

SUPERIOR UNIVERSITY

SEMESTER PROJECT PROPOSAL

“Automatic Car Parking System”

Group Number 1

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1. Summary

The "Car Parking System" project aims to develop an automated parking management system utilizing Arduino UNO microcontroller, servo motor, IR sensors, and an LCD screen. This system optimizes parking space utilization by providing real-time information about available parking slots and automatically controlling entry and exit barriers.

Key features include:

- Automated monitoring of available parking slots
- Dynamic control of entry and exit barriers
- Real-time display of parking availability on an LCD screen
- Enhanced user experience and reduced congestion in parking areas

The project's ultimate goal is to streamline the parking process and improve overall efficiency in managing parking spaces.

2. Introduction

The "Car Parking System" introduces a sophisticated solution for efficient parking space management. By integrating Arduino UNO microcontroller, servo motor, IR sensors, and an LCD screen, the system automates various tasks associated with parking management.

Key activities include:

- **Arduino UNO:** The central processing unit of the system, responsible for receiving input from sensors, processing data, and controlling system outputs. It executes the parking algorithm to determine parking availability and control barrier operations.
- **IR Sensors:** Positioned at entry, exit, and parking slots, these sensors detect the presence of vehicles by emitting and receiving infrared radiation. Each sensor sends a digital signal to the Arduino UNO, indicating whether a parking space is occupied or vacant.

- **Servo Motor:** Actuates the entry and exit barriers in response to signals received from the Arduino UNO. It rotates to open or close the barriers, allowing or restricting vehicle access based on parking availability.
- **LCD Screen:** Displays real-time information about total parking slots, available slots, and system status messages. It provides visual feedback to users, enabling them to make informed decisions when entering the parking area.

The project builds upon existing research in automated parking systems to deliver a robust and user-friendly solution.

3. Objectives

The objectives of the "Car Parking System" project are:

1. **Reliability:** Design a reliable system capable of accurately detecting vehicle presence and controlling entry/exit barriers. The IR sensors must consistently and accurately detect vehicles to prevent false positives or negatives.
2. **Efficiency:** Optimize parking space utilization by providing real-time information about available parking slots. The system should update parking availability on the LCD screen promptly and accurately.
3. **User Experience:** Enhance user experience by minimizing search time for available parking slots and providing clear instructions at entry and exit points. The LCD screen should display intuitive messages and instructions to guide users effectively.
4. **Safety and Security:** Ensure the system's operation does not compromise safety and security in the parking area. The servo motor should control barrier movement smoothly and securely to prevent accidents or unauthorized access.
5. **Scalability:** Design a scalable system that can be easily expanded to accommodate additional parking spaces in the future. The system architecture should allow for seamless integration of new sensors and barriers as needed.

5. Timetable

The project timeline is structured as follows:

Phase	Description of Work	Start and End Dates
Phase One	Requirement Analysis and System Design	25-05-2024 to 27-05-2024
Phase Two	Hardware Procurement and Assembly	27-05-2024 to 29-05-2024
Phase Three	Software Development and Integration	30-05-2024 to 04-06-2024
Phase Four	System Testing and Debugging	05-06-2024 to 09-06-2024
Phase Five	System Deployment and User Training	10-06-2024 to 11-06-2024

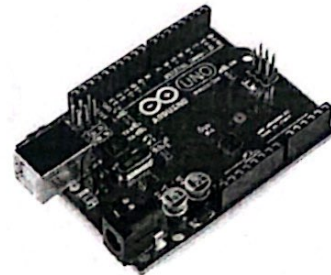
The timeline may be adjusted based on project requirements and resource availability.

4. Functionalities of the Project

The project encompasses the following functionalities:

- **Arduino UNO:**

- Receives input signals from IR sensors.
- Processes sensor data to determine parking availability.
- Controls servo motor operations to open or close barriers.
- Sends commands to the LCD screen to display real-time parking information.



- **IR Sensors:**

- Emit infrared radiation to detect vehicles.
- Receive reflections of emitted radiation.
- Send digital signals to the Arduino UNO to indicate vehicle presence.
- Positioned strategically at entry, exit, and parking slots to cover the entire parking area effectively.

- **Servo Motor:**

- Actuates entry and exit barriers.
- Rotates to open or close barriers in response to commands from the Arduino UNO.
- Ensures smooth and secure movement to facilitate vehicle access while maintaining security.

