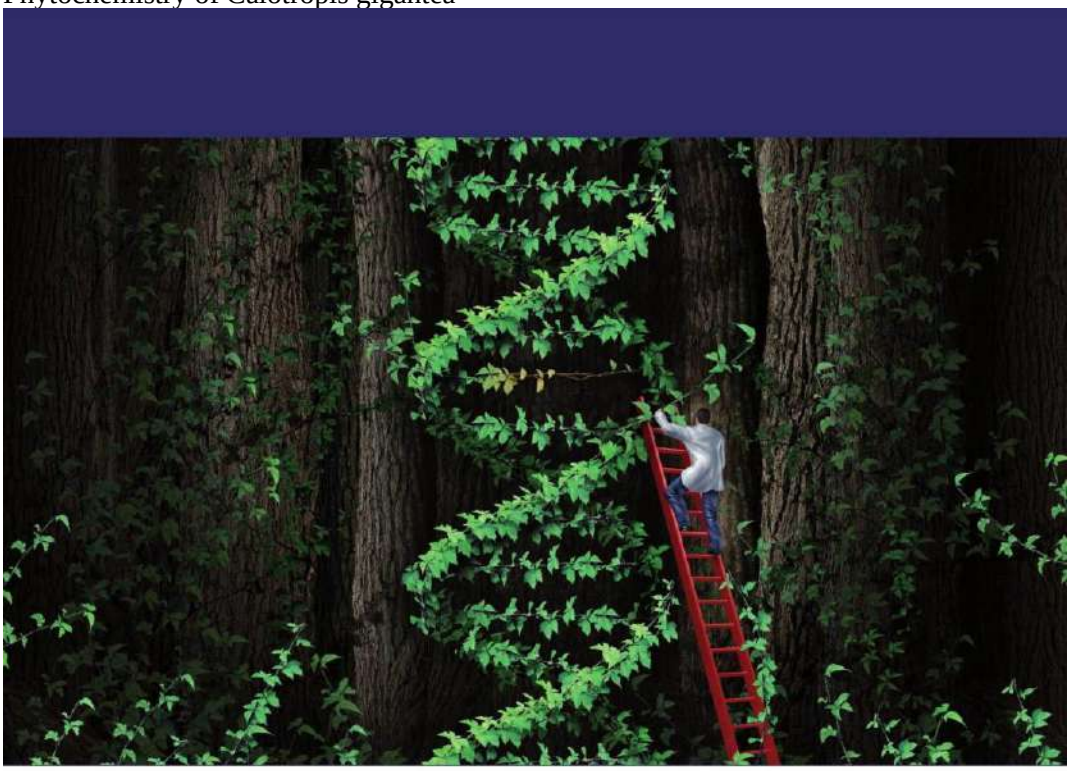
Abstract:

In Earlier days PLASTIC was a revolutionary invention which brought many changes in industrial & daily activities. But now a days, it has become a major problem as it is increasing the landfills which is leading to more pollution because of its high degradation time and no proper disposable way which is affecting the environment. The global production of plastic has shown an increase from around 1.3 MT in 1950 to 300 MT in 2010 due to the introduction of plastic in various fields. Out of the total consumption of plastic,53 % constitute polyolefins which is a large hydrocarbon. Polyethene is most consumed one i.e. 33% of total due to this it is taken into consideration.

To overcome this problem, we used Thermal Cracking i.e. Pyrolysis, it is a process which converts the large hydrocarbon chains in to small hydrocarbon chains by heating the plastic at high temperature (350 – 400°C) & the products obtained are fuel oil and non- condensable fractions. The fuel oil can be used for heating purposes and non-condensable fractions to reduce air pollution. Polythene, Polypropylene are used as they are pure hydro-carbons and burnt completely.

Key words: Alternative fuels, GCMS, CHNS and HDPE.

Phytochemistry of Calotropis gigantea



Obulareddy Chittepu

Phytochemistry of CALOTROPIS gigantea

phytochemical screening and Antimicrobial investigation of CALOTROPIS gigantea.

LAP LAMBERT Academic Publishing

Back

Phytochemistry of CALOTROPIS gigantea

phytochemical screening and Antimicrobial investigation of CALOTROPIS gigantea.

LAP Lambert Academic Publishing (2019-09-05)

€ 54,90

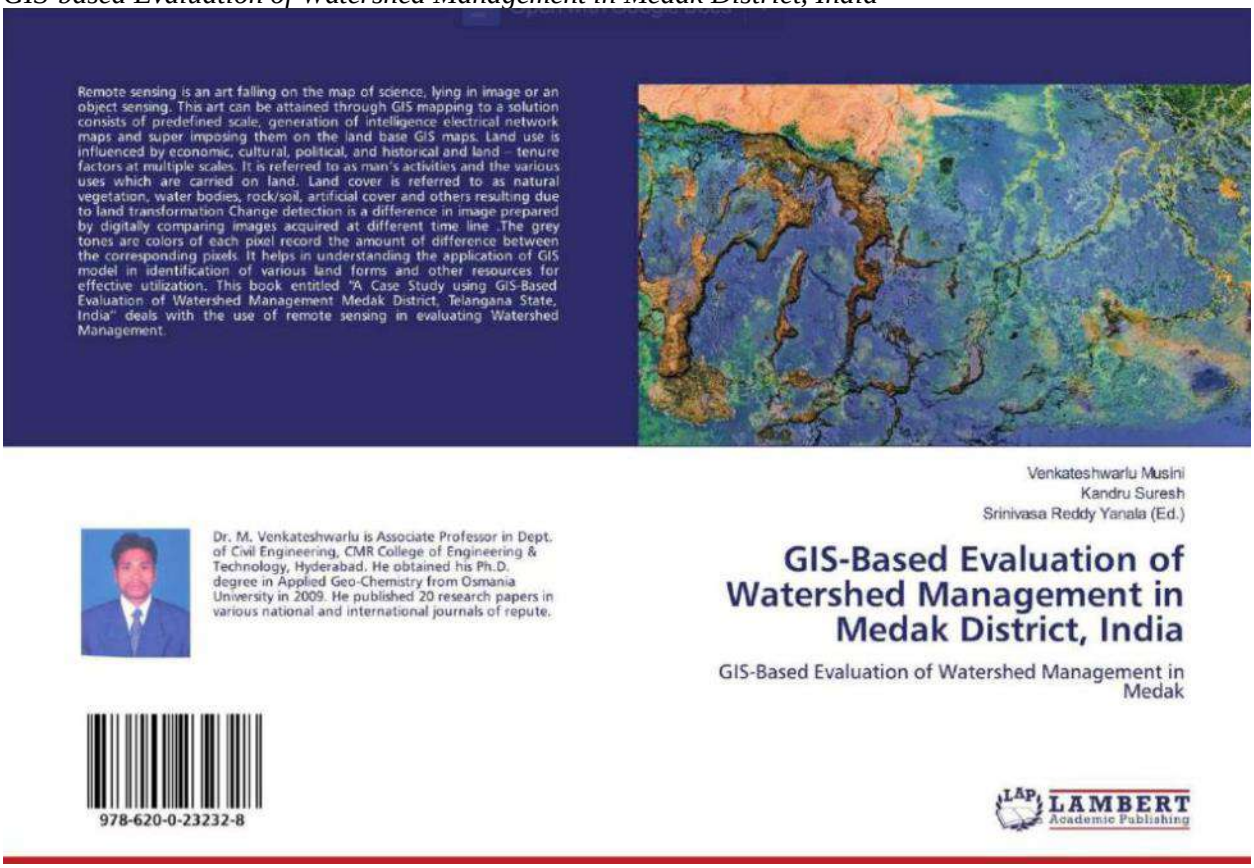
Buy at the MoreBooks! Shop

In the present era, there are rapid advancements in the fields of medical and pharmaceutical sciences.Even though there is a rapid advancement, equally there is emergence of new diseases caused by different microbial organisms.Extensive use of the existing drugs leads to emergence of antibiotic resistance pathogens.There were several reports that the pathogenic bacteria were evolving and becoming resistant to the drugs over the time. Pathogenic organisms cause many infections in human beings such as pulmonary, respiratory, cutaneous, nosocomial and several other communicable infections.Majority of the times, we observe these infections in immune deficient patients who are sensitive and more likely to be affected by these pathogens. Chemically synthesized drugs are very effective against the infectious diseases but, on the other hand, they are found to have many side effects.Therefore, there is a need to look for alternative drugs for the chemical drugs.Plants serve as major sources of potential drugs. They are bio compatible and have no side effects.Plants produce secondary also called as phytochemicals. Calotropis gigantea is one of such plant which possess medicinal properties..

Book Details:

ISBN-13:	978-620-0-29522-4
ISBN-10:	6200295220
EAN:	9786200295224
Book language:	English
By (author) :	Obulareddy Chittepu
Number of pages:	108
Published on:	2019-09-05
Category:	Microbiology

GIS-based Evaluation of Watershed Management in Medak District, India



SCIENTIFIC INTERNATIONAL PUBLISHING HOUSE (SIPH)

Registered under the ministry of SME,
Government of India.
GSTIN: 33AKIPR5169FZY
UDYAM-TN-25-000518

Certificate of Publication

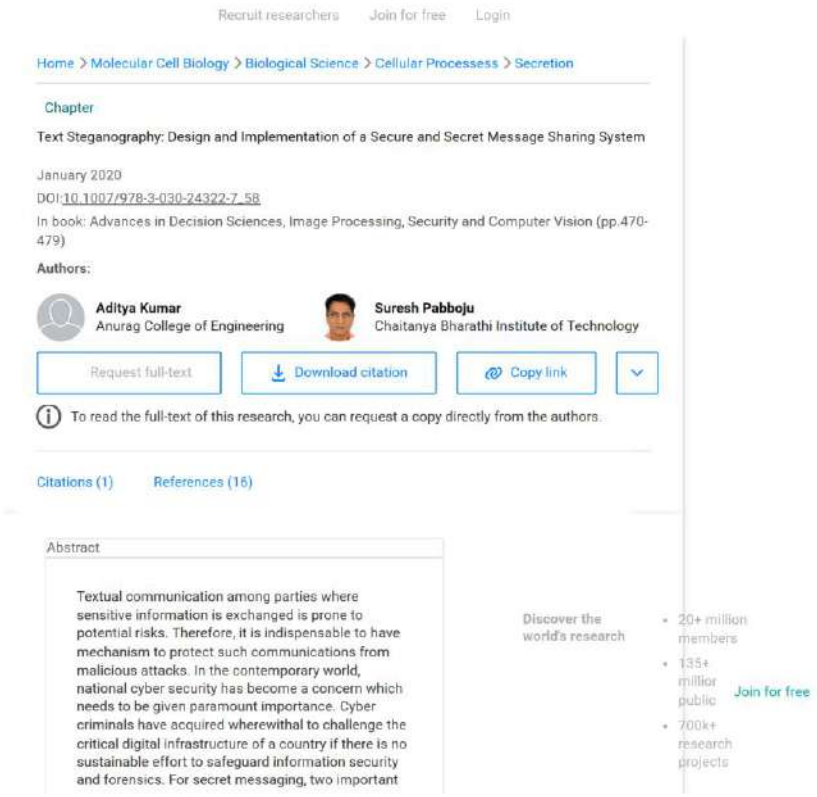
The editorial board of Scientific International Publishing House (SIPH) is hereby awarding this certificate to **Dr. G. N. R. PRASAD,** in recognition of the publication of the text book entitled **"ARTIFICIAL INTELLIGENCE AND DATA SCIENCE ENGINEERING"** published in first edition January-2022

