الجـامـعة الأهـلـية
AHLIA UNIVERSITY
BAHRAIN

Graduation
Project Exhibition

Organised by
The College of Engineering

13nd December 2023
12:00 pm - 13:30 pm

OVERVIEW

The College of Engineering organizes a biannual Graduation Project Exhibition which is a great opportunity to present the fruits of our graduate students work. The Graduation Project Exhibition is an excellent event to link between the academic and industrial sectors.

In Addition, it is great occasion for our graduate students to practice and improve their engineering, communication and presentation skills.

PROGRAMME

12:00 pm **12:10 pm**	Welcome Note

12:10 pm **13:10 pm**	Student Projects Demonstration

13:10 pm **13:30 pm**	Best Project Award & Closing Remarks

No.	Student Name	Project Title

1

Marwa
A.Ameer Alhaddad

Alzain
Yusuf Alhusaini

DESIGN OF A POWER AMPLIFIER WITH HIGH EFFICIENCY USING ARTIFICIAL INTELLIGENCE MODELLING FOR MODERN WIRELESS COMMUNICATIONS

Modern mobile communication signals require power amplifiers that can keep their very high efficiency throughout a wide range of output power levels, which is a significant challenge for traditional power amplifier topologies. An amplifier load impedance can be dynamically adjusted according to its power input to improve effi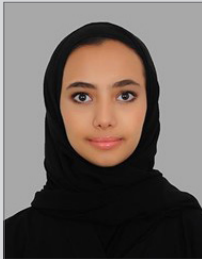ciency. In recent times, the demand for high-performance transceivers has increased as wireless systems continue to evolve towards higher data rates and lower power consumption.

The power amplifier plays a crucial role in various scenarios, such as base-stations, handsets, and point-to-point radio-links, as it consumes a significant amount of power in the overall architecture. Achieving maximum efficiency is of utmost importance, particularly in 5G systems where power amplifiers need to deliver high efficiency, gain, linearity, and output power across wider bandwidths.

The frequency bands for 5G networks consist of two ranges: FR1, covering sub-6 GHz bands used by previous standards, and FR2, encompassing the millimeter wave range from 24.25 GHz to 52.6 GHz. Modern mobile communication systems, including 5G, employ Orthogonal Frequency Division Modulation (OFDM) schemes to achieve high data rates. This project focuses on designing a wideband power amplifier specifically tailored for 5G applications using hybrid artificial neural-optimization network modeling. The power amplifier will be designed and simulated using 10 W packaged GaN HEMT devices released by Cree/Wolfspeed, the operating frequency will be in the Mid-band spectrum (1 GHz - 6 GHz)..

2

Yusuf
Abdulghaffar

Abdulla
Jassim

RFID-ASSISTED AUTONOMOUS WHEELCHAIR FOR INDOOR NAVIGATION

The disabilities have limited millions of lives in their life span. Even though the availability of the wheelchairs with technologies which eases, the process but the prices aren't accessible to all groups of people.

In this project we use Artificial Intelligence which will help the system to understand and breakdown the hand gestures into movement patterns.

The project involves major safety measures such as autobraking, fall detection alert system, speed limiting system and also illumination system for the dark places and night situations.

This technology will enhance safety measures in the present world and aims to be accessible by everyone to help the disabled people to move independently and have free willingly mobile.

LIST OF PROJECTS

No.	Student Name	Project Title
3	Maryam Jaafar Alhasan Yaqeen Abdulwahab	**SMART STORAGE ROOM GUARDIAN: IOT-BASED ENVIRONMENTAL MONITORING AND ALERT SYSTEM** The Supermarket Smart Shelf Monitoring System project aims to implement an advanced monitoring system utilizing IoT, computer vision, and machine learning technologies in supermarkets. By installing cameras on shelves, the system provides real-time data on product availability, shelf conditions, and customer behavior. This enables optimized inventory management, improved shelf organization, and enhanced pricing accuracy. The project seeks to streamline supermarket operations, reduce out-of-stock instances, and elevate the overall customer experience, leading to increased profitability and customer loyalty.
4	Feras Alhamrani	**INTELLIGENT ROAD PANEL TRAFFIC SIGN** The project aims to develop an Arduino-based road speed management system that adjusts vehicle speeds in real-time based on weather conditions, particularly rain and dust storms. The overarching goal is to significantly reduce weather-related accidents, fostering secure and flexible road environments. This system uses Arduino hardware to track real-time weather information, focusing on rain and dust sensors. An LCD display is used to provide drivers with up-to-date road condition and speed change information. Create guides or interfaces informing drivers about the system's functionality, promoting higher road safety awareness. The project focuses on developing an environmental monitoring system that integrates rain and dust sensors with an Arduino microcontroller and includes sensor selection, calibration, software, and hardware integration.