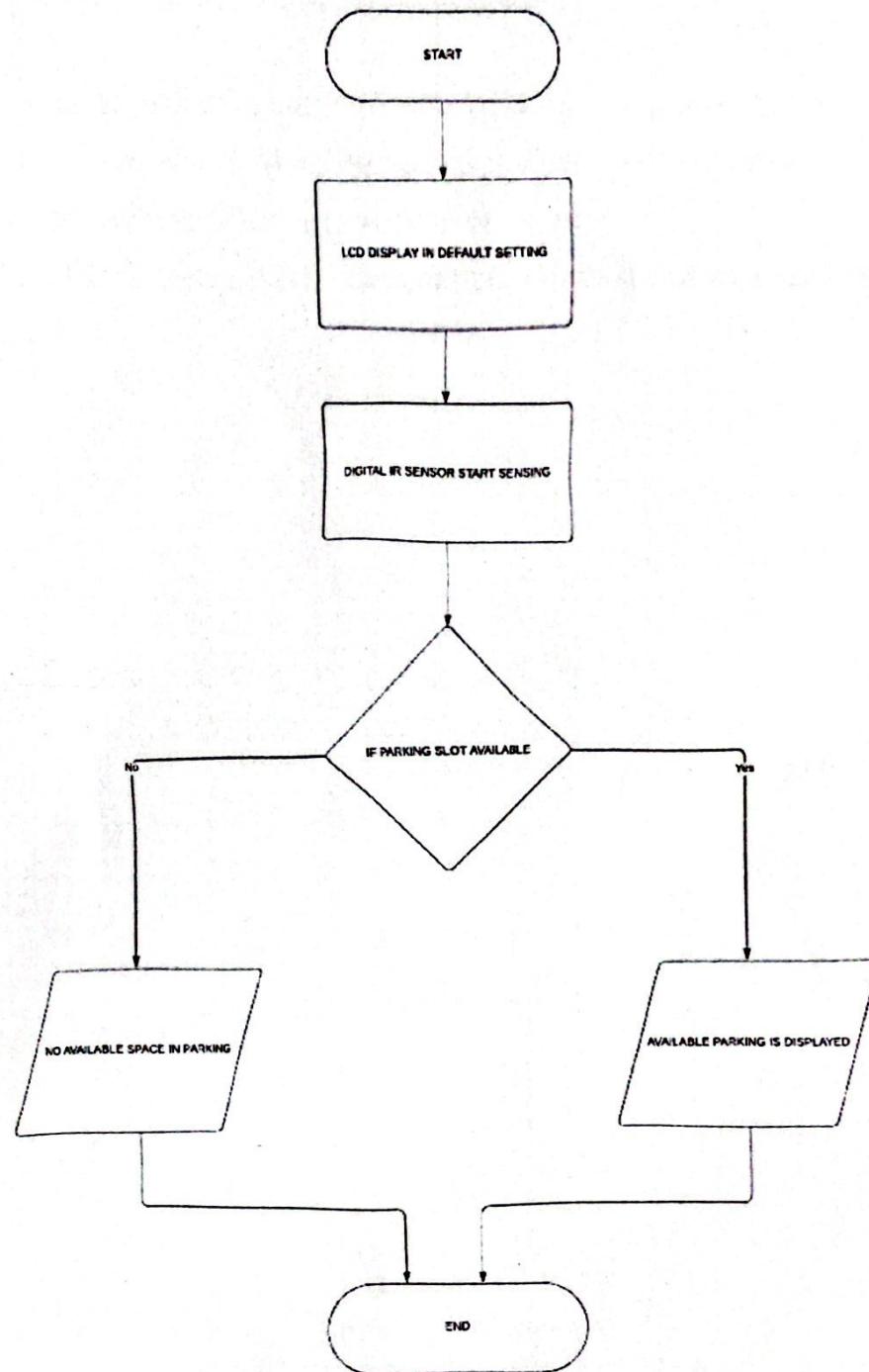


- **LCD Screen:**

- Displays real-time information about total parking slots and available slots.
- Updates parking availability dynamically as vehicles enter or exit.
- Provides visual feedback to users, indicating parking status and system messages.

The system's architecture ensures seamless integration of components, enabling efficient communication and operation.

6. Flow Chart



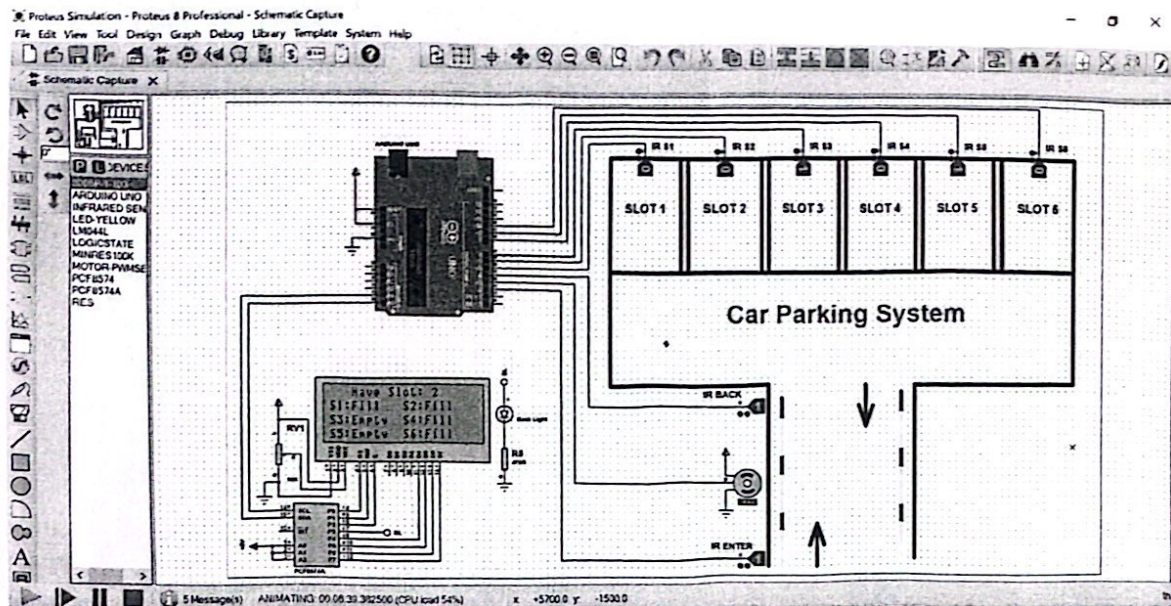
7. Evaluation

The project's progress and success will be evaluated through:

- Continuous monitoring of system performance during development stages
- Testing of hardware and software components to ensure reliability and accuracy
- User feedback and satisfaction surveys post-implementation
- Regular reviews to assess project milestones and address any issues or challenges encountered

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8.Circuit Diagram:



Components Diagram:

