Department: Electronics & Communication Engineering
Course: B. Tech. ECE
Sample PBL Implemented during the session July-December 2024

Part C: Experiential Learning

1. IoT based Real-time Glucose Bottle Tracking and Alarming System in Hospitals

Summary: In healthcare settings, managing IV (intravenous) fluid administration is crucial for patient safety and treatment effectiveness. Nurses and caregivers must frequently check IV bags manually to ensure they do not run empty, which can lead to serious medical complications such as air embolisms or interrupted medication flow. This manual monitoring is time consuming and prone to human error, especially in busy hospitals or during emergencies when staff is limited. The lack of an automated, real-time system to track the IV fluid level increases the risk of delayed interventions, which could negatively impact patient care. Furthermore, existing solutions for IV monitoring are often expensive, complex, and not easily accessible in resource-limited healthcare environments.

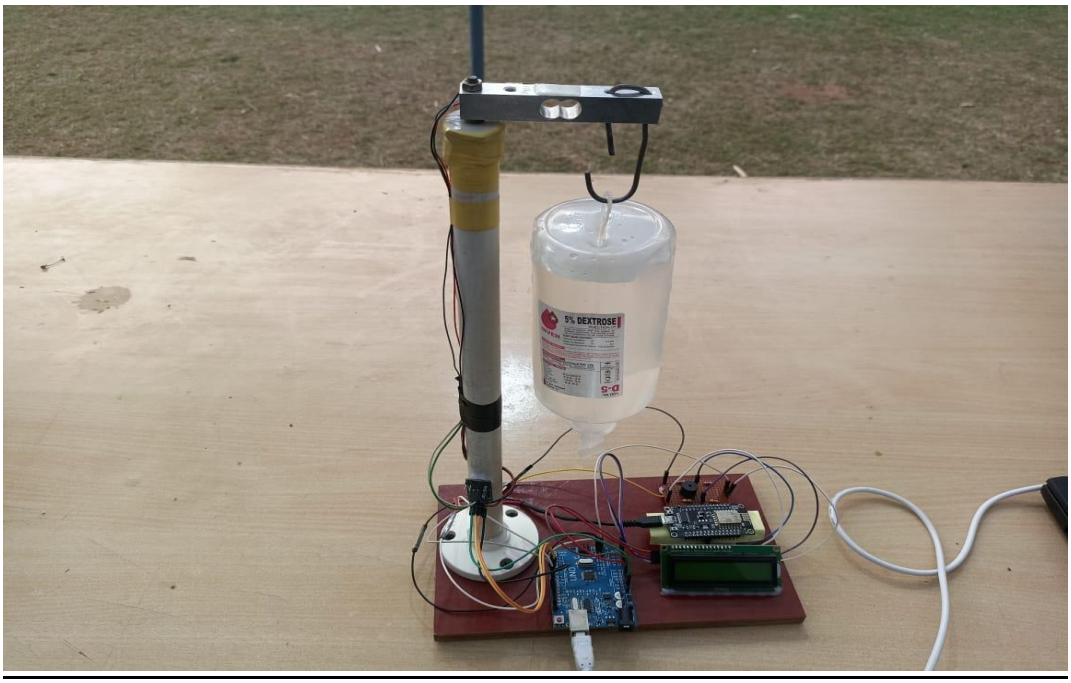


Photo 1: IoT based Real-time Glucose Bottle Tracking and Alarming System in Hospitals

Photo 2: IoT based Real-time Glucose Bottle Tracking and Alarming System in Hospitals

2: IoT driven Agriculture Systems for Smart Monitoring of Soil Health

The IoT-driven system not only equips students with industry-relevant skills but also addresses a critical issue in agriculture. The ability to monitor and manage soil health effectively has the potential to transform traditional farming practices, making them more efficient and sustainable. This aligns with global efforts to combat climate change and ensure food security for a growing population.

Photo 1: IoT driven Agriculture Systems for Smart Monitoring of Soil Health

Photo 2: IoT driven Agriculture Systems for Smart Monitoring of Soil Health

3. Home Automation Using IoT Devices

Home automation, powered by Internet of Things (IoT) devices, is revolutionizing how individuals interact with their living spaces by enabling smart, efficient, and convenient control of household functions. IoT-based home automation systems integrate smart devices and sensors, offering seamless connectivity and centralized control.

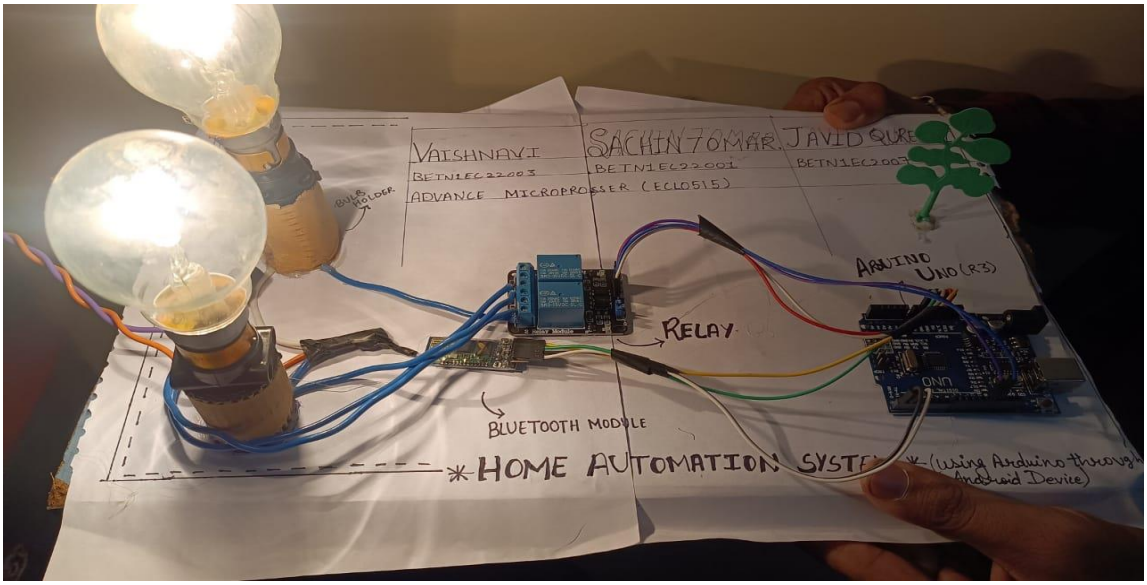


Photo 1:Home Automation Using IoT Devices

4. IoT based Smart Home Automation with Retro-fitting Model

The IoT-based Smart Home Automation system with a retro-fitting model focuses on transforming traditional homes into smart homes by integrating advanced IoT technologies without requiring significant structural changes. The retro-fitting approach offers cost-effective and user-friendly solutions, making smart home systems accessible to a broader audience.

Photo 1: Home Automation Using IoT Devices

Photo 2: Real-time Glucose Bottle Tracking and Alarming System in Hospitals and Home Automation Using IoT Devices

5. ## Bidirectional Visitor Counter using IR sensors

In this project, a bidirectional people counter using IR Sensors and Arduino Uno. This project will help learner to understand the working and application of IR sensor. The IR sensor is simple and powerful with wide variety of applications. This project will also help the user to understand logic of IR Sensors and Interfacing with many IoT Devices.

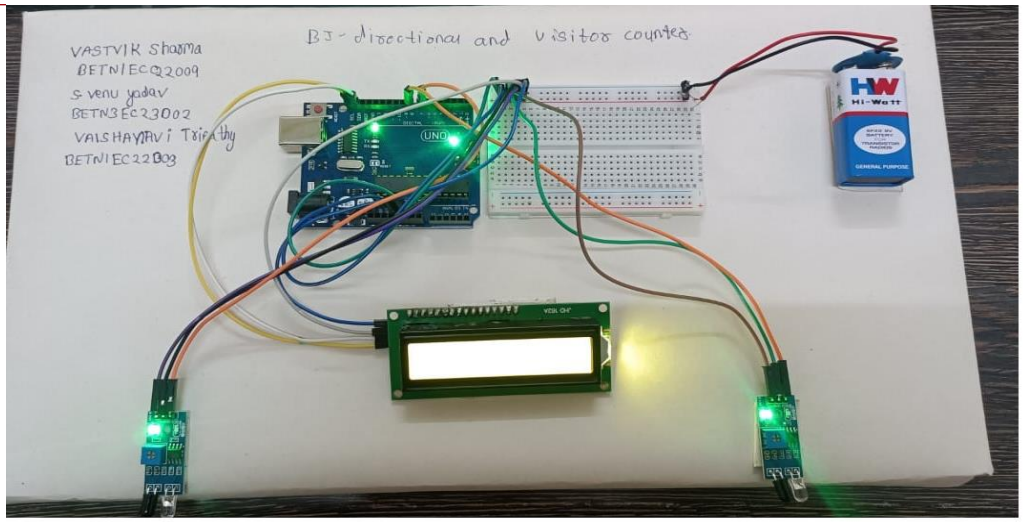


Photo 1: Bidirectional Visitor Counter using IR sensors

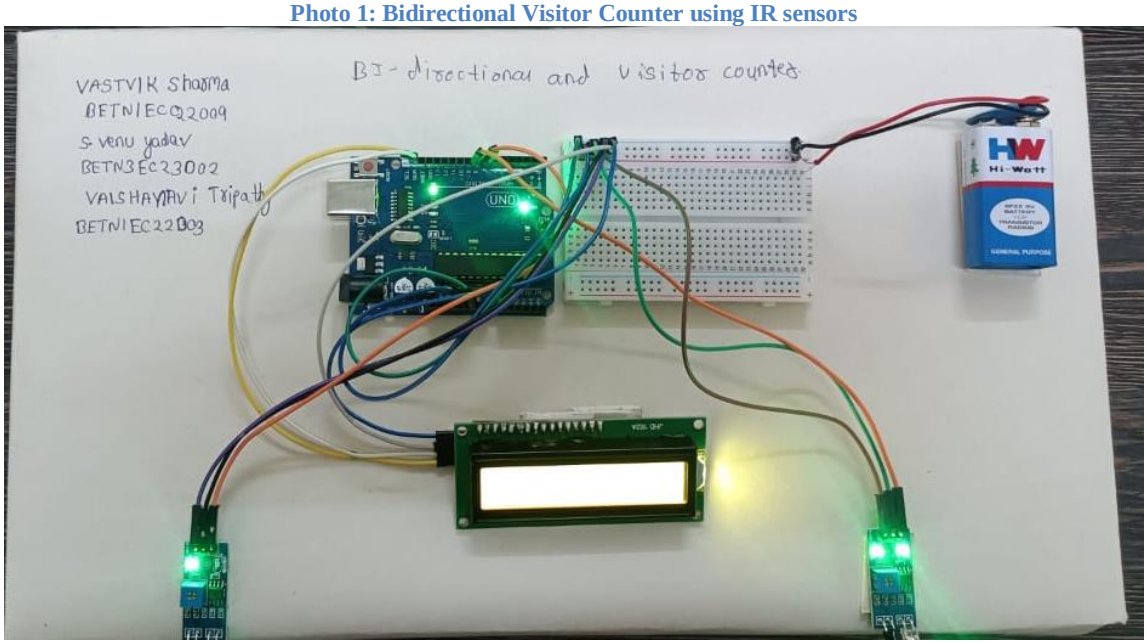


Photo 2: Bidirectional Visitor Counter using IR sensors

6. Healthcare Monitoring System with Pulse Rate Sensor, ECG Sensor, LCD Display

Project Objective: The objective of this project is to design a portable healthcare monitoring system that: • Measures the pulse rate and ECG of the patient. • Displays the health parameters on an LCD screen. This system ensures the continuous monitoring of vital health signs and enhances patient safety through timely alerts.

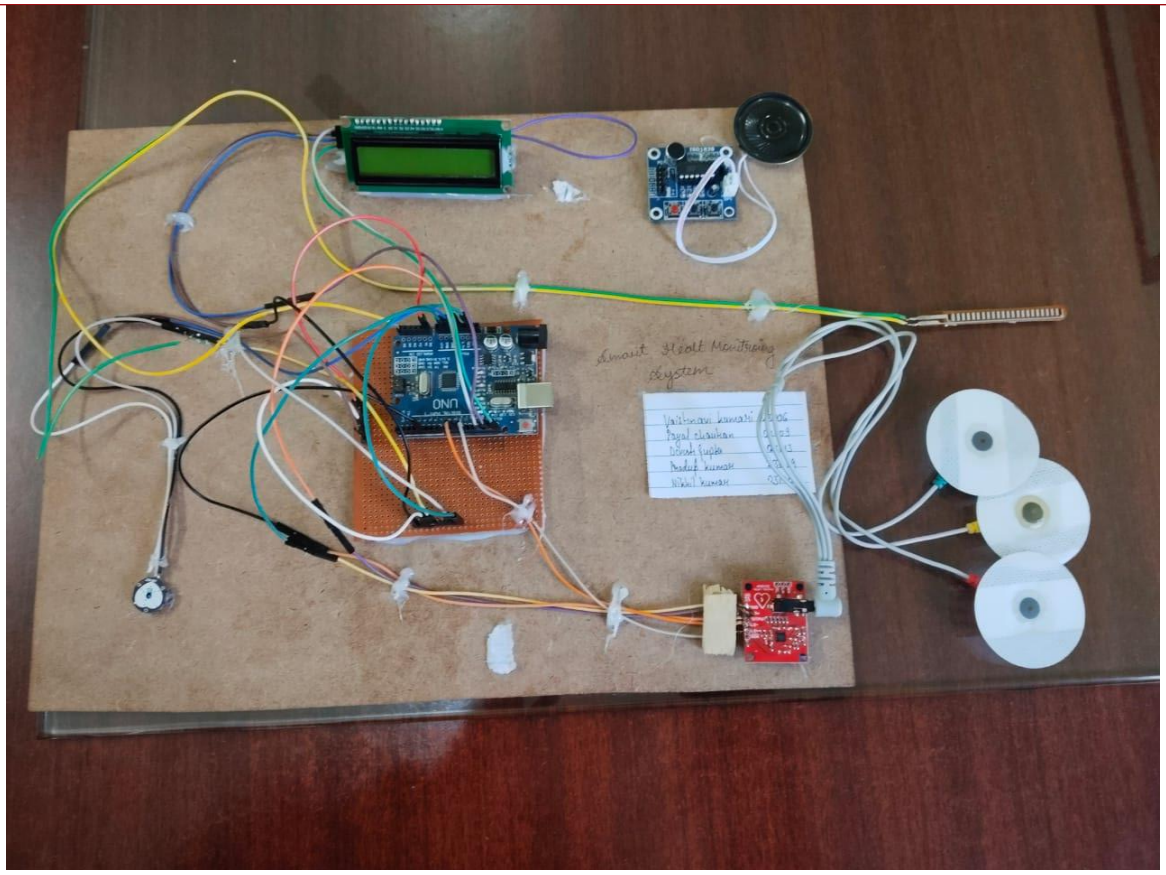


Photo 1: Healthcare Monitoring System with Pulse Rate Sensor, ECG Sensor, LCD Display

