

Shri Ramdeobaba College of Engineering and Management, Nagpur -440013

Electronics Engineering Department

Session: 2021-22

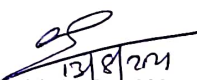
Problem Statement for Six months(part time) Research Internship under Electronics Engg.Department

Sr.No.	Name of faculty	Problem Statement	Area of Research	Skills required	Brief Description about the research work
1	Prof.S.R.Pandey	Design of interface circuit for piezoelectric energy harvester	Piezo electric energy harvesting	Sound understanding of basic electronic devices/circuits and analysis	The purpose of this research is to explore the possibility to enhance the power transfer from piezoelectric energy harvester (PEH) source to the load. It involves proposing innovative interface circuit topologies for the same.
2	Prof.S.V.Laddha	AI-powered Smart Hydroponics cultivation system	Artificial Intelligence, IoT, Agriculture	Python programming, basics of IoT	AI-driven ' Smart Hydroponics' can determine optimum growth for a plant through a combination of hardware setup and a software tool that can recreate its growth trajectory. Insights can be generated from data obtained by sensors in the hardware. AI has many possibilities in Hydroponics which includes: Seed profiling, Plant nutrients monitoring, maintaining appropriate and desirable conditions within the greenhouse
3	Prof.S.V.Laddha	Segmentation and classification of liver from CT/MRI images	Artificial Intelligence	Python programming	Understanding prerequisites of complicated medical procedures plays an important role in the success of the operations. To enrich the level of understanding, physicians use advanced tools such as three-dimensional visualization and printing, which require extraction of the object(s) of interest from DICOM images. Accordingly, the precise segmentation of abdominal organs (i.e. liver, kidney(s) and spleen) has critical importance for several clinical procedures including but not limited to pre-evaluation of liver for living donor-based transplantation surgery or detailed analysis of abdominal organs to determine the vessels arising from and entering them for correct positioning of a graft prior to abdominal aortic surgery. This motivates ongoing research to achieve better segmentation results and overcoming countless challenges originating from both highly flexible anatomical properties of abdomen and limitations of modalities reflected to image characteristics.

4	Dr. S. Balpande	Development of ANDROID application as an interface for Soil Nutrients detection system	Software application	Python / 'C' language, Machine Learning Techniques, Android studio/other platform	The aim of this research internship is to develop ANDROID application to determine the concentration of soil nutrients like Nitrogen, Phosphorous, and Potassium, Organic carbon, Soil conductivity and PH. This application will be interfaced (through Bluetooth) with hardware and has to sync the data, tabulate it, share and print the soil nutrients data .
5	Dr.S.Balpande	Development of ANDROID application for Soil Nutrients Quantification based on image processing	Software application	Python / 'C' language, Machine Learning Techniques, Android studio/other platform	The aim of this research internship is to develop ANDROID application for mobile phone to determine the concentration of soil nutrients like Nitrogen, Phosphorous, and Potassium, Organic carbon, Soil conductivity and PH. This application should have provision to interface external camera to capture the image of sample . Image processing and machine learning are to be used . The ready to use databases would be provided to you. It is required to train the model using machine leaning techniques and quantify unknown soil samples.
6	Prof.S.V.Admane	Analysis of Approximate Multipliers in AI/ML Application	Approximate Computing	Sound Knowledge of Python, C and Verilog	In DNN,most resource consume operation is MAC unit. The recent literature shows that the for training and inference of DNN the floating 32-bit operations can be replaced by integer operations of 8bit , giving advantage in power reduction, fast operation and reduction in area. To gain further advantage we can introduce approximation in 8 bit operations with help of approximate multiplier. Therefore the objective of project is to analyze the existing approximate multipliers for DNN applications and suggest the improvement to gain advantage in terms of efficient usage of resources.
7	Dr.D.M.Kotambkar	Medical Image Analysis with GANs modeling using Machine learning approach	Machine learning , Medical Image processing	Knowledge of Python , Open CV,CNN	Generative Adversarial Networks(GANs) are an approach to generative modeling using machine learning methods, such as convolutional neural networks. Generative modeling is an unsupervised learning task in machine learning that involves automatically discovering and learning the regularities or patterns in input data in such a way that the model can be used to generate or output new examples that plausibly could have been drawn from the original dataset. This problem statement is aimed for analysis of medical images with GAN using machine learning approach.

