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PROJECT: SMART PARKING

Phase 1: Project Definition and Design Thinking

Project Definition: The project involves integrating IoT sensors into public transportation vehicles to monitor ridership, track locations, and predict arrival times. The goal is to provide real-time transit information to the public through a public platform, enhancing the efficiency and quality of public transportation services. This project includes defining objectives, designing the IoT sensor system, developing the real-time transit information platform, and integrating them using IoT technology and Python.

Design Thinking:

1. Project Objectives: Define specific objectives such as real-time parking space monitoring, mobile app integration, and efficient parking guidance.
2. IoT Sensor Design: Plan the design and deployment of IoT sensors in parking spaces to detect occupancy and availability.
3. Real-Time Transit Information Platform: Design a mobile app interface that displays real-time parking availability to users.
4. Integration Approach: Determine how Raspberry Pi will collect data from sensors and update the mobile app.

Module 1:

INTRODUCTION TO INTERNET OF THINGS:

Internet of Things (IoT) is the networking of physical objects that contain electronics embedded within their architecture in order to communicate and sense interactions amongst each other or with respect to the external environment. In the upcoming years, IoT-based technology will offer advanced levels of services and practically change the way people lead their daily lives. Advancements in medicine, power, gene therapies, agriculture, smart cities, and smart homes are just a very few of the categorical examples where IoT is strongly established.

IoT is network of interconnected computing devices which are embedded in everyday objects, enabling them to send and receive data.

Over 9 billion 'Things' (physical objects) are currently connected to the Internet, as of now. In the near future, this number is expected to rise to a whopping 20 billion

Module 2:

GETTING STARTED WITH ARDUINO UNO & TINKERCAD PLATFORM:

The Arduino platform is the one of the best platforms for learning about circuits and creating projects. The Arduino platform provides ease for the users to interface the different devices with

microcontrollers. We have interfaced the distance sensor with Arduino Uno to make the car parking system that is mostly used in automobiles for parking at tight spaces:

How to make car parking system using Arduino Uno:

Nowadays automobiles are equipped with the sensors that help the drivers to cover up the blind spots while parking the cars. To create the parking sensor first we have to shortlist the components that are required to build the circuit for the parking system:

- 1 Ultrasonic Distance Sensor (HC-SR04)
- Arduino Uno
- Connecting wires
- Breadboard
- 1 16×2 LCD
- 1 Potentiometer
- 1 Buzzer

The image below shows the circuit designed using the components listed above:

Hardware assembly for car parking system using ultrasonic distance sensor and Arduino Uno:

To implement the circuit given above in the diagram on the hardware we have given the hardware assembly to get an idea of how the circuit will look like on the breadboard. Moreover, another purpose of the hardware assembly is to further clarify the connections of different components used in the circuit. The image below is the hardware assembly for circuit created to make the parking system using ultrasonic distance sensor with Arduino Uno

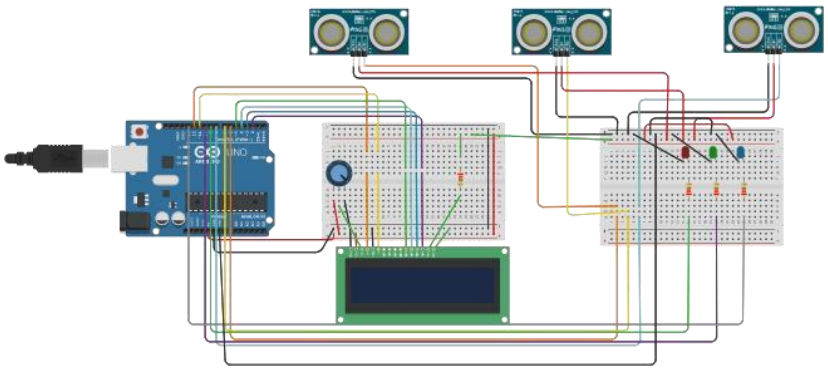

Fig: **SMART PARKING**