Smart Car Parking System

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Abstract— Now days in many multiplex systems there is a severe problem for car parking systems. There are many lanes for car parking, so to park a car one has to look for the all lanes. Moreover there is a lot of men labor involved for this process for which there is lot of investment. So the need is to develop a system which indicates directly which parking slot is vacant in any lane. The project involves a system including infrared transmitter and receiver in every lane & LCD display outside the car parking gate. So the person entering parking area can view the LCD display and can decide which lane to enter so as to park the car.

Index Terns - **Parking System, LCD Board, Vacant Parking Slots etc.**

1.   INTRODUCTION

There a lot of instances today where people park their vehicles in places where parking is not allowed or have a lot of problems finding the right places to park. Parking these days in cities is one of the most difficult conundrums for the people. People waste a lot of their time finding the right parking slots, as a result many park their vehicles in congested areas and places where parking is prohibited. This leads to a lot of confusion, especially during the rush hours when there is a lot of traffic wasting lots and lots of times. This project deals with this problem in a very efficient manner as it allows folks to find parking slots prior to their entrance the large car parking area. The person who needs to find a slot first can easily locate vacant parking slot. This helps in optimizing parking inconvenience and saves time as well as prevents congestion. This sheds light on the way in which this difficult problem can be solved. The prototype basically looks for the available parking slots and helps the driver or the person to locate them. When the driver reaches the larger parking area, at the entrance only he will be able to decide that where his car could be parked. After the driver parks his vehicle, a local indication is sent to him giving him the confirmation that his vehicle has been parked successfully. This reduces chaos regarding parking space and the traffic inside the car parking area can be avoided.

II.   DESIGN & WORKING PROCEDURE
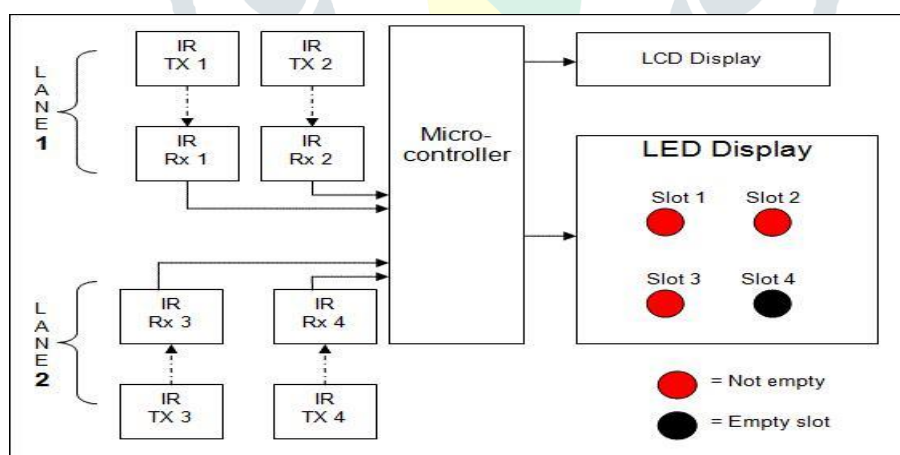
A. Block diagram

Fig. 1 Block Diagram of Proposed System

B. Apparatus required

Following are the various components used in this project:-

1. Printed Circuit Boards

2. Power supply

3. Basic Electronics Components

4. Microcontroller (PIC16F73)

5. Integrated Circuits (LM 2576 IC/MAX232 IC)

6. LCD Display(4 Digit 7 Segment Display)

7. Proximity Sensors (Photoelectric Type)

1) Printed Circuit Boards

The use of miniaturization and sub miniaturization in electronic equipment design has been responsible for the introduction of a new technique in inters component wiring and assembly that is popularly known as printed circuit.Printed circuit boards (PCBs) consist of an insulating substrate material with metallic circuitry photo chemically formed upon that substrate. Thus, PCB provides sufficient mechanical support and necessary electrical connections for an electronic circuit.
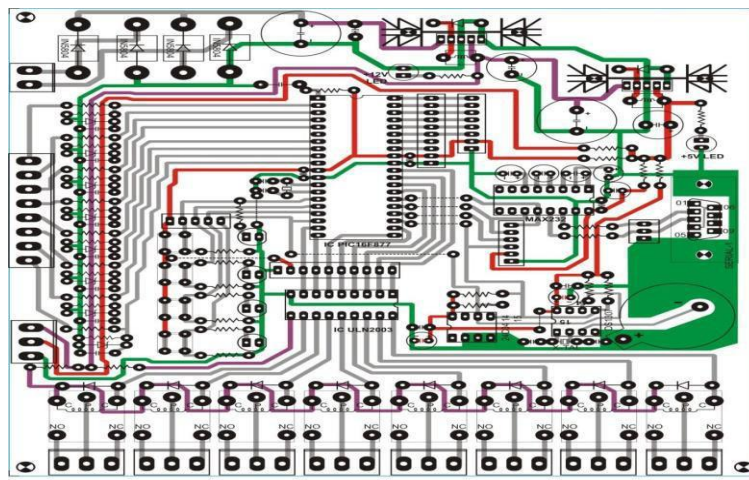