ISBN NO: 978-93-92992-39-1
Year of Allotment of ISBN: 2022

Editor-in-Chief

www.sipinternationalpublishers.com

Text Steganography: Design and Implementation of a Secure and Secret



Real Time Aspect based sentiment analysis on consumer reviews

Data Engineering and Communication Technology pp 801–810

Real-Time Aspect-Based Sentiment Analysis on Consumer Reviews

Jitendra Kalyan Prathi, Pranith Kumar Raparthi & M. Venu Gopalachari

Conference paper | First Online: 09 January 2020

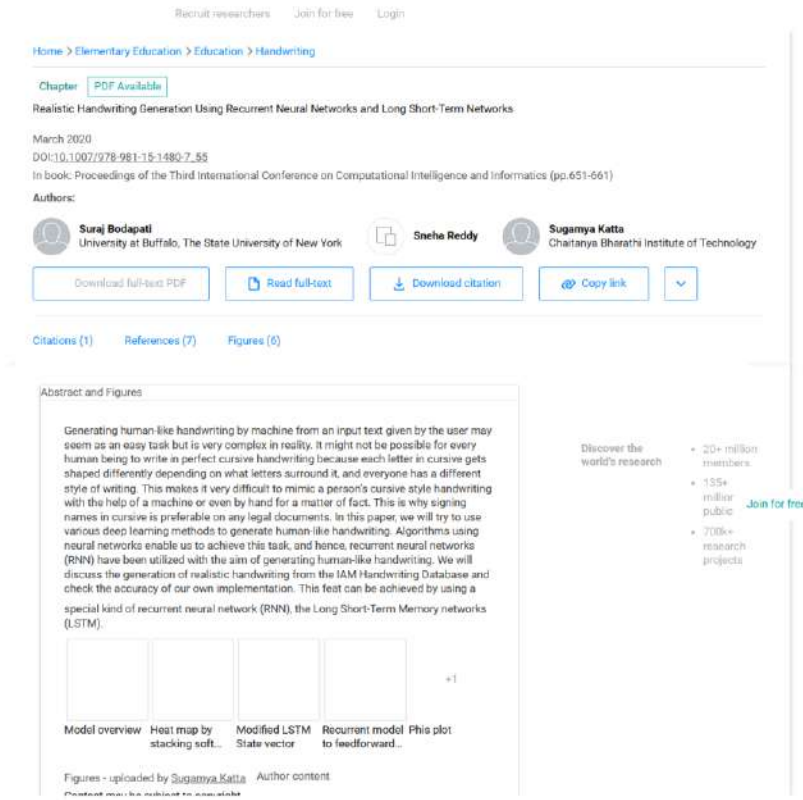
678 Accesses | 1 Citations

Part of the Advances in Intelligent Systems and Computing book series (AISC,volume 1079)

Abstract

The rise of e-commerce websites, as new shopping channels, led to an upsurge of review sites for a wide range of services and products. This provides an opportunity to use aspect-based sentiment analysis and mine opinions expressed from text which can help consumers decide what to

Realistic Handwriting Generation Using Recurrent Neural Networks and Long Short-Term Networks



Rough Set-Based Classification of Audio Data

Proceedings of the Third International Conference on Computational Intelligence and Informatics pp 627–637

Rough Set-Based Classification of Audio Data

T. Prathima, A. Govardhan & Y. Ramadevi

Conference paper | First Online: 18 March 2020

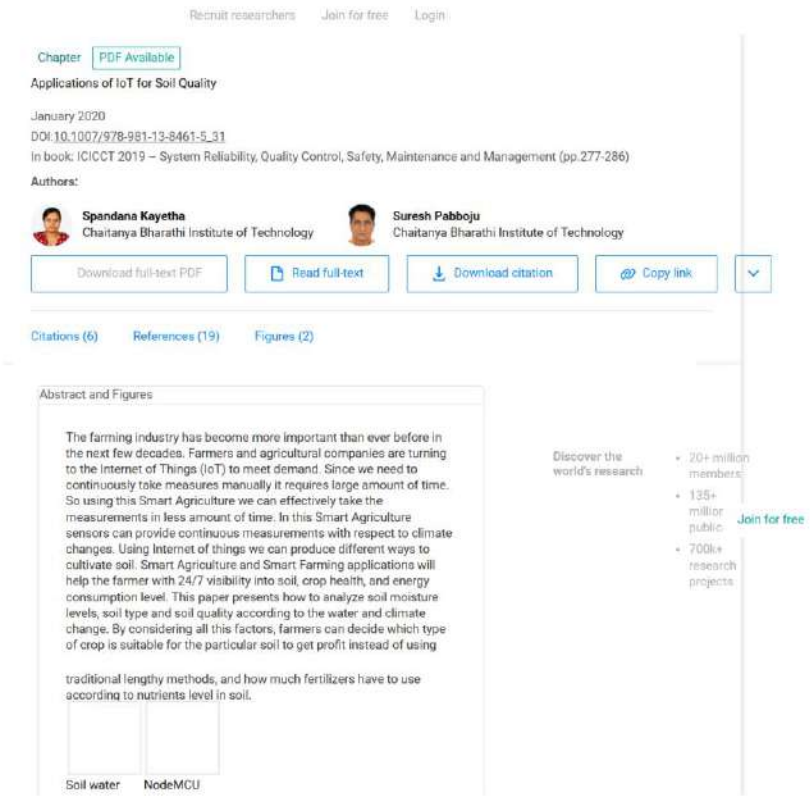
477 Accesses

Part of the Advances in Intelligent Systems and Computing book series (AISC,volume 1090)

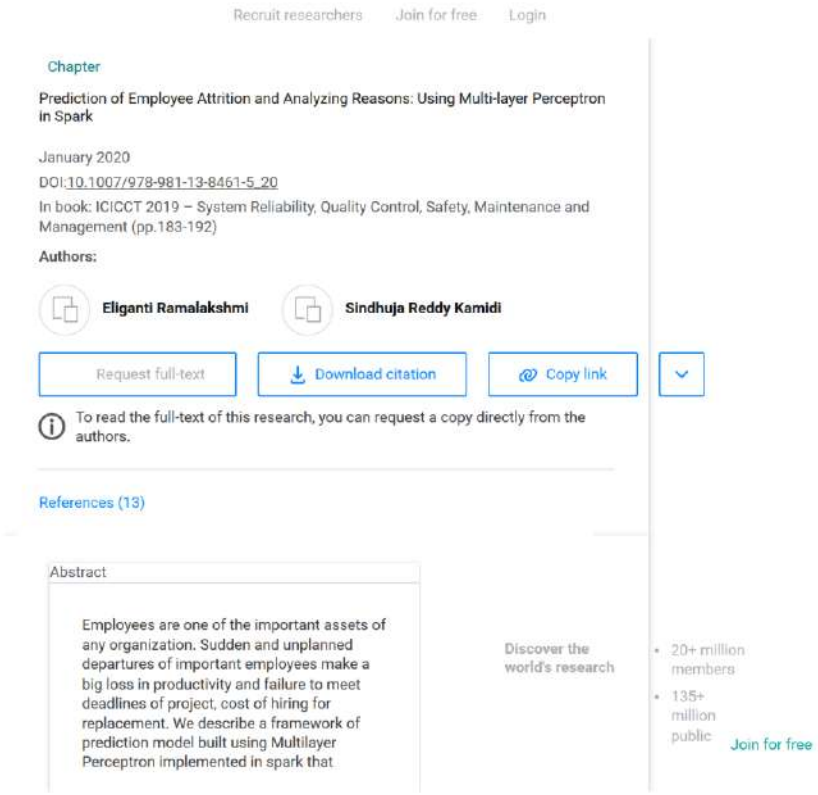
Abstract

For effective multimedia content, retrieval audio data plays an important role. Recognising classes of audio data which is neither music nor speech is a challenging task; in this aspect, the authors proposed to work on environment sounds. To represent the audio data, low-level features are extracted. These low-level descriptors are computed from both time domain and frequency

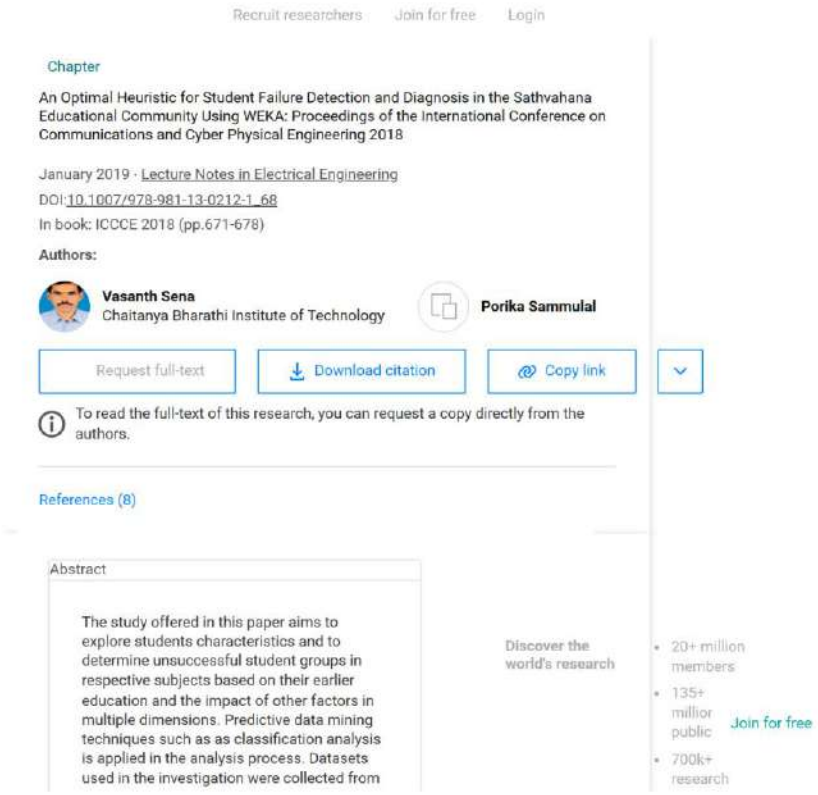
Applications of IoT for Soil Quality. In: System Reliability, Quality Control, Safety, Maintenance and Management.



Prediction of Employee Attrition and analyzing reasons: using Multi Layer Perceptron in Spark



An Optimal Heuristic for Student Failure Detection And Diagnosis In The Sathavahana Educational Community Using WEKA



An approach to mine time interval based weighted sequential patterns in sequence databases

Hexagonal image processing and transformations: A practical approach using R

Cognitive Science and Artificial Intelligence pp 91–99

Hexagonal Image Processing and Transformations: A Practical Approach Using R

E. Ramalakshmi & Neeharika Kompala

Chapter | First Online: 23 December 2017

1290 Accesses

Part of the SpringerBriefs in Applied Sciences and Technology book series (BRIEFSFOMEBI)

Abstract

Hexagonal structure is remarkable in connection to the standard square structure for picture depiction. The geometrical course of action of pixels on hexagonal structure can be portrayed similar to a hexagonal system. Hexagonal structure gives a straightforward way to deal with picture translation and turn information. Winding Architecture is a reasonably new and competent approach to manage machine vision structure. Regardless, all the present hardware for finding picture and for indicating picture are made in light of rectangular building. It has transformed into a noteworthy issue impacting the pushed research on Spiral Architecture. In this

DYNAMIC PHONE WARPING – A METHOD TO MEASURE THE DISTANCE BETWEEN PRONUNCIATIONS

Akella Amarendra Babu[1], and Ramadevi Yellasiri[2]

[1]St. Martin's Engineering College, Dhulapally, Secunderabad, India
[2]CBIT, Hyderabad, Telangana, India

ABSTRACT

Human beings generate different speech waveforms while speaking the same word at different times. Also, different human beings have different accents and generate significantly varying speech waveforms for the same word. There is a need to measure the distances between various words which facilitate preparation of pronunciation dictionaries. A new algorithm called Dynamic Phone Warping (DPW) is presented in this paper. It uses dynamic programming technique for global alignment and shortest distance measurements. The DPW algorithm can be used to enhance the pronunciation dictionaries of the well-known languages like English or to build pronunciation dictionaries to the less known sparse languages. The precision measurement experiments show 88.9% accuracy.

KEYWORDS

Natural Language processing, word distance measurements, pronunciation dictionaries.

1. INTRODUCTION

Pronunciation dictionaries are not available for all languages and the accents of various regions. This paper aims to build online pronunciation dictionaries using sound distance measurements. Human beings hear a word; compare it with the words in the memory and select the word which highest similarity to the input word. The objective of this paper is to follow the technique adopted by the human beings and prepare the pronunciation dictionaries. The primary focus of this paper is to measure distances between and sounds and to use this data to measure the distances between the words.

The reasons for the pronunciation variability are as under:

1.1 Speaker's Accent: The accent of the speaker depends on his mother tongue [1, 2]. The difference is negligible in respect of the speakers of the same country. But the difference is glaring in respect of foreign speakers.

1.2 Speaker's Emotions: The pronunciation of the same word would be different when spoken with different emotions like joy, love, anger, sadness and shame [3, 4].

1.3 Speaking Style: The speaker style varies when speaking to various people. The same name is spoken with different pronunciation while addressing an office peon and while addressing your friend.

Dhinaharan Nagamalai et al. (Eds) : ACSIT, ICITE, SIPM - 2018
pp. 65–73, 2018. © CS & IT-CSCP 2018 DOI : 10.5121/csit.2018.80805

Automatic Framework of Music Ringtone Extraction from Tollywood Songs

Indian J.Sci.Res. 17(2): 381-386, 2018

ISSN: 0976-2876 (Print)
ISSN: 2250-0138(Online)

AUTOMATIC FRAMEWORK OF MUSIC RINGTONE EXTRACTION FROM TOLLYWOOD SONGS

[1] Ramadevi Y ,[2] Prathima T ,[3] Apsar Sh
[1]Professor, Department. of Computer Science and Engineering, CBIT, Hyderabad, Telangana
[2]Research Scholar, Department. of Computer Science, JNTU Hyderabad, Telangana
[3] PG student, Department. of Computer Science and Engineering, CBIT, Hyderabad, Telangana

Abstract: An automatic framework is used to extract the ringtones from music automatically. In this, song is considered as the grouping of segments of music such as intro, chorus, verse, bridge, outro. Mostly the ringtone will be the 'chorus' or 'intro' segments of music. The process of manually checking each song and cropping specific parts of the song is a tedious process. Western music and Bollywood songs are widely used for ringtone extraction. The accuracy is not stable for different genres of the songs such as hip-hop, ghazal etc work, for automatic extraction of ringtone, beat tracking is done by using Simon Dixon BeatRoot followed by feature extraction process as the audio data lies within beats. Songs from Tollywood (regional) were used for experimentation. SVM and Naïve Bayes classifiers are used for comparisons. The class labels are predicted based on training samples. The accuracy gained by SVM is 62.9% with 11093 beat data and the Naïve Bayes classifier gained 75% accuracy with the same beat data. In the two datasets of experimentation Naïve Bayes performed better than SVM.

Index Terms - BeatRoot, Feature Extraction, Classification, Segment Boundary Detection.

I. Introduction

Automatic music extraction is very useful in significant fields. In this a song is taken as input and divided into segments which are considered as meaningful regions such as verse or chorus. The structure of song is usually divided into intro, verse, chorus, outro, etc. Ringtone is an audio file played on mobile phones to indicate an incoming call. Ringtones are popular because in a crowd of people with cellular handsets it is easy to identify easy whose phone is ringing.

Ringtones and ring-music bring more fun when people make calls and it remains as labor intensive work, people need to listen each and every song to set the starting point and ending point for a clip with in audio file, then extract the segment [1]. In this paper our main goal is to extract the ringtone automatically by detecting the boundaries of segments correctly with good accuracy.

Song forms are made up of a number of sections that may or may not be repeated within the same song. Some of the popular song structures are strophic (AAA) form, AAB (12 bar blues) form, AABA song form, AB or verse/chorus song form, ABC song form or verse/chorus/bridge song form. South Indian music song forms are very similar to western music forms.

A. Genres of Telugu songs

In music genre refers to musical style. Some of the popular genres of Indian music are [2]:

- Classical: The composition of classical music is based on ragas, which are the scales of seven basic notes such as sa, re, ga, ma, pa, dha and ni. The commonly played musical instruments of this genre includes sitar, surbahar, sarod, sarangi, santoor, bansuri, pakhavaj and tabla.
- Ghazal: According to Arabic dictionary the word ghazal means 'talking about woman', it is generally a poem consisting of five to fifteen couplets known as 'shers'. The ghazals became a part of the Indian music with the invasion of Mughals.
- Pop- Indipop music is a hybrid of Indian and western musical traditions.
- Devotional: Bhakti or devotion, constitutes an important part of Hindu religious practice. The broad sweep of devotional music includes chants and readings of scriptures such as the Vishwasahasranam, Shivamahimmah stotra, Bhagavad Gita and holy mantras, such as Om Namah Shivaya.
- Folk: India folk music owes its origins to the villages, which represents the folklore and lives of the villagers
- Tribal: Indian tribal music is originated from the inhabitants of the hilly regions and they are composed among the tribals of northeast India and southern states.

Folk and tribal music was composed and performed in order to celebrate a particular festival or to deliver a message.

B. Structure of Indian song

A Wavelet Based Digital Image Watermarking for Broadcast Monitoring using Genetic Algorithm

6th International Conference on Advanced Computing, Networking, and Informatics

(ICACNI 2018)

CERTIFICATE

This is to certify that ***Sridevi Tumula and Rahul Chandra Nagu*** *authored a paper titled* ***'A Wavelet Based Digital Image Watermarking for Broadcast Monitoring using Genetic Algorithm'*** *in the 6th International Conference on Advanced Computing, Networking, and Informatics (ICACNI 2018) held during 04 - 06 June 2018 co-organized by Department of Computer Science & Engineering, National Institute of Technology Silchar and Centre for Computer Vision and Pattern Recognition, National Institute of Technology Rourkela.*

Shyamosree Pal

Shyamosree Pal

Ripon Patgiri

Suitability of Ionospheric Coefficients for IRNSS Single Frequency Receivers

Qurram Javeed Mohd
Department of ECE
Chaitanya Bharathi Institute of Technogy (CBIT)
Hyderabad, India
mdqurramjaveed@outlook.com

Dattatreya Sarma Acharia
Department of ECE
Chaitanya Bharathi Institute of Technogy (CBIT)
Hyderabad, India
ad_sarma@yahoo.com

Supraja Reddy Ammana
Department of ECE
Chaitanya Bharathi Institute of Technogy (CBIT)
Hyderabad, India
ammana.supraja@gmail.com

***Abstract*— For single frequency navigation receiver, there are various techniques to estimate the ionospheric delay. Klobuchar model is a standard technique for single frequency signal that is used to estimate the ionospheric delay globally. It uses two sets of ionospheric coefficients, namely, alpha and beta, to compute the ionospheric delay. There are two different ionospheric model coefficients for IRNSS and GPS. This paper compares the estimation of ionospheric delay using single frequency (two sets of ionospheric model coefficients) and dual frequency signals. The dual frequency estimation is used to validate the results due to Klobuchar model. The ionospheric delays due to GPS ionospheric coefficients are found more suitable than the delays due to IRNSS ionospheric coefficients.**

***Keywords*—GPS, IRNSS, Klobuchar Model, etc.**

I. Introduction

Indian Regional Navigation Satellite System (IRNSS), now termed as Navigation with Indian Constellation (NavIC) is an autonomous system developed by Indian Space Research Organisation, Govt. of India. It provides signals in two frequency bands, namely, L5 band and S1 band. The propagation of these signals is effected by various errors. One prominent error, namely, ionospheric error, delay the travel time of the signals. Ionospheric delay can be estimated using single frequency and dual frequency signals [1-3]. For single frequency receivers, in particular for civil aviation, ionospheric time delay degrades the positional accuracy. Approximately 50% of the ionospheric time delay can be reduced by the Klobuchar model (1987) that uses two sets of coefficient. In this paper, Ionospheric delay is estimated using ionospheric coefficients provided by navigation files of GPS and IRNSS. Also, to validate the results more precise estimation of ionospheric delay is required. Hence, ionospheric delay using dual frequency is also estimated.

II. Data Acquisition

Under an MoU between Chaitanya Bharathi Institute of Technology (CBIT) and Space Applications Centre (SAC), ISRO two Accord made IRNSS receivers are installed at CBIT, Hyderabad. Extensive research work and several experiments are carried out. Data is continuously acquired, stored and shared with SAC periodically. This paper uses Receiver Independent Exchange (RINEX) and Comma Separated Value (CSV) data provided by the receiver. The CSV data provided by the receiver is termed as IRNSS Receiver Software (IRS).

III. Methodology

The navigation message of the GPS and IRNSS contains ionospheric Alpha and Beta coefficients. Klobuchar model use these coefficients with Elevation and Azimuth angle between the user and satellite [4]. The vertical ionospheric time delay (T_{Id}) is given as,

$$T_{Id} = f * \left[5 \times 10^{-9} + \sum_{n=0}^{3} \alpha_n \emptyset_m^n \times \left(1 - \frac{x^2}{2} + \frac{x^4}{24}\right)\right] \quad (1)$$

where

$$x = \frac{2\pi(t - 50400)}{\sum_{n=0}^{3} \beta_n \emptyset_m^n}$$

α and β — Ionospheric coefficients from navigation file
$\emptyset_m^n$ — Geomagnetic latitude (semi-circles)
f — Slant factor

As the delay due to GPS coefficients are for L1 frequency, the calculated delay is converted for L5 frequency using a correction factor of 1.7934. Klobuchar model provides vertical ionospheric delay, hence, it is converted to slant ionospheric delay. To estimate the slant ionospheric delay, the vertical delay is to be multiplied with a standard mapping function. The most commonly used Mapping Function (MF) to calculate slant ionospheric delay is given as [5],

$$MF = \left(1 - \left(\frac{R_e \times \cos(el)}{R_e + h_{ION}}\right)^2\right)^{-\frac{1}{2}} \quad (2)$$

Where R_e is the earth radius (6,371 km), el is the elevation angle between user and satellite and h_{ION} is the ionospheric thin shell height considered as 350 Km in this analysis.

The ionospheric delay is directly provided by the IRS software. Apart from this, code measurements are used to estimate the ionospheric delay using dual frequency data. Ionospheric delay is given as

$$I_f = \frac{40.3}{f^2} \times TEC \quad \text{(m)} \quad (3)$$

where, f is frequency (Hz), TEC is Total Electron Content (el/m^2).

Total Electron Content (TEC) is defined as the total number of electrons a signal experience with a cross sectional area of 1 m^2. TEC due to code measurements is given as [3,6],

$$TEC_C = 4.4192 \times (P_1 - P_2) \quad \text{[TECU]} \quad (4)$$

where, P_1 and P_2 are the pseudoranges from S1 and L5 frequency respectively.

