

DEPARTMENT OF

ELECTRONICS AND COMMUNICATION ENGINEERING

ANVESHAN (A HALF YEARLY NEWS LETTER)



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Bapatla Engineering College (Autonomous) GBC Road, Mahatmajipuram, Bapatla, Andhra Pradesh 522102











Bapatla Engineering College :: Bapatla (Autonomous) Mahatamajipuram, Bapatla-522102 Department of Electronics and Communication Engineering

ANVESHAN – A Half Yearly News Letter (Volume 3, Issue 1, July- December 2023)

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Department of Electronics and Communication Engineering

ANVESHAN – A Half Yearly News Letter (Volume 3, Issue 1, July- December 2023)

S.No	Description	Page No.
1.	College & Department History	1
2.	POs & PSOs	2
3.	Message from the Principal & HOD	3
4.	Journal & Book Chapter Publications	4
5.	Conference Paper Presentations	6
6.	Patent Publications	14
7.	Events Organized	19
8.	Events Attended by the Faculty	24
9.	Faculty Achievements	27
10.	Student Achievements	27

INDEX

ABOUT THE COLLEGE

Bapatla Engineering College (Autonomous) was established by Bapatla Education Society in the year 1981 and is reckoned for its academic excellence in engineering & sciences with NAAC A+. It is a constituent institution of Acharya Nagarjuna University and is one of the best private engineering institutions in the southern region. BEC offers graduate courses in 8 disciplines with total intake of above 1000 students, 5 post-graduate courses in CSE, CAD/CAM (Mech), PE (EEE), SE (CIVIL) and CESP (ECE). The College is a little away from the din and bustle of Bapatla, a town with a historic and hoary past, about 75 Km. south of Vijayawada on Chennai-Vijayawada rail route. All departments have well equipped laboratories in addition to the common facilities of workshops, central library, state-of-art central computing facility, sports facilities and Innovation Centres that houses research and testing facilities for industrial projects and technology labs to promote inter-disciplinary research activities.

ABOUT THE DEPARTMENT

The Department of Electronics & Communication Engineering was established in 1981 and has experienced, well-qualified, committed and motivated faculty with specializations in various streams. Currently ECE department offers a 4 year Graduate Program (B.Tech) in Electronics & Communication Engineering (ECE) and 2 year Post-Graduate (M.Tech.) program in Communication Engineering & Signal Processing (CESP), The Department was accredited thrice by NBA of AICTE. Department has 33 faculty and are members of professional bodies like ISTE, IEEE, IETE and CSI. Having state of the art laboratories to gain good knowledge in the field of Electronics, Communication, Microwave, VLSI, DSP& Image Processing, Networking, Microprocessor and Microcontroller, the department has its own fingerprint and is demonstrated in various academic and research activities conducted at the college level.

VISION

➤ To produce globally competitive and socially responsible Electronics and Communication Engineering graduates to cater the ever-changing needs of the society.

MISSION

- > To provide quality education in the domain of Electronics and Communication Engineering with advanced pedagogical methods.
- To provide self-learning capabilities to enhance employability and entrepreneurial skills and to inculcate human values and ethics to make learners sensitive towards societal issues.
- > To excel in the research and development activities related to Electronics and Communication Engineering.

PROGRAM OUTCOMES (PO'S)

Engineering Graduates will be able to:

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12. Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSO'S)

A graduate of the Electronics & Communication Engineering Program will be able to:

PSO1: Develop and implement modern Electronic Technologies using analytical methods to meet current as well as future industrial and societal needs.

PSO2: Analyse and develop VLSI, IoT and Embedded Systems for desired specifications to solve real world complex problems.

PSO3: Apply machine learning and deep learning techniques in communication and signal processing.

MESSAGE FROM PRINCIPAL



Dr. Nazeer Shaik Principal, Bapatla Engineering College

I am delighted to know that our Electronics and Communications Engineering department is launching ANVESHAN (A Half-Yearly News Letter, Vol.3 Issue 1, July-December 2023). A common perception that ECE faculty members are hardworking is reflected in their achievements and I am glad that they are published in a News Letter format. Happy to know that good number of patents and research articles were published by both faculty and students. Hard work is always rewarded and there is no substitute for hard work. I wish a great success to the faculty members of ECE Department in all the academic and research activities in future.

MESSAGE FROM HOD



Dr. B. Chandra Mohan Professor & HOD

It gives me immense pleasure in writing a foreword to this ANVESHAN (A Half-Yearly News Letter, Vol.3 Issue 1, July-December 2023) by the ECE department. Every faculty member has an innate talent which is not explored often. The talent might be curricular or co-curricular. In the present context, in addition to the core subject knowledge, the faculty should be able to communicate effectively in both oral and verbal form. Conventional approaches in the design, simulations and algorithms are changing rapidly due to the tremendous progress in the artificial intelligence arena. It is necessary for the faculty to update themselves and be ready to meet the expectations of the industry and academia. Hope this newsletter will give a glimpse of the various research articles and patents published by the faculty and students of Electronics and Communication Engineering.

JOURNAL & BOOK CHAPTER PUBLICATIONS

Micromachines, Vol.14, Issue 8, pp. 1545-1563, July 2023, ISSN: 2072-666X

Design and Analysis of Modified U-Shaped Four Element MIMO Antenna for Dual-Band 5GMillimeterWave Applications

Chandrasekhar Rao Jetti¹, Tathababu Addepalli², Sreenivasa Rao Devireddy³, Gayatri Konni Tanimki¹, Ahmed Jamal Abdullah Al-Gburi^{4,*}, Zahriladha Zakaria^{5,*} and Pamarthi Sunitha²

¹Department of ECE, Bapatla Engineering College (A), Bapatla 522102, Andhra Pradesh, India ²Department of ECE, Aditya Engineering College, Surampalem 533437, Andhra Pradesh, India ³Department of ECE, Koneru Lakshmaiah Education Foundation, Vaddeswaram522302, Andhra Pradesh, India

⁴Center for Telecommunication Research & Innovation (CeTRI), Fakulti Teknologi Kejuruteraan Elektrikal dan Elektronik (FTKEE), Universiti Teknikal Malaysia Melaka (UTeM), Ayer Keroh 75450, Malaysia

⁵Centre of Telecommunication Research & Innovation (CeTRI), Fakulti Kejuruteraan Elektronik dan Kejuruteraan Komputer (FKEKK), Universiti Teknikal Malaysia Melaka (UTeM), Durian Tungal 76100, Malaysia

*Correspondence: ahmedjamal@utem.edu.my (A.J.A.A.-G.); zahriladha@utem.edu.my (Z.Z.)

