SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

Title:

SMART GARAGE SYSTEM USING 8086 MICROPROCESSOR

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Course

CSE2006 - Microprocessor and Interfacing

Under the guidance of

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ABSTRACT:

The Smart Garage System using 8086 microprocessor is a project that aims to automate the process of opening and closing garage doors, as well as providing added security features. The system is designed to detect the presence of a car in the garage, automatically open the door, and close it once the car has left.

The heart of the system is an 8086 microprocessor, which is responsible for controlling the various components of the system. The system also includes sensors, such as infrared sensors, which detect the presence of a car in the garage, and limit switches, which detect the position of the garage door. The system is designed to be modular and expandable, allowing additional features and components to be added as needed.

Overall, the Smart Garage System using 8086 microprocessor provides a convenient and secure way to automate the process of opening and closing garage doors, while also providing added security features to protect the garage and its contents.

INTRODUCTION:

The Smart Garage System using 8086 microprocessor is a project that aims to improve the automation and security of garage doors. Garage doors are an essential part of any residential or commercial building, and automating their opening and closing can provide convenience and efficiency. The traditional method of manually opening and closing garage doors can be time-consuming and laborious. Moreover, the security of the garage and its contents can be compromised if the doors are not properly secured.

To address these issues, the Smart Garage System using 8086 microprocessor provides an automated solution that can detect the presence of a car in the garage, automatically open and close the door, and provide added security features. The system is designed to be modular and expandable, allowing additional features and components to be added as needed.

The 8086 microprocessor is the central component of the system, responsible for controlling the various sensors and components. The system also includes sensors such as infrared sensors and limit switches, which detect the presence of a car in the garage and the position of the garage door, respectively.

Overall, the Smart Garage System using 8086 microprocessor provides a reliable, efficient, and secure solution to automate the process of opening and closing garage doors while providing added security features to protect the garage and its contents.

LITERATURE SURVEY:

Title	Authors	Year of Publication	Implementation/Methodology	Merits
Design and Implementation of Smart Garage System Using 8086 Microprocessor	Olaoye, Oluwatosin O. et al.	2019	Use of 8086 microprocessor, sensors, and programming	Low cost, easy implementation
Smart Garage System Using Arduino Microcontroller	Mohammed, Ali Abdulqadir et al.	2018	Use of Arduino microcontroller, sensors, and programming	Low cost, easy implementation, remote control capabilities

Design of Smart Garage Door Opener System Based on Zigbee Wireless Sensor Network	Sun, Yu et al.	2018	Use of Zigbee wireless sensor network	Reliable, energy efficient
Development of a Smart Home System Using Raspberry Pi and Microcontroller for Remote Control Applications	Djenouri, Youcef et al.	2021	Use of Raspberry Pi and microcontroller, sensors, and programming	High level of automation, remote control capabilities
Design and Implementation of Smart Home Automation System Using Raspberry Pi and IoT	Dahal, Suresh et al.	2021	Use of Raspberry Pi, IoT, sensors, and programming	High level of automation, remote control capabilities

Design and Implementation of a Smart Home System Using Voice Recognition	Kim, Joon-Hee et al.	2018	Use of voice recognition technology, sensors, and programming	Convenient and user-friendly
A Review of Smart Home Automation System Based on IoT	Mohd, Mohd R. et al.	2020	Review of existing literature and research	Comprehensive overview of IoT-based smart home systems
Integrating IoT and Cloud Computing for Smart Home Automation System: A Review	Liu, Jun et al.	2018	Review of existing literature and research	Comprehensive overview of IoT and cloud-based smart home systems
Development of a Smart Home System for the Elderly and Disabled People	Yoon, Kyeong-Seop et al.	2020	Use of sensors and programming, tailored for the elderly and disabled	Tailored for specific user needs, user-friendly

A Smart Home System for Energy Management and Security	Tsai, Tzung-Han et al.	2019	Use of sensors and programming, focused on energy management and security	Energy efficient, secure

PROBLEM STATEMENT:

Fishing for a parking space in a hotel is a routine activity and it is estimated that nearly 30% of urban congestion is created by drivers cruising for parking space, Also resulting in oil wastage, almost one million barrels of world's oil every day. This ever growing traffic congestion and uncertainty in the parking availability and payment have thus enforced the need for a Smart Parking/Garage systems. A Smart parking technology that will help optimize parking space usage, improve the efficiency of the parking operations and help smoother traffic flow.