IV. Results and Discussion

Several days of data has been analysed, but, for convenience results due to only two typical days (21st July and 30th July 2018) are shown. Estimation of ionospheric delay for 21st July and 30th July 2018 are shown in Fig. 1 and 2 respectively. Two results are due to Klobuchar model and

978-1-5386-7070-6/18/$31.00 ©2018 IEEE

Analysis of Ionospheric Delay Effects on IRNSS-GPS Receiver Coordinates

K. Lakshmanna
Dept. of ECE, CBIT
Hyderabad, India
lakshmanna05@gmail.com

N. Alivelu Manga
Dept. of ECE, CBIT
Hyderabad, India
namanga04@gmail.com

A. D Sarma
Dept. of ECE, CBIT
Hyderabad, India
ad_sarma@yahoo.com

***Abstract*— The ionosphere is one of the major error sources in today's GNSS receivers for accurate position estimation. The signals from the satellites experience delay when propagating through the ionosphere resulting in error in position estimation. Various models and mathematical formulations have been developed to estimate the range error due to ionospheric delay. This paper investigates the effect of ionospheric delay on IG (IRNSS-GPS) receiver position coordinates (x, y and z). The position error and standard deviation of each coordinates is estimated. Also, 2D (x and y coordinates) position accuracy of IG receiver is estimated by using CEP, DRMS and 2DRMS. It is observed that, y coordinate is more effected and this aspect may be useful in analyzing the timing accuracy estimation.**

Keywords—IRNSS-GPS, ionospheric delay, CEP, DRMS and 2DRMS

I. INTRODUCTION

Indian Regional Navigation Satellite System (IRNSS) is an indegineous regional navigation system, developed and controlled by Indian Space Research Organization (ISRO). It operates both in L5 and S1 band of frequencies. The IRNSS receiver consists of 7 satellites (3 GEO and 4 GSO) namely IRNSS-1B, 1C, 1D, 1E, 1F,1G and 1L

. Ionosphere is one of the prominent sources of error in satellite navigation resulting in error in the xyz components and the position estimation consequently[1]. Several reseachers presented 2D position accuracy in the context of GPS [2-4]. Similar work is done on comparative analysis of single and dual frequency of ionopheric delay effects on user position accuracy in the context of GPS [5]. Recently, siginificant work is done on the performance evalution of IRNSS-GPS-SBAS receiver in terms of position and accuracy [6]

II.THEORITICAL BACKGROUND

The geodetic coordinates of GNSS receiver can be (latitude, longitude and altitude) converted to Cartesian coordinate (x, y and z) components as follows [7]

$$x = (n + h)\cos(\phi)\cos(\lambda) \quad (1)$$

$$y = (n + h)\cos(\phi)\sin(\lambda) \quad (2)$$

$$z = [(1 - e^2)n + h]\sin(\phi) \quad (3)$$

Where ϕ is latitude (deg.), λ is longitude (deg.), n is radius of curvature of the earth (meters), h is ellipsoidal height (meters) and e is the eccentricity of ellipsoid, a and b are semi-major and semi-minor axes of the ellipsoid, O_P and I_P are the points outside and on the surface of the ellipsoid respectively (Fig.1). From the equations (1, 2 and 3), it is evident that the variation in x and z coordinates is minimum at low latitude and high longitude angles for a given eccentricity, ellipsoidal height and radius of curvature of the earth. Whereas, the variation in y coordinate is maximum for low latitude and high longitude angles. In the paper, we did analysis for a low latitude and high longitude station, Hyderabad (17.3921° N, 78.3195° E). We also simulated and verified that, variation in y-axis is more than in x-axis and z (Fig. 2)

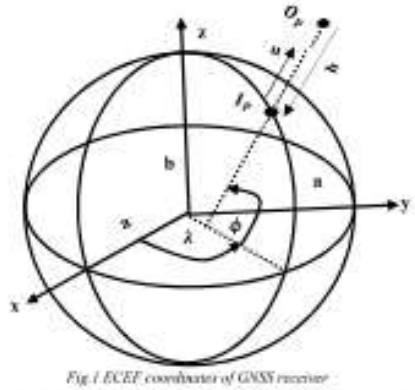


Fig.1 ECEF coordinates of GNSS receiver

The 2D position accuracy is measured in IGS (IRNSS+GPS+SBAS) receiver from the scatter plot using Circular Error Prabability (CEP). The receiver logged the positions over period of a time, positions are spread over an area due to measurement errors called scatter plot. The GNSS receiver designers used various methods like CEP, Distance Root Mean Square (DRMS) and 2DRMS to characterize the position accuracy. The CEP is described as the radius of a circle with true position as the center, which contains the propability of 50% error values with in circle, given by [8]

$$CEP = 0.56\sqrt{\sigma_x^2} + 0.62\sqrt{\sigma_y^2} \quad (4)$$

Where σ_x and σ_y are stadard deviation of x and y coordinates respectively.

In order to characterize the 2D position accury by using DRMS, first need to estimate the standared deviation of position coordinates (x and y). The DRMS is defined as squre root of sum of squares of stadard deviation of x and y position coordinates. The DRMS circle contains the probability of 65% error values with in the circle, is expressed as

$$DRMS = \sqrt{\sigma_x^2 + \sigma_y^2} \quad (5)$$

Similarly, 2DRMS is defined as twice the value of DRMS. The 2DRMS circle contains the probability of 95% error values with in the circle ,is given by

$$2DRMS = 2 * \sqrt{\sigma_x^2 + \sigma_y^2} \quad (6)$$

These parameters are most commonly used position accuracy measures for GNSS receivers

978-1-5386-7070-6/18/$31.00 ©2018 IEEE

Sierpinski Monopole Antenna Reconfigurable System using Hairpin Bandpass Filter Sections

Dr.Manikya Krishna Chaitanya Durbhakula
Department of E.C.E
Vardhaman College of Engineering
Hyderabad, India
chaitanyadmk@gmail.com

Dr.N.V.Koteswara Rao
Department of E.C.E
Chaitanya Bharathi Institute of Technology
Hyderabad, India
nvkoteswararao@gmail.com

***Abstract*— In this paper, the design and development of a Sierpinski monopole gasket antenna reconfigurable system cascaded with two hairpin bandpass filter sections is presented. The reconfigurability is achieved by incorporating PIN diode switching mechanism to select the appropriate filter section to resonate the antenna at a desired frequency of interest. The proposed structure is aimed to be operated at 3.5 GHz and 7.5 GHz with good amount of gain, bandwidth along with the reduction of interference at the receiver. The proposed model is verified using the commercially available simulating software CST Microwave suite and a prototype is fabricated and tested accordingly. The simulated results are compared with the measured values and the corresponding results are presented. The simulated results shows that the antenna is resonating at 3.5 GHz and 7.5 GHz for a measured values of 3.48 GHz and 7.5 GHz with the appropriate selection of the switching mechanism. The antenna demonstrates a gain of 9.8 dBi and 6.2 dBi when simulated corresponding to a measured values of 10.1 dBi and 7.1 dBi respectively. The antenna offers a bandwidth of 60 MHz and 100 MHZ when simulated and 50 MHz and 180 MHz after the practical measurement at the operational frequencies. Nearly a 26 dB of separation of measured power levels between the operating frequencies can be observed at the receiver. The structure is better suitable for the Cognitive Radio applications as it offers better values of gain, bandwidth and reduced interference levels at the receiver along with design flexibility.**

Keywords*—Sierpinski Monopole Gasket, Hairpin Bandpass Filter, PIN diodes, Reconfigurability, Interference, Gain, Bandwidth, Cognitive Radio

I. Introduction

The growing demand for the wireless connectivity has necessitated a new communication technique to exploit the usage of electromagnetic spectrum in an efficient way. The Cognitive Radio (CR), a prominent technology is intended for the effective utilization of the spectrum in a systematic approach either by using spectrum underlay or spectrum overlay approach [1]. The most important task in this perspective is the design of an antenna that must be capable of adapting the changes in the environment accordingly. Therefore, the antenna systems should be reconfigurable to cater the needs of the CR framework [2]. The microstrip antennas are considered to be the suitable structures for achieving these performance characteristics owing to their advantages of being compact, lesser in weight, ease of integration with feeding mechanism. At the same time, they have the disadvantage that, they offer lesser values of gain and bandwidth. The fractal antennas are considered to be the suitable components in the design of a reconfigurable antenna system. The Sierpinski gasket fractal antennas [3] in particular, allow the design of dynamic structures to obtain the frequency reconfigurability mechanism using suitable switching mechanism. This is due to the nature of their multi-band operational characteristics with reasonably good operational band width and systematic utilization of the spectrum for the efficient communication. Similarly, the monopole configuration offers more gain and band width when compared to dipole arrangement [4]. However, it is essential to note that maintaining the constant gain over the band in a reconfigurable antenna and reducing the interference between the operating frequencies at the receiver is a serious challenge when working at different resonant frequencies. These challenges can be solved by integrating appropriate antenna structures with reconfigurable filters [5]. In this context, the hairpin bandpass filters are considered to be the more appropriate structures for achieving good pass band characteristics as they are compact, simple in design, easy to fabricate at lower costs [6]. Moreover, they offer lesser coupling losses when compared to other coupled line filters and so on. Therefore, these two components can be cascaded together to select a particular resonant frequency by proper switching mechanism. Such arrangements will help to maintain uniform antenna surface current distribution over the structure at a particular frequency and avoids the alterations by tuning the filter components [7] due to which the antennas offer constant gain over a frequency range of interest. On the other hand, the noise performance of the overall system can be improved and interference is minimized effectively at the receiver end due to the independent operation at a given frequency. The frequency reconfigurability of these structures can be obtained by incorporating appropriate PIN diode switching circuitry [8] along with the cascaded hairpin band pass filters. The PIN diodes are also helpful in providing further isolation and to reduce the interference at the receiver. These systems are more dynamic, compact and can be designed easily with stable radiation characteristics, reasonably good values of gain and bandwidth. The similar kind of structures that are available in the literature [9] [10] could not provide the higher values of gain and bandwidth and they do suffer from the coupling losses and interference. Therefore, this paper aims to resolve the problems that are identified from the literature by adopting a different mechanism. The proposed antenna system consists of a sierpinski monopole gasket cascaded along with suitable hairpin bandpass filters operated by the appropriate PIN diode switching mechanism to obtain the reconfigurability. Even though, the Sierpinski monopole gasket can offer multi band operation, i.e at 1.75 GHz, 3.5 GHz, 7.5 GHz, 11 GHz, the proposed structure is designed to operate only at 3.5GHz and 7.5 GHz by using the proper switching mechanism considering the practicality of the design. The proposed model is verified by using commercially available CST microwave suite [11] and the results are compared with the measured values of fabricated prototype and a good agreement has been obtained.

978-1-5386-7070-6/18/$31.00 ©2018 IEEE.

"Edge cut Dual-Band Slot Antenna for Bluetooth/WLAN and WiMAX Applications"

SpringerLink

Edge Cut Dual-Band Slot Antenna for Bluetooth/WLAN and WiMAX Applications

Soft Computing and Signal Processing pp 561-570 | Cite as

- J. Rajeshwar Goud (1) Email author (rajeshwargoud@gmail.com)
- N. V. Koteswara Rao (2)
- A. Mallikarjuna Prasad (3)

1. ECE Department, St. Martin's Engineering College, , Secunderabad, India
2. ECE Department, Chaitanya Bharathi Institute of Technology, , Hyderabad, India
3. ECE Department, University College of Engineering, JNTUK, , Kakinada, India

Conference paper
First Online: 17 January 2019

Part of the Advances in Intelligent Systems and Computing book series (AISC, volume 900)

Abstract

A novel edge cut dual-band microstrip slot antenna and dual-band slot antenna are presented. The presented antennas find applications in Bluetooth/WLAN and WiMAX. These antennas use microstrip feed; in dual-band slot antenna, the lower band is considered from about 2.38 to 2.42 GHz, and the upper band is considered 2.59–2.64 GHz, whereas edge cut dual-band slot antenna, the impedance bandwidth of lower band is 2.37–2.43 GHz and the impedance bandwidth of upper band is 2.71–2.76 GHz. For dual-band antenna, the center frequency for lower band is 2.4 GHz and for upper band is 2.61 GHz, whereas for edge cut dual-band slot antenna, center frequency for lower band is 2.4 GHz and for upper band is 2.73 GHz which is assumed. The antenna simulations are carried out using HFSS, and a comparison among simulation and measured results is presented in this paper.