Abstract: A novel compact slotted four-element multiple input multiple output (MIMO) planar monopole antenna is proposed for 5G mmWave N257/N258 and N262 band applications. The antenna, with dimensions of 12 mm \times 11.6 mm \times 0.508 mm, is fabricated on a Rogers RT/duroid 5880 (tm) substrate with a relative permittivity of 2.2 and a dielectric loss tangent of 0.0009. The suggested antenna consists of four U-shaped radiating elements (patches) on top of the dielectric material and a slotted ground on the bottom. The radiating elements are fed by a 50-ohm microstrip line feed. To improve the impedance performance of the MIMO antenna, a rectangular strip of 1.3 mm \times 0.2 mm and a couple of rectangular slots are added to each radiating element. The first operating band at 27.1 GHz, ranging from 25.9 GHz to 27.8 GHz, is achieved by using slotted U-shaped radiating elements. The second operating band at 48.7 GHz, ranging from 47.1 GHz to 49.9 GHz, is obtained by etching hexagonal slots on the ground. The antenna design achieves an isolation of >27 dB through the orthogonal positioning of radiating elements and slots on the ground. The designed antenna operates at 27 GHz (N257/N258) and 48.7 GHz (N262) bands, exhibiting stable radiation patterns, a peak gain of >5.95 dBi, radiation efficiency of >90%, an envelope correlation coefficient of $<10^{-6}$, a total active reflection coefficient of \leq -10 dB, channel capacity losses of <0.03 bits/sec/Hz, and a mean effective gain of \leq -3 dB. The simulated and measured results of the antenna show good agreement, making it well-suited for 5G mmWave communication applications.

Keywords: 5G mmWave, impedance matching, isolation, mutual coupling and multiple input multiple output (MIMO).

Optimization Driven Spike Deep Belief Neural Network classifier: a deep-learning based Multichannel Spike Sorting Neural Signal Processor (NSP) module for high-channel-count Brain Machine Interfaces (BMIs)

Vanga Karunakar Reddy¹, Sunil Babu Melingi², Ch. V. M. S. N. Pavan Kumar³, K. Ashok Kumar¹, Ramesh Kumar Mojjada⁴

¹Department of Electronics and Communication Engineering, Matrusri Engineering College, Saidabad, Hyderabad, Telangana, India.

²Department of Computer Science and Engineering, Vignan's Foundation for Science Technology & Research (Deemed to be University), Vadlamudi, Guntur District, A.P, India. ³Department of Electronics and Communication Engineering, Bapatla Engineering College, Bapatla, Guntur District, A.P, India.

⁴Renault Nissan Technology & Business Centre India, Ascendas IT Park, Mahindra World City SEZ Plot NoTP2/1, Natham Sub Post Office Ground Floor, Chengalpattu, Tamil Nadu

Abstract: An Optimization Driven Spike Deep Belief Neural Networks is a type of neural network that is inspired by the functioning of the human brain. It is a variant of the more general class of Deep Belief Networks (DBNs), which are artificial neural networks composed of multiple layers of hidden units. Spike sorting is a critical process in neural signal processing that involves separating and identifying individual action potentials, spikes, from extracellular recordings of neuronal activity. This process is essential for understanding the behaviour of individual neurons and for decoding neural signals in various applications, such as Brain Machine Interfaces (BMIs) and neuro science research. Spike sorting is challenging due to the complexity of the recorded signals, including overlapping spikes and noise from other sources. This manuscript proposes A deep-learning based Multichannel Spike Sorting Neural Signal Processor (SSNSP) Module for High-Channel-Count Brain Machine Interfaces to record spike activity (SA) of brain neuron signals with less noise. Here first data acquisition is first step and the data's are took form Neural Signal Processor (NSP). Then the collected features are stored in BMIs. After this process feature is extracted using Haar DWT. Haar DWT is a frequencybased feature extractor used to extract the spike or noisy signals from the neuron signals. Then the extracted features are given to driven spike DBN, this is a combination of multi-layer perceptron (MLP) layer and DBN. To increase the accuracy, Adam-Cuckoo Search optimization is used, which optimize the driven spike DBN weight parameter. An FPGA was used to construct and test a prototype 32-channel SSNSP component based on this analysis. Synthesised signals are used at various signals to noise ratios. Then, human neurons are classified based on the channels containing neural spike data. The impact of busy as well as idle state prediction errors on the spectrum efficacy is examined. The proposed technique is implemented in MATLAB platform. Finally, the proposed technique attains better detection accuracy 22.86%, 28.94%, 31.11% and 27.34% compared to the existing models, like Deep Learning Laser Speckle Contrast ESNN (DL-LSC-ESNN), Highly Stretchable Hydro gels as Wearable with Implantable Sensors for Recording Physiological with Brain Neural Signals (HSN-WIS-RPBNS), Lower-power band of neuronal spiking action dominated through local single units enhances the Presentation of BMI (LPB-NSA-LSU-BMI) and Emotion Categorization Utilizing Feature Fusion of Multimodal Data along Deep Learning in Brain-Inspired Spiking Neural Network (EC-FFMD-BISNN) respectively.

PAPER PRESENTATIONS IN CONFERENCES

International Conference on Speech and Computer (SPECOM 2023), Dharwad, India. Vol. 14338, pp. 611–625, November 22, 2023, ISBN: 978-3-031-48308-0

Respiratory Sickness Detection from Audio Recordings Using CLIP Models

Bhuma Chandra Mohan Bapatla Engineering College, Bapatla, India

Abstract - In this work, a deep learning algorithm is proposed to detect whether the cough belongs to a healthy one or sick one. The objective of this work is to propose an improved deep learning algorithm for accurately classifying the cough recordings into two classes i.e., sick and healthy. Features are extracted from the pre-trained Contrastive Language Image Pre-training (CLIP) models. CLIP models are trained on very large image text pairs. Hence, rich and diversified features can be extracted from these CLIP models. The cough audio recordings are converted to Mel Spectrograms, Tempograms, and Chromagrams. These spectral distributions are converted into images. The images are sent through CLIP models and the features are extracted from the CLIP models by using transfer learning approach. Pool of feature arrays are formulated from the three types of spectral distribution images and various CLIP models. Features extracted from these models are fused by using several approaches i.e., Concatenation, Max fusion, Min fusion, and feature interleaving. With appropriate choosing of a classifier and feature selection, strategy the balanced classification accuracy is computed. The proposed algorithm is tested on a database consisting of sick and not sick audio recordings. Feature vector size is reduced by using Particle Swarm Optimization. With the proposed approach, the balanced classification accuracy is well above 85%. Various other classification metrics i.e., precision, recall, and F1 score are also evaluated with cross validation and robustness of the proposed approach is justified with extensive simulations. Further, improved classification metrics are reported on Virufy dataset also.

Keywords - CLIP Models, Cough Classification, Pre-Trained CNN

International Conference on Unmanned Aerial System in Geomatics UASG 2021: Wings 4 Sustainability, Vol. 304, pp.39-50, 16 March 2023, ISBN: 978-3-031-19308-8

Forest Fire Detection from UAV Images Using Fusion of Pretrained Mobile CNN Features

Bhuma Chandra Mohan Bapatla Engineering College, Bapatla, India

Abstract - In this work, a Convolutional Neural Network based approach is presented for accurate classification of forest areas with fire from UAV images. In general, the deeper the CNN architecture, the classification of 'fire' versus 'no fire' is more accurate. However, deeper architectures consume lot of battery power and impose constraints on the processor used in UAV. It is time taking too. Hence, architectures like ResNet50 are not suitable as 23 million parameters are required to train a ResNet50 model. In this regard, mobile CNN architectures are quite handy and they require very few parameters of typical 1–7 millions. They are faster also and take very less time for inference. In this work, the features from selected pre-trained mobile CNN architectures i.e., Squeezenet, MobileNetv1, MobileNetv2, MnasNet, MobileNet v3, SqueezeNext, ShuffleNet, CondenseNet, DiCENet, FBNet, MixNet, and EfficientNet Lite-0, EfficientNet Lite-1 are used in the classification process. All the architectures are pre-trained on 'imagenet' dataset with 1000 classes and 14 millions of images. Features from the last pooling layer of each network are obtained. Feature fusion (concatenation) from the selected mobile CNN architectures is considered for classifying the images with 'fire' and 'no fire'. SVM classifier is applied to the fused feature vector. In general, as the size of the fused feature vector increases, the classification accuracy increases. A wildfire image dataset with 2096 images is chosen with balanced classes of 'fire' and 'no fire'. With a 80% train and test split, the mean classification accuracy obtained is in excess of 98%. Various other performance metrics are also given to emphasize the merit of the proposed approach.

