DESIGN OF AUTOMATIC SMART PARKING SYSTEM FOR FOUR WHEELS

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Abstract- This paper aims to provide a person pleasant, reliable and automatic automobile parking gadget even if recognized; many cars may additionally pursue very confined parking spaces to reason serious visitors congestion. In this paper, we design and put into effect a prototype of smart parking system The automated vehicle parking gadget is completely automated with the consumer being given a unique ID corresponding to the trolley being allotted to him or her this sort of device is useful to clear up the problem of restrained parking space to be had is busy towns. With the growth of monetary behavior and the upgrade of dwelling widespread, the ratio of people in India who own automobiles and motorcycles have lately improved giving a lift to metropolitan traffic. Therefore, parking issues will be a huge undertaking to facilitate visitor's network and make certain city life great. Searching for parking space in most metropolitan regions, particularly throughout the frenzy hours, is hard for drivers. The issue arises from not knowing wherein the to be had areas can be at that point.

Key word- Design automation, Load modeling ,Mechanical Parking system

1. Introduction

The conventional parking systems including multilevel or multi-save vehicle parking systems (non-automated),robotic automobile parking structures, computerized multilevel automobile parking systems and so on. Were carried out on a big scale. But these structures have a prime downside of huge area consumption that's correctly eliminated with the use of "Automatic car parking system". In an automatic vehicle parking, the motors are left at the entrance and are in addition transported in the constructing with mechanical structure. Similarly, they're retrieved by way of mechanical structure and located on the go out for the proprietor to drive away. Our

proposed machine gives an Autonomous automobile parking that regulates the quantity of cars that can be parked in a given area at any given time based on the parking space availability. When a automobile arrives at the doorway, it will likely be stopped at the main gate and the motive force de-boards the automobile. If the supply of parking area is confirmed, the user commands the automobile to get parked to the exact slot. The vehicle lines its direction to the entrance of the parking location. Here, it waits and the info required for parking of vehicle at the proper slot are communicated to the Car Control Unit. On receiving the facts, the automobile will further hint its path To loose parking spot. On a success parking, the information on the LCD might be up to date routinely.

1.1   Project Objective

1. To maintain a priority list for the provision of parking spaces in areas where residents' parking is causing environmental damage and to review the priority list on an annual basis.

2. To ensure that car parking provision and enforcement are broadly self-financing through the Decriminalisation of Parking Enforcement (DPE) process.

3. To help maintain the vitality of town centres and to minimise out of town development

1.2   1.2 .Parking Problem

Difficulty in Finding Vacant Spaces Quickly finding a vacant area in a multilevel automobile parking space is tough if not impossible, specifically on weekends or public holidays. Finding spaces during weekends or public vacations can take extra than 10 minutes for about 66% of traffic. Stadiums or shopping malls are crowded at top durations, and difficulty in finding vacant slots at these locations is a major hassle for customers. Insufficient vehicle park spaces cause visitors congestion and driver frustration.

1.3. Improper Parking

If a car is parked in this kind of manner that it occupies parking slots as opposed to one, that is called improper parking .Improper parking can happen when a driving force isn't always cautious approximately every other driver's rights. This is tackled by the development of computerized smart car parking system.

2 .literature survey

 Scientists with MIT constructed a good sensor bundle [11] with 2000 of which in important cars and trucks, measures typical pace, in addition to picking up the rocks or normal water while traveling. These people find vehicles using disturbances within earth's magnet niche as a result of vehicles. People examine diverse approaches to depend on new or used cars. Most are in-road inductive loops, probe vehicles within site visitors, entry to permanent magnetic devices, us going for wise streets studs, some machine eye sight solutions (with problems) and using info because of mobile or portable mobile phone network. The job objectives are solving the efficient potential customers' operations and road safe practices obstacle by providing some assembly to get customer info.

   Hsiao-Kuang, et al. [1]proposed WSN-based traveling facts range along with communication process. These people engineered in addition to prototype hardware in addition to applications WSN themes. Additionally, they establish you are the different parts of ITS for the reason that security sub-system, approach sub-system, execution subsystem in addition to communication sub-system. That they produced some nodes choices: vehicle machine (mobile nodes), roadside equipment (static nodes) along with inter section item (sink). One's own success targets solving that successful supervision and additionally road safety practices struggle by giving the composition to collect traffic knowledge.

     Sabnam et. al[2]in the Double Abdullah University or college involving Scientific discipline together with Know how work with unaggressive infrared along with an ultrasonic sensor to help you classify new or used cars and additionally discover flooding at pavements. Their own operate targets helping you out with this effective traffic direction in addition to roads essential safety difficulties by checking vehicles, classifying him or her and additionally discovering flood upon streets.

 Zips et al[3] additional analyze the number of choices associated with exploitation the technological know-how from WSN within A. In-depth detailed description from sensor node developed for sensing the intensity of magnetic discipline in addition to