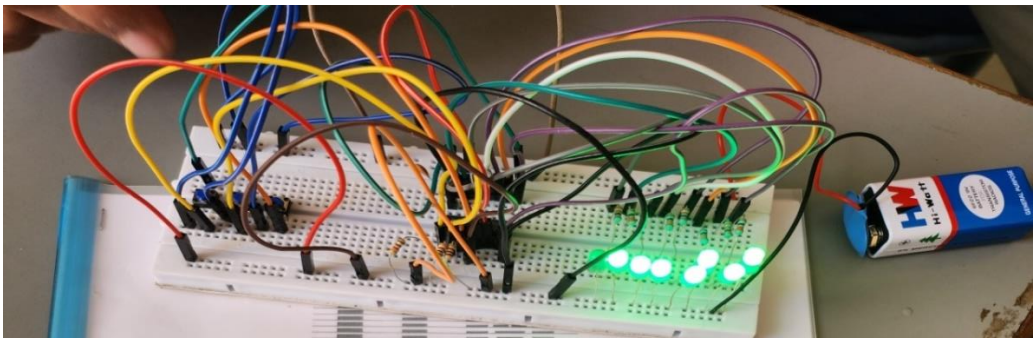
7. Smart Rider Jacket

Progressive reductions in the safety of human beings while riding, as well as the promotion of more sustainable alternative modes of transportation, are now observable components of global strategies. These significant changes in transportation dynamics will not only contribute to environmental advantages but also improve the safety of riders, especially after the lockdown phase, when the youngster was under house arrest and in the mode of riding out. I see global plans as promoting safer alternative means of transportation and progressively reducing the safety of people while they travel. Not only will these large modifications to transportation dynamics benefit the environment, but they will also increase rider safety, particularly following the lockdown period when the youngster was under house arrest and riding out. As more people begin to explore alternative modes of transportation, such as walking, cycling, and riding, the need for improving safety will become even more pronounced To achieve these goals, various tactics for increasing riding demand through this activity have been developed, resulting in a significant increase in the number of bicycle users in most situations, from adults to children. Numerous strategies have been devised to increase riding demand through this activity, resulting in a significant increase in the number of people using bicycles in most scenarios, from adults to children, to achieve these aims. Safety has been a major problem because riders are more susceptible to fatalities and serious injuries during traffic incidents than other vehicle occupants, even if this activity aids in keeping individuals safe and healthy after lockup. The World Health Organization (WHO) reports that vulnerable road users account for half of all traffic fatalities worldwide. For instance, despite the moderate amount of cyclists on the road, cycling accidents cause 2.20 per cent and 4.60 per cent, respectively, of all road fatalities and injuries in Canada. These factors, as well as other variables like the number of riders on the road, the state of the roads, the weather, and the amount of experience and ability of the riders, can have a significant impact on the percentage of riding accidents.

Photo 1: Smart Rider Jacket

8. **3 : 8 Decoder Circuit**

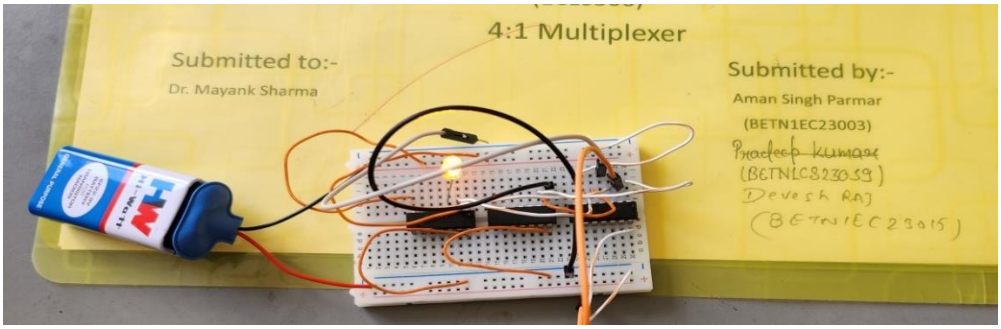
The conversion of binary to decimal can be done using a device namely a decoder. This device is one kind of combinational logic circuit that uses the n-input lines to generate 2n output lines. Here, the output of this device might be below 2n lines. There are different kinds of binary decoders which include multiple inputs as well as multiple outputs. Some kinds of decoders include one or more enable inputs along with the data inputs. Whenever the enable input is disabled then all the outputs will be inactivated. Based on its function, a binary decoder changes the data from n-input signals to 2n output signals. In some kinds of decoders, they have below 2n output lines. So in that situation, a minimum of one output prototype may be repeated for various input values. There are two kinds of higher-order decoders like 3 Line to 8 Line Decoder & 4 Line to 16 Line Decoder. This article discusses an overview of 3 Line to 8 Line Decoder.



9. **4:1 Multiplexer Using Bread Board**

4x1 Multiplexer has four data inputs D0, D1, D2 & D3, two selection

lines S0 & S1 and one output Y. The block diagram of 4x1 Multiplexer is shown in the following figure. One of these 4 inputs will be connected to the output based on the combination of inputs present at these two selection lines. Truth table of 4x1 Multiplexer is shown below



10. **Half Subtractor Circuit**

We can make the circuit in real on Breadboard to understand it clearly; for this we have used three widely used XOR, AND and NOT chip from 74 series 74LS86, 74LS08, and 74LS04.74LS86 has four XOR gates inside the chip and 74LS08 has four AND gates inside it where as 74LS04 has six NOT gate inside it. These three ICs are widely available and we will make Half-Subtractor circuit using these three. Below are the pictures of those three ICs.