Fig.2 PCB with PIC16F877 and MAX232

2) Power Supply

The system is provided with 220V AC power supply which is rectified to 12V DC then further voltage regulator can be used as per requirement.

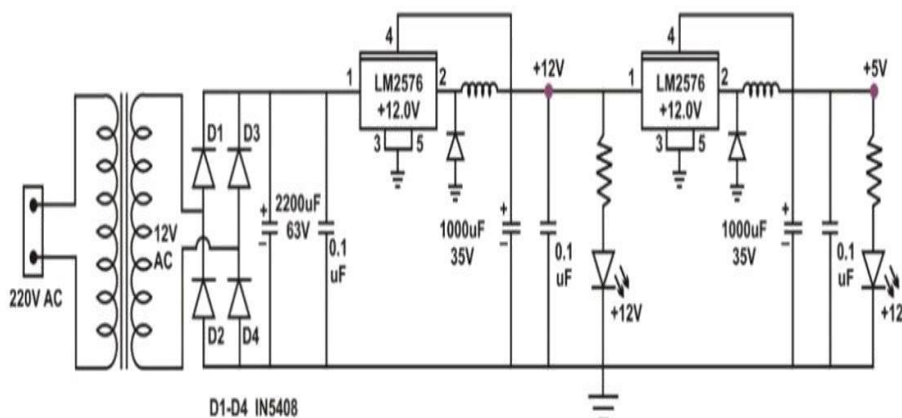Fig. 3 Shows circuit of power supply of proposed system

Fig.3 Power supply Circuit of Proposed System

3) Microcontroller(PIC16F73)

This powerful (200 nanosecond instruction execution) yet easy-to-program (only 35 single word instructions) CMOS FLASH-based 8-bit microcontroller packs Microchip's powerful PIC® architecture into an 40 package and is upwards compatible with the PIC16C5X, PIC12CXXX and PIC16C7X devices. The PIC16F877A features 256 bytes of EEPROM data memory, self programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, the synchronous serial port can be configured as either 3-wire Serial Peripheral Interface (SPI™) or the 2-wire Inter-Integrated Circuit (I²C™) bus and a Universal Asynchronous Receiver Transmitter (USART).

FEATURES On Board Regulator with filters and Operating voltage from 6V - 20 V

 Reset Pin

 Power Indicator LED

 20MHz crystal for maximum speed

 In system programming through External Serial Programmer

 USART connector for External RS-232 Link PC (Selectable - See options above) 6 ADC channels

 LCD Display connection
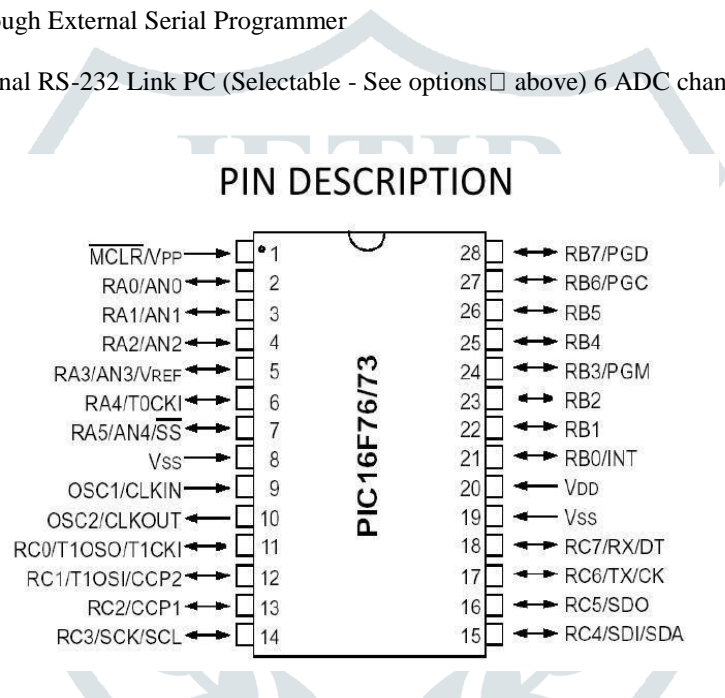

Fig. 4 Pin Diagram of PIC16F73

4) Integrated Circuits(LM 2576 IC/MAX232 IC)

