ECE INNOVATIONS 2022

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

MUFFAKHAM JAH COLLEGE OF ENGINEERING AND TECHNOLOGY

A COLLECTION OF RESEARCH ARTICALS IN

ELECTRONICS AND COMMUNICATION

VISION OF THE INSTITUTION

To be part of universal human quest for development and progress by contributing high caliber, ethical and socially responsible engineers who meet the global challenge of building modern society in harmony with nature.

MISSION OF THE INSTITUTION

1. To attain excellence in imparting technical education from the undergraduate through doctorate levels by adopting coherent and judiciously coordinated curricular and co-curricular programs

2. To foster partnership with industry and government agencies through collaborative research and consultancy

3. To nurture and strengthen auxiliary soft skills for overall development and improved employability in a multi-cultural work space

4. To develop scientific temper and spirit of enquiry in order to harness the innovative talents

5. To develop constructive attitude in students towards the task of nation building and empower them to become future leaders

6. To nourish the entrepreneurial instincts of the students and hone their business acumen.

7. To involve the students and the faculty in solving local community problems

DEPARTMENT VISION

To be recognized as a premier education center providing state of art education and facilitating research and innovation in the field of electronics and communication engineering.

DEPARTMENT MISSION

We are dedicated to providing high quality holistic education in electronics and Communication engineering that prepares the students for successful pursuit of higher education and challenging careers in industry, R& D and Academics

MESSAGE FROM THE DIRECTOR

This magazine as in its previous issues brings about the notable achievements of the staff and students in research / projects. I am sure; the readers of this magazine get inspiration and new ideas for their research.

MESSAGE FROM THE HEAD OF THE DEPARTMENT

It is my pleasure to congratulate the ECE DEPARTMENT that has taken the initiative for producing this magazine. It is great to find a considerable number of projects, certainly prove that our staff and students are adequately equipped and possess necessary skill sets to express their talent.

Reading this magazine would definitely be an inspiration and motivation for all students and staff to contribute even more to the forthcoming issues.

I hope that everyone would continue to give their full efforts to keep the momentum and continue to enhance the standards of the magazine.

CONTENTS:

OCR-Based Smart Oxygen Concentrator

Project Team:

1. Shaik Akheel Ali (1604-18-735-105)
2. Syed Rahemath (1604-18-735-309)
3. Mohammed Salman Khan (1604-18-735-312)

Project Guide:
Dr. Mohammed Arifuddin Sohel

Abstract:
A portable oxygen concentrator is a device used to provide oxygen therapy to patients requiring higher oxygen concentrations than the level of ambient air. Patients often opt for portable oxygen concentrators during trips outside their home or when travelling. The oxygen concentrator can be monitored remotely using IoT methods, where the readings are captured by Optical Character Recognition (OCR) and sent to the user (doctor).

Implementation of Digital Twin for Industrial IoT

Project Team:

1. Hamza Shah Khan (1604-18-735-081)
2. Mohd Saeed Ali (1604-18-735-098)

Project Guide:
Dr. Mohammed Arifuddin Sohel

Abstract:
Multiple technologies have emerged in recent years that are instrumental in driving the advancement of smart manufacturing and the Industrial Internet of Things (IIoT). These include Big Data, advanced analytics, artificial intelligence (AI) and machine learning (ML), operational intelligence, advanced robotics, cyber-physical systems, next-generation material science, and generative design for additive manufacturing. Although all these technologies are changing the face of manufacturing, the Industrial IoT, connected smart assets, and particularly the digital twin, have the most immediate and significant impact on smart manufacturing.

Braille Script Generation Using OCR & Raspberry Pi

Project Team:

1. Mohammed Saad Ahmed (Roll No. 1604-18-735-109)
2. Mohd Abdul Khadar (Roll No. 1604-18-735-096)
3. Abdullah Madani (Roll No. 1604-18-735-110)

Project Guide:
Dr. Mohammed Arifuddin Sohel

Abstract:
Blindness represents one of the major disabling societal issues, significantly impacting the lives of visually impaired people and their families. For accessing written information, one of the primary tools used by blind individuals is the traditional Braille code. In recent years, there has been a considerable technological effort to develop refreshable Braille devices. These devices consist of multiple physical dots that dynamically change their configuration to reproduce different sequences of letters in Braille code.

Although these approaches are promising, they come with several challenges, including high costs, design complexity, portability, and power consumption. While many solutions have been proposed for multi-cell devices, the potential of single-cell refreshable systems has not been extensively explored. Investigating single-cell systems could offer practical solutions to overcome the aforementioned challenges, potentially leading to the widespread adoption of such assistive technologies by end-users.

In this project, we present the design and development of a cost-effective **Refreshable Braille Display** system, utilizing OCR technology and Raspberry Pi. We report on the system's performance based on tests conducted with blindfolded individuals and expert Braille readers. The results demonstrate the device's effectiveness in accurately reproducing alphanumeric content, opening new possibilities for its use in everyday life applications and enhancing the accessibility of written information for visually impaired individuals.

Human Activity Recognition Using Smartphone

Project Team:

1. Mohammed Akbar (1604-18-735-084)
2. R Shahina Sultana (1604-18-735-065)

Project Guide:
Mohammed Muneeruddin

Abstract:
Smartphones are increasingly becoming the primary platform for human activity recognition. This project focuses on robust human activity recognition using the 3-dimensional accelerometer and gyroscope sensors found in modern smartphones. As smartphones become more integrated into everyday life, activity recognition technology plays a crucial role in various applications such as health monitoring, fall detection, context-aware applications, human survey systems, and home automation.

Smartphone-based activity recognition is an active area of research due to its potential to create new types of mobile applications. By leveraging the accelerometer and gyroscope, this project aims to develop an efficient and accurate system for recognizing different human activities, which can improve user experience in numerous domains.

Audio Watermarking

Project Team:

1. Suvarna Sanjana (Roll No. 1604-18-735-113)
2. G. Leena Kiran (Roll No. 1604-18-735-116)

Project Guide:

Mrs. Afshan Kaleem

Abstract:

This project presents a method for providing copyright protection to an audio signal through time-domain processing. The key challenge is to ensure that modifications to the audio signal are minimal, preserving the perceptual similarity to the original. The audio watermarking technique developed does not require the original signal for watermark detection. Additionally, the embedded watermark is robust against common audio manipulations, including MPEG audio coding, cropping, time-shifting, filtering, resampling, and requantization. This makes the method highly reliable for ensuring the security and integrity of audio content.

ABSTRACT

Humanoid Robot Phase-2

The 2017 Humanoid Project focuses on completely redesigning the mechanical structure of the Humanoid Robot and also uses smart servos instead of traditional regular servo motors.

Smart Servos and Regular Servo Motors:

communication is unidirectional. The controller unit (Arduino) sends the ervo motor using a Pulse Width Modulated Signal (PWM) Signal. The servo moves the servo to the desired position according to the duty cycle of the le, but also pretty limiting. There is no way to get feedback on the actual position.

Instead of using PWM signals to control the position, smart servos have traded this unidirectional technologyfor serial communication which allows for bi-directional communication. Because serial communication is used, different types of input commands can also be sent to the smart servos, compared to only a position command for the regular servos. Most smart servos will not only accept position commands, but also speed and time commands. Because smart servos are the latest technology, most of them benefit from an upgrade inprecision. The higher the grade of the servo, the higher the precision will get, but so will the price.

Mechanical Design: The 2017 Humanoid Robot will be completely redesigned keeping all the essential design aspects into consideration. Firstly, the humanoid robot will be designed on Solid works and center of mass will be calculated using Simulation tool present in the Solid works. The height of the bot will be around70 cm.

Lower Body:

The length of the leg and thigh part will be almost identical similar to that of an actual human unlike the last years bot. Firstly the lower part of the body will be designed and based on the center of gravity the subsequent parts will be added on the top of it.