Keywords

Edge cut Dual-band Slot antenna HFSS Microstrip antenna WLAN WiMAX

References

"Investigations of Doppler Collision Effects on NavIC"

Investigations of Doppler Collision Effects on NavIC

Publisher: IEEE Cite This PDF

P. Sathish ; D.Krishna Reddy ; A.D. Sarma ; K.Sudershan Reddy All Authors

Abstract:
Doppler collision is a very important effect that will limit the performance of the satellite navigation systems. Therefore, there is a need to analyze the effect on NavIC (Navigation with Indian Constellation). NavIC is the emerging regional satellite navigation system designed and developed by Indian Space Research Organization, India. This system having seven IRNSS (Indian Regional Navigation Satellite System) satellite constellation consists of three geostationary satellites (IRNSS 1C, 1F and 1G) and four geosynchronous satellites. As the NavIC constellation uses the geostationary satellites, the effect of Doppler collision is more, even though they have orbital inclination angle of about ±5°. In this paper, the effect of Doppler collision for NavIC constellation is analyzed by considering three months data acquired from IGS (IRNSS-GPS-SBAS) receiver. It is found that Doppler collision occurs between IRNSS 1C and 1G is more comparatively IRNSS 1C and 1F & IRNSS 1F and 1G. The Doppler collision period occurs twice in a one sidereal day for all IRNSS geostationary satellites combination. For IRNSS 1C and 1G, the Doppler collision period is about 4 hrs 52 min i.e 18.8% of the one day time (24hrs). These results are useful for changing the inclination of geostationary satellites for avoiding Doppler collision which will improve positional accuracy.

Published in: 2018 3rd IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT)

"Performance Evaluation of IRI-2016 Model Using IRNSS Data over a Low Latitude Station: Preliminary Results"

IEEE International Conference on Innovative Technologies in Engineering 2018 (ICITE OU)

Performance Evaluation of IRI-2016 Model Using IRNSS Data over a Low Latitude Station: Preliminary Results

D. Kavitha, P. Naveen Kumar
Electronics and Communication Engineering Department
University College of Engineering , OU
Hyderabad, Telangana, India
Kavitha.agrlow@gmail.com

A.D. Sarma
Electronics and Communication Engineering Department
Chaitanya Bharathi Institute of Technology (CBIT)
Hyderabad, Telangana, India

***Abstract*—The International Reference Ionosphere (IRI) model plays an important role in various applications and connected with communication, navigation and other fields. This paper discusses the performance of the latest version IRI-2016 model for estimating the vertical ionospheric delays during geomagnetic quiet (13th May 2017) and disturbed (20th May 2017) days over a low latitude station. The ionospheric delays obtained due to IRNSS L5 (1176.45MHz) signal at low latitude Hyderabad station (17.24° N; 78.31° E), are compared with the results of IRI-2016 model. The obtained results will be helpful in improving the performance of IRI-2016 model over low latitude regions.**

Keywords*— *Ionospheric delay, IRNSS, IRI and Low Latitude.

I. INTRODUCTION

The ionospheric propagation effects play a critical role on the performance of Communication, Navigation and Surveillance system applications. Precise estimation of Total Electron Content (TEC) would be very helpful in improving the system performance in both civilian aviation and defence applications. The low latitude ionospheric layer is highly dynamic in nature, due to several phenomena such as equatorial ionospheric anomaly (EIA) [1], which can result in variations of different ionospheric parameters such as TEC. These TEC variations affect communication and navigation fields to a great extent. Hence, to understand the ionospheric variations over low latitude regions, modeling of ionospheric time delay is necessary. Accordingly, ionospheric models can be classified as global, regional, and local for estimating ionospheric characteristics of a specific region at a specific latitude, longitude, altitude, time, and geomagnetic activity. The IRI model is one of the standard global models to predict the behavior of the ionospheric layer in terms of various parameters. The IRI model is based on the world wide data available not only from ground based but also from space based systems. In the recent past, several regional ionospheric models are investigated over the Indian region [2-3]. Various investigators observed significant fluctuations in ionospheric time delays over low-latitude regions during the geomagnetic storm days [4-5].

II. DESCRIPTION OF IRI-2016 MODEL AND IRNSS

In this section we described IRI-2016 model and IRNSS.

A. IRI-2016 model

The IRI model is a global ionospheric model and is developed by the Committee on Space Research (COSPAR) and the International Union of Radio Science (URSI). The IRI model is an empirical and data based model to predict the variations in ionospheric layer [6]. This can be used to estimate the values of ion temperature, ion composition, electron density, electron temperature, and VTEC (Vertical Total Electron Content) at altitudes ranging from approximately 50 to 2000 km. When new data and new techniques are available, model is being upgraded continuously. In 1978 the first version of IRI model was released [7]. Later this model was followed by several improved versions in 1986, 1990, 1995, 2001, 2012 and 2016. At present, IRI-2016 is the updated version of the model. The IRI model strongly depends on existing database and the regions which are not covered by database experience reduced reliability of the model. India is one such region and needs careful attention while using this model.

B. IRNSS

The IRNSS (Indian Regional Navigation Satellite System) is being developed by India. This system covers India over a range of 1,500 km beyond its borders with 7 satellites constellation. It can provide position accuracy within 10m over the Indian landmass and below 20m over the oceans. It is expected to provide better coverage area and improved accuracy with satellite constellation enhanced to 11 satellites. In the present constellation four satellites are geosynchronous (1A, 1B, 1D, 1E) and remaining is geostationary (1C, 1F, 1G). At present 1A satellite is not operational, its all rubidium atomic clocks on board IRNSS-1A are failed. A new satellite is expected to be launched soon. The system is expected to be operational from early 2018 after a system check. It will provide Standard Positioning Service (SPS) for civilian users and a Restricted Service (RS) for authorized users [8]. Its performance is degraded by several sources of errors such as multipath effects, clock error, DOP (Dilution of Precision),

978-1-5386-5080-6/18$31.00 2018 IEEE

‘Multipath and Thermal noise free Relative TEC Estimation using IRNSS L5 and S1 Signals’

IEEE International Conference on Innovative Technologies in Engineering 2018(ICITE OU)

Multipath and Thermal noise free Relative TEC Estimation using IRNSS L5 and S1 Signals

Mohd Qurram Javeed, A.D. Sarma, A. Supraja Reddy, T. Sridher and N.V. Koteswara Rao
Department of ECE
Chaitanya Bharathi Institute of Technology (CBIT)
Hyderabad, Telangana, India
mdqurramjaveed@outlook.com

Tarun Kumar Pant
Space Physics Laboratory,
Vikram Sarabhai Space Centre (VSSC),
Thiruvanthapuram, Kerala, India

***Abstract*— Indian Regional Navigation Satellite Systems (IRNSS) is an autonomous system developed to cater navigational and precise time needs over the Indian region and its surrounding. There are various error sources that degrade the positional accuracy of the user. Prominent among them is ionospheric time delay error which is a function of Total Electron Content (TEC). But, the TEC estimation is influenced by the multipath and thermal noise. Therefore, multipath and thermal noise free relative TEC measurements are made and compared with TEC estimated by two other methods, namely, code TEC and IRNSS Receiver Software (IRS) techniques. The L5 (1176.45 MHz) and S1 (2492.028 MHz) signals from IRNSS 1A and 1B satellites are considered in our analysis. The results due to these three techniques indicate that relative estimation technique gives a better performance in terms of smoothness indicating the removal of multipath and thermal noise from the TEC measurements. This will be helpful in proper estimation of ionospheric time delay. In view of this, the relative TEC estimation technique can be used in the IRNSS receiver instead of the present IRS technique.**

Keywords—IRNSS, TEC, Relative TEC, etc.

I. INTRODUCTION

Global Navigation Satellite Systems (GNSS) signals are low power signals propagating through space to Earth. They get affected by various parameters in the propagation path. Ionospheric time delay is one of the prominent errors that affect the positional accuracy of GNSS receiver. The ionospheric time delay can be properly estimated when two coherent signals from the same satellite propagate through dispersive ionosphere. For GNSS applications, several ionospheric time delay models are proposed [1]. For these models, precise TEC estimation is necessary. In the case of GPS, the ratio of the L1, L2 and L5 signals (L1/L2=1.28; L1/L5=1.34) is much less than the ratio of IRNSS S1 and L5 signals (S1/L5=2.19). The high ratio of IRNSS signals is expected to facilitate better estimation of TEC. Further, this delay is directly proportional to the Total Electron Content (TEC). It is to be noted that TEC estimation is influenced by the multipath and thermal noise. A signal arriving at an antenna through different paths due to reflection / diffraction represents multipath phenomenon [2]. Thermal noise is a basic electric noise produced by random movement of electrons in any conductor (including components in IRNSS/GPS receiver)[3]. Once TEC is estimated, the delay can be calculated using a standard expression. TEC can be estimated using either code or carrier phase observations or both. Indian Regional Navigation Satellite System (IRNSS) is a newly added satellite based regional navigation system developed by Indian Space Research Organisation (ISRO). It transmits two frequencies, L5 (1176.45 MHz) and S1 (2492.028 MHz). Recently, a few papers are published on the analysis of L5 and S1 signals [4, 5 and 6]. With the launch of IRNSS-1F on 28 April 2016, the first phase of IRNSS constellation is completed and is declared fully operational [7]. Currently, field trials are going on to analyze the performance of IRNSS at various research organisations and academic institutions in India. Data is available in two formats, namely, Receiver INdependent EXchange format (RINEX) and National Marine Electronic Association (NMEA) data. Apart from these, receiver is also providing data in Comma Separated Value (CSV) format and is termed as IRNSS Receiver Software (IRS) format in this analysis. It contains all the mandatory calculations including user and satellite position information [8]. In this paper, TEC is estimated using three prominent techniques, namely, code, Relative (code and carrier phase) and IRNSS Receiver Software (IRS) techniques. Further, corresponding ionospheric time delay is also estimated for L5 and S1 signals using standard equation. Also, at present IRNSS 1A signal is not being used for position estimation due to failure of three atomic clocks onboard [9]. As data was collected for 17th June 2016, this problem was not encountered.

II. ESTIMATION OF CODE DIFFERENCE AND CARRIER DIFFERENCE OF S1 AND L5 SIGNALS

There are several techniques to estimate ionospheric time delay. One technique is to use code difference measurements of dual frequency receiver. Another technique involves the measurements of both code and phase. These techniques are described in the next section. This section deals with the calculations of the code difference and phase difference of L5 and S1 signals to simplify the calculation of both TEC estimation techniques.

The pseudorange observation equations are given as [10],

978-1-5386-5080-6/18$31.00 2018 IEEE

IEEE International Conference on Innovative Technologies in Engineering 2018 (ICITE OU)

Analysis of PDFs of Ionospheric Scintillation Index Data due to Low Latitude Station

G. Venkateswarlu
Department of ECE
Vasavi College of Engineering
Hyderabad, India
e-mail: ginkalavenkat@gmail.com

A. D. Sarma
Department of ECE
Chaitanya Bharathi Institute of Technology
Hyderabad, India
e-mail: ad_sarma@yahoo.com

***Abstract* - Ionospheric scintillations when severe, drastically affects the performance of GNSS system in terms of tracking error, navigation message and C/N_0. For characterization of amplitude scintillation index, four prominent PDFs namely lognormal, Weibull, Nakagami and Raleigh are considered. The Maximum Likelihood Estimation (MLE) method is used to compute the parameters of the PDFs. The Chi-square goodness of fit is used to choose the best fitting probability distribution. It is found that amplitude scintillation index data variations follow lognormal during daytime (4.27) and lognormal more closely than other density functions in the night time (0.92).**

Index Terms— ***GNSS, Ionosphere, Scintillation, PDF***

I. INTRODUCTION

The performance of the GNSS receiver is degraded by many errors including ionospheric delay and scintillations. Using Space Based Augmentation System (SBAS) grid model, the ionospheric error can be reduced [1]. The refractive index of the ionosphere is a function of free electronics, and fluctuations in refractive index induces fluctuations in the propagating signal. These fluctuations are called as scintillations. Scintillations are a function of operating frequency, local time, season, geomagnetic activity, eleven years solar cycle and geographic location [2]. Scintillations are usually expressed by using two indexes namely S_4 for amplitude and σ_ϕ for phase scintillations. Scintillations are more predominant in low and high latitude regions effecting both amplitude and phase of the GNSS signals. Severe scintillation condition can prevent a GPS receiver from locking on to the signal and reduce the performance of the system [3]. The refractive index is a function of free electrons, variations of the scintillation index are random, and the behaviour can be characterized by using a Probability Density Functions (PDFs) [4-5]. Very limited research work has been reported on characterizing ionospheric scintillation index data using PDFs. In one of the research paper scintillation index data was characterized by using Nakagami distribution [6]. To identify which PDF the present low latitude station data exactly follows, four prominent PDFs lognormal, Weibull, Nakagami and Raleigh are considered in the investigation.

II. THEORETICAL BACKGROUND

For a data consisting of p scintillation index data observations $\{x_n\}$, $n = 1, 2, 3, \ldots p$, the empirical PDF, $f(x)$ is given as [7],

$$f(x) = \frac{p_x}{ph} \tag{1}$$

Where, h is bin size centered at x, and p_x is the number of observations lies between $x \pm h/2$. The shape of the probability density curve depends on the bin size.

Several methods are suggested in the literature to identify bin width h [8]. However, in this paper, we considered lognormal, Weibull, Nakagami and Raleigh PDFs. The expressions for the considered PDFs are as follows [9-10].

i) The lognormal PDF $f_{ln}(x,\theta_{ln})$ is given as

$$f_{ln}(x,\theta_{ln}) = \frac{1}{x\sigma\sqrt{2\pi}}\exp\left(-\left(\frac{(\log x - m)^2}{2\sigma^2}\right)\right) \tag{2}$$

where, θ_{ln} gives the parameters of the density function with m as mean and σ^2 as variance.

ii) The Weibull PDF $f_{wd}(x,\theta_{wd})$ is given as,

$$f_{wd}(x,\theta_{wd}) = \frac{a}{b}\left(\frac{x}{a}\right)^{a-1}\exp\left(-\frac{x}{b}\right)^a \tag{3}$$

where, $\theta_{wd} = [a,b]$ is a parameter vector with shape (a) and scale (b) parameters.

iii) Nakagami PDF $f_N(x,\theta_N)$ is given by,

$$f_N(x;\theta_N) = \frac{2m^m}{\Gamma(m)\Omega^m}x^{2m-1}\exp(-\frac{m}{\Omega}x^2) \tag{4}$$

where, θ_N is parameters with m is shape parameter and Ω is scale parameter.

iv) The Raleigh PDF $f_R(x,\theta_R)$ can be expressed as,

$$f_R(x,\theta_R) = \frac{x}{\sigma^2}e^{-x^2/2\sigma^2} \tag{5}$$

where, θ_R is a parameter vector with σ^2 variance.

Each density function parameters are computed by using Maximum likelihood estimation method. Chi-square goodness of fit test (χ^2) is used to identify the best suitable probability distribution from the considered distributions.

978-1-5386-5080-6/18$31.00 2018 IEEE

“Performance Evaluation of Mixed-Pair method of Estimation of Ionospheric Gradients on IRNSS L5 Signals”,

IEEE International Conference on Innovative Technologies in Engineering 2018(ICITE OU)

Performance Evaluation of Mixed-Pair method of Estimation of Ionospheric Gradients on IRNSS L5 Signals

Supraja Reddy Ammana
Department of ECE, Chaitanya Bharathi Institute of Technology (CBIT)
Hyderabad, Telangana, India
ammana.supraja@gmail.com

***Abstract*—Mixed-Pair method is one of the well-known techniques for estimation of spatial gradients of ionospheric delay. This technique has been extensively used to compute gradients of delay on GPS L1 signals. No significant work is reported on computation of gradients on IRNSS signals using this technique. In this paper, the performance of Mixed-Pair method is evaluated in the context of IRNSS L5 signals. It is observed that with this method, gradients estimated due to the combination of IRNSS 1D and 1E (Geo-Synchronous satellites) is resulting in gradients at short base-lines (tens of kms), whereas, all the other satellite combinations are yielding gradients at long base-lines (hundreds of kms). Therefore, it is inferred that this method can be effectively applied to study the spatial variation of ionosphere over both short and long baselines, especially in IRNSS based DGPS applications.**

Keywords*— IRNSS, L5 signals, Ionospheric spatial gradients, Mixed-Pair method

I. INTRODUCTION

Indian Regional Navigation Satellite System (IRNSS) is a result of Indian Space Research Organization's (ISRO's), endeavor to have India's own satellite-based navigation system. IRNSS is a regional satellite navigation system that provides Position Velocity and Timing (PVT) information to users over Indian landmass and regions extending to 1500 kms around Indian boundaries. Currently, there are seven satellites in IRNSS constellation, with three satellites in GEO orbit at 83°E (IRNSS 1C), 32.5°E (1F), 131.5°E (1G) and four satellites in GSO orbit at 55°E (IRNSS 1A and 1B) and at 111.75°E (1D and 1E) [1]. The two pairs of GSO satellites move in such a way that they form a figure of '8', while crossing the equator. All the satellites broadcast signals on two frequencies namely L5 (1176.45 MHz) and S1 (2492.028 MHz). Like any other satellite navigation system, IRNSS signals also experience delay as they pass through the ionosphere and systems working on IRNSS L5 band experience larger delays compared to those on S-band. Also, in low-latitude regions, ionosphere is highly variable both spatially and temporally and these variations affect the performance of Differential GPS (DGPS) systems serving both local-area and wide-area. Accurate low-latitude ionospheric time delay modelling and precise estimation of ionospheric spatial gradients play an important role in designing and developing reliable Augmentation Systems [2],[3]. Ionospheric spatial gradients are estimated using three prominent techniques, namely Time-Step method, Station-Pair method and Mixed-Pair method [4]. In Time-Step method, the difference of ionospheric delays experienced by a satellite at two distinct epochs of time divided by Ionospheric Pierce Point (IPP) separation distance (at those two epochs) results in the estimation of gradients [5]. As IRNSS satellites are either GSOs or GEOs, the time interval between the two epochs has to be sufficiently large to obtain the estimates of gradients over large distances. But, such a huge time interval induces temporal gradient in spatial gradient computations. In Station-Pair method, the difference of ionospheric delays experienced by a pair of stations due to a single satellite, at a particular instant of time, is divided by the corresponding IPP separation distance to estimate the gradients. The disadvantage with this method is that a close network of stations is required to obtain gradient estimates over short base-lines. Mixed-Pair method employs configurations such as one station observing two satellites, two-stations observing two-satellite pairs etc. [6]. In this paper, the performance of this technique is analyzed in the context of IRNSS L5 signals, with an emphasis on the IPP distances covered.

II. METHODOLOGY

Data is acquired from the IRNSS-GPS-SBAS receivers located at CBIT (17.39°N, 78.32°E) and Osmania University (17.24°N, 78.31°E) stations located at Hyderabad, India. The receiver provides significant parameters such as satellite position, elevation, azimuth, pseudoranges, clock parameters, doppler shift, ionospheric and tropospheric delays, etc for all the satellites in Comma Separated Value (CSV) format. Slant ionospheric delays on L5 signal corresponding to each satellite are extracted from the CSV file and converted to vertical delays with the help of mapping function [7]. The gradients of vertical ionospheric delays are computed using Mixed-Pair method. Two configurations of this method are considered, the first is, one station viewing two satellites and second is, two stations viewing two different satellites.

A. One Station – Two Satellites

In this method, the vertical ionospheric differential delays ($Id^{i}_{R_{x1}} - Id^{j}_{R_{x1}}$) experienced by a pair of satellites (i, j), with respect to a station (R_{x1}), at a particular instant of time, divided

978-1-5386-5080- 6/18$31.00 2018 IEEE

Performance Analysis of Different Spatial Domain Methods for Traffic Control Using Image Processing: A LabVIEW approach"

Performance Analysis of Different Spatial Domain Methods for Traffic Control Using Image Processing: A LabVIEW Approach

G. Mallikharjuna Rao[1] and P. Srinivas[2]

[1]Department of ECE, CBIT, Osmania University, Hyderabad, India
[2]Department of ECE, ASIST, JNTUK Vijayawada, India
[1]mallikharjunag@gmail.com [2]padalasrinu@gmail.com

***Abstract*—In this paper, we present a scheme for performance analysis of spatial domain methods, namely, Laplacian, Arbitrary, Sobel and Prewitt operator methods for traffic control using an image processing with LabVIEW approach, including timing constraints are used to control the signal along the cross-road signal posts. In this paperwork, the reference image and the real-time image captured from the camera is loaded in the image acquisition of LabVIEW. To process the acquired image, four different methods of kernels namely Arbitrary, Laplacian, Prewitt and Sobel methods are used to obtain an edge detection image. The edge detection images have stored and captured images are compared and the Root Mean Square Error is calculated to estimate the timing constraints to operate the traffic signal lights on a four-lane dynamically. LabVIEW graphical programming tools are used for the development of the scheme and simulation results are shown. Finally, the performance of the four methods analyzed using an image quality metric RMSE value to estimate the time in order to allow the vehicles in a particular direction and dynamically to switch them on and off control from one particular direction to another.**

***Index Terms*—Image Processing, Laplacian operator, Arbitrary operator, Sobel operator, Prewitt operator, Traffic management.**

I. Introduction

The spatial domain method, namely Prewitt, Laplacian, Sobel and arbitrary [2,3] are used for edge detection of the stored image and acquired a real-time image. However, the performance analysis of kernel of four different spatial domain edge detection methods. The edge detection method used in time estimation and traffic control is lacking in the literature [4,5]. Therefore, we introduce the scheme using LabVIEW approach and the block diagram is shown in Fig. 1.

In prior, the empty road image is stored in the database, without any vehicles on the road [6]. The image is converted into an array, where four different edge detection methods are applied to convolve with the store image as well as the real-time image captured to generate edge detection of the stored image and the real-time image. The Root Mean Square Error metrics are applied to compute the result analysis of the stored and captured edge detected images. Based on the error obtained, the time estimation is calculated and applied to the traffic light display pole, then the vehicles are allowed to move in one direction to the other directions. The procedure is followed for all the directions dynamically with respect to the traffic density existing in the particular direction.

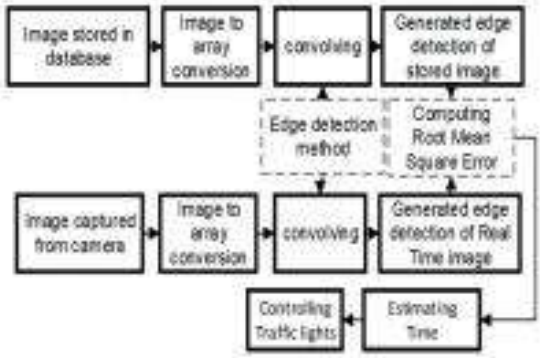


Fig. 1. Block diagram of the edge detection using spatial domain methods.

Therefore, four different spatial domain edge detection methods are applied to distinguish the edges of the original image. The major problem of the traffic signals is manually done by the traffic police. Hence, focused on annotation of timing without human intervention, using camera vision is the approach to reduce the human resource and computational cost. The Sobel operator edge detection method is a discrete differential operator to compute an approximated gradient of an image to change the intensity levels. The remaining three edge detection methods with different types of masks or kernels of the Laplacian (positive and negative) operators, Prewitt (vertical and horizontal) operator, arbitrary operator and Sobel (vertical and horizontal) operator are used for conducting a test on real-time images captured from the specified location. Further, the error estimation on the desired images is calculated to analyze and manage the timing with respect to the lane to switch on and off the signaling of the signal post.

The paper consists of seven sections. Section II states the related work with spatial domain, Laplacian, Prewitt,

978-1-5386-5024-6/18/$31.00 ©2018 IEEE

Performance Analysis of Different Transform Methods for Image Steganography: A LabVIEW approach

G.Mallikharjuna Rao
Department of ECE
CBIT, Osmania University
Hyderabad, India
e-mail: mallikharjunag@gmail.com

K. Deergha Rao
Department of ECE
VCE, Osmania University
Hyderabad, India
e-mail: korraidrao@yahoo.com

***Abstract*— In this paper, we present a scheme for performance analysis of transform methods namely DCST, FDOST, BIOR2.2 and Haar for image steganography using LabVIEW approach with four stego keys with one, two, three and four LSB bits to embed person details in person image (Online e-filing application form). In this work, hidden text message containing the personal details with different payload (1kbyte to 4kbytes) converted into binary, and then the binary hidden message is embedded into the cover image to obtain stego image. The stego image is transformed using DCST, FDOST, bior2.2, and Haar to produce DCST, FDOST, bior2.2 and Haar coefficients. The hidden message using different keys with the original image is retrieved by applying four different inverse transform methods. LabVIEW programming tools are used for the development of scheme presented and execution of the graphical code for simulation. Finally, the performance of the four methods is analyzed using image quality metrics PSNR and MSE with and without steganography.**

Keywords — Image steganography, Fast Discrete Orthonormal Stockwell Transform (FDOST), Discrete Cosine Stockwell Transform (DCST), Biorthogonal, HAAR

I. Introduction

The transform methods namely DCST, FDOST, bior2.2, and Haar [1, 2] used for compression of stego image [3]. However, the performance analysis of this methods and stego key with more than two LSB bits lack in the literature [4]. Therefore, in this paper scheme using LabVIEW approach presented, the block diagram of this scheme as shown in figure 1.

In the person image (cover medium), personal details (embedded message) are embedded using LSB technique to obtain stego image [5, 6]. Then by applying transformation methods to stego image to obtain transform coefficients by using four different transform methods and then transmitted through a medium to the receiver. At the receiver end, the selected inverse transformation method used to retrieve the stego image and LSB technique with correct stego key stood for searching precisely detectable structure in the extracted one, two, three or four bit/s, applied to obtain the text message. The right stego key [7] resolved through a thorough stego key search by measuring the samples of the embedding path. Steganography furnishes with the potential ability to hide the presence of the secret message and finding hardness of identifying the information embedded in an image.

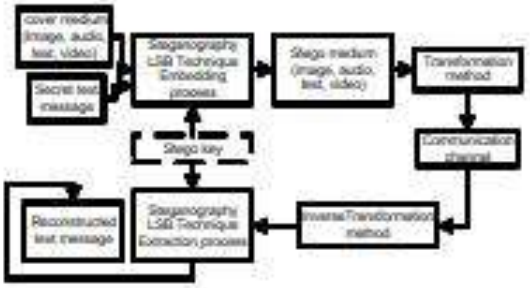
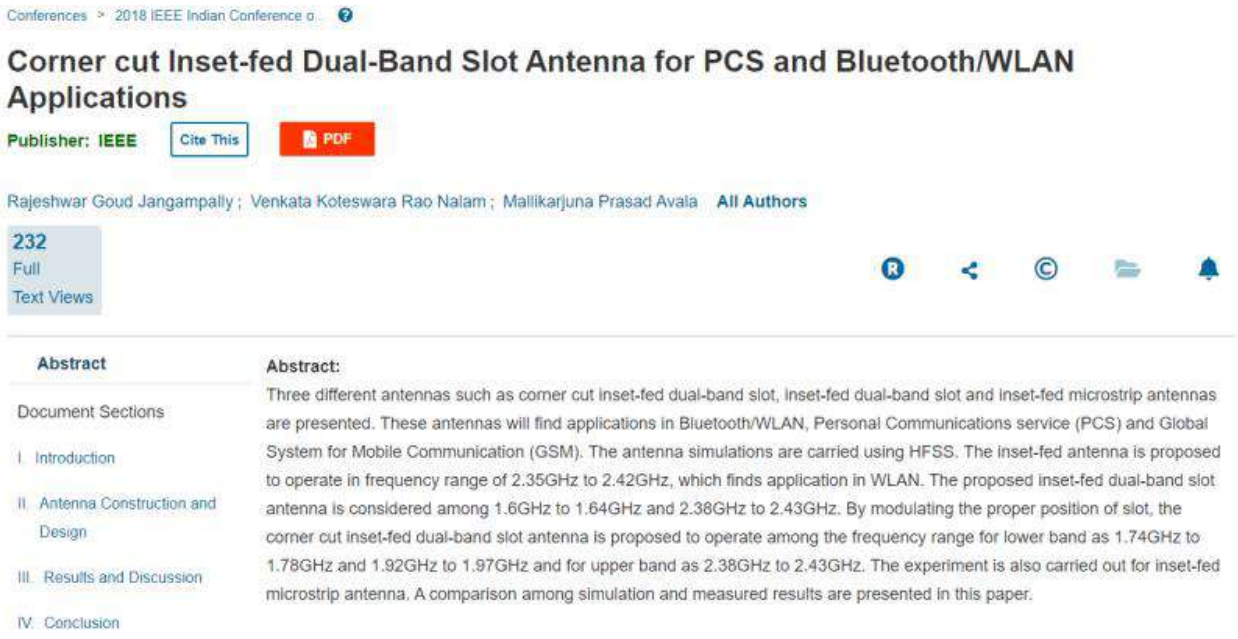


Fig. 1. Block diagram of steganography with transformation method

Therefore, four different compression methods on stego image applied and transform coefficients being to be transmitted. The related work on the multiresolution disintegration of the Stockwell Transforms (ST) [8, 9] is valuable but redundant and computationally costly. From the beginning of this, we will concentrate on its discrete orthonormal form, the DOST to accomplish the desirable efficiency and compactness. The DOST [10] is a readied adaptation of ST. The multiresolution analysis, the time-based resolution required for a low frequency in view of the sampling theorem. In general, individuals are dealing with low frequency dominated groupings in the field of image processing. In those groupings, the useful information kept in the low frequencies, which makes it sensible to drop some high-frequency information to accomplish a good approximation. Because of the multiresolution nature of the FDOST and Time-Frequency Representation (TFR), an approximation can be performed by dropping or controlling time - or/and frequency - specific FDOST coefficients [11]. Fast Discrete Orthonormal Stockwell Transform demonstrates that, various very straightforward modifications made to get different required properties. For instance, this paper presents a real valued Discrete Cosine based DOST (DCST) [12]. Finally, we apply the FDOST and DCST in the evolution of direct compression analysis and contrast with bior2.2, and HAAR compression.

978-1-5386-3695-4$31.00 ©2018 IEEE

“Wavelet Packet: A Multirate Adaptive Filter for De- noising of TDM Signal”
“Corner cut Inset-fed Dual-Band Slot Antenna for PCS and Bluetooth/WLAN Applications”



"Receiver Bias Estimation of Indian GAGAN System using FRB Technique for Equniox Days: Preliminary Results"

"Estimation of GNSS Receiver Bias using Fitted Receiver Bias (FRB) Method"

Estimation of GNSS Receiver Bias Using Fitted Receiver Bias Method

K. Praveena* , A. Supraja Reddy , D. Krishna Reddy*** , P. Naveen Kumar ******

**K.Praveena, PhD Scholar, ECE, University College of Engineering, Osmania University, Hyderabad, Telangana, India,E-Mail: kaithaipraveena@gmail.com*
***Dr.A. Supraja Reddy, Assistant Professor, Chaitanya Bharathi Institute of Technology, Hyderabad, Telangana, India, E-Mail: ammana.supraja@gmail.com*
****Dr.D. Krishna Reddy, Professor, ECE, Chaitanya Bharathi Institute of Technology, Hyderabad, Telangana, India,E-Mail: dkreddy@cbit.ac.in*
*****Dr.P.Naveen Kumar, Associate Professor, ECE, University College of Engineering, Osmania University, Hyderabad, Telangana, India,E-Mail: drnaveenkumarp9@gmail.com*

ABSTRACT

Global Navigation Satellite System (GNSS) is a collective term given to all the satellite based navigation systems that provides accurate user position, velocity and timing information anywhere in the world. Among various GNSS, GPS is the first operational GNSS. GPS positional accuracy is mainly affected by ionospheric time delay error, which depends up on, the Total Electron Content (TEC) (the integral of the electron density along the ray path between satellite and receiver, it provides the number of electrons per square meter). TEC measurements are corrupted by receiver instrumental bias. The instrumental biases occur due to the frequency dependent delays of analog hardware within the GPS satellite and receiver. Hence, to compute the user position, estimation of receiver bias is essential. One of the simple and less complex method for estimation of receiver bias is Fitted Receiver Bias (FRB) method. To carry out this work, GPS data was collected from two GPS receivers (NovAtel Dual frequency GPS receiver (GSV4004B) at Begumpet (Lat: 17.45°N Lon: 78.47°E) and (GPStation6 (NovAtel) at Hyderabad (Lat: 17.40°N Lon: 78.51°E)), India. In this paper, the receiver instrumental bias of two different receivers was estimated using FRB method. It was observed that estimated receiver bias for NovAtel receiver was -6ns and GPstation6 receiver was -11ns. Two GPS PRN satellites data were considered. In GSV4004B receiver, PRN16, PRN22 and in NovAtel receiver, PRN2, PRN12 satellites were considered. Before removal of instrumental bias, the TEC values obtained were negative values and after removing the receiver bias, the TEC values obtained were positive values. Hence, FRB method is very helpful for estimation of GPS instrumental biases, which greatly helps in improving the user position accuracy for Civilian Applications, such as transportation, search, and rescue operations etc.

Keywords: *Fitted Receiver Bias, GNSS, Receiver instrumental bias and Total Electron Content*

INTRODUCTION

Satellite navigation has evolved from being purely under the control of USA, Department of Defense. In the present day, there are multiple GNSS like GPS of USA, such as GLONASS of Russia, GALILEO of the European Union, and Beidou of China. Accordingly, there are Regional Navigation Satellite Systems (RNSS) like Indian Regional Navigation Satellite System (IRNSS) of India, and Quasi Zenith Satellite System (QZSS) of Japan. A user can determine his position - latitude, longitude, and altitude by receiving signals from these satellites with the help of an appropriate GNSS receiver. The position accuracy of GPS system is limited by

459

"IOT Based status tracking and controlling of motor in Agricultural Farms"

2018 5th IEEE Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON)

IOT BASED STATUS TRACKING AND CONTROLLING OF MOTOR IN AGRICULTURAL FARMS

Sri J.Balakrishna
Assistant Professor, Department of ECE
Chaitanya Bharathi Institute of Technology (A)
Hyderabad, India
balkrishna159@gmail.com

Mr. Himamsu Marellapudi
BE-V Sem., Department of ECE
Chaitanya Bharathi Institute of Technology (A)
Hyderabad, India
himamsu12@gmail.com

Dr. N. Alivelu Manga
Associate Professor, Department of ECE
Chaitanya Bharathi Institute of Technology (A)
Hyderabad, India
namanga04@gmail.com

***Abstract*— In India, majority of the population's income by any means depends on agriculture. So it is of cardinal importance to effectively use the technology to enhance vital resources. Nowadays husbandman in agricultural fields are facing many snags due to perceptual power cuts, lack of ground water, motor malfunction. The panacea to overcome motor problems is smart agriculture. This paper gives the solution using raspberry pi3, android and web applications to control the motor using parameters: circuit for tracking power status, ground water availability and motor status. An android application is developed in order to monitor the above three parameters and also to control the motor in farm accordingly.**

Keywords—IoT, Raspberry Pi3.

I. INTRODUCTION

IoT is the web of devices and gadgets to transfer the data with no or little human intervention. Hence, to gain high coherence, IoT works in collaterally with agriculture to obtain smart farming. In 21st century, many agricultural industries turned to adopt IoT for smart agriculture to improve efficiency, productivity, global market and other features such as minimum time, human intervention, and cost etc. The advancement in the technology drives the sensors to be more economic, reliable and small. As internet is also globally accessible, smart farming can be achieved with full pledge. Focusing on innovation in agriculture, smart farming is the panacea to the problems that agricultural industries is currently facing. The solution can be produced using smart phones and IoT devices. Farmer can get any required data or information as well can monitor his agricultural field.

II. IOT IN AGRICULTURE

Internet of things has been providing its audacity across the industries such as retail, banking, telecom industry, manufacturers and more. Amidst the various industries, the one sector it is quickly catching up with is, the agriculture. With the concept of digitization and smart farming, it is gaining popularity like never before and is coming with the potential to offer high precision crop control, data collection and automated farming techniques.

III. NEED OF IOT IN AGRICULTURE

A prediction by the food and agriculture arm of the United Nations (FAO) bluntly says, that the production of food worldwide should see an escalation of 70% by 2050 to feed the ever growing population. The industrial professionalists believe that IoT could play a vital role in meeting this need. Combined with data analytics, it can improve the efficiency of inputs like soil moisture, fertilizers, pesticides, monitoring the livestock and soil nutrition, predicting plant diseases, monitoring storage capacities like water tanks, and ensuring crops are fed and watered well through sensors and actuators. It shows an overall potency to increase the productivity with a reduced cost.

IV. PROBLEMS FACED BY FARMERS

We say India is an agricultural country. Yes, it feeds a billion people but let us acknowledge that ours is not a flourishing one. Agricultural sector is in a state of distress, which is severely affecting many farmers. Many farmers are committing suicides because of debt burden, loss of crop. The government has also announced many schemes to resolve these problems. But these schemes are not solutions to farmer's problems because it provides only temporary relief. We witness many suicidal deaths even after the announcement of these schemes. Some problems faced by them are as shown below.

A. Irregular Power Supply

The supply of power to Indian agriculture, vital for successful irrigation, is in particularly grave condition. Supply is neither reliable nor of the steady quality needed to avoid damaging the irrigation pumps it runs and severely disrupting irrigation and farming operations. The electricity supply is vital to farmers who use electric pumps to irrigate their fields

978-1-5386-5002-8/18/$31.00 ©2018 IEEE

International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075, Volume-X, Issue-X, don't delete Top & Bottom Header, & Fill up Manuscript details (1st Page, Bottom, Left Side)

A Bandwidth Enhanced U-Slot PIFA with defected ground structure for dual-band mobile Applications

T.Narasimha Murthy, Dr. A.V.Narasimha Rao, Dr. N. Bala Subhramanyam,

Abstract: ***The Planar inverted-F antenna (PIFA) is compact antenna and it is widely used in hand-held communication terminals. Despite their favorable features of excellent performance characteristics, low-profile and flexibility of integration, the PIFA is inherently of small bandwidth. Since present day need for multi band communication by a single device, there is necessity for a multi band PIFA. The present work proposes a novel configuration of Planar Inverted-F Antenna (PIFA) for dual band operation with bandwidth enhancement for hand-held wireless communication devices, which is achieved by modification of the physical structure of both radiating patch and of the ground plane. Simulated and measured results demonstrate that the new configuration covers two frequency bands with a considerable bandwidth improvement.***

Index Terms: Bandwidth, Cognitive Radio, Planner antennas, Resonance, Return-Loss, Ultra Wideband, HFSS.

I. INTRODUCTION

There has been an explosion of wireless communication technology in recent times in terms of bandwidth, multi-functionality and miniaturization. The imminent and considerably large commercial deployment of ultra-wideband (UWB) systems has spawned the need of ultra-wideband antennas. The fusion of different radio units into single radio unit has requires multi-band antennas [2].

In miniaturization of the hand held communication terminals, has put limitations on the physical size of the antenna and these aspects influence to choose the low profile, multi-band multi-functional and ultra wideband frequencies. The main drawback of many low-profile antenna designs are the narrow impedance bandwidth and which in turn affects the wideband functionality requirement. The need for multi functionality in terms of multi band operation gives rise to the ability of band-switch-ability of the antenna.

PIFA is having the feasible solution due to its reduced space in the device, its omni-directional pattern and its integrability as a circuit element. The operation of this antenna can be understood easily with the help of other techniques or technologies like, quarter-wavelength monopole and rectangular micro-strip technic. Dual band operation is achieved by cutting a U-slot on the radiating patch of PIFA, and operational bandwidth is enhanced by implementing a Defected Ground Structure (DGS). The U-shaped Slot in the radiation patch the antenna is divided into two categories like radiating patch antennas, the outer patch is working in the lower frequency band (900MHz) and the inner patch in the higher frequency band (1800MHz) [3]. A method of introducing narrow apertures in the ground plane which alters the distribution of currents in it, is a popular way to improve the bandwidth performance[5]. These slots in the ground plane would resonance at same frequencies and therefore may increase the bandwidth. PIFA can be simply represented by a capacitor with shorted plates so anything that lowers the capacitance and so the Q factor, that should result in enhanced band width.

Revised Manuscript Received on December 22, 2018.
T.Narasimha Murthy, Assistant Professor, FST, IFHE, ICFAI University, Hyderabad, India.
Dr. N. Bala Subramanyam, Professor and Head, Dept of ECE, GVPCE, Visakhapatnam, India.
Dr. A.V.Narasimha Rao, Professor, Dept of ECE, CBIT, Hyderabad

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

On the Suitability of Ionospheric Gradient Estimation Techniques for IRNSS based GBAS Applications

Supraja Reddy Ammana and A.D.Sarma
Department of ECE, Chaitanya Bharathi Institute of Technology (CBIT)
Hyderabad, Telangana, India
ammana.supraja@gmail.com, ad_sarma@yahoo.com

***Abstract*—Time-Step method and Station-Pair method are prominent techniques for estimation of spatial gradients. Since GBAS is meant to serve a limited area of about 50kms of an airport for aircraft Precision Approach and landing, these two methods were considered for gradient estimation within the GBAS service area. Much of the work on these techniques has been reported for GPS-based GBAS applications. In this paper, the suitability of these methods to IRNSS-based GBAS applications is investigated. It is observed that since IRNSS satellites are either GEO or GSO, the time interval (Δt), of Time-Step method should be significantly high (30min for GSO), to obtain gradient data for GBAS' service area. With the Station-Pair method, a dense network of stations, each separated by not more than 1-2 kms is required.**

Keywords— IRNSS, GBAS, Ionospheric spatial gradients, Time-step method

I. INTRODUCTION

Indian Regional Navigation Satellite System (IRNSS) is a regional satellite-based navigation system designed, developed and implemented by Indian Space Research Organisation (ISRO), to provide navigation services over Indian region. It consists of a combination of three satellite in GEO orbit (IRNSS 1C at 83°E, 1F at 32.5°E, 1G at 131.5°E with an inclination of −5°) and four satellites in GSO orbit (IRNSS 1A and 1B at 55°E, 1D and 1E at 111.75°E with an inclination of 29°±2°). All the satellites transmit on two frequencies namely L5 (1176.45 MHz) and S1 (2492.028 MHz). Both the signals experience a delay as they pass through the ionosphere, but S-band signals experience significantly less delay. Also, as India is located in equatorial/low latitude region, severe spatial as well as temporal variability of ionospheric delay is a common phenomenon in this region. The spatial variation of delay (named as spatial gradient) is an important parameter affecting the performance of Local Area DGPS systems like Ground Based Augmentation System (GBAS). Therefore, quantifying and characterizing the gradients is considered as a challenge in the design of robust GBAS systems. Time-step method Station-Pair method and Mixed-Pair method are prominent techniques for estimation of gradients [1],[2]. The suitability of Time-Step method and Station-Pair method was investigated for estimation of spatial gradients on GPS L1 signals within a limited area of 50 kms for Indian GBAS applications and found to be appropriate [3],[4]. In this paper, suitability of these techniques for estimating spatial gradients on IRNSS L5 signals is investigated for IRNSS-based GBAS applications.

II. METHODOLOGY

Data acquired from the IRNSS-GPS-SBAS receivers located at CBIT (17.39°N, 78.32°E) and Osmania University (17.24°N, 78.31°E) stations, Hyderabad, India, is used in this paper. Dual frequency measurements provide precise estimates of ionospheric delay [5]. Raw code and carrier measurements on L5 and S1 frequencies are extracted from the RINEX data. The ionospheric delay on L5 is estimated using code measurements and carrier-phase measurements following the standard equations [6]. The noisy code-based estimates of delay are smoothed using carrier phase-based estimates. The resulting smoothed estimates of delays are slant delays and converted to vertical delays by multiplying with standard Obliquity Factor [7]. The gradients of vertical ionospheric delays are computed using Time-Step method and Station-Pair method.

A. Time-Step method

In this method, the difference of the vertical ionospheric delays experienced by given satellite-receiver pair 'k' at two distinct epochs of time ($Id^{k}_{t1} - Id^{k}_{t2}$) is divided by the corresponding Ionospheric Pierce Point (IPP) separation distance (d) to obtain the gradient of vertical ionospheric delay ($VIG^{k}_{t1,t2}$).

$$VIG^{k}_{t1,t2} = \frac{\left| Id^{k}_{t1} - Id^{k}_{t2} \right|}{d} \qquad (1)$$

IPP latitude and longitude are computed using standard equations [8]. The time-interval ($\Delta t = t_1 - t_2$), can be chosen and varied in order to vary the IPP distance and thereby obtain gradients over the area of interest.

B.Station-Pair method

In this method, difference of vertical ionospheric delays ($Id^{k}_{R1} - Id^{k}_{R2}$) experienced by a pair of stations (R_{r1}, R_{r2}) is divided by the IPP distance (d) between the stations to estimate the Vertical Ionosphere Gradients ($VIG^{k}_{R1,R2}$).

$$VIG^{k}_{R1,R2} = \frac{\left| Id^{k}_{R1} - Id^{k}_{R2} \right|}{d} \qquad (2)$$

The gradients are computed for all the IRNSS satellites for several days using these two techniques (Eqns. 1 and 2). However, results due to IRNSS 1B on a typical day (15 May 2017) (1<Kp<5) are presented here.

978-1-5386-7105-4/18/$31.00 ©2018 IEEE