Two IC's are used in our project namely LM 2576 & MAX232.Both IC's contributing to the project's working in their own set of features.Max232 is designed by Maxim Integrated Products. This IC is widely used in RS232 Communication systems in which the conversion of voltage level is required to make TTL devices to be compatible with PC serial port and vice versa. On the other hand LM2576LM2576 series of monolithic integrated circuits provide all the active functions for a step-down (buck) switching regulator. Fixed versions are available with a 3.3V, 5V, or 12V fixed output.
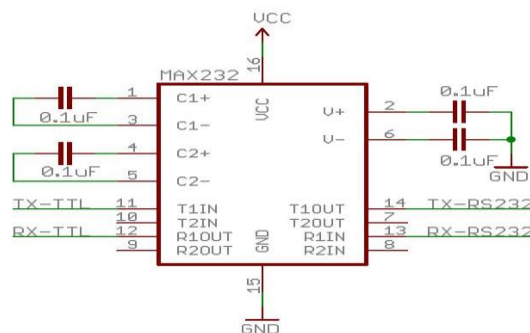

Fig. 5 MAX232 Pin Description

5) LCD Display (4 digit 7 segment display)

In proposed project a LCD for the purpose' of displaying number of vacant and occupied slots for parking the vehicle is used. This way a driver doesn t have to waste time in searching for available parking slots, he can easily take help of display for unoccupied slots, and park his vehicle accordingly.

FOR EMPTY- 0
FOR FULL-1

Fig.6 LCD Display

6) Proximity Sensors(Photoelectric type)

Proximity sensor is also used in project. These sensors detect objects upto the range of 4m,type of proximity sensor used is photoelectric. These are often called phototelectric proximity sensor. Photoelectric sensors use light sensitive elements to detect objects and are made up of an emitter (light source) and a receiver. In the proposed system total of 8 sensors are used in project for 4 slots.

Fig.7 Proximity Sensor

C. Working Procedure

This system will indicate empty and filled car parking slots at the entry. Now a days Car parking at shopping malls and markets is becoming a big issue and is causing to traffic jam.To avoid this problem, we are designing this system to indicate empty slots and filled slots, so that a car driving person can directly take his car to that empty slot. We will indicate the slot state by LEDs and in LCD screen. We will use low cost IR sensors, Proximity sensors, real-time data and applications that allow users to monitor available and unavailable parking spots, the goal is to automate and decrease time spend manually searching for the optimal parking floor, spot and even lot. **The LCD display will display the number of available slots.**
Fig. 8 Shows the working model of smart car parking system

Fig. 8 Working Model of Proposed System

III. ADVANTAGE

1   Reduced Traffic
2   Optimized Parking
3   Reduced Pollution

4   Enhanced User Experience
5   Increased Safety
6   Decreased Management Costs
7   Real-Time Data and Trend Insight

IV. APPLICATIONS

• Nowadays in many multiplex systems there is a severe problem for car parking systems. There are many lanes for car parking, so to park a car one must look for the all lanes. Moreover, there is a lot of men labor involved for this process for which there is lot of investment. So, the need is to develop a system which indicates directly which parking slot is vacant in any lane. The project involves a system including infrared transmitter and receiver in every lane and a LED display outside the car parking gate. So, the person entering. parking area can view the LED display and can decide which lane to enter to park the car.

• Conventionally, car parking systems does not have any intelligent monitoring system. Parking lots are monitored by human beings. All vehicles enter into the parking and waste time for searching for parking slot. Sometimes it creates blockage. Condition become worse when there are multiple parking lanes and each lane have multiple parking slots. Use of automated system for car parking monitoring will reduce the human efforts. Display unit is installed on entrance of parking lot which will show LEDs for all Parking slot and for all parking lanes. Empty slot is indicated by the respective glowing LED.

V. CONCLUSION & FUTURE SCOPE

The future scope to this Smart Car Parking System can be that availability of spaces could be displayed on a smart phone Application or even to satellite navigation device so that drivers will always aware of whether there are free spaces are not. And also enhance to send some notifications to users smart phone when vehicle enters to particular shopping places and some streets in a city etc. A successful implementation of this project would result in less traffic and chaos in crowded parking spaces like malls and business buildings where many people share a parking area. It provides drivers with Also, as it would reduce the waiting time, long queues, tension, stress and increase the efficiency of the parking system. As the Smart Car Parking System Requires minimal manpower, there are minimum chances for human errors, increased security in addition to a swift and friendly car parking experience for drivers.

VI. REFERENCES

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