Centurion Journal of Multidisciplinary Research

Special Issue:

Proceedings of
3rd National Conference on
Mechatronics, Computing and Signal Processing
(MCSP-2022)

29th-30th April 2022

Centurion
UNIVERSITY
Shaping Lives...
Empowering Communities...

centurion university of technology and management

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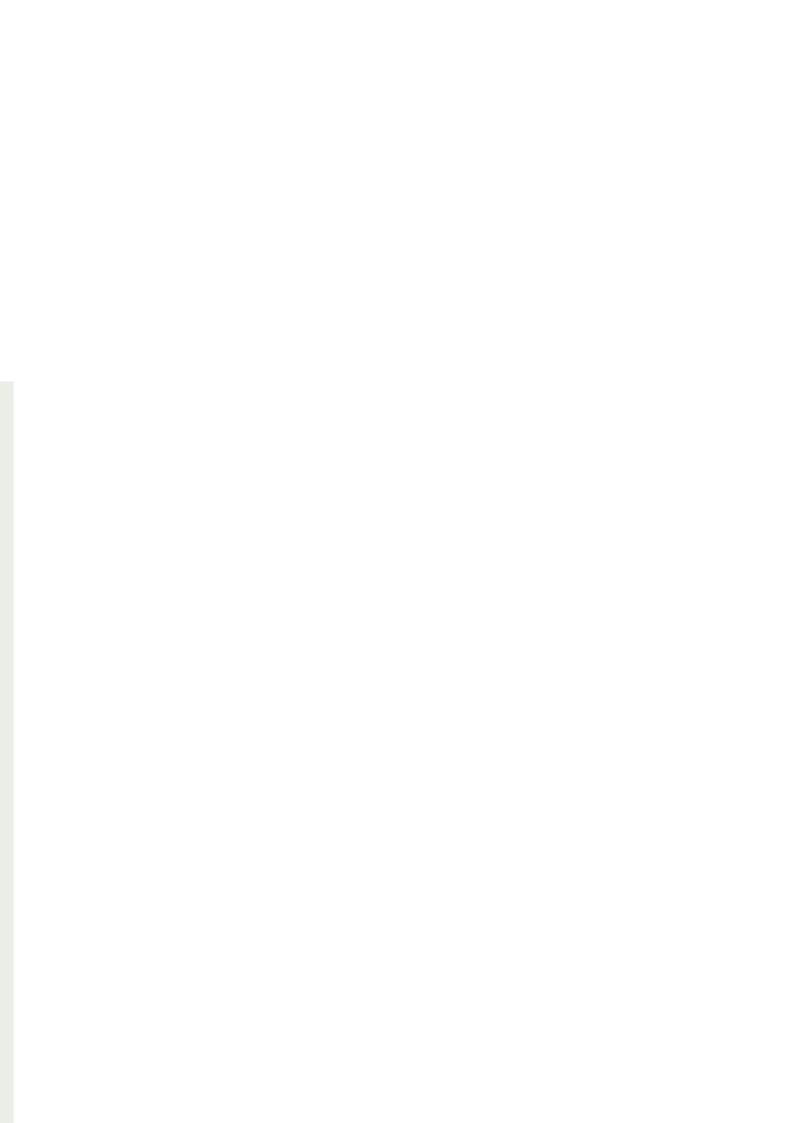
29th–30th April 2022

Organized by

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

School of Engineering & Technology

Centurion University of Technology & Management, Odisha

Website: www.cutm.ac.in|E-mail: mcsp@cutm.ac.in

Contents

Centurion University of Technology & Management

Centurion University is a State-enacted University which was established in the year 2010 by an act of the state legislature. Centurion University is accredited with NAAC "A" grade. School of Engineering Technology (SoET Bhubaneswar Campus) is a constituent college of Centurion University of Technology Management which is the First Multi-Sector State Private University in Odisha recognized by AICTE. SoET BBS draws on the experience of highly qualified faculties, emeritus professors and industry personnel. The Institute has excellent infrastructure and state-of-the-art equipment. The institute has a global perspective coupled with a global academic interface. Sprawling across 40 acres, Bhubaneswar Campus is located within the Bhubaneswar Development Authority (BDA) area, established in the year 2008. The institute presently has an intake of 1000 students across five branches. Bhubaneswar campus has created a unique niche by providing opportunities for inclusive education of international standards.

MCSP-2022

The scope of 3rd National Conference on Mechatronics, Computing Signal Processing is to provide a multidisciplinary platform for the exchange of ideas and knowledge among interested researchers, students, academician, and practitioners in the areas of Mechatronics, computing and Signal Processing. The conference will strengthen the relationships with other institutions and scientists, industry personnel and facilitate joint research programmers in these highly challenging areas.

Messages

<u>Message</u>

It is a matter of great delight that Centurion University of Technology and Management, Odisha is organising 3rd National Conference on Mechatronics, Computing and Signal Processing- MCSP-2022, on 29th and 30th April 2022. I am happy to note that the institute has been consistently focusing on imparting high-quality education in various fields of engineering and technology, since its establishment in 2005.Technology is rapidly evolving and getting upgraded with new innovations day by day. Our institution provides right ambience for research and encourages both students and faculty to think innovatively to keep pace with the changing trends. I welcome all the delegates for their interest towards participating in this conference. I am sure that this conference will serve as a befitting platform for researchers, industry personnel, academicians, and post graduate students with research intent to deliberate on their research findings, experiences, and innovative ideas. I extend my appreciation to the organising committee and the participants from various parts of the globe for their valuable contribution.

Prof. (Dr.) Supriya Pattnayak
Vice Chancellor, Centurion University of Technology and Management, Odisha

<u>Message</u>

It gives me immeasurable pleasure to announce that the Centurion University of Technology and Management, Odisha is organising 3rd National Conference on Mechatronics, Computing and Signal Processing- MCSP-2022, on 29th and 30th April 2022.A conference of such nature portrays the institute's interest and dedication towards research and development which needless to spell is the need of the hour. I understand that the forum will aim at bringing the research scholars of the world under one roof as they would deliberate and share their expertise and research ideas on science and technology. I would also like to express my appreciation to the organizing committee for their enthusiasm, commitment, dedication, and sincere work in organizing the event. I wish the conference a grand success.

Prof. (Dr.) Anita Patra
Registrar, Centurion University of Technology and Management, Odisha

Message

I am extremely happy to know that the ECE department of Centurion University of Technology and Management is organizing the 3rd National Conference on Mechatronics, Computing, and Signal Processing to be held in Bhubaneswar, India on 29th and 30th April 2022. It will cover multidisciplinary fields of engineering such as mechanical, electrical/electronics, control systems, computer science, signal processing, IoT, etc. Nowadays no research can succeed without a multidisciplinary approach. Thus, this conference is highly relevant to modern-day research. It will enhance our knowledge base. I welcome all the speakers and participants to make the event successful. I thank the organizing committee for their wholehearted effort.

Prof. Dipankar Bhattacharyay
Pro-Vice-Chancellor (Research and Learning)
Centurion University of Technology and Management, Odisha

It is my immense pleasure to welcome you all to 3rd National Conference on Mechatronics, Computing and Signal Processing- MCSP-2022, on 29th and 30th April 2022. MCSP-2022 provides an opportunity for the meeting of Researchers, Engineers, Scientists, and specialists in the various research and development fields of Engineering and Technology. The conference offers a premise for global experts to gather and interact intensively on the topics of Mechatronics, computing, and Signal Processing. I hope eminent speakers will cover the theme computation and innovation from different perspectives. I am privileged to say that this conference will offer suitable solutions to the global issues. Organizing such an event at this point of time underlines our objectives of creating an atmosphere for the exchange of ideas for development. I would also like to thank the organising committee for their passion, commitment, dedication, and earnest efforts in putting the event together. I wish you all the best for the conference.

Prof. Jagannath Padhi
Director, Centurion University of Technology and Management, Bhubaneswar

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Message

It gives me immense pleasure to know that Department of Electronics and Communication Engineering is organizing 3rd National Conference on Mechatronics, Computing and Signal Processing- MCSP-2022, on 29th and 30th April 2022.This conference is undoubtedly an invaluable opportunity for an exchange of views and ideas amongst the speakers, academicians, and scholastic participants. The theme of the conference is quite relevant considering the research prospects in the country. The endeavour is indeed laudable. The participants will get scope to enlighten themselves with latest development and research directions from the galaxy of eminent speakers on different aspects of Science, Engineering and Technology. I take this opportunity to welcome all the delegates and hope this conference will reap benefits to all stake holders. I congratulate the organisers for this endeavour and extend good wishes to the associated members and delegates involved in organising this conference.

Prof. (Dr.) P.K. Mohanty
Dean, Academics, Centurion University of Technology and Management, Odisha

Welcome Address

We are pleased to welcome you to the 3rd National Conference on Mechatronics, Computing, and Signal Processing on (online conference through Zoom) will be held in Bhubaneswar, India on 29th and 30th April 2022, and it will provide a unified communication platform for researchers in the topics of Mechatronics, computing, and Signal Processing. This conference enables interdisciplinary collaboration of science and engineering technologists in the academic and industrial fields, as well as networking internationally. During the conference, there will be substantial time for presentation and discussion. Attendants will find various activities useful in bringing together a diverse group of engineers and technologists across the disciplines for the generation of new ideas, collaboration potential and business opportunities.

<div align="right">

Dr. Harish Chandra Mohanta, HOD, ECE
Conference Organizing Chair

</div>

Speakers

Keynote Speaker: Dr. D. P. Kothari

Title of Talk: Energy and environment problems facing the third world and their probable solutions for sustainable development and poverty alleviation

Dr. D. P. Kothari obtained his BE (Electrical) in 1967, ME(Power Systems) in 1969 and Ph.D. in 1975 from BITS, Pilani, Rajasthan. From 1969 to 1977, he was involved in teaching and development of several courses at BITS Pilani. Earlier Dr. Kothari served as Vice Chancellor, VIT, Vellore, Director in-charge and Deputy Director (Administration) as well as Head in the Centre of Energy Studies at Indian Institute of Technology, Delhi and as Principal, VRCE, Nagpur. He was visiting professor at the Royal Melbourne Institute of Technology, Melbourne, Australia, during 1982-83 and 1989, for two years. He was also NSF Fellow at Perdue University, USA in 1992. He also taught at Melbourne University Australia for one semester in 1989. Dr. Kothari, who is a recipient of the most Active Researcher Award, has published and presented 812 research papers in various national as well as international journals, conferences, guided 50 Ph.D scholars and 68 M. Tech students, and authored 50 books in various allied areas. He has delivered several keynote addresses and invited lectures at both national and international conferences. He has also delivered 42 video lectures on YouTube with maximum of 40,000 hits! Dr. Kothari is a Fellow of the National Academy of Engineering (FNAE), Fellow of Indian National Academy of Science (FNASc), Fellow of Institution of Engineers (FIE), Fellow IEEE ,Hon. Fellow ISTE and Fellow IETE. His many awards include the National Khosla Award for Lifetime Achievements in Engineering (2005) from IIT, Roorkee. The University Grants Commission (UGC), Government of India has bestowed the UGC National Swami Pranavandana Saraswati Award (2005) in the field of education for his outstanding scholarly contributions. He is also the recipient of the Lifetime Achievement Award (2009) conferred by the World Management Congress, New Delhi, for his contribution to the areas of educational planning and administration.

Recently he received Excellent Academic Award at IIT Guwahati by NPSC-2014. In last two months he has received 6 Life Time Achievement awards by various agencies on 19th February, 4th March, 11th March, 18th March, 20TH March and 25th March 2016, respectively. On 20th April 2016 he received 'Living Legend' Award in Chennai Conference. Currently Dr. Kothari is with Wainganga College of Engineering Management, Nagpur serving as Director Research .He is also chairman board of governors of THDC Institute of Hydropower Engineering and Technology ,Tehri.
Wikipedia Link: http://en.wikipedia.org/wiki/D.P.Kothari.

Keynote Speaker: Dr. P. K. Biswal

Title of Talk:Neuromorphic Computing: Concepts and Applications

Dr. Pradyut Kumar Biswal obtained his M.Tech and Ph.D. from Visvesvaraya National Institute of Technology, Nagpur and Indian Institute of Technolgy, Kharagpur in 2002 and 2011 respectively. He has teaching experience of around 16 years. Currently, he is positioned as an Assistant Professor in International Institute of Information Technology, Bhubaneswar, India. He teaches Microprocessor Microcontroller, Digital Signal Processing, Digital Image Processing, VLSI Design. His research interest includes Architecture design for signal and image processing algorithms, Biomedical signal and image processing, Hyperspectral image processing.He is a Senior Member of IEEE, USA and associate member of IEI (India). He has published around 70 research papers in international journals and conferences. He is acting as a reviewer in IEEE transactions of Image processing, IEEE transactions of Circuits and systems, BSPC Elsevier, Springer, and many International Journals. He has guided 4 Ph.D. thesis and currently 4 doctoral students are working under him.

Invited Speaker: Dr. V. Ravi

Title of Talk:Data Acquisition Using LabVIEW

Dr. Ravi V is an Assistant Director, Startup Incubation Centre, Vellore Institute of Technology, Chennai, India. He is an Associate Professor in the School of Electronics Engineering at Vellore Institute of Technology, Chennai. Prior to this appointment, he worked as a senior validation engineer at Microchip Technology Chennai and UTC Aerospace, Bangalore. He has overall 20+ years of experience which includes automated test equipment design, IC characterization, product validation, electrical and functional testing, prototype product development, and teaching. Ravi V has received the award of "Best Continuous Improvement Event of the year 2010" from UTC Aerospace, Bangalore. He has published 35+ research articles in the international journals, book chapters and conferences. His research areas include semiconductor memory design and testing, brain inspired computing, IC characterization, Internet of Things, and deep learning in VLSI.

Invited Speaker: Dr. M Azees

Title of Talk:Security in wireless communications

Maria Azees received the B.E. degree in electronics and communication engineering and the M.E. degree in applied electronics from the St. Xavier's Catholic College of Engineering, Nagercoil, India, which is affiliated under Anna University, Chennai, India, in 2011 and 2013, respectively, and the Ph.D. degree from the Faculty of Information and Communication Engineering, Anna University, in 2017. He is currently working as a Senior Assistant Professor with the GMR Institute of Technology, Rajam, India. He has already published the research articles in some of the reputed journals, such as the IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS, IEEE TRANSACTIONS ON INDUSTRIAL INFORMATICS, Cluster Computing (Springer), and IET Intelligent Transport Systems. His research interests include security in wireless sensor networks, blockchain technology, and VANETs. He is currently one of the Academic Editor of Security and Communication Networks (Wiley).

