AUTOMOTIVE SENSORS AND POWER SYSTEMS (EC2241-1)

Mini Project Report on

"AUTOMATIC CAR PARKING SYSTEM"

Submitted by

Student name: PRANAMYA ACHARYA   NNM22EC111

Student name: MITHILA R SHETTY   NNM22EC088

Student name: RANJITHA BHAT   NNM22EC131

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

2024-2025

TABLE OF CONTENT

ABSTRACT

This project aims to develop an innovative automatic car parking system utilizing Arduino microcontroller, infrared (IR) sensors, servo motors, and an I2C LCD display. The system is designed to enhance parking efficiency and minimize human intervention in the parking process.

By strategically positioning IR sensors at designated parking spaces, the system can accurately detect the availability of each spot. When a vacant space is identified, a servo motor-controlled barrier will automatically lift, guiding the driver towards the available parking area. An I2C LCD display will provide real-time information on the number of available parking spaces, ensuring drivers can make informed decisions.

The automatic car parking system can improve parking efficiency, reduce congestion, and enhance the driver experience. It automates parking and provides real-time information.

INTRODUCTION

The automatic car parking system is a innovative solution designed to simplify the parking process, reducing the risk of accidents and saving time. This system utilizes Arduino as the brain, IR sensors to detect obstacles, a servo motor to control the parking gate, and an LCD display with I2C communication to provide user feedback. By integrating these components, the system can automatically detect available parking spaces and guide vehicles into them.

The IR sensors play a crucial role in detecting obstacles and measuring the distance between the vehicle and the parking gate. The Arduino board processes this data and controls the servo motor to open or close the gate accordingly. Meanwhile, the LCD display provides users with important information, such as available parking spaces and instructions. The I2C communication protocol enables seamless data exchange between the LCD display and Arduino.

By automating the parking process, drivers can enjoy a hassle-free experience, while parking lot operators can optimize space utilization and reduce labor costs. With its compact design and user-friendly interface, this system is ideal for various parking applications, from small lots to large-scale facilities.Whether in urban or suburban settings, this system is set to transform the parking experience, making it faster, safer, and more efficient for all.

BLOCK DIAGRAM
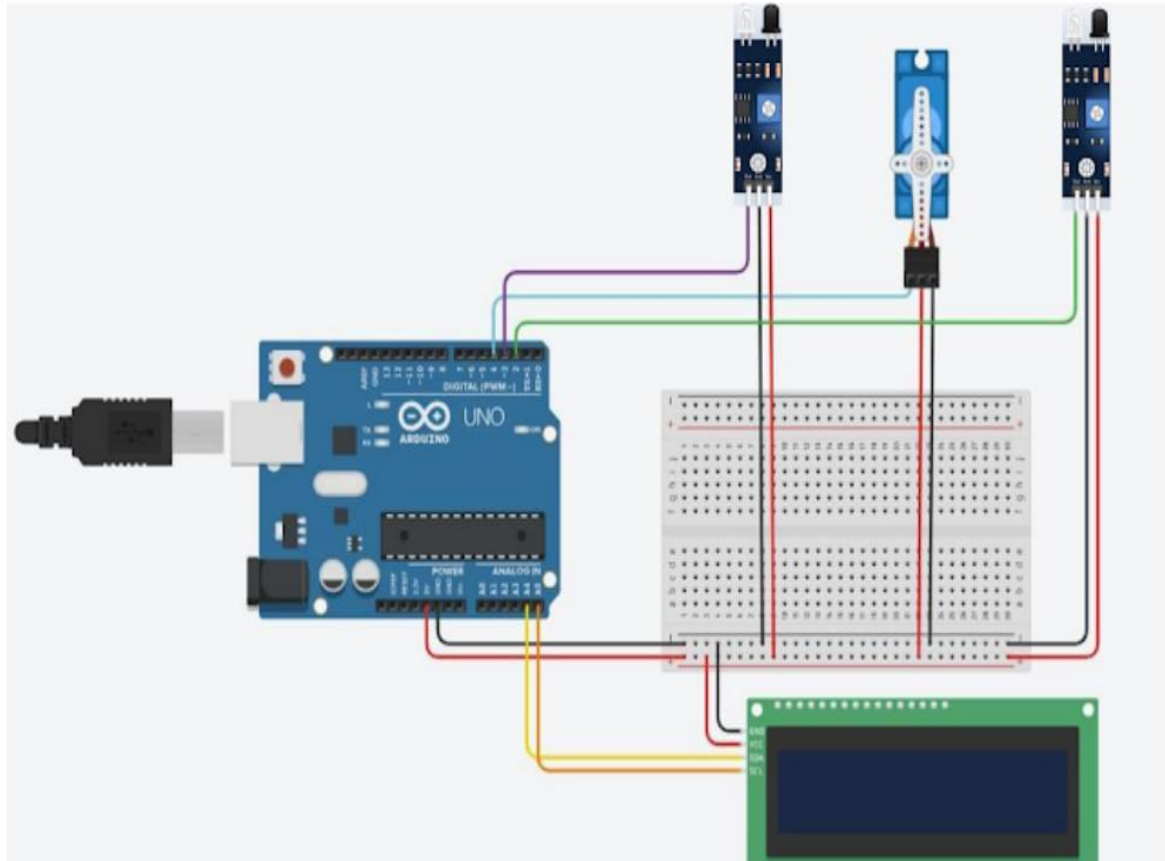
The block diagram for this project includes the following components:

- **Arduino Microcontroller**: The central processing unit that controls the entire system, receives data from IR sensors, processes the information, and sends commands to servo motors and LCD display.

- **IR Sensors**: Detect the presence or absence of vehicles in designated parking spaces. They transmit signals to the Arduino microcontroller, indicating the availability or occupancy of each space.

- **Servo Motor**: Control the movement of barriers or gates at the entrance of parking spaces. They are activated based on the information received from the IR sensors, allowing or restricting vehicle access.

- **LCD Display with I2C module**: Provides a visual interface for displaying information about the availability of parking spaces. It receives data from the Arduino microcontroller and updates the display accordingly.

HARDWARE AND SOFTWARE REQUIREMENTS

Hardware Requirements:

1. Arduino Board (e.g., Arduino Uno)

2. IR Sensors (infrared sensors for obstacle detection and distance measurement)

3. Servo Motor (for controlling the parking gate)

4. LCD Display with I2C Communication (for user feedback and instructions)

5. Power Supply (for Arduino and other components)

6. Breadboard and Jumper Wires (for prototyping and connections)

7. Parking Gate (physical gate that opens and closes)

Software Requirements:

1. Arduino IDE (Integrated Development Environment for programming Arduino)

2. Programming Language (e.g., C/C++)

3. IR Sensor Library (for reading data from IR sensors)

4. Servo Motor Library (for controlling servo motor)

5. LCD Display Library (for displaying text and data on LCD)

6. I2C Communication Library (for communication between Arduino and LCD)

7. Algorithm for Automatic Parking (custom code for controlling the system)

REFERENCES

[1] https://www.hackster.io/Techatronic/automatic-car-parking-system-project-using-arduino-ba2cb8

[2] https://youtu.be/P64CoHCSD6w?si=8xGMSCBp1Tl7QENN