INDEPENDENT SMART PARKING & RETRIEVE OF VEHICLE USING MOBILE APLLICATION BASED ON GSM MODEM TECHNOLOGY

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ABSTRACT
Implementation a driverless car is an autonomous vehicle that can drive itself from one point to another without assistance from a driver. In this paper, the control problem of autonomous bay parking system. We choose a referenced parking lot and define a suitable parking spot based on some measurements at various places. Assistant driving system in vehicle makes driving safe and smooth for modern vehicles. They are two mode Park mode, Retrieve mode In park mode, once the user presses the auto mode button, the car starts to move forward calculate the parking gap beside it using the parking scanner(ultra sonic sensor) and when it finds one, it positions itself steering by DC motor. In retrieve mode, by using mobile phone through GSM modem communicate with processor sending SMS to processor which is connected to robot model.

Index Terms – Park mode, Retrieve mode, ARM processor, Pallet.

I. INTRODUCTION
After the admin started the system, the driver was prompted to enter a key for his designated parking spot and he was given the choice either to park or retrieve his car. Each key had been checked for accuracy and had been assigned a designated parking spot. If there was a car on the driveway that has been detected by the ultrasonic circuit, which is connected to the PC via the pins of a parallel port; the driver was given the choice to park his car. The car was then placed on the pallet available. The pallet is always in the levelled position i.e. as soon as the forklift takes the car on the pallet; the stack pushes up another pallet. Therefore, every time a pallet was taken to a parking spot, the stack was pushed up to realign the top of the pallet, with the level of the driveway. After that, the program sent the signals to the ARM microcontroller to move the forklift to the stack; this was accomplished by sending continuous movement instructions to make smooth movement. The commands for the working of the forklift were written according to the following algorithm.

Implementing getting SMS after car parked in desired place and also self retrieving by using smart mobile via GSM modem. If you want to drive the robot to forward direction you have to send SMS to the modem to which is connected to robot and we can drive the robot to reverse direction left side and right side as well. Adding alcohol sensor if driver drunk & drive the car, car will stop automatically and also get SMS to user via GSM modem.

II. PROBLEM STATEMENT
The main aim of automated car parking service was to adjust more cars in the same space, thereby reducing the space needed to park the same number of cars. It is a method of automatically parking and retrieving cars.

The aim was to design and implement a prototype of multilevel automated car parking service. This service is fully automated where the driver enters a numerical key and a selection, and then the system picks up the vehicle and stores it in a designated parking space. Upon retrieval, the driver enters the key and the selection, and the system picks up the car and delivers it to the exit.

The learning objective was to obtain knowledge in the fields of electronics, robotics and control systems, communication and programming. In addition, it improved planning and organizing skills, critical thinking and analytical skills, research skills, team work and observation skills.

While implementing this project, some technical problems were faced regarding accuracy, precision and memory space. These issues were later taken care of by changing the software language of the functions written in the microcontrollers. It was planned to write the code using the C language.

PERFORMANCE METRICS
To evaluate the performance of a parking management system, we introduce the following metrics, which reflect the needs of involved parties, and our concerns on traffic congestion and environmental protection.

Walking Distance:
Walking distance is defined as the distance from a driver’s selected parking space to the destination. It is an important factor for a driver to determine where to park. Usually, a driver wants to park as close to the 7 destination as possible if his budget permits. Therefore, the walking distance indicates the satisfaction of drivers.
Parking Revenue:
Regardless of whether a parking lot is privately owned or municipally owned, parking revenue represents the benefit to the parking providers. Since multiple parties are involved in this system, our design does not aim to maximize the parking revenue for service providers only, but allows them to obtain profits at reasonable level.

Service Differentiation:
Usually a driver wishes to pay as little as possible, and has a certain budget for parking. In a crowded area, the parking resource is limited. To alleviate the contention on parking resource and maintain reasonable parking revenue for service providers, the management system should differentiate the drivers according to their budget and need.

Traffic Searching for Parking:
The traffic generated by drivers searching for parking is not negligible and reflects the social welfare. Hence, an efficient parking guidance system should efficiently reduce the traffic searching for parking. Also, reducing the amount of searching time for parking is desired.

III. SYSTEM HARDWARE DESIGN
This project is designed with microcontroller, ultrasonic transmitter and receiver, signal conditioning unit, Driver circuit along with motors, Alarm driver circuits and robot model.
This robot is rotated with help of motor. Ultrasonic transmitter and Receiver are attached in the stud. So whenever the stud is rotating both ultrasonic transmitter and receiver are rotated. Oscillator circuit generate 40KHZ frequency signal it transmitted through the ultrasonic transmitter. If any object is there the ultrasonic wave hits that and reflected from that object. The reflected wave is received by ultrasonic receiver depends upon the object distance the received signal strength is varied. Then it given to signal condition unit in which the received signal is amplified and also noise signal is rectified, then noiseless amplified signal is given to Microcontroller. Here the microcontroller may be Atmel or PIC both are flash type reprogrammable microcontroller.
In microcontroller we have already programmed. When an ultrasonic wave reflected from any one objects, the received signal is given to microcontroller to display the corresponding distance of the object on the LCD display. At same time microcontroller activates the alarm circuit. So alarm makes the sounds for indicating to the person. Robot movement as well as stud rotation is controlled by microcontroller. The microcontroller controls the driver circuit which controls the motors attached in the robot. Therefore the robot movement is controlled as per the instruction fed in the microcontroller.
In micro controller we have to program to get the input signal from the cell phone through the data cable and the micro controller will activate the relay through the relay driver circuit which contains transistors, which acts as the switch. So it can control the relay. The relay outputs are connected to DC Motors and the dc motors will drive the robot according to the command received.
For an example, if you want to drive the robot to forward direction you have to send SMS to the modem to which is connected to robot. After receiving the SMS the modem send the corresponding signals to micro controller through the data cable and level convertor, now the micro controller activates the corresponding relay, so DC motor will be operated robot moving in the forward direction. Similarly we can drive the robot to reverse direction left side and right side as well.
By using this project we can control the robot through the mobile phone. The special feature of this robot is it is fully operated with the help of battery.