8	Prof S R Pandey	Implementation of intrusion detection system for Controller Area Network	Secure system design	Programming skills, Sound understanding of Embedded systems concepts, Reasoning and analytical ability	Develop sound understanding of CAN vulnerabilities and probable attacks on CAN. Implementation of efficient Intrusion detection system for CAN.
9	Prof J. B. Zalke	Piezoelectric / Tribo-electric energy harvesting interface circuit design	Circuit Design	Basics of Electronics	Innovative energy harvesting interface circuit design.
10	Dr. Vivek Khetade	Identifying the limitation of TPUv4 architecture and finding the architecture to overcome it.	Digital design ,	Python , Verilog , Digital fundamental,	To explore the basic architecture of TPUv4, identify the limitation with respect to domain specific application , and modifying the architecture and simulating its for performance optimization .
11	Prof V. R. Gupta	Content-Aware Image Retargeting	Image Processing and Deep Learning	Basic knowledge of Deep Learning, CNNs, TensorFlow/PyTorch and OpenCV, Good command over Programming in Python,	Cameras and display devices are designed depending on diverse targets of customers' needs, and hence the resolution and aspect ratio of each module are different. Considering a full screen display scenario of an image, the original image may not perfectly fit the display in full screen, due to the different aspect ratios between the display device and the image. It may rather introduce clipping, stretching or shrinking. Image retargeting techniques adjust the aspect ratio (or size) of an image to fit the target aspect ratio, while not discarding important content in an image. Content-aware image retargeting aims to preserve important content as much as possible. The main aim of this project is to develop a Content-aware image retargeting method/technique/algorithm using Deep learning.
12	Dr. R.S. Ocharwar	Air Quality Mapping using R/python	Air quality monitoring	Knowledge of python/ R software, Arduino/microcontroller interfacing	Policy makers require detailed air quality information to take measures to improve air quality. Also, researchers need detailed air quality information to assess health effects. The project outcome is expected for statistical mapping of air quality data. Accurate and spatially highly resolved air quality maps in latitude and longitude wise manner form a basis. Measurements of air quality shall be taken at a limited number of locations using micro controller, sensors and the data shall be displayed using R/ python software.

13	Dr (Mrs.) A. A. Khurshid	Super resolution deep learning to quantify and detect micro plastic in water bodies	machine learning	programming skills using python or MATLAB, basic concepts of image processing	Garbage and waste disposal is one of the biggest challenges currently faced by mankind. In many coastal areas there is significant water pollution in the form of floating or submerged garbage. Encouraged by the advances in Computer Vision from the use Deep Learning, it is proposed to use Deep Neural Networks to survey and detect plastic debris in the water bodies. Also a image classification system, which combines deep learning to automatically detect the plastic particles and classify the images according to their quantitative information is proposed to be developed, so as to monitor plastic particle pollution.
14	Dr (Mrs.) Richa R. Khandelwal	Development of Imaging Technique to achieve better Image Quality	Image Processing	Readiness to learn and apply the knowledge of image processing, basics of Python Programming, knowledge of image sensors	The performance of a digital camera is determined by the performance of each pixel on the detector array. The number of pixels that make up a sensor chip is both a performance indicator and a marketing necessity from mobile phones to digital single-lens reflex (DSLR) cameras. When multi-pixel detectors cannot be applied due to the weak signals caused by scattering or absorption losses, a single-pixel detector might be used as an alternative method to perform imaging. Imaging is extremely important for acquiring the light field information of the target. Researchers have shown that an image can be captured with just one pixel based on spatially structured illumination and multiple measurements in the time domain. In this work to reduce the imaging time and capture high-quality images orthogonal patterns (Hadamard Patterns) will be used instead of random patterns as illumination pattern.
15	Parag Jewarkar	IOT based bridge damage notification with alarm system	IOT	Sensors, IOT, basic Programming, Arduino/RaspberryPi/ESP8266	IOT based bridge damage notification with alarm system is safety risk model, based on RF representation where the causes and the consequences of potential accidents can be avoided arising from railway operations and the maintenance over the bridge. Railway bridges are damaged stroked due to weather conditions such as floods, earthquake, cyclones, etc. If the bridge gets damaged because of some conditions that information goes to the railway authority people, then they notifies and informs the corresponding train, which takes more time for information to transmit. Hence to avoid any delays, our device will immediately notifies and informs the current train coming on the track through wireless medium.


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