Keywords- Forest fire detection, Mobile CNN architectures, Feature fusion of pre-trained networks

2023 IEEE 8th International Conference on Engineering Technologies and Applied Sciences (ICETAS), Bahrain, pp.1-8, 25-27, October 2023, ISBN: 979-8-3503-2709-0

Cardiovascular Disease Prediction Using Machine Learning Algorithms

Kalapraveen Bagadi¹, Visalakshi Annepu², Adnan Naji Jameel AL-Tamimi³, Naga Raju Challa⁴, H.S. S. Aljibori⁵, M. N. Mohammed⁶, Oday I. Abdullah⁷, Rabab Alayham Abbas Helmi⁸, M. Alfiras⁹

^{1,2}VIT-AP University, Amaravati, India

 ³College of Technical Engineering, Al-Farahidi University, Baghdad, Iraq
 ⁴Dept. of Elec. and Comm. Eng., Bapatla Engineering College, Bapatla, India
 ⁵College of Engineering, University of Warith Al-Anbiyaa, Karbala, Iraq
 ⁶Mechanical Engineering Department, College of Engineering, Gulf University, Sanad, Bahrain

⁷Dept of Energy Engineering, University of Baghdad, Iraq ⁸School of Graduate Studies, Management and Science University, Shah Alam, Selangor, Malaysia

⁹Electrical and Electronic Engineering Department, College of Engineering, Gulf University, Sanad, Kingdom of Bahrain

Abstract- The fact that cardiovascular disease (CVD) is a major cause of death worldwide highlights the significance of accurate prediction for successful preventative and treatment measures. Machine learning algorithms, which use the analysis of vast patient data to reveal hidden patterns and risk variables, have recently come to light as potential techniques for CVD prediction. This study intends to analyse how machine learning (ML) techniques are used in CVD prediction and evaluate how well they perform in comparison to conventional approaches. The study makes use of a sizable patient cohort's medical history, demographic data, and clinical factors in a complete dataset. Predictive models are built using a variety of machine learning algorithms, including support vector machine (SVM), gradient boosting, K-nearest neighbours, naive Bayes classifier, and logistic regression. To find the most important factors influencing CVD risk, feature selection techniques are used. Metrics like accuracy, sensitivity, specificity, and the area under the receiver operating characteristic curve are used to assess how well the machine learning models work. The outcomes are contrasted with well-known risk prediction models and clinical guidelines in order to assess the added value of machine learning methods. This work intends to improve CVD prediction capabilities and offer useful insights for better risk assessment and management strategies by utilizing the power of machine learning.

Keywords- Prediction, Health informatics, Machine learning Algorithms, Cardiovascular disease

2023 IEEE International Conference on Self Sustainable Artificial Intelligence Systems (ICSSAS), Erode, India, pp. 1557-1560, 18-20 October 2023, ISBN: 979-8-3503-0085-7

A Super Wide Band Antenna for Millimeter Wireless Applications

V. N. Koteswara Rao. Devana¹, Chandra Sekhar Rao. Jetti², Ch. V. Ravi Sankar³, Savanam.Chandra Sekhar⁴, D. Rajendra Prasad⁵, V. L.N. Phani Ponnapalli⁶

^{1,3}Department of ECE, Aditya Engineering College (A), Surampalem, India
²Department of ECE, Bapatla Engineering College (A), Bapatla, A.P, India
⁴Department of BBA, KL University, Vaddeswaram, Guntur, India
⁵Department of ECE, St.Ann's College of Engg & Tech, Chirala, India
⁶Department of ECE, Vikas College of Engg & Tech., Nunna, India

Abstract- A novel flower slotted fractal (FSF) super wide band (SWB) antenna is suggested for use in millimeter wave wireless applications operating in the C, WLAN, X, Ku, K, and Ka bands. The reported radiator operated over 3.8-41.35 GHz and is printed on a 16x22 mm² strip of FR-4 substrate microstrip line along with a beveled partial ground structure. The intended FSF radiator's fluctuating gain of 1.86-7.33 dBi, peak efficiency of 96.55%, and bandwidth ratio (BR) of 10.8:1 make it appropriate for SWB applications.

Keywords- DGS, Fractal, microstrip, Slot, Super Wide Band

2023 IEEE 14th International Conference on Computing Communication and Networking Technologies (ICCCNT), Delhi, India, pp. 1-5, 06-08 July 2023, ISBN: 979-8-3503-3509-5

Ear Drum Disease Classification using Convolutional Neural Networks and Aquila Optimizer

Bhuma Chandra Mohan Bapatla Engineering College, Bapatla, India

Abstract- A deep learning approach for classification of ear drum diseases is proposed in this work. At first, several feature matrices are generated by extracting the features from various pre-trained networks using transfer learning approach. A pool of classifiers is chosen and by using a meta heuristic algorithm i.e., Aquila Optimizer, three best feature matrices and three best classifiers are selected from the pool of feature matrices and classifiers. Performance of the other models is analyzed by fixing the classifiers. Ensemble prediction is done from the selected feature matrices with majority voting strategy. Extensive validations are carried out using various train and test splits. Experiments are carried on an eardrum dataset 'Otomatch' which is an imbalanced dataset. Various imbalanced metrics i.e., geometric mean, balanced accuracy, index balanced accuracy and F-measure, are used to assess the merit of the proposed algorithm. Compared to an existing work on the chosen dataset, the proposed algorithm performs better in terms of mean classification accuracy.

