Shahjalal University of Science & Technology, Sylhet

Department of

Computer Science and Engineering

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Submitted By,

Al-Amin

Reg. no: **2020331057**

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Department of computer Science & Engineering, SUST

Submitted To,

Abdullah Al Noman

Lecturer

Department of computer Science & Engineering, SUST

Automated Car Parking System

Author names:

1. <u>Member -1:</u>
   - Name   : Al-Amin
   - Reg. no. : 2020331057
   - Email   : alamin.sust.cse@gmail.com
2. <u>Member-2:</u>
   - Name   : Riaz Ahmed
   - Reg. no. : 2020331079
   - Email   : riazahmed2246@gmail.com

3. <u>Member-3:</u>
   - Name   : Mahmudul Ferdous
   - Reg. no. : 2020331037
   - Email   : mahmudulferdous2050@gmail.com

4. <u>Member-4:</u>
   - Name   : Md. Sakib Hassan
   - Reg. no. : 2020331109
   - Email   : mdsakibhassan256124@gmail.com

5. <u>Member-5:</u>
   - Name   : MD Rafi
   - Reg. no. : 2019331096
   - Email   : rafimd4212@gmail.com

Abstract:

This project focuses on the development of a digital car parking system using microprocessor and microcontroller technology. The system aims to provide an efficient and automated solution to manage parking spaces in urban areas. By employing advanced sensors and control mechanisms, the system ensures optimal utilization of parking spaces while minimizing the need for manual intervention. These abstract outlines the key components and objectives of the proposed project.

Key Terms:

1. Digital car parking system
2. Microprocessor
3. Microcontroller
4. Sensors
5. Automation
6. Urban parking management

Introduction:

The escalating urbanization has led to an increase in the number of vehicles, exacerbating the challenges associated with parking in metropolitan areas. Traditional parking management methods often prove to be inefficient and prone to human error. Hence, there is a pressing need for the adoption of advanced technologies to streamline parking operations. This project aims to address this need by developing a digital car parking system that leverages microprocessor and microcontroller technology.

Related Work:

Several research efforts have been made in the field of automated parking systems utilizing microprocessors and microcontrollers. Previous studies have explored various sensor technologies, control algorithms, and user interfaces to optimize parking space utilization and enhance user experience. However, there remains room for innovation and improvement in terms of system efficiency, reliability, and cost-effectiveness.

Proposed Solution:

The proposed solution entails the design and implementation of a digital car parking system that integrates microprocessor and microcontroller components. The system will utilize a network of sensors to detect the presence of vehicles in parking spaces and relay this information to a centralized control unit. Based on real-time data, the control unit will dynamically manage parking allocations, guide drivers to available spaces, and provide feedback to users through intuitive interfaces.

Aim and Objectives of the Proposed Solution:

The primary aim of this project is to develop a robust and efficient digital car parking system using microprocessor and microcontroller technology. The specific objectives include:

1. Designing the hardware architecture for the parking system.
2. Developing software algorithms for sensor data processing and parking space management.
3. Integrating sensors, microprocessors, and microcontrollers into a cohesive system.
4. Testing the system performance under various operating conditions.
5. Evaluating the feasibility and effectiveness of the proposed solution in real-world scenarios.
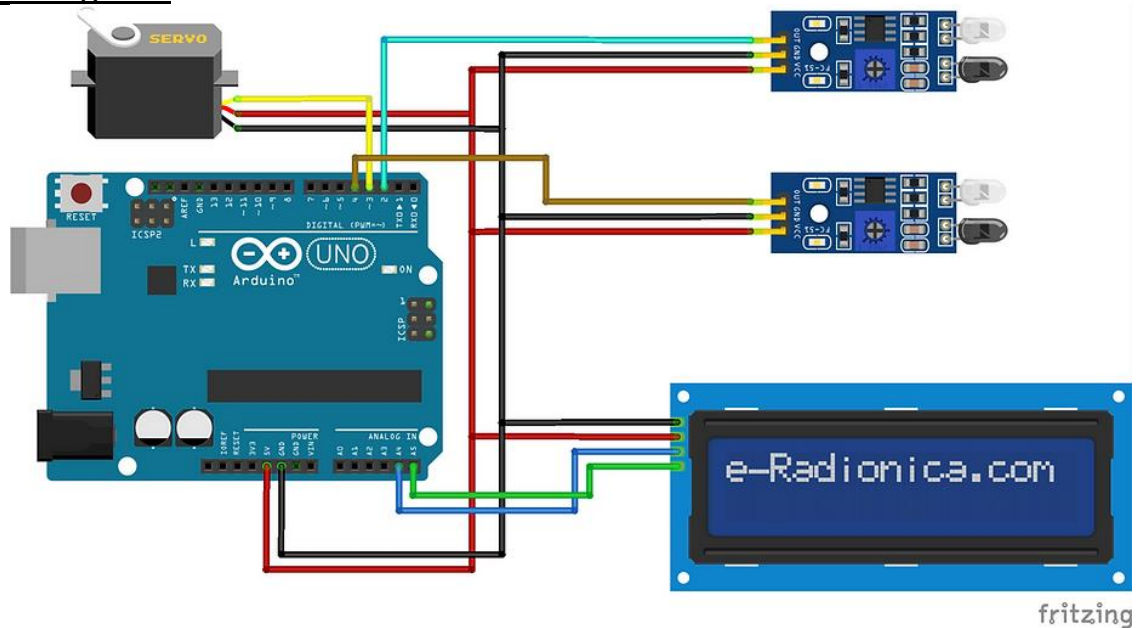
Hardware Requirements:

1. Arduino UNO
2. IR Proximity Sensor
3. 16x2 LCD i2c Display
4. Servo Motor
5. Jumpers

Software Requirements:

1. **Arduino IDE** - Integrated Development Environment (IDE) for programming microcontrollers.
2. **Simulink** - Simulation software for testing and debugging.
3. **Sensor interfacing libraries and drivers**

Circuit Diagram:

Cost Estimation:

Only the hardware will dictate the cost of the project. We are going to make use of open-source software. The software is free of charge.

Hardware cost:

Materials	Quantity	Cost (BDT)
Arduino UNO	1	1050.00
IR Proximity Sensor	2	180.00
16x2 LCD i2c	1	115.00
Servo Motor	1	170.00
Jumpers	10 pcs	50.00
Others		500.00
Total		**2065.00**

Work Plan for the Proposed Study with Timeframe:
1. Project planning and research: 2 weeks
2. Hardware design and procurement: 4 weeks
3. Software development and testing: 2 weeks
4. Integration and system testing: 2 weeks
5. Evaluation and documentation: 2 weeks

Conclusion:
The proposed digital car parking system represents a significant advancement in urban parking management through the integration of microprocessor and microcontroller technology. By automating parking space allocation and optimizing resource utilization, the system offers a practical solution to alleviate parking congestion in urban areas.

References:
1. Automated car parking system by D. Azshwanth
2. Microcontrollers http://www.nxp.com