Invited Speaker: Dr P. S. Subudhi

Title of Talk: Wireless Electricity: From Magic to Reality

Partha Sarathi Subudhi, (M'15-SM'21, IEEE) completed his Bachelor of Technology in "Electrical Engineering" from Biju Patnaik University of Technology, Odisha, India in 2012 and Master of Technology in "Power Electronics and Drives" from Vellore Institute of Technology, Chennai, India in 2015. He then went on to join for a full-time Ph.D. with the School of Electrical Engineering (SELECT), Vellore Institute of Technology (VIT) from 2015 to 2020. Currently, he is an Adjunct Professor with the Department of Electrical and Electronics, Faculty of Engineering and Architectures, Nisantasi University, Istanbul, Turkey. He has been working as an Assistant Professor with the Department of Electrical Engineering, Bajaj Institute of Technology (BIT), Wardha, Maharashtra, India since 2021. He is an Editor of International Journal of Power and Energy Systems, Acta Press, and a Guest Editor of River Publisher. He is also managing editor of IEEE Educational Videos on Power Electronics. He is an active member of IEEE PELS. Dr. Subudhi is a member of the IEEE Technical Committee 9 (TC 9) on Wireless Power Transfer Systems. Recently, he got selected as a member of publication committee of IEEE PELS TC9. He is also a member of IEEE Technical Committee 12 (TC 12) on Energy Access and off Grid System. He is also a member of the IEEE PELS Educational.

Invited Speaker: Dr. R. Arun Sekar

Title of Talk: Blockchain Technology and its Impact

Dr. Arun Sekar Rajasekaran received his Bachelor's degree in Electronics and Communication engineering from Sri Ramakrishna Engineering College in 2008 and his Master's degree in VLSI Design in 2013 and his Doctorate of philosophy in Low Power VLSI design from Anna University, Chennai in 2019. He is currently working as an Assistant professor in the Department of Electronics and Communication Engineering at GMR Institute of Technology, Rajam, Andhra pradesh. He has nearly 12 years of Teaching experience. He had published more than 24 papers in International conferences and 23 reputed Indexed Journals namely, IEEE Transactions on Industrial informatics, Springer, (Microprocessor and microsystems, Computers and electrical engineering) Elsevier, IET communications, IEEE Access and Concurrency and computation (Wiley) publications. His areas of interest are Low power VLSI design, Network security, Blockchain, Body area networks and Image processing. He is a life member of ISTE, IETE, ISRD and IEANG.

Invited Speaker: Dr. Ram Narayan Patro

Title of Talk:Techniques for Hyperspectral Image Pre-Processing and Classification
Dr. Ram Narayan Patro received the B.Tech. degree in electronics and communication engineering from BPUT, in 2009 and the M.Tech. degree in VLSI and embedded system design from Jawaharlal Nehru Technological University, Hyderabad, India, in 2015. He has completed the Ph.D. degree in Electronics and Communication Engineering with the IIIT in 2021, Bhubaneswar, India. Currently he is working as Senior Technical Content Developer for MathWorks India. His research interests include remote sensing, signal processing, image processing, band selection, machine learning, and embedded system.

Invited Speaker: Dr. M. Sundararajan

Title of Talk: Nanomaterials for Energy and Environmental Applications Dr. M. Sundararajan, currently working as Assistant Professor in Department of Physics, Paavendhar College of Arts and Science, M.V South, Salem. I completed my under graduation (B.Sc Physics) from Arignar Anna Govt. Arts College, Attur-Salem. Then I acquired my B.Ed degree from T.S.M College of Education, Kallakurichi. I pursued my post graduation (M.Sc Physics) from Thanthai Hans Roever College, Perambalur. I completed my M.Phil from Loyola College, Chennai. I pursued my Ph.D from VIT University, Chennai. Now I have published 37 Scopus index journals and 5 paper under review. Further, I have received total citation of 798 and h index 13. For 2015-2016, I received best researcher award and also in the year of 2018 and received the best Doctoral thesis award from VIT Chennai. In the year 2021, I got international young scientist award from VDGOOD technology factory Mysore-India. Further, life member of Energy Science Society of India. Already I have delivered 5 quest lecture in various topics of Material Science and applications. I have collaboration with multiple National and International Universities. My research area includes Energy and Environment, Spectroscopy and Solar Cell etc., I have Guiding M,Sc, M.Phil and Ph.D students.

Sessions & People

Schedule

Friday, April 29, 2022
Session 1
11:00AM –11:15AM – Inauguration
11:15AM– 1.15PM – Key Note Talk 1- Dr. D. P. Kothari
1:15PM – 2:15PM – Lunch Break
Session 2
2:15PM – 2:45PM – Invited Speaker Talk 1- Dr. M. Sundarajan
2:45PM – 4:00PM – Paper Presentation
4:00PM – 4:45PM –Invited Speaker Talk 2- Dr. Ravi V.
5:00PM – 6:00PM – Paper Presentation

Saturday, April 30, 2022
Session 1
10:00AM –11:00AM – Key Note Talk 2- Dr. P. K. Biswal
11:15AM– 11.45PM – Invited Speaker Talk 3 – Dr Partha Sarathi Subuddhi
11:45AM– 12.15PM – Invited Speaker Talk 4 – Dr. Azees M.
12:15PM – 1:00PM – Invited Speaker Talk 5 – Dr. Arun Sekhar R.
1:00PM – 2:00PM – Lunch Break
Session 2
2:00PM – 2:30PM – Invited Speaker Talk 6 – Dr. Ram Narayan Patro
2:30PM – 5:00PM – Paper Presentation
5:00PM – 5:15PM –Valedictory Session