Keywords- Eardrum Disease Classification, Pre-trained CNN, Ensemble Learning, Transfer Learning

2023 IEEE International Conference on Engineering Technologies and Applied Sciences (ICETAS), 25-27 October 2023, pp.1-6, ISBN: 979-8-3503-2709-0

Implementation of an Efficient IoT Enabled Automated Paralysis Healthcare System

Visalakshi Annepu¹, Adnan Naji Jameel AL-Tamimi², H.S. S. Aljibori³, Naga Raju Challa⁴, Kalapraveen Bagadi⁵, M. N. Mohammed⁶, Oday I. Abdullah⁷, M. Alfiras⁸, Rabab Alayham Abbas Helmi⁹

^{1,5}VIT-AP University, Amaravati, India

²College of Technical Engineering, Al-Farahidi University, Baghdad, Iraq ³College of Engineering, University of Warith Al-Anbiyaa, Karbala, Iraq

⁴Dept. of Elec. and Comm. Eng., Bapatla Engineering College, Bapatla, India

^{6,7}Mechanical Engineering Dept., College of Engineering, Gulf University, Sanad, Bahrain ⁷Dept of Energy Engineering, University of Baghdad, Iraq

⁸Electrical and Electronic Engineering Department, College of Engineering, Gulf University, Sanad, Kingdom of Bahrain

⁹School of Graduate Studies, Management and Science University, Shah Alam, Selangor,

Malaysia

Abstract- This system aims to provide comprehensive care to individuals with paralysis, including symptom monitoring, medical treatment, and rehabilitation. The IoT-based system comprises interconnected devices, such as sensors, wearables, and mobile apps that communicate with one another and with healthcare providers. The system can track patients' vital signs, activity levels, and medication adherence, and provide immediate feedback to healthcare providers. Additionally, the system can aid with rehabilitation exercises, send reminders, and gather data on progress to enhance treatment outcomes. The system's intelligent analytics can also assist healthcare providers in detecting patterns in patient behavior and tailoring treatment plans more effectively. Overall, an IoT-based paralysis healthcare system has the potential to transform healthcare delivery by offering personalized, real-time care and monitoring to individuals with paralysis.

Keywords- Internet of Things, Healthcare, Sensors, Paralysis detection, Intelligent system

8th Indian International Conference on Air Quality Management (IICAQM 2023), 6th December to 8th December 2023.

Image Based Air Quality Estimation Using Dinov2

Bhuma Chandra Mohan

Bapatla Engineering College, Bapatla, India

Abstract- Air pollution is a major threat to mankind nowadays. Major constituents in the polluted air - i.e., PM2.5 (Particulate Matter 2.5) and PM10 (Particulate Matter 10) can be estimated using sensors. However, in this work, an algorithm is proposed for estimating the Air Quality Index, PM2.5 and PM10 from the outdoor images captured by a webcam. This problem is considered as a regression problem. Features from the images are computed by using a state-of-the-art self-supervised learning model DinoV2. The extracted features are given to a regressor. Various single output regressor, and multiple output regressors are explored. The proposed algorithm is tested on the images collected from the cities in India and Nepal (12240 images). Size of the feature vector is reduced by using Genetic Algorithm. For a 10-fold cross validation, the value of \mathbb{R}^2 (Coefficient of determination) for AQI prediction is well above 0.98 for K neighborhood regressor.

Keywords- AQI estimation, DINOv2, Self-supervised model, feature extraction

International Conference on Condition Assessment, Rehabilitation & Retrofitting of Structures (CARRS 2023), IIT Hyderabad, 10-13 December 2023

Concrete Crack Classification using LAION-5B Trained CNN

Bhuma Chandra Mohan Bapatla Engineering College, Bapatla, India

Abstract- Crack detection using computer vision and machine learning algorithms is becoming a reality due to progress in accurate imaging and processing. In this work, a deep learning algorithm using a pre-trained CLIP model trained on LAION-5B is proposed for classifying the concrete and non-concrete ones. LAION-5B comprises 5.85 billion multilingual image-text pairs. Two pre-trained networks, ViT-B/32 with xlm-roberta-base encoder and ViT-H/14 with xlm-roberta-base encoder trained on LAION-5B dataset are used to identify whether the surface has a crack or not. By using a transfer learning approach, the features are extracted from ViT-B/32 and ViT-H/14 and suitable classifiers i.e., Support Vector Machine and K-Nearest Neighbor Classifier are used further. The proposed algorithm is tested on Conglomerate Concrete Crack Detection Dataset (10995 images), Concrete & Pavement Crack Dataset (30000 images), Concrete Crack Classification Dataset (4000 images) and SDNET2018 Dataset (56092 images). SDNET2018 is also a highly imbalanced dataset comprising Decks, Walls, Pavements crack images. Balanced accuracy, index balanced accuracy and geometrical mean are used for imbalanced datasets like SDNET2018. Except for SDNET2018 dataset, the proposed model is able to classify the crack and non-crack images with close to 100% accuracy for certain cross fold validations and train test splits.

Keywords- Concrete Crack Classification, LAION-5B pre-trained, Conglomerate Concrete Crack Detection Dataset, Concrete Clack Classification Dataset, Concrete & Pavement Crack Dataset, SDNET2018, index balanced accuracy.

2023 IEEE International Conference on System, Computation, Automation and Networking (ICSCAN), Puducherry, India, pp. 1-4, 17-18 November 2023, ISBN: 979-8-3503-1512-7

An Investigation of a Matching Circuits for Radio Frequency Energy Harvesting Applications

Udayabhaskar Pattapu¹, Sreenivasa Rao N², M Mahesh Kumar³, Suneel Miriyala⁴, G. Vijaya Kiran⁵

^{1,5}Department of Electronics and Communication Engineering, PACE Institute of Technology and Sciences, Ongole, Andhra Pradesh, India

^{2,3}Department of Electronics and Communication Engineering, Santhiram Engineering College, Nandyal, Andhra Pradesh

⁴Department of ECE, Bapatla Engineering College, Bapatla, Andhra Pradesh

Abstract- This paper presents HSMS 286C diode is used as a voltage doubler (VD) circuit, different types of matching circuit has been investigated for a VD rectifier circuit with a load resistance of 3 K Ω . Matching networks for efficient RF to dc voltage conversion. For lumped, transmission line, Rogers 4350 and FR4 substrates have investigated, efficiency of the rectifier matching circuits are 80.5%, 81.2%, 62% and 32.7% respectively. For transmission line matching networks, the maximum conversion efficiency has been attained, and the overall output voltage is greater than 5 volts at an input of 20 dBm with a 3 K Ω load resistance.

Keywords- Voltage doubler, impedance matching circuit, Schottky diode, rectifier circuit, rectenna

2023 IEEE 14th International Conference on Computing Communication and Networking Technologies (ICCCNT), Delhi, India, pp. 1-5, 06-08 July 2023, ISBN: 979-8-3503-3509-5

Manhole Detection and Monitoring System through IoT

Suneel Miriyala¹, K. Rajesh², P. Uday Bhaskar³, M. Satya Sairam⁴, M. V. S. Prasad⁵

^{1,2}Department of ECE, Bapatla Engineering College, Andhra Pradesh, India ³Department of ECE, PACE Institute of Technology & Sciences, Andhra Pradesh, India ^{4,5}Department of ECE, RVR and JC College of Engineering, Andhra Pradesh, India

Abstract- In general, identification of manhole cover, monitor hazardous gas leaks, measure temperature, humidity, and flow rates inside the manhole and keep an eye out for any obstructions there may be was a quite complex issue. In the modern era, IoT is a very well-liked technology. We have therefore described this IoT-based method to solve the problems happen during manholes. In the modern world, accidents involving missing manhole covers and fatal fall into manholes both occur often. The toxic gases that are being retrieved from the manhole are causing scavengers a lot of issues as well. For the scavengers, it causes a variety of illnesses, and occasionally it even results in death. To overcome this problem, a new IoT based mechanism was introduced to monitor the manhole by using various sensors like a tilt sensor, ultrasonic sensor, temperature sensor, gas sensor, and water flow sensor. These sensors will monitor the manhole every minute and alert the municipal officers. Fortunately make use of an LCD and wi-fi module to transmit the most recent data.