We are planning to make a Smart Garage System with the maximum capacity of 200 cars. The garage would be used in an underground parking of a hotel. The door of the garage could be opened and closed using a remote control unit which is used by the user. The remote control unit has only a single button and the range of the remote is not very large so the remote is only used for short distances. A user would be able to retrieve a car at any point of time. A LCD display will be available which indicates the number of cars in the garage. The full and empty status will be indicated through an LED.

PROPOSED SYSTEM:

To determine if a car/person is entering or leaving IR sensors are placed on both the inside and outside of the garage.
The heavier car is differentiated from a person by using pressure transducers.

A remote is also used for opening and closing of the garage. The sensors and remote signals are continuously checked for any valid input. A user can press the remote to open or close the garage.

A count is kept for the number of cars in the garage which is updated whenever a car enters or leaves the garage. This count is displayed on the LCD screen and if the count is 200, a red LED glows whereas in the case of 0, a green LED glows. Whenever a door is opened using a remote, it can be closed by pressing the remote again. Otherwise, it will automatically close after 5 minutes.

When a car wants to enter the garage, then the user presses the remote. This would open the gate using the motor and the car can enter the garage. The door will remain open till the remote is again pressed else it will automatically close in 5 minutes. The count of cars will be updated.

When the car wants to leave the garage, the remote is pressed by the user. This would close the gate using the motor and the car can leave the garage. The door will remain open till the remote is again pressed else it will automatically close in 5 minutes. The count of cars is updated.

System Specifications:

Remote unit button toggles the condition of the garage door- i.e. if the door is opened it is closed and vice versa.

The remote unit is used for short distances only.

A DC motor is used for opening and closing the door. The motor is a 50V ,3 A motor.

The system distinguishes between a person and a car using a switch that can be closed only by the weight of a car.

System is used in the hotel- We assume that only one person leaves the garage after the car is parked and only a single person enters the garage to retrieve the car

The system also has to distinguish between entry and exit by using two IR sensors on either side of the gate. Depending on the sequence in which the sensors are triggered (by man\car), an entry or exit is recorded and the count of vehicles is changed accordingly in case of cars.

Whether a car enters or a valet enters the door remains open for a period of five minutes. During these 5 minutes the system keeps checking if the remote is triggered.

The door can close after 5 Minutes or when the valet uses the remote. The remote can be used inside as well as outside the garage.

An LCD screen (LM016L) is used to display the count of cars in the garage while an LED screen displays "FULL" when there are 200 cars and "EMPTY" when there are no cars.

Block Diagram:
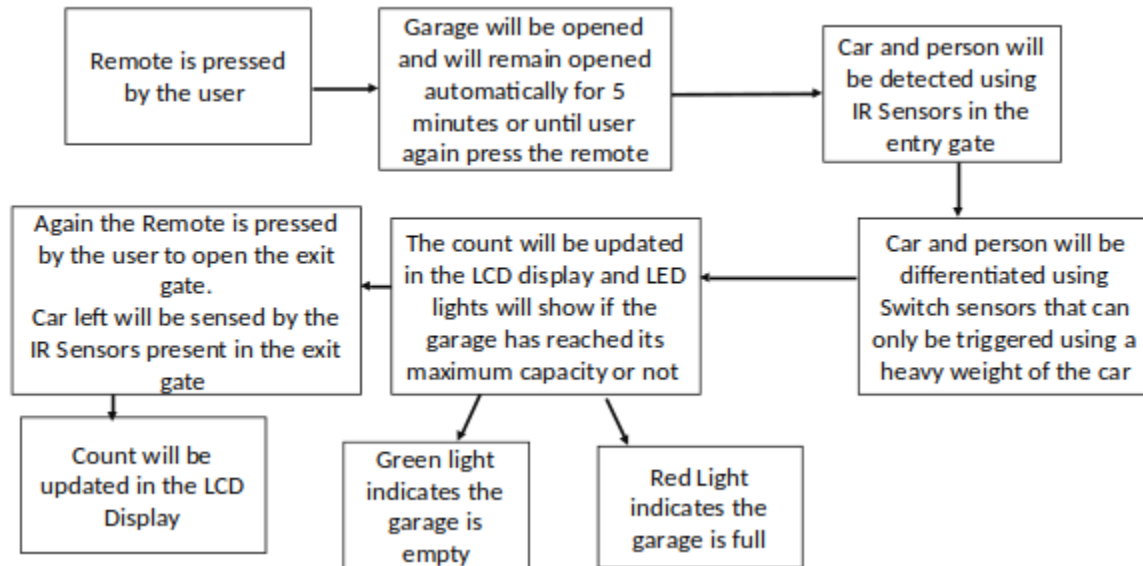
Hardware and Software Requirements:

Components	Details	Quantity
Microprocessor	INTEL 8086	1
4 KB ROM chips	2732	4
2 KB RAM chips	6116	2
PPI	8255	2
TIMER	8253	2
LCD display	LCDLM016L	1
3 to 8 line Decoder	74LS138	2
AND gates	7408	1
OR gate	7432	6
Motor Driver	8253	2
Motor	8253	2
Bidirectional buffer	74LS245	1
Unidirectional buffers	74LS244	2
Unidirectional latches	74LS373	3
Clock Generator	8284	1
Comparator IC	LM139	1
IR receiver	TSOP 1738	3
Weight Sensor	---	1

RESULTS AND DISCUSSION:

The system helps in better traffic control in the garage of a hotel.
The result will be published in the LCD DISPLAY that will be visible to all the customers entering into the hotel.
Display will show the count value of the vehicles parked inside the garage.
This information will be real-time, that is it will be continuously updated as and when a car leaves or enters.
In addition to that, we will have two LED lights that will show the threshold conditions of the garage. Green light will show the empty status and the red light will show the full status.

SIMULATIONS:
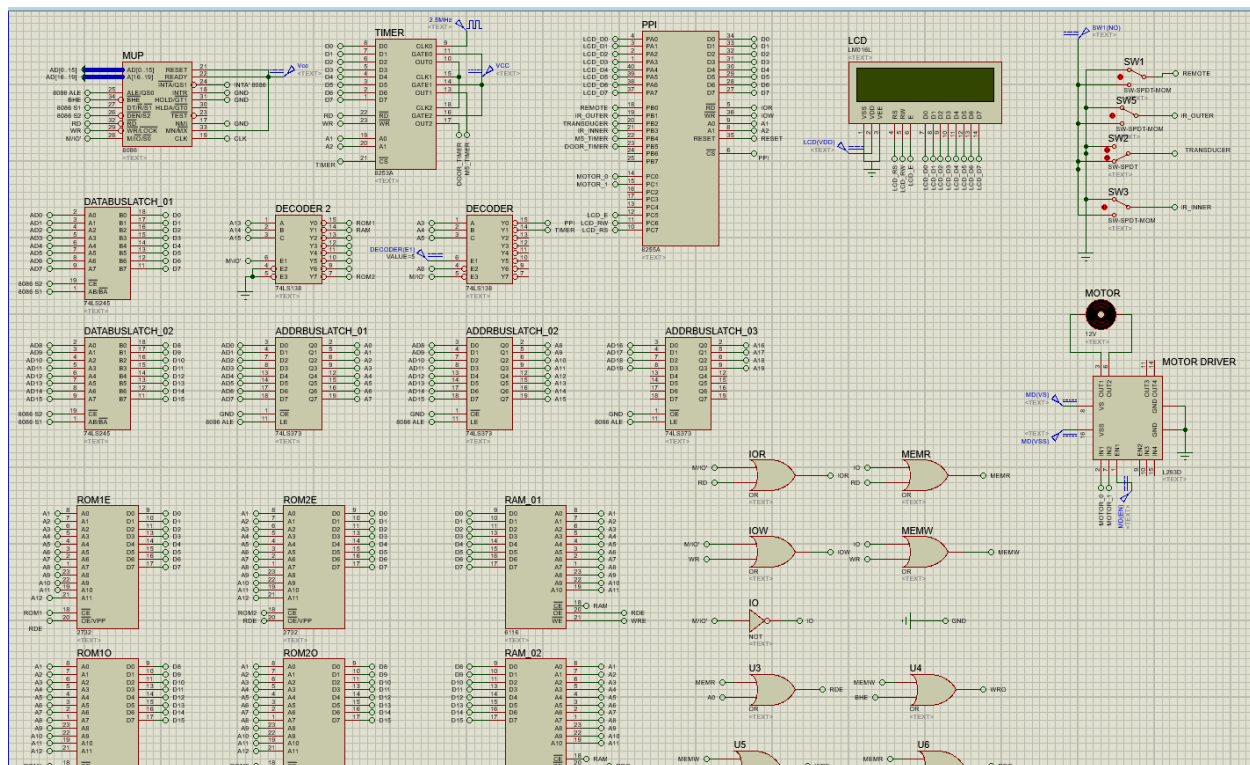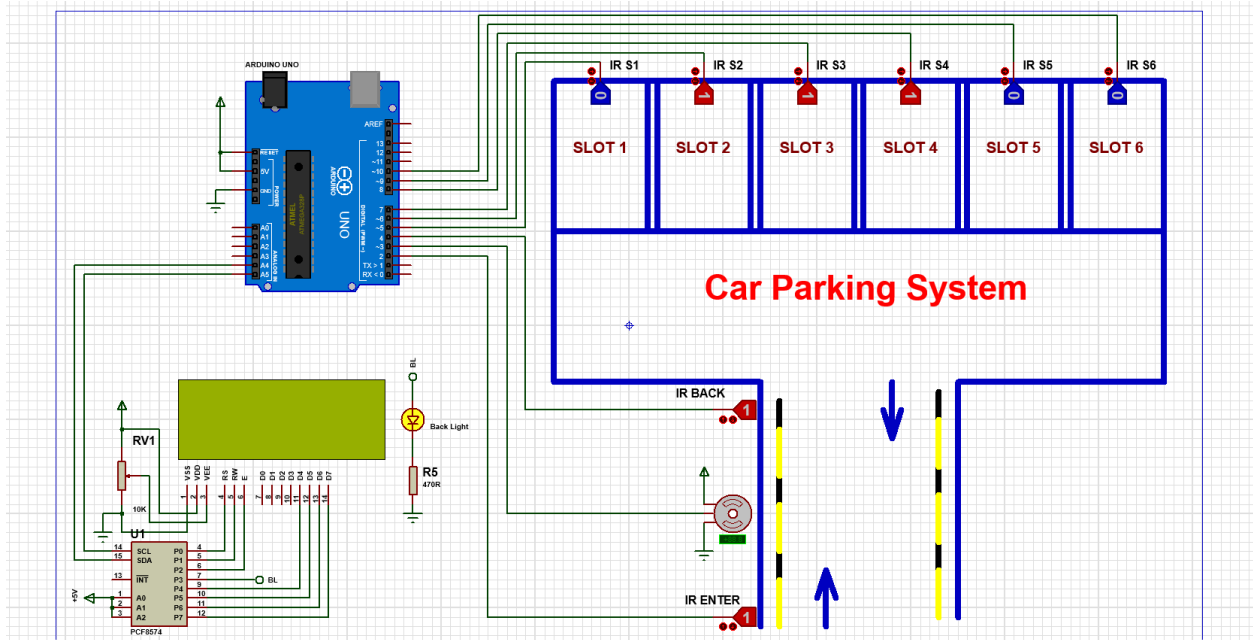
CONCLUSION:

The project finally demonstrates the working principle of a smart garage system using IR sensors, pressure transducers, and a remote control. The system is capable of detecting the entry and exit of a car or a person, keeping a count of the number of cars inside the garage, and displaying it on an LCD screen. The system also ensures safety by automatically closing the door after 5 minutes of being open and using different colored LEDs to indicate the number of cars inside the garage. Overall, the smart garage system provides convenience, safety, and efficient management of the garage space.

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