Paper Presentation Schedule

Sl. No.	Title &Authors	Name of Presenter	Affiliation	Day & Session
1	A. Tony Dhiwahar, Cu1xMgxF e2O4(0 x 0.5) ferrite spinel nanoparticles for photocatalytic activity towards rhodamine B under visible light irradiation.	A. Tony Dhiwahar	Urumu Dhanalakshmi College, Tiruchirappalli, India	Day 1, Session 2
2	Mahendra Kumar Swain, Decentralized LoRa-IoT Architecture Integrated with Blockchain to Manage Supply chain in Agriculture 4.0	Mahendra Kumar Swain	Persistent System Ltd. Bangalore	Day 1, Session 2
3	P. Sree Roopa, E. Lakshmi Sirisha, A. Nitheesh Sri Raj, V. Jagan Naveen, Noise Removal in Speech Processing Using Spectral Subtraction	P. Sree Roopa	GMRIT, RAJAM	Day 1, Session 2
4	K. Durga Prasad Reddy, M. Sravan, K. Akhil, P. Harsha Vardhan, K. Sandeep Komal, R Arun Sekar, Smart Street Light Controller	K. Durga Prasad Reddy	GMRIT, RAJAM	Day 1, Session 2
5	B.M.S. Sreenivasa Rao, K. Lokesh Subrahmanyam, N. Sravya, P. Vamsi Krishna, M. Abhishek, M.CH.V Ravi Kumar Distance Measurement Based on Gyration	B.M.S. Sreenivasa Rao	GMRIT, RAJAM	Day 1, Session 2
6	P. Annan Naidu, T. Himabindu, L.Mohan Kumar, B.Venu, B. Sri Ram Precision Farming with IOT	P.AnnanNaidu	AITAM.TEKKALI	Day 1, Session 2
7	K. Navya Manjeera, P. Deekshita, M. Mukesh, J. Prem Sai, K. Uday Kiran Child Proofing Intelligent, Home Appliance System	K. Navya Manjeer	GMRIT, RAJAM	Day 1, Session 2
8	sankararao Majji, Asisa Kumar Panigrahy, Ion Sensitive Field Effect Transistor as a Bio-compatible Device	sankararao Majji	GRIET,HYDERABAD	Day 1, Session 2
9	I Siddhartha Narayana, Sri Malini Sankara, Narayana N, Shaik Abdul Naeem, Punna Sandeep, GPS Tracking and Live Monitoring Women Safety Device Using IoT	I Siddhartha Narayana	GRIET,HYDERABAD	Day 1, Session 2
10	B. M. S. Sreenivasa Rao, D.Guna Venkat, N. Rajesh, K. Hemanth, N. Naga Sivaji, K. Sudheer Naidu Wireless AC Power Detector and Smart Watering System	B. M. S. Sreenivasa Rao	GMRIT, RAJAM	Day 1, Session 2
11	P Tulasi Radhika, Optimization of CSA for low power and high performance using MTCMOS and GDI logic	P Tulasi Radhika	GITAM Univerity, Hyderabad	Day 1, Session 2
12	Shikha Sahu, A Pine Shaped Dual-Band Frequency Reconfigurable Antenna	*Shikha Sahu*	VSSUT, Burla	Day 1, Session 2
13	Sai Ram Dandyala, Govardhan Ganesh, Design and Implementation of Arduino based Alert System for prevention of COVID-19	Sai Ram Dandyala	CUTMAP	Day 1, Session 2
14	Bhargav Sandeep, I Siddharth, A Smart Sanitary napkin incinerator for smart cities	Bhargav Sandeep	CUTMAP	Day 1, Session 2
15	A Subramanyam, Voice Based Smart Home Automation System	A Subramanyam	CUTMAP	Day 1, Session 2
16	Smart Home Safety and Security Using Sensors	Siva Gangadhar	CUTMAP	Day 1, Session 2

Sl. No.	Title &Authors	Name of Presenter	Affiliation	Day & Session
17	Pooja Maharatha, Genetic Algorithm Optimized PID Controller for Frequency Control of Islanded Microgrid System	Pooja Maharatha	VSSUT, Burla	Day 2, Session 2
18	G. P. Rautaray, H. C. Mohanta, S. Mohanty Design of a circular ring monopole antenna for wideband applications	G. P. Rautaray	GITA,Bhubaneswar	Day 2, Session 2
19	S. K. Samal, H. C. Mohanta, Design of a Reconfigurable Ultra-Wideband (UWB) Antenna for Pattern Diversity Applications	S. K. Samal	Pune Business School, Maharashtra, India	Day 2, Session 2
20	A. Ashok, Microwave combustion synthesis of spinel CoFe2O4 - CuFe2O4 nanocatalysts for biodiesel production from waste cooking oil	A.Ashok	VIT, Chennai, India	Day 2, Session 2
21	B. Arunadevi, Synthesis and characterization of zinc doped cobalt oxide nanoparticles by microwave assisted combustion technique	B.Arunadevi	BASCW, Salem, Tamil nadu, India	Day 2, Session 2
22	Dabbeeru Bhargavi , Banitha Kumara Sahu, Varisa Mouli, Sachin Kumar Patro ASIC Implementation of Modified Floating point number Architecture	Dabbeeru Bhargavi	CUTM,Odisha	Day 2, Session 2
23	Ram Sikil Ray, Vikasah Kumar, Siddharth Kumar, Nawab Ahsan, Bhuwneshwar kumar Design and Implementation of Universal Serial Bus Protocol	Ram Sikil Ray	CUTM,Odisha	Day 2, Session 2
24	M. Indhumathi , P. Devu Babu ,M. Tarakeswara Rao, Bikash Kumar Nayak, Design of Compressors for Fault Tolerant Applications	M. Indhumathi	CUTM,Odisha	Day 2, Session 2
25	Ch Chandu, Ch Mayukha, Kamal Nayan, A Sai Krishna ASIC Implementation Of 32-Bit RISC-V Processor	Ch Chandu	CUTM,Odisha	Day 2, Session 2
26	Lalbabu Prashad,Harish Ch. Mohanta, A Single Notch Coplanar-Fed Crescent Patch antenna for UWB application	Lalbabu Prashad	CUTM,Odisha	Day 2, Session 2
27	S J Sreeram Pullakavi, Bh V S R K Ayyappa Kumar An Intellectual Cheval Glass	S J Sreeram Pullakavi	Ideal Institute of Technology, Kakinada, Andhra Pradesh	Day 2, Session 2
28	Abhinna Das, Sandip kumar Das, A Study on Fast Charging of Electric Vehicles and its Impact with Solutions	Sandip kumar Das	DIET, Odisha, India	Day 2, Session 2
29	Harsh Dhawalia, Md. Azam Ansari, Binit Kumar Ram, M. Kisan Kumar Design and Implementation of Real-time Traffic light control System using Verilog	Harsh Dhawalia	CUTM,Odisha	Day 2, Session 2
30	Deba Priya Manna, Anwesha Mohanty, Smart Irrigation Control	Deba Priya Manna	CUTM,Odisha	Day 2, Session 2
31	Chinmay R. Goswami, Sumedh R. Burse, Hrishikes, G. Borkar, Vaishnavi N. Arjun, Animesh U. Shende, Astha S. Naware, Dr. Partha Sarathi Subudhi Grid Interfaced Solar Wireless Charger For Two-Wheeler Electric Vehicles	Chinmay R. Goswami	Bajaj Institute of Technology, Wardha	Day 2, Session 2
32	Anjali Kumari, Sweeti kumari, Bipul Kumar, Subham Kundu, Prabhat Ranjan, Prince Kumar Bharti, Janni Abhishek Design and Implementation of 16-bit MIPS Processor	Anjali Kumari	CUTM, Odisha	Day 2, Session 2

Committee Members

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24 Mr. Nimay Chandra Giri
Mrs. Bhabani Dash

$Cu_{1-x}Mg_xFe_2O_4(0 \geq x \geq 0.5)$ **ferrite spinel nanoparticles for photocatalytic activity towards rhodamine B under visible light irradiation.**

A. Tony Dhiwahar

Department of Physics, Nehru Arts and Science College, Coimbatore, Tamil Nadu, 641 105, India.
PG and Research Department of Physics Urumu Dhanalakshmi College, Tiruchirappalli, Tamil Nadu, 620 020, India.

Magnesium substituted copper ferrite nanoparticles have been prepared via microwave combustion method. The XRD data affirm the presence of cubic spinel structure. The average crystallite size was observed to lie within 19 to 22 nm obtained with aid of Debye Scherrer's formula. The HR-SEM analyses exhibited agglomerative sphere-shaped nanoparticles and the elemental compositions Mg, Cu, Fe and O was obtained using energy dispersive X-ray analysis. For the prepared samples band gap values were seen to lie within 2.30 eV – 2.10eV attained with the help of diffuse reflectance spectroscopy. For all samples, in the visible band in the middle of 415 and 450 nm, when photoluminescence emissions occurred, violet emissions were seen corresponding to the existence of oxygen vacancies. The hysteresis curves were used to infer remanent magnetization (Mr), coercivity (Hc), and saturation magnetization (Ms). The prepared nanoparticles were subjected to photocatalytic degradation (PCD) of rhodamine B under the influence of visible light. The copper ferrite spinel system reacts with H2O2, resulting in a fenton-like process. In comparison to the other samples, the CMF4 sample exhibits superior photocatalytic performance. The possible mechanisms amenable for the PCD method are elaborated.

Decentralized LoRa-IoT Architecture Integrated with Blockchain to Manage Supply chain in Agriculture 4.0

Mahendra Kumar Swain

Persistent System Ltd., Bangalore

The Internet of Things (IoT) has brought a revolution in technological era, where objects around us will be connected and interact with each other to perform certain tasks without human intervention. Features like vision, self-configuration and intelligence could be incorporated into the IoT architecture to improve preciseness. The idea gives a descriptive analysis of block chain in to customized IoT architecture for various domain applications like agriculture, smart city, smart traffic management, industrial IoT etc. A blockchain based LoRa architecture has been proposed for agricultural application and implementation to solve spade to spoon analogy. The impact of block chain IoT (BIoT) has been discussed in reference to traditional cloud centric applications.

Noise Removal in Speech Processing Using Spectral Subtraction

P. Sree Roopa, E. Lakshmi Sirisha, A. Nitheesh Sri Raj, V. Jagan Naveen

GMRIT, Rajam, India

At the time of transmission via any media, signals get affected by unwanted components; which are adverse but inevitable. Elimination of such unwanted components termed as noise. The presence of noise in speech can significantly reduce the intelligibility of speech and degrade performance. Noise is characterized by a short burst of acoustic energy, with a wide spectral bandwidth. Typical acoustic noises include sounds of machine gun firing, of rain drops hitting a hard surface like the windshield of a moving car, of typing on a keyboard, of indicator clicks in cars, of clicks in old analog recordings, of popping popcorn and so on. One difficulty with removing noise from speech is the wide temporal and spectral variation between different parts of speech, such as the periodic and low-frequency nature of vowel signals and the random and high-frequency nature of consonants. So, removing noise from transmitted signals has remained an important as well as puzzling task for the researchers since the preliminary days of Digital Signal Processing. Among a significant number of techniques proposed for removal of noise from signals, use of digital filters has become most effective in multiple ways. Among a considerable number of techniques, use of different window functions for implementation of digital filters is most acceptable. Here, a new strategy has been proposed for optimizing parameters to design a digital filter using Blackman window functions. A new innovative objective function has been introduced for optimization that performs based on the signal de-noising capability of the filters implemented by the optimized sets of parameters.

Smart Street Light Controller

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Generally, street lights are switched on for whole night and they are switched off during the day. But during the night time, street lights are not necessary if there is no traffic. Saving of this energy is very important factor these days as energy resources are getting reduced day by day. The proposed system consists of Arduino uno, LDR, PIR sensor. The LDR in our circuit works as a variable resistor. The resistance of the LDR changes based on the light intensity .This system controls the street lights using light dependent resistor and PIR Sensor. Street lights are switched on depending on the intensity of the light on LDR and also depending the vehicle moment using PIR sensor. When the vehicle enters, they are detected by their motion and intensity, then the street lights are automatically switched on for some time and they switched off automatically if there is no motion at that time.

Genetic Algorithm Optimized PID Controller for Frequency Control of Islanded Microgrid System

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In the evolving era, microgrid wins the heart in all power fields. Among that DC configuration achieved more demand because of its less complex structure, low cost, more reliability, and more power quality and last but not the least the control scheme is less complex than AC microgrid. Management of power and energy are the evolving traits adopted by researchers now a days. This project mainly aims at the stable operation of microgrid. With increasing pollution and over population we require to enhance our power generation capability keeping environment in consideration. Only way is to adapt to Renewable power generation and incorporate into our grid. Solar energy is plentiful and it can be harnessed very easily with various means. Wind energy can be harnessed by Wind Turbines. But integrating renewable energy comes with its own challenges.Despite the global energy crisis and the increasingly atmospheric pollution, distributed generation integration with renewable energy is becoming a potential trend in technology. Finally, attention has been paid to the recent challenges to the microgrid system. As different energy sources such as solar, wind, fuel cell, and Diesel engine generator; Distributed energy resource, Distributed generator, Flywheel energy storage, Fuel cell; can be incorporated into the microgrid, it is important to control the power flow between the sources. An attempt is made in this project to study the hybrid system consisting of a three energy sources, namely wind energy, photovoltaic power source and Battery. Each of the three energy sources is controlled to deliver uninterrupted power supply to the load. A control strategy for the management of power flows with solar , wind and other energy sources in micro grid are discussed. Given that voltage profile regulation is critical an algorithm is evaluated in MATLAB / SIMULINK environments for different charging conditions and variations in solar and wind energy. This also gives rise to transient in frequency and tieline power response. This should be mitigated with advanced controllers and techniques. This paper contains a study of load frequency control of single area power system which contains thermal, Solar, and wind power generation unit. The power system also contains energy storage systems. Energy storage systems will help us combat over loading during peak hours and assists the generator in retaining synchronicity. In an interconnected power system slight change in load demand can give rise to

frequency perturbance and power deviation. Load frequency control is done for the purpose of suppressing the frequency and power deviations. The frequency of single area should be maintained and tie line power should be kept at the rated value. Load frequency control commonly includes control strategy for a power system which is able to rein in systems back to stability in case of disturbance. The standard controllers used are unable to perform the task optimally hence advanced controllers are required to be brought in for more complex power systems.

Design of a circular ring monopole antenna for wideband applications

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A humble and compacted circular ring serrated wideband monopole antenna has been proposed in this article. The proposed antenna consists of a circular monopole antenna, which was connected through a $50-\Omega$ microstrip fed line and a round-cornered finite ground plane. It exhibits a very wide frequency band from $5{\sim}20GHz$ with a voltage standing wave ratio less than 2. By employing a U-shaped parasitic element near the round corned finite ground plane and a T-shaped stub inside the radiating patch, a single band-notched characteristic in the frequency band of $5.2{\sim}5.825$ GHz, industrial scientific and medical (ISM) band is generated. In order to realize the second band-notched function for X-band satellite communication systems $(7.2{\sim}8.4GHz)$, a U-shaped slot has been inserted in the round-cornered finite ground plane. The required dimension of the proposed antenna is $24mm \times 30mm \times 0.787mm$. It is a miniaturized antenna as compared to the existing wideband monopole antenna.

Design of a Reconfigurable Ultra-Wideband (UWB) Antenna for Pattern Diversity Applications

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A cross configuration of an ultra-wideband (UWB) directional antenna for multi-directional array functions has been proposed in this article. The CPW (Coplanar Waveguide) UWB prototype was originally designed as a basic antenna to obtain a virtually unchanged radiation pattern on a circuit board. This basic antenna is coupled to a similar antenna in a four-element cross configuration to perform an array function. The proposed structure provides high isolation of the intermediate element of 10 dB or more with a voltage-to-wavelength ratio (VSWR) of less than 2 in the $7.5\,GHz\,to\,10.7\,GHz$ frequency range. The transmission characteristics and operating frequency range of the proposed antenna are investigated. The simulated result shows that the proposed antenna is suitable for UWB beam applications. The simulated directional UWB antenna is united with alike antennas printed on both sides of the substrate in a cross-symmetrical arrangement to achieve the characteristics of a multidimensional radiation pattern. The transient array is designed so that the antenna elements do not come into direct contact with the antenna.

Distance Measurement Based on Gyration

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Generally to measure a distance from one place to another place it will be a difficult task with measuring tape. It is impossible to measure more than 30m.It will consume most of our time, strength and errors may occur due to long distance. In order to measure long distances in an efficient manner and to decrease the effort for people. The wheelmeter will be an useful and affordable measuring instrument it is a type of rolling tape that is considered to be a simplified version of measurement . The primary purpose is to determine the approximate distance from one location to another location. Each revolution of the wheel measures the specific distance, in terms of yard, centimeter, meter, inches. Thus counting revolutions with a mechanical device attached to the wheel measures the distance directly. It can be commonly used by people who need an easy way to find accurate distance from one place to another place. When the Rotary encoder rotates, it sends the pulses to Arduino. Output pins of the rotary encoder are connected to pin D3 and pin D3 of Arduino .Arduino identifies the rotation and direction (clock wise or anti clockwise)of the wheel. Arduino counts the pulses and converts them in distance by using some basic mathematical operations, called calibration. Now calculated distance is shown on the LCD. Which makes our work much easier compared to another measuring instrument.

Precision Farming with IOT

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Nowadays population Is increasing. bigger harvests are needed to feed it. with traditional farming, a great deal of land is unused and yields no crop, roots cannot go deep enough into the soil to take up water and mineral salts. The most recent of IoT (internet of things) Advances bring about level of simplification and enables every farmer to get benefit and Precision farming makes use of information technologies in agriculture. It provides a frame work within which farmers can more accurately understand and control what happens on their farms. by using of sensors, we manage the sufficient water level, humidity, temperature level. this work presents over view of precision farming through IOT.

Child Proofing Intelligent Home Appliance System

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In this proposed work, a childproof based intelligent home appliance system is designed to preserve the kids from unwanted contact with home appliances and to save the power from unfortunate functioning of those devices because of the kids. The main objective of this proposed work is to develop an intelligent home appliance system with the support of an Arduino UNO which will ask a password on the LCD display which is attached with the Arduino to check whether the person using the smart appliance is an adult or a kid. If he is the adult, he can type the password correctly using the keypad and hence the appliance will be unlocked properly with the help of the Arduino. Here, it is assumed that the password is only known by adults in the home. If the password is not being typed correctly, then he is considered as a kid and the appliance will not be allowed to function by the Arduino. Moreover, a system generated alert message will be given to the registered mobile number of the home user. Therefore, this system can be really useful for making an object safe environment for the children.

Ion Sensitive Field Effect Transistor as a Bio-compatible Device

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The ion-sensitive field-effect transistor (ISFET) is one of the most sensitive and adaptable sensors available, and it may be employed in modern complementary metal-oxide semiconductor (CMOS) techniques. Potentiometric sensors, such as ISFETs, are getting prominence among sensor scientists and industrialists due to their small size, power efficiency, as well as compatibility with industry-standard CMOS technology. These past decades have been broken down into three distinct time periods, which we describe in detail in this paper to give an overview of what has been accomplished in the field over this. This work, briefly reviews about history, characteristic of the ISFET, and further discussion is performed about vivid applications of the ISFET.

GPS Tracking and Live Monitoring Women Safety Device Using IoT

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Women's safety has long been a big worry in many parts of the world. Every day, we witness multiple acts of violence against women. As a result, we introduce a GPS-based Live Monitoring Women Safety Device that makes use of the Internet of Things. If a woman feels she will be in danger, she can engage this system. It's helpful since a lady may or may not be able to use the emergency button when a problem arises. If a woman is struck in the head by an emergency button push alerting system from behind, she may never have the chance to press the panic button, and no one will ever know she is in danger. As a result, this device will be able to solve the problem as it uses voice enabled technique for activation of the device.

Microwave combustion synthesis of spinel CoFe2O4 - CuFe2O4 nanocatalysts for biodiesel production from waste cooking oil

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The purpose of this work is to develop the magnetically separable cobalt ferrite and copper ferrite nanocatalysts for biodiesel production from waste cooking oil. The nanocatalysts were synthesized by microwave assisted combustion process. The catalysts were characterized by XRD, FTIR, HR-SEM, EDX, DRS and VSM analysis. The results showed that the ferrite nanoparticles are the cubic spinel structure and ferromagnetic performance with soft magnetic in nature. The cobalt ferrite is the better catalytic activity for the transesterification reaction between waste cooking oil and methanol. The highest biodiesel yield 97% was achieved using cobalt ferrite nanocatalsyt under the reaction conditions such as 4 wt% catalyst weight, 21:1 methanol to oil molar ratio, 65^oC of reaction temperature and 1 h reaction time. Cobalt ferrite catalyst is reused for 10 times with small reduction of biodiesel yield and ferrite catalyst was separated easily from the reaction medium using external magnetic field. Furthermore, the physicochemical property of prepared biodiesel was compared with standard ASTM method. The biodiesel composition was determined using gas chromatography-mass spectrometry (GC-MS) analysis.

Wireless AC Power Detector and Smart Watering System

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Agriculture is the primary sector and is the fundamental resource of food production. Agriculture has done in the countryside, where the power cuts are frequent. Farmers rely on current to turn on their motors for irrigation. For this, they need to stay in the field looking for when the power will come. Using this simple non-contact AC Power Detector, we can identify the presence of AC voltage in the wire. The modern home automation system provides security and a blissful life at residence. That is why the popularity of using home automation technology is increasing day by day. Today's World is moving to digitalization where everything is made easy and comfortable for youth and senior citizens. This project aims at detecting AC Power using wireless and notifying the farmers that power came. The farmers get notifications to their smartphones via webpage or email. Thus, farmers can control the motor from a remote location over smartphones. This project uses the Node MCU esp8266 microcontroller and the Blynk application.

Optimization of CSA for low power and high performance using MTCMOS and GDI logic

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The basic structure in any arithmetic block is an adder circuit. Hence, by optimizing the adder circuit, high operation speed and low power consumption can be achieved. Several kinds of adders have been proposed to reduce the worst-case propagation delay from least significant bit (LSB) to most significant bit (MSB). The Carry Select Adder (CSA) is one of the adder architectures that reduces the carry propagation delay by grouping sub-block of adders. In microprocessors, digital signal processors, various kinds of arithmetic building blocks such as adder / subtraction, multiplier/divider and shifter are required to compute binary data. The priority of data path can be operation speed, low power consumption, area or design time. The most important design goals in many cases are high operation speed and low power consumption. The basic operation involved in any analog, digital, control system, DSP's is addition. Performance and reliability of almost every digital system is depends on performance of adder. Over the decade, many adder architectures are proposed and still research work is going on adder to obtain best results in power, delay and power delay product (PDP). In this paper we proposed one of the fastest adder architecture called Carry Select adder (CSA) and optimization is done for performance parameters like delay and power using GDI (Gate Diffused Input) and MTCMOS techniques. Implementation has been done in gpdk 90nm technology using Cadence tool.

A Pine Shaped Dual-Band Frequency Reconfigurable Antenna

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In recent years reconfigurable antennas have attracted a lot of attention in the modern wireless systems. In satellite communication and ECM system there has always been a continuous demand for smaller size, lighter weight antenna system that has properties to accomplish selectivity in frequency, bandwidth, polarization and gain. A frequency reconfigurable antenna is proposed for wireless communication. We can achieve Frequency reconfiguration by modifying physical or electrical dimensions of the antenna using RF-switches, impedance loading or tunable material. The design and simulation of the proposed antennas are done using ANSYS HFSS version-19. Here re-configurability is achieved by RF-switches placed in the radiator. The antenna analysis is done by taking different conditions of switch. Antenna fabrication and measurement of different parameters will be done in future. A comparison of measured result will be analyzed with some existing antenna outcomes.

Synthesis and characterization of zinc doped cobalt oxide nanoparticles by microwave assisted combustion technique

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The pure and Zn^{2+} ion doped cobalt oxide nanoparticles were synthesized by microwave combustion technique with help of L-arginine fuel. The single cubical phases obtained by both the nanoparticles were confirmed by XRD analysis with significant shift at higher angles are identified. The optical band gap defines the quantum confinement effect of synthesized nanoparticles. In between $479 - 662 cm^{-1}$ band regions, the presence of metaloxygen ion have exposed the creation of cobalt oxide in FTIR spectra. The pure and Zn^{2+} ion doped cobalt oxide exhibits super paramagnetic behaviour. The decrement and increment in coercivity (Hc) and retentivity (Mr) have enhanced the super paramagnetic nature by addition of Zn^{2+} ions. Consequently, the synthesized $(Co_{1-x}Zn_xO)$ nanoparticles are well suited for optoelectronic, magnetic and catalytic applications.

ASIC Implementation of Modified Floating point number Architecture

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Floating point numbers are the quantities that cannot be represented by integers, either because they contain fractional values or because they lie outside the range re presentable within the system's bit width. Multiplication of two floating point numbers is very important for processors. Architecture for a fast floating point multiplier yielding with the single precision IEEE 754-2008 standard has been used in this project. The floating point representation can preserve the resolution and accuracy compared to fixed point. Pipeline is a technique where multiple instructions are overlapped in execution. Multiple operations performed at the same time by pipeline will increase the instruction throughput. In several high performance computing systems such as digital signal processors, FIR filters, microprocessors, etc multipliers are key components. System Verilog is a hardware description language that is mainly used for design verification. However, it might as well be used for implementation of synthesizable complex designs. The most important aim of the design is to make the multiplier quicker by decreasing delay. Decrease of delay can be caused by propagation of carry in the adders having smallest amount power delay constant.

Design and Implementation of Arduino based Alert System for prevention of COVID-19

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In this paper, an alert system that ensures safety from COVID-19 pandemic as it is fully touch proof. What If the person who came to the house cannot find the doorbell or if the person has fever or if they maybe covid affected, what can be done to ensure? If an automatic alert system which could check the temperature of the awaiting person and find instructions whether it is safe or not to let them inside and alert the insider. There would no more hassles. The guest of the house does not require to search for the doorbell and touch any of the home surfaces. This automatic alert system using object detection circuit on the door itself, the circuit will automatically sense the presence of the person and alert the residents.

A Smart Sanitary napkin incinerator for smart cities

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The problem of improper disposal of menstrual waste is a major problem in clean India. This waste is problematic for many reasons. Heaps of napkins infested with disease causing germs pose danger to the health and hygiene of the society. The proposed system uses safe scientific process of disposal of sanitary napkins by incinerating them to ash, at comparatively low temperatures. Systems bleach napkin utilizing fire, without letting the procedure generated in, by the smoke established burner. This measure has to be taken to fix the issues that, usage of napkins triggers to the health and also to the environment.

Voice Based Smart Home Automation System

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Automation is a trending topic in the 21st century, making it play an important role in our daily lives. The main attraction of any automated system is reducing human labour, effort, time and human errors. With the development of modern technology, smart phones have become essential for every person. Applications are being developed on android systems that are useful to the society in various ways. Another upcoming technology is voice-based processing which enables us to command and control things with our voice. This paper presents a microcontroller-based voice-controlled home automation system using smartphones. Such a system will enable users to have control over every appliance in his/her home with their voice. All that the users need is an android smartphone, which is present in almost everyone's hand nowadays, and a control circuit the control circuit consists of a microcontroller, which processes the user's commands and controls the switching of devices. The connection between the microcontroller and the smartphone is established via Bluetooth, a widespread wireless technology used for sharing data.

Smart Home Safety and Security Using Sensors

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Home safety and security is a circuit that Detects any fire, gas leakage, smoke, and it starts alerting and displaying in LCD. Fire sensor will sense the fire whenever fire comes. Motion sensor will sense whenever the object is moving. Door sensor is used to sense the door is opened or closed. Smoke sensor will sense smoke whenever smoke comes. Gas sensor will sense the gas whenever the gas leakage occurs. The AT89c51 is a low power, high performance C-MOS 8-bit micro computer with 4k bites of flash programmable and erasable read only memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with industry standard MCS-51 instruction set and pinout. The main objective of the project is to design and demonstrate the Home safety and security using sensors. Our project consists of fire sensor, door sensor, gas sensor. Fire sensor to sense the fire with smoke and rise in temperature. Door sensor to sense the opening or closing of door. Gas sensor to sense the gas leakage occurrence.

Design and Implementation of Universal Serial Bus Protocol

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The Universal Serial Bus (USB) is a two wire, bi-directional serial bus interface. The USB2.0 specifications define three types of USB implementations depends on data transmission rates, those are Low Speed (1.5MHz) only (LS), Full Speed (12MHz) only (FS) and High Speed (480MHz)/Full speed (12MHz) (HS). USB consists of Transmitting and Receiving sections, in which the Transmitter of the USB sends data to different USB devices through D+ and D- lines whereas the Receiver gets data on the same lines. This presentation reveals Implement using CADENCE of USB with HS/FS transmission rate providing with USB 2.0 specifications. Further USB has been designed by using Verilog code and simulated, synthesized and programmed to the targeted Spartan2 family of Implement using CADENCE environment.

Design of Compressors of Fault Tolerant Applications

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Approximate multipliers are widely being advocated for energy-efficient computing in applications that exhibit an inherent tolerance to inaccuracy. Approximate circuits have been considered as a potential alternative for error-tolerant applications to trade off some accuracy for gains in other circuit-based metrics, such as power, area and delay. In this work Approximate Arithmetic circuits such as Adders and Multipliers are designed. Bitwise pixel addition and subtraction of two gray scale images of the same size is performed by using approximate adder circuit and compared with the images obtained by exact addition and subtraction method. To corroborate the above observation, performance metrics like Mean Square Error (MSE), Peak Signal to Noise Ratio (PSNR), Mean Absolute Error (MAE), Average Distance (AD) are deduced in python.

ASIC Implementation Of 32-Bit RISC-V Processor

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This paper targets the design and implementation of a 32-bit RISC Processor using Verilog (Hardware Description Language). As IC chip design involves complex computations and intense usage of resources, by using an HDL we can save resources and time by implementing it using the software approach. The implementation strategies have been followed the RISC architecture. A lot of tools and hardware description languages were created allowing engineers to implement their designs in an easier and more efficient way. Verilog is a hardware description language that is mainly used for design verification. The processor has 32-bit arithmetic and logical instruction set which has been designed and simulated. The instruction set is extremely simple and it gives an insight into the kind of hardware that would be required to execute the instructions accordingly. The ALU, instruction memory, program counter, register file, control unit and memory have been integrated in the proposed processor. All the modules in the design are coded in Verilog to ease the description, verification, simulation and hardware implementation. The blocks are designed using the behavioural approach.