Keywords- Detection, IoT, Manhole and Monitoring

29th International Conference on Processing and Fabrication of Advanced Materials, IIT Tirupati, India, 06-08 September 2023

Microstructure Classification of Ultra High Carbon Steel Using Deep Learning Approach

Bhuma Chandra Mohan

Bapatla Engineering College, Bapatla, India

Abstract- One way of understanding the material characteristics is using the information obtained from the micrographs of the materials. Classification and evaluation of microstructures is done by human experts leading to errors. Computer vision approaches are superior in this scenario. In this work, a deep learning approach is presented for classifying the Ultra High Carbon Steel (UHCS) micrographs obtained from SEM (Scanning Electron Microscope) images captured under varieties of heat treatments. There are seven classes and 961 images in the UHCS dataset. In this proposed work, several (652) pre trained Convolutional Neural Networks (CNN) are used for extracting the features from the micrographs. Selected features from the CNNs are concatenated and are given to a classifier. Feature vector size is reduced by using Boruta feature selection algorithm. Since the dataset is an imbalanced one, oversampling strategy ADASYN is employed for the under-represented classes like Martensite, and Pearlite+Widmanstatten categories. A balanced accuracy of 95.2% and F1 score of 97% is obtained for a 10-fold cross validation using a Passive Aggressive Classifier. Further, the proposed approach is also tested with another dataset using Ti-6Al-4V alloy micrographs. There are three classes (Acicular (186), Bimodal (350) and Lamellar (689) and 1225 images in this dataset. A classification accuracy of well above 98% is obtained on this dataset.

Keywords- Micrographs Classification, Pre-trained CNN, Over Samplers.

Development of remote health monitoring system based on Internet of Things for patients integrated with mobile application

PPM Prasad¹, N. Kanagasabai², P. Surendra Kumar³

^{1,3}Department of Electronics and communication Engineering, Bapatla Engineering college, Bapatla, Andhra Pradesh - 522102, India

²Department of Electronics and Instrumentation, Annamalai University, Chidambaram, Tamil Nadu- 608002, India

Abstract- Internet of Things (IoT) has given good opportunities and enhancements in various applications for the clinically ailed subjects. The mobile application of IoT is a rapid technology that permits for clinical performance. This proposed work focuses on the practical usage, factors of consuming low power, real time system on remote monitoring based on the technology of IoT. This startup has provided an enhanced step in the field of cloud mode monitoring of health. The cluster of population which were availing the requirements for health care monitoring are increasing year by year and the development of standard smart digital intelligent systems that has to be virtually connected with the hospitals. This could formulate an unhealthy circumstance for providing a care to the patients who are affected with disease specifically those with unstable and serious disorders. Hence, the development of modern electrical and electronic equipment integrated with internet could provide sustainable solutions in this world. Such concept has been illustrated in this study with the aid of mobile application working under the platform of IoT to access certain biological signal such as ECG, heart rate, brain frequency, pulse rate, blood pressure etc for the humans. Measurement and processing of certain symptoms are being utilized with the maximal speed and high memory microcontroller. The primary contribution is to transmit an ECG signal to the cell phone for clinical examination. This assist in diagnosing the cardiac disease prior to the serious disorders or hazardous effects to occur for humans. Lastly, the acquired results are built as an output of Intelligent mobile application.

PATENT PUBLICATIONS

Indian Patent Journal, Application Number: 202341049478 A, Filing Date: 22/07/2023, Published: 01/09/2023

A Novel Quad-Element MIMO Antenna with Defected Substrate for 5G Sub-6GHz N77/N78 Band Application

Dr.Jetti Chandrasekhar Rao¹, Dr. Tathababu Addepalli², Dr. B. Kiran Kumar³, Dr. M.Vinod Kumar⁴

¹Department of ECE, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India. ²Department of ECE, Aditya Engineering College, Surampalem, Kakinada-533437, Andhra Pradesh, India.

³Department of ECE, St. Ann's College of Engineering and Technology (A), Nayuni Palli - 523187, Chirala, Andhra Pradesh, India.

⁴Department of ECE, Dhanekula Institute of Engineering and Technology, Vijayawada -521139, Andhra Pradesh, India.

Abstract- In this present invention, a novel compact microstrip line feed 4-port MIMO (multiple input multiple output) antenna with a specified size of 58 x 58 x 1.6 mm³ for 5G sub-6GHz N77/N78 bands is disclosed. The disclosed antenna is constructed on a FR4 substrate with relative permittivity=4.4, height=1.6, and loss tangent=0.02. The disclosed MIMO design consists of four circular slotted octagonal shaped radiators (antenna elements) on top and defected ground with ground patches on the substrate's bottom layer. Every octagonal radiator has a circular slot to improve impedance matching. The ground plane consists of a rectangle ground patch with an additional octagonal ground patch under each radiator. The ground plane consists of a partial ground that is rectangular in shape and a ground patch that is positioned beneath each radiator. The MIMO antenna radiators' orthogonal structure and the defected substrate have improved the isolation between the nearby radiators. The developed antenna covers the 5G sub-6GHz N77/N78 band and has a resonance frequency of 3.5GHz from 3.1-42GHz with isolation greater than 15dB.

Indian Patent Journal, Application Number: 202341049494 A, Filing Date: 22/07/2023, Published: 01/09/2023

A Unique Compact Triple-band Single-Element Monopole Patch Antenna for 5G Sub-6GHz Wireless Applications

Dr.Jetti Chandrasekhar Rao¹, Dr. Tathababu Addepalli², Dr. M.Vinod Kumar³, Dr.D. Sreenivasa Rao⁴

¹Department of ECE, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India. ²Department of ECE, Aditya Engineering College, Surampalem, Kakinada-533437, Andhra Pradesh, India.

³Department of ECE, Dhanekula Institute of Engineering and Technology, Vijayawada-521139, Andhra Pradesh, India.

⁴Department of ECE, Koneru Lakshmaiah Education Foundation, Vaddeswaram-522302, AP, India

Abstract- The present invention discloses a novel compact triple-band monopole dual-feed patch antenna for 5G sub-6 GHz wireless applications. The FR-4 epoxy dielectric material (or substrate), which has a relative permittivity of 4.1 and a dielectric loss tangent of 0.02, is used to design the antenna, which has dimensions of 36 mm \times 20 mm \times 1.6 mm. The antenna structure comprises of a dual feed slotted rectangular patch (radiating antenna element) with defected ground plane. The radiating patch without slots and strips produces a single band from 2.4 to 5.5GHz with resonance at 2.9GHz. To realize the desired triple bands at N77/N78 (3.3-4.2GHz), N79 (4.4-5.0GHz) and N47 (5.85-5.92GHz) frequency spectrums, a pair of half-circle shaped slots with a radius 5mm each are added to the radiating patch. Moreover, a small circular slot of radius 1mm, rectangular slot of dimensions 1mm \times 16mm and couple of inverted L-shaped strips adjacent to the feed line are used to further improve the impedance matching properties at the operating bands. Hence the disclosed invention operates at 5G sub-6GHz N77/N78, N79 and N47 frequency bands.

Indian Patent Journal, Application Number: 202341052397 A, Filing Date: 04/08/2023, Published: 01/09/2023

A Novel Technique for Mitigation of Interference in Massive MU-MIMO System

Chandra Mohan Bhuma²¹, Challa Naga Raju², Kalapraveen Bagadi³

^{1,2}Department of ECE, Bapatla Engineering College Bapatla – 522102 ³School of Electronics Engineering, VIT-AP University, Amaravati-522237, India.