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5	Rawan AlAradi Malak Mohamed Alderazi	**SMART PLANT DISEASE DETECTION SYSTEM USING MACHINE LEARNING AND IOT TECHNOLOGY** In this project we design and build a System to detect the healthy plants and unhealthy plants using smart computer programs to recognize plant leaves and find out if they're healthy or sick. By teaching these programs with lots of leaf pictures, they learn to tell the difference between healthy and sick leaves. These clever programs use special tricks to spot even tiny problems on leaves. This helps farmers quickly figure out if their plants are sick, so they can take care of them early. It's like having a super-fast and accurate doctor for plants, making it easier to keep our food supply safe and healthy. Plants disease is crucial for farmers for several reasons Such as detecting diseases early allows farmers to take action promptly, preventing the spread of diseases and minimizing crop damage and Healthy crops contribute to food security by ensuring a consistent and reliable food supply, meeting the demands of the growing population.
6	Shaikha Isa Alsadah	**SMART DRIVER DISTRACTION DETECTION USING EMBEDDED MACHINE LEARNING** Global road accidents remain a pressing issue, predominantly attributed to human error, accounting for approximately 9 out of 10 incidents. The World Health Organization (WHO) reported an alarming annual toll of 1.35 million lives lost in road accidents, equating to an average of 64 fatalities per day (WHO, 2020). Among the leading causes of these tragic incidents is driver distraction, contributing significantly to fatal accidents. This project aims to design a driver distraction and behaviour detection system which is capable of seamless integration into vehicles. This solution harnesses Tiny Machine Learning (TinyML) algorithms, crafted with assistance from the Edge Impulse platform, enabling the entire machine learning process, spanning from data pre-processing and model creation to deployment onto an Arduino Nano Sense BLE. The intention behind designing a driver assistance system capable of integration into vehicles is to offer an economical solution utilizing embedded machine learning. This initiative aims to address a real-world problem by potentially mitigating accidents arising from driver distractions.

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7	Lama Ahmed Mohamed	**SMART GLASSES TEXT READER FOR BLIND PEOPLE** Existing assistive devices for visually impaired people are frequently expensive, have limited mobility, and have sophisticated interfaces, all of which interfere with their general use. The project intends to overcome these restrictions by developing a low-cost, portable, and user-friendly smart eyewear system that provides real-time text recognition and text-to-speech feedback, allowing visually impaired people to read printed words independently and easily. This project is to build a smart glasses system using a Raspberry Pi 2 Model B, a Raspberry Pi Camera Module 2 NoIR, headphones, a power bank, and Python, which is software designed specifically to assist blind people in reading text. The device uses software for image processing to collect photographs, detect text, and provide text-to-speech feedback via headphones. The project intends to increase the independence and access of visually impaired persons by allowing them to read printed text in real time by integrating these components.
8	Abdulla Shawqi Almannaei Abdulla Adnan Alsada	**SMART INDUSTRIAL SYSTEM TO CONTROL THE AMOUNT OF PRODUCTIVITY** In today's data-driven world, accurate and efficient object classification is crucial for a wide range of industries, from manufacturing and logistics to retail and healthcare. Conventional classification methods often face challenges in terms of cost, complexity, and adaptability. This project presents a solution to seamless integration of cost-effective sensor technology into pre-existing machinery, enabling real-time object classification with unparalleled accuracy and efficiency. The project employs a combination of ultrasonic, infrared (IR), and RFID sensors. Ultrasonic sensors provide precise distance measurement, ensuring accurate object positioning. IR sensors monitor object characteristics, such as size, shape, and surface texture. RFID sensors capture unique object codes, enabling real-time identification and tracking. Arduino microcontroller with L298N stepper motor driver meticulously control the movement of a stepper motor coupled with a horizontal lead screw which refers to the real-world object movement in industries. As an object enters the classification zone, the IR sensor detects its presence, triggering the ultrasonic sensor to measure its distance with precision providing valuable input for the classification code. The RFID sensor captures the unique object code, unlocking its identity and associated details, and then depending on collected information will assign the object to its appropriate category. This project will help identify and sort products in warehouses, optimize inventory management, streamline logistics, and envision classifying garments in a retail setting, enhancing customer experience, and cost and time-effective solutions

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9

Qassim A.Ali jawad

Abdulla A.jalil Alsanad

POWER POINT CONTROLLER USING HAND GESTURES

As technology continues to advance, the demand for innovative and intuitive interfaces for presentations has grown. This project introduces a dynamic presentation control system leveraging computer vision and hand gesture recognition.

The implementation utilizes the OpenCV library and the Mediapipe Hand Tracking Module to detect and track hand movements in real-time. The system allows users to navigate through presentation slides, annotate content, and control a virtual pointer.The presentation control system incorporates features such as slide navigation, gesture-based annotations, and a virtual pointer for enhanced interactivity. Hand gestures are used to switch between slides, with specific gestures triggering actions such as moving forward or backward.

Additionally, the system supports real-time annotation on the slides. The virtual pointer enhances user engagement, allowing presenters to highlight specific elements on the slides. The system integrates zoom functionality based on hand gestures, enabling presenter to dynamically adjust the zoom level for a more detailed examination of content. The project aims to enhance the presenter's control over the presentation environment, providing a more interactive approach to engage with the audience.

8

A.Majeed Aqeel

Mohammed Khalil

SAFETY BUS SPEED CONTROLLER

"This project aims to develop a device that controls the speed of the school bus and tracks its location through bus monitoring. This will be achieved using a speed control device and a tracking device.

Parents will also be able to ensure the safety of their children during their journeys to and from school. The project will be implemented using a combination of electronic components and modern technologies and software. It will include an Arduino board, a GSM module integrated with a GPS device, and a transmitter and receiver for controlling legal speeds on public roads and a speed display for the bus.

The project will be developed using various modern programming languages to implement the necessary commands for its operation. When the bus driver exceeds the legal speed limit, the system will automatically send a text message to the supervisor.

The supervisor will then set the appropriate speed for the road by comparing it with the legal speed on the GPS device. To execute this project, we will first conduct research on speed control devices, GPS devices, and GSM devices, and determine the suitable features and characteristics for our project.

We will extensively test them to ensure they are user-friendly and error-free. The impact of this project is significant as it will ensure the safety of students and citizens, reduce traffic accidents and violations, and provide reassurance for students during their school journeys."

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