A Single Notch Coplanar-Fed Crescent Patch antenna for UWB applications

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A coplanar-fed crescent patch antenna with single notch band characteristics for Ultrawideband (3-10 GHz) applications is proposed. The circular patch in addition with elliptical shaped patch is introduced in the resonating band to obtain wider bandwidth. The crescent patch is evolved from circular patch antenna by itching circular hole inside uniformly. The proposed antenna is designed on FR4 substrate with dielectric constant 4.3 and size of the overall antenna is 50×50×1.6 mm3. From simulation results a notch band of 772MHz from 3.32GHz-4.09GHz and in the pass band maximum return loss of -51.1dB at 8.02 GHz with a gain of 1.74dBi is observed. Antenna characteristics and impedance bandwidth shows better performance in the UWB (3-10GHz) region. The proposed antenna is designed and simulated using CST Studio tool.

An Intellectual Cheval Glass

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In this globalization era, the smart mirror was one of the innovations for a futuristic physical entity interconnected with many applications. Smart mirror is a creative appliance that combines contextual details with the use of Raspberry Pi 3 to provide the interactive user interface on the mirror surface. The approach involving smart mirror research, hardware and software design, prototype creation, implementation and finally the evaluation stages must be taken care of in order to build this smart mirror.

A Study on Fast Charging of Electric Vehicles and its Impact with Solutions

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The Electric vehicles are revolutionizing the present global scenario due to depletion in fossil fuels to meet the standards required for better techno-economic feasibility and for a green environment. The long duration in charging is a major issue in electric vehicle, several companies like ABB, Hyundai. Tesla has come up with several fast-charging solutions to meet these Global challenges. In this paper the classification of electric vehicles is discussed with different power electronics interfaces like DC-DC converter like buck-boost converter topologies. Different motors like DC motor and AC motors used for light motor vehicle and heavy vehicles are discussed with differential mechanisms are also discussed. The impact of EV fast charging and the impact on grid stability and other power quality issues under islanded and on grid mode are also analyzed briefly in this paper. To compete with IC engine-based vehicles the charging time should be reduced to 10-15 minutes as per the global standard, Nickel Cadmium and other conventional batteries are being replaced by Lithium-Ion batteries due to toxic emissions, therefore fast charging topologies are becoming prominent embedded with different EV software and Optimization techniques based on algorithms like PSO techniques, Artificial neural network, Fuzzy logic etc. which are briefly analyzed and discussed.

Design and Implementation of Real-time Traffic light control System using Verilog

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The traffic in road crossings /junctions is controlled by switching ON/OFF Red, Green Amber lights in a particular sequence. The Traffic Light Controller is designed to generate a sequence of digital data called switching sequences that can be used to control the traffic lights of a typical four roads junction in a fixed sequence. It is also proposed to implement the day mode and night mode operations. It plays more and more important role in modern management and control of urban traffic to reduce the accident and traffic jam in road. It is a sequential machine to be analyzed and programmed through a multistep process. The device that involves an analysis of existing sequential machines in traffic lights controllers, timing and synchronization and introduction of operation and flashing light synthesis sequence. The methods that are used in this project are design the circuit, write a coding, simulation, synthesis and implement in hardware. In this project, XILINX Software was chosen to design a schematic using schematic edit, writes a coding using Verilog HDL (Hardware Description Language) text editor and implements the circuit on Programmable Logic Device [PLD].

Smart Irrigation Control

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An automatic irrigation control system has been designed to facilitate the automatic supply of adequate of water from a reservoir to field or domestic crops in all agricultural seasons. One of the objectives of this work is to see how human control could be removed from irrigation and also to optimize the use of water in the process. The method employed is to continuously monitor the rain prediction, level of water in the tank and ultimately the soil moisture level to decide whether irrigation is needed, and how much water is needed in the soil. A pumping mechanism is used to deliver the needed amount of water in the tank and then to the soil. The work can be grouped into four subsystems namely; rain sensing unit, water level sensing unit, soil moisture sensing unit and pumping subsystems along with the plus point of giving the on and off status of pumps via messages to the farmer which make up the automatic irrigation control system. A rain sensor is constructed to know about the raining status as it would a loss of money and water if irrigation is done during raining seasons. An ultrasonic sensor is also used to prevent overflowing of water from water tank along with the use of soil moisture sensor to know the moisture content of soil. Also, two pumps are used among which one is the tank pump and other one is watering pump. At last, a GSM module is used to give the ON and OFF status of pump via messages to the farmers phone.

Grid Interfaced Solar Wireless Charger For Two-Wheeler Electric Vehicles

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This feature reduces the overall size of the system thus the reliability of the system increases. Significant research has been pursued over the last two decades in the development of efficient EV charging methods. This project includes the equivalent circuit analysis and characteristics of the CPT system, designs for the charging plates, leakage inductance reduction, advanced compensation topologies, power transfer level enhancement, and misalignment toleration. At kilowatts power level, the transfer distance increases from several millimetres to several hundred millimetres with a grid to load efficiency above 90%. The wireless power transfer (WPT) method is the technology that will set humans free from annoying wires. By introducing WPT in EVs, the obstacles of charging time, range, and the cost is easily mitigated. The improved controller adopted in this system operates smoothly in order to select the available source to charge the EV wirelessly. A DC-DC efficiency as high as 92% was achieved, showing the value of the proposed topology. This project explains a novel WPT technique that is applied to charge EV. In fact, WPT technology is developing rapidly in recent years. In this system, an improved wireless coupler is used which has the capability to eliminate the harmonics present in the voltage and current automatically without the need for additional filters. In the proposed system, a wide input voltage range is achieved by duty control while the output voltage is inherently load-independent, and this eliminates the need for an extra DC-DC converter. The improvement in these factors has been essential for the implementation of EV charging. Furthermore, the system is extended to transfer PV power wirelessly. During cloudy conditions or at night, the PV power is insufficient to charge the EV. Therefore, the system is integrated into the utility grid in order to charge the EV uninterruptedly during low power generation from the grid. Deficiency in the availability of petroleum products has given rise to the incorporation of electric vehicles (EVs) globally as a substitute for the conventional transportation system. The advances make the WPT very attractive to electric vehicle (EV) charging applications in both stationary and dynamic charging scenarios.

Design and Implementation of 16-bit MIPS Processor

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MIPS16 enables embedded system designers to reduce costs by decreasing the size of memory required to run their application by up to 40 percent compared to traditional 32-bit software implementations. In addition to providing advanced code density, MIPS16 also achieves a high level of power efficiency, and performance equivalent to that of 32-bit only implementations. MIPS16 also improves the instruction cache hit rate. It is supported by hardware and software development tools from MIPS and other providers. The aim of the paper present is to design implement a 16-bit MIPS processor. MIPS is also called (Microprocessor without Interlocked Pipeline Stages). The MIPS architecture contains 6 different pipeline stages such as Instruction Fetch stage, Instruction Decode stage, Execute stage, Memory Stage, Write Back stage, Register, Hazard Detection Unit. Now a top module has been obtained and implemented in cadence using ASIC design flow, both fronted and backend design is obtained along with different reports such as power, area and timing. We have used some different tools such as nclaunch, RTL compiler and encounter. Static timing analysis has been done in different stages of backend (physical) design and the optimization is done in each stage. The testbench result of the different sub modules are obtained along with the top module. The simulation results are presented to validate the project work.