IV. PARKING MANEUVER
The parallel park is an essential skill to learn if you want to be able to park in town on the street. More often than not there is insufficient space to drive forward into a vacant parking space and therefore your only option is to reverse in. The parallel park manoeuvre requires you to pull alongside the target vehicle you intend to park behind. Try to line up your left door mirror with the front end of the target vehicle.
Having checked that it is safe to commence the manoeuvre you gradually reverse until your rear wheels are level with the back of the target vehicle. At this point begin to apply sufficient left hand lock until your car is diagonal to the kerb at about a 45 degree angle. When the back of your vehicle is about 2 feet from the kerb apply sufficient right hand lock so that the vehicle becomes...
parallel to the kerb. Continue to reverse slowly and steer to the left to straighten the wheels of your vehicle. Should you need to move forward to correct your position you may do so provided you can still pull away from behind the vehicle in front without having to reverse again. Irrespective of this the manoeuvre must be done within two car lengths of the rear of the target vehicle.

Fig 2. Parking Maneuver

The additional learning points associated with this manoeuvre are as follows:

1. Location
   Carefully assess the parking space to ensure it is at least one and a half car lengths in size and that it is safe, legal and convenient.

Fig 4. Find the Location

2. Signal your intentions clearly
   Make sure your intentions are known by slowing down well before the parking space and by positioning yourself reasonably close and parallel to the vehicle that you intend to park behind. Immediately get ready to reverse. The brake and reversing lights become a signal to following traffic as does the change in position.

Fig 5. Target car position

3. Target car position
   Try to position your car parallel to the target vehicle allowing sufficient room for oncoming vehicles to pass or following vehicles to overtake but not so close that it prevents you from completing the manoeuvre in the space available. The closer you are to the target car the more difficult it will be to get a suitable angle to reverse into the space available.

Fig 6 All round awareness

4. All round awareness
   Watch out for pedestrians from either side of the road who may cross behind you as you attempt to reverse. This will require you to be continually looking over your left and right hand shoulders being careful to pause using clutch control when your view to the rear is temporarily lost in the switch over. Check that you will not present a hazard to passing vehicles as your vehicle swings out. Similarly ensure you will not hit the rear of the target vehicle with the front of your car as you swing in.

Fig 7 Dealing with other road users

5. Dealing with other road users
   You must always give way to other road users. You must give way to any pedestrians crossing behind and avoid swinging the car out into the path of overtaking or oncoming vehicles.
6. Keeping calm
Other experienced drivers will appreciate that if you rush this manoeuvre you will end up taking longer and run the risk of hitting something or someone. Therefore if traffic appears once you have started the manoeuvre you will usually find that they give you priority. Under no circumstances allow yourself to be hurried when doing this exercise.

Why Self-Retrieving:
Retrieving our car from the tiny parking area is difficult for newly learned driver. So many problems will be faced at the congested parking area while retrieving the car. One of the problem is other users are not parked correctly in that particular slot. It’s shown in Fig. 3

![Fig 3: Not Parked Correctly](image)

So that, the user cannot open the door and do not go to inside of the car. This creates the problem to the user to retain our vehicle from the parking space. In retrieve mode, the user retrieve the car by using mobile phone the car starts to track the direction and steers itself automatically out of the parking lot and drives itself to the point

V. SOFTWARE REQUIREMENTS
Software and language used for programming the ARM microprocessor are shown below. The circuit design can be simulated using the Orcad software for the corresponding signal response of parking system.

Keil Ide:
We use KEIL µ vision3 software for programming the LPC2148 microprocessor. The software solves the complex problems facing embedded software developers. While starting a new project, first we have to select the microprocessor, that we are going to use for our project from the device database and the µ Vision IDE sets all compiler, assembler, linker, and memory options.

VI. RESULT AND CONCLUSION
Purpose of the current work is to study and analyze the driverless car technology. This mobility is usually taken for granted by most people and they realize that transportation forms the basis of our civilization. The need for a more efficient, balanced and safer transportation system is obvious. This need can be best met by the implementation of autonomous transportation systems.

Current work focuses on how to use the Future Car Technology That's On the Road Today. In the future, automated system will help to avoid accidents and reduce congestion. The future vehicles will be capable of determining the best route and warn each other about the conditions ahead. Many companies and institutions working together in countless projects in order to implement the intelligent vehicles and transportation networks of the future.

REFERENCE
BIBLIOGRAPHY

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