Abstract- In this study, we are concerned with a near-optimal detection algorithm namely Lattice Reduction associated Reactive Tabu Search (LR-RTS) detection for large Multi-user Multiple Input Multiple Output (MU-MIMO) systems with hundred or/and thousands of antennas at the enhanced Mobile Broadband station (e-MBBS) and Mobile Users (MU). The performance of the MU-MIMO system is severely affected by the interferences such as Inter-Antenna Interference (IAI) and Multi-user Interference (MUI). The main contribution of this work is two-fold. First, the Lattice Reduction (LR) based precoding scheme is incorporated at MU for suppressing the IAI. Then secondly, an LR-associated RTS detection algorithm is proposed, in which the initial solution is approximated by the proposed LR pre-coder that mitigates the MUI at e-MBBS. The proposed scheme outperforms the linear detection technique named Zero Forcing (ZF) as well as the heuristic search-based algorithm such as Likelihood Ascent Search (LAS). For a large number of antennas and higher-order QAM, the proposed LR-RTS detection algorithm based on the layered local neighbourhood search provides a better trade-off between the performance and computational complexity. Simulation results show that the proposed LR-RTS technique has approximately 2dB to 9dB gain over the classical techniques.

Indian Patent Journal, Application Number: 202321040775 A, Filing Date: 15/06/2023, Published: 01/09/2023

Interactive Fitness Equipment with Real Time Biometric Feedback

Mr. Rahul Mohan Chavan, Dr. Kavitha, Mr. Anil Kumar Biswal, Dr.Venugopal N, Mrs. B. Swathi, Dr.Chitra Kiran.N, Rajath H G, Mrs. Milan Samantaray, P.P.M.Prasad

Abstract- The proposed invention is an interactive fitness equipment system with real-time biometric feedback, designed to revolutionize the workout experience. The system comprises an interactive display, biometric sensors, and advanced data analysis algorithms. The biometric sensors capture and monitor vital signs, such as heart rate and oxygen saturation, providing users with realtime feedback on their physical exertion. The interactive display offers a user-friendly interface, allowing access to various workout programs and tracking features. Advanced algorithms process the biometric data, generating personalized insights and recommendations based on the user's fitness level, goals, and performance. The system adapts the intensity and complexity of workouts to optimize effectiveness and safety. Additionally, virtual trainers, interactive games, and immersive simulations enhance engagement and motivation. Users can participate in virtual competitions and challenges, comparing real-time performance metrics with others. This interactive fitness equipment system provides a personalized and dynamic workout environment, promoting improved health, well-being, and community engagement.

Indian Patent Journal, Application Number: 202341050227 A, Filing Date: 26/07/2023, Published: 01/09/2023

Design of Ultra Compact Dual-band 26/38 GHz monopole Antenna for 5G mm-wave applications

Shaik Idrish¹, Dr. S. Krishna Veni², Gatram Mahesh³, Kakumanu Nagaraju⁴

^{1,3,4}Department of Electronics and Communication Engineering, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India

²Department of Electronics and Communication Engineering, Gayatri Vidya Parishad College for Degree and PG Courses, Vishakhapatnam- 530003, Andhra Pradesh, India

Abstract- The present invention discloses a dual-band mm-wave microstrip antenna featuring parasitic elements was proposed for use in 5G NR n-258 and n-260 band applications. The modified Y-shaped main patch, the secondary three parasitic patch elements, and the square looping partial ground plane were used to model the dual-band composite patch antenna. The major Y-shaped patch was fed using the strip line feed technique, and the secondary parasitic patches were fed indirectly via edge coupling with the primary patch. With measurements of 6.8x6.8x0.4 mm3, this modified patch structure was put on a Rogers's 5880 substrate (dielectric constant 2.2). This embedded antenna's radiating structure resonated in two mm-wave bands: the first, from 23.61- 27.73 GHz, with a center frequency of 26 GHz with a bandwidth of 4.25GHz, and the second, from 37.33 to 38.63 GHz, with a center frequency of 38.00 GHz and 1.4GHz bandwidth obtained. 5.04 dBi and 6.15 dBi were the maximum gains obtained over the first and second band, and greater than 95% radiation efficiency was observed over both bands. From the results extracted, it was found that the antenna is capable of covering the 5G NR n-258 and n-260 bands with significant bandwidth, gain, and efficiency.

Indian Patent Journal, Application Number: 202341072480 A, Filing Date: 25/10/2023, Published: 15/12/2023

A Triangular-shaped 4-Port MIMO Antenna with Circular Slots for 5G Sub-6GHz N79 Band Communication

Jetti Chandrasekhar Rao, Dr. Tathababu Addepalli, Dr. B. Kiran Kumar, Mrs. Ch. Jyotsna Rani, Dr. Sivasubramanyam Medasani, Dr Rajesh Ella, Mr.D.V.Ravi Kumar

¹Department of ECE, Bapatla Engineering College, Bapatla-522102, Andhra Pradesh, India. ²Department of ECE, Aditya Engineering College, Surampalem, Kakinada-533437, Andhra Pradesh, India.

³Department of ECE, St. Ann's College of Engineering and Technology (A), Nayuni Palli - 523187, Chirala, Andhra Pradesh

⁴Department of ECE, AU College of Engineering, Andhra University, Andhra Pradesh, India. ⁵School of Engineering, Department of ECE, Mohan Babu University (Erstwhile Sree Vidyanikethan Engineering College), Tirupati,Andhra Pradesh, India

⁶Department of H&BS, Aditya College of Engineering, Surampalem, Kakinada - 533437, Andhra Pradesh, India

⁷Department of CSE, Aditya College of Engineering, Surampalem, Kakinada - 533437, Andhra Pradesh, India.

Abstract- A new small microstrip line feed Four-element MIMO (multiple input multiple output) antenna for 5G sub-6GHz N79 bands with a defined size of 39.5mm x 39.5mm x 1.6mm is disclosed in the current invention. The described antenna is built on a FR4 substrate with relative permittivity of 4.4, thickness of 1.6mm, and loss tangent values of 0.02. The disclosed MIMO architecture includes four circular slotting triangle-shaped antenna elements on top and defective ground with 12-sided polygon-shaped ground elements on the bottom layer of the substrate. To increase impedance matching, each triangle-shaped antenna element features a circular slit. The ground plane is made up of a rectangular ground patch with a 12-sided ground element which enhances the gain and is located underneath each antenna element. The orthogonal structure of the MIMO antenna elements and the defective substrate have increased the isolation between neighboring elements and also improves the gain. The designed antenna has a operating frequency of 4.5GHz between 4.2 and 5.5GHz, with more than 15dB isolation, and it supports the 5G sub-6GHz N79 band.

WORKSHOPs/FDPs/STTPs/SEMINARs ORGANIZED

S.	Date	Торіс	Seminar/	Resource
No			Lecture/Conf	Person/Guests
		x	erence/ Event	
1	31/08/2023	Importance of Higher	Seminar	Mr M. M. Trinadh,
		Education in India		Senior Faculty, ACE,
	1.6/00/2022		a .	Hyderabad
2	16/08/2023	GATE orientation class	Seminar	Mr, Irinath, ACE
		for 3rd years	~ .	Institute, Hyderabad
3	26/08/2023	An awareness program	Seminar	Dr. B. Chandra Mohan,
		on hackathon- 2023		Mr. K. Sambasıvarao
		Problem Statements		and Mr. M. Lawin
				Mr .M. Lenin
				PEC Papetle
1	08/00/2022	Tashnigal sominar	Sominor	ECE Students
4	08/09/2023	organized for	Seminar	ECE Students
		Engineer's Day 2023		
		Engineer s Day 2025		
5	04/09/23	Group discussion for	Group	ECE Students
		Engineer's Day 2023	Discussion	
6.	07/09/2023	Circuit Debugging-	Circuit	ECE Students
		Engineer's Day 2023	Debugging	
7.	25/09/2023	Internal Hackathon	Internal	ECE Students
			Hackathon	
8.	16/11/2023	Parents-Teachers	Parents-	Parents and teachers
		meeting	Teachers	
			meeting	
9.	21/11/2023	Student Development	Machine	In association with
		Program	Learning,	Excellence in Artificial
			Deep Learning	Intelligence, IIT
			and Artificial	Kharagpur
			Intelligence	
10	05/00/2022	T	T	F 1
10	03/09/2023	Teacher's day	Teacher's day	from ECE
11	22/00/2022	Orientation program on	Orientation	ECE Students
11	23/09/2023	coreer guidance by IBS	program	ECE Students
10	07.0.0000			
12	27-9-2023	Applications of Ethical	Workshop	Spypro Security
	to 30-9-	Hacking and Cyber	(Hybrid	Solution Pvt. Ltd.
	2023	Security (Hands on	Mode)	
12	10 th & 11 th	Experience) Miero Architecturo		Sri S Sagar
13	$\frac{10 \times 11}{10 \times 2022}$	Design: Deen Dive into	A IWU Day Student	Oualcomm
	July 2023	RISC V	Workshop	Technologies Inc. USA
			,,,orkshop	

1. Orientation program on Importance of Higher Education in India (31.08.2023)



2. Conducted a GATE orientation class for 3rd years by ACE institute senior faculty Mr. Trinath (16/08/2023)



3. An awareness program on hackathon 2023, problem statements is conducted in ECE department by the resource persons Dr. B. Chandra Mohan, Mr .K. Sambasivarao and Mr. M. Lenin Faculty from ECE Department, BEC, Bapatla (26/08/2022)



4. Technical seminar organized for engineering day 2023 (08/09/2023)



5. Group discussion for engineering day 2023



6. Circuit Debugging-Engineers day 2023



7. Internal hackathon



8. Parents-Teachers meeting organized By ECE Department on 16/11/2023









10 Teacher's day organized by ECE students on 5th sep2023



11. Orientation program on career guidance by IBS on 23/09/2023



12. Applications of Ethical Hacking and Cyber Security (Hands on Experience)



13. A Two Day Student Workshop on Micro Architecture Design: Deep Dive into RISC V from 10th & 11th July 2023



WORKSHOPs/FDPs/STTPs ATTENDED BY FACULTY

S.No	Faculty	Name of	Title	Organizers	Dates
	Name	the Event			
1	K Kalpana	FDP	Emerging Trends in	RVR and JC,	09-11-23 to
			VLSI Device,	Guntur	11-11-23
			Circuits and system		
			design: A Practical		
			Approach		
2	Dr.P.Surendra	FDP	Intellectual Property	Universal	13-9-23
	kumar		Rights (IPR) and	College of	
			Patent, Designs	Engineering	
			Filing Process	and	
				Technology,	
				Guntur	
3	Dr.P.Surendra	FDP	Antenna Design	College of	25-9-23 to
	kumar		Technologies for	Engineering	27-9-23
			Intelligent Transport	Guindy,	
			System		

				Anna University	
4	Dr.P.Surendra kumar	FDP	AI Enabled AR/VR in Communications & Signal Processing Application	Department of ECE,Nalla Narasimha Reddy group of Institutions, Hyderabad	03-10-23 to 07-10-23
5	Dr.P.Surendra kumar	FDP	Emerging Trends in VLSI Device, Circuit and System Design- A Practical Approach	RVR and JC Guntur	09-11-23 to 11-11-23
6	Mr.Patnala Madhukumar	FDP	IP Awareness/ Training Program	National Intellectual Property Awareness Mission	13-9-23
7	Mr.M.Lenin Babu	FDP	Acharya 7.0 FDP (Entrepreneurship development program	ATAL Incubation Center- SKU, Ananthapura mu	16-11-23 to 18-11-23
8	Dr.Ch.V.M.S. N.Pavan Kumar	FDP	Emerging Trends in VLSI Device, Circuit and System Design- A Practical Approach	RVR and JC, Guntur	09-11-23 to 11-11-23
9	Dr.Ch.V.M.S. N.Pavan Kumar	Training Program	IP Awareness/ Training Program	National Intellectual Property Awareness Mission	13-9-23
10	Dr.Ch.V.M.S. N.Pavan Kumar	FDP	Enhancing Faculty Expertise: Communication and Signal/Image Processing (EFECSIP-2023)	Aditya College of Engineering and Technology, Kakinada	10-7-23 to 15-7-23
11	Dr.J.Chandrase khar Rao	FDP	Advanced Natural Language Processing	BEC-Bapatla	3-10-23 to 7-10-23
12	Dr.J.Chandrase khar Rao	FDP	(AITOBE-2023)	ATAL-BEC	20-11-23 to 25-11-23
13	Y.Sruthi	FDP	Emerging trends in VLSI Device, Circuits and system design: A Practical approach	RVR and JC, Guntur	09-11-23 to 11-11-23

14	Dr.U.Srinivasa	FDP	Drone Boot Camp	DIET,	26-10-23 to
	Rao		1	Vijayawada	28-10-23
15	Dr.U.Srinivasa	FDP	ATAL FDP	BEC, Bapatla	20-11-23 to
	Rao		AITOBE - 2023	<i>/</i> 1	25-11-23
16	T.Praveen	FDP	ATAL FDP	BEC, Bapatla	20-11-23 to
	Kumar		AITOBE - 2023	· 1	25-11-23
17	Dr. Naga Raju	FDP	Machine Learning	GITAM	06-11-23 to
	Challa		Approaches towards	University,	11-11-23
			5G/6G Mobile	Bangalore	
			Networks	_	
18	Dr. Naga Raju	FDP	ATAL FDP	ATAL-BEC	20-11-23 to
	Challa		AITOBE - 2023		25-11-23
19	T.Krishna	FDP	ATAL FDP	ATAL-BEC	20-11-23 to
	Chaitanya		AITOBE - 2023		25-11-23
20	D.Swetha	FDP	ATAL FDP	ATAL-BEC	20-11-23 to
			AITOBE - 2023		25-11-23
21	K.Sambasiva	FDP	ATAL FDP	ATAL-BEC	20-11-23 to
	Rao		AITOBE - 2023		25-11-23
22	Dr. Sumanth	FDP	C Programming	BEC-Bapatla	24-07-23 to
	Kumar				28-07-23
	Panguluri				
23	Dr.J.Chandrase	FDP	Emerging Research	ATAL-PACE	04-12-23 to
	khar Rao		Area in Advance	Institute of	09-12-23
			VLSI System Design	Technology	
			& Challenges:	and Sciences	
			Semiconductor-to-		
			End Application –		
			Approach		
24	Dr.J.Chandrase	FDP	Quantum Signal	LBRC	14-12-23 to
	khar Rao		Processing	Mylavaram	20-12-23
25	N.Naga Swathi	FDP	AI Enabled AR/VR	Nalla	03-10-23 to
			in Communications	Narasimha	07-10-23
			& Signal Processing	Reddy group	
			Application	of	
				Institutions,	
26		EDD		Hyderabad	7.0.024.0
20	IN.INaga Swathi	FDP	Data Science and its	вес-варана	1-8-23 to 9-
27	N Nogo Swoth:	Sleill	A I for India 2.0	CUVI	0-23
21	IN.INaga Swathi	SKIII Event	AI IOI IIIUIA 2.0	through Stall	1/-0-23
		Lvent		India Digital	
28	N Naga Swathi	Training	IP Awareness/	National	13_9_23
20	11.11aga Swalli	Program	Training Program	Intellectual	15-7-25
		1 Togram	Training Trogram	Property	
				Awareness	
				Mission	
29	N.Naga Swathi	FDP	Advanced Natural	BEC-Bapatla	03-10-23 to
			Language Processing	Í.	07-10-23
30	U.Srinivas	FDP	ATAL FDP	ATAL-BEC	20-11-23 to
			AITOBE - 2023		25-11-23

FACULTY ACHIEVEMENTS

- Dr.Ch.V.M.S.N.Pavan Kumar from the department of ECE completed a 8-Week NPTEL Online Certification course on "Accreditation and Outcome Based Learning " from 01-08-23 to 01-10-23 conducted by IIT Kharagpur with Elite Silver band.
- 2. Dr.Naga Raju Challa from the department of ECE acted as a reviewer in the IEEE first International Conference on Ambient Intelligence, Knowledge Informatics and Industrial Electronics (AIKIIE 2023), organized by Rao Bahadar Y Malleswarappa Engineering college, Ballari, India, 02-03 November 2023.
- 3. Dr.Naga Raju Challa from the department of ECE acted as a reviewer in the International Conference on Recent advances in Science and Engineering Technology (ICRASET 2023), organized by BGS Institute of Technology, Mandya, India, 23-24 November 2023.
- 4. Dr.Sumanth Kumar Panguluri from the department of ECE acted as Reviewer for Signal, Image and Video Processing Journal (Springer SCIE) on 25 DEC-2023.
- 5. Dr.Ch.V.M.S.N.Pavan Kumar delivered a guest lecture on "Technical Challenges in Image Processing and its Applications" at PACE Institute of Technology & Science on 21-09-2023.
- 6. Dr.Ch.V.M.S.N.Pavan Kumar delivered a guest lecture on "Design of Amplifiers and its Applications" at PACE Institute of Technology & Science on 22-09-2023.
- Dr.Ch.V.M.S.N.Pavan Kumar from the department of ECE completed a 3-Week Online Certification course on "Master Class on Machine Learning" from 28-9-23 to 18-10-23 conducted by Pantech e Learning Pvt. Ltd.
- 8. N.Naga Swathi from the department of ECE completed a 3-Week Online Certification course on "Master Class on Machine Learning" from 28-9-23 to 18-10-23 conducted by Pantech e Learning Pvt. Ltd.
- 9. Mr.Patnala Madhukumar from the department of ECE completed a 4-Week Online Certification course on "High Performance Computing" from 17-7-2023 to 14-8-2023 offered by Andhra University Incubation Council.

S.No	Regd.No	Name	Event Name	Place	Prize
1	Y21AEC557	Vemavarapu	Essay Writing in	Nehru Yuva	Second
		Abhinay	Yuva Utsav 2023	Kendra,	
				Guntur	
2	Y21AEC557	Vemavarapu	Folk Group	Agricultural	Second
		Abhinay	Singing in	College,	
		-	District Youth	Bapatla	
			Festival 2023	_	
3	Y21AEC412	Boddu Vyshnavi	Kho-Kho	BEC-Bapatla	Second
4	Y21AEC412	Boddu Vyshnavi	Literary Club	BEC-Bapatla	
			(Youth	-	
			Parliament)		Third

STUDENT ACHIEVEMENTS

5	Y21AEC484	Marturi.Pothuraju	Viva-VVIT	VVIT,	Second
		5	(Techy Buzz)	Nambur	
6	Y21AEC484	Marturi.Pothuraju	Viva-VVIT	VVIT,	Second
			(Circuitronics)	Nambur	
7	Y21AEC443	Gunja Venkata Rao	Circuit	BEC-Bapatla	Second
			Debugging		
8	Y21AEC483	Marisetti Hema	Circuit	BEC-Bapatla	Second
		Durga Suresh	Debugging		
9	Y21AEC482	M.Sai Priya	Magazine	BEC-Bapatla	First
10	Y22AEC441	Y. Pallavi	Computational	BEC-Bapatla	Particip
			Skills of		ant
			Mathematics in		
			Various Fields of		
			Engineering		
11	Y22AEC464	Gorle.Chandramma	Technical Paper	BEC-Bapatla	Particip
			Presentation, Talk		ant
10	NOO A DOACA		It Out		0 1
12	Y22AEC464	Gorle.Chandramma	56 th Engineer's	BEC-Bapatla	Second
12		Naldanah andara	Day		Caral
13	Y 22AEC 521	Nakkanaboyina.	Computational	BEC-Bapatia	Second
		Jyoun Sh	Skills Of Mathematics in		
			Various Fields of		
			Findingering		
14	Y20AEC465	Jetti Nikhitha	F-Hunt	BFC-Bapatla	First
15	Y20AEC442	Dommeti Sri Durga	District Youth	BLC Dapatia Banatla	Second
15	1201120112	Prasad	Festival	Agriculture	becond
		Trusuu	i ostivui	College	
16	Y20AEC401	Amarneni Deepika	Yuvutsav	Bapatla	First
		Rani		1	
17	L21AEC403	Adilakshmi Battula	Bectagon, WAVE	BEC-Bapatla	
			7E7H, 55th	1	First
			Engineers Day		
18	L21AEC425	Vissamsetty Harika	Yuva Utsav-2023	Bapatla	First
		Sri Durga Sujitha			
19	L21AEC403	Adilakshmi Battula	Awaaz	BEC-Bapatla	Particip
					ant
20	Y20AEC457	Madhu Karishma	Magzine WAVE	BEC-Bapatla	First
		Gurram	7E7H		
21	Y21AEC483	Marisetti Hema	Circuit	BEC-Bapatla	Second
		Durga Suresh	Debugging		
22	Y21AEC443	Gunja Venkata Rao	Circuit	BEC-Bapatla	Second
			Debugging		
23	Y21AEC484	Marturi.Pothuraju	Viva-Vvit	VVIT,	Second
			(Circuitronics)	Nambur	
24	Y21AEC484	Marturi.Pothuraju	Viva-VVIT	VVIT,	Second
			(Techy Buzz)	Nambur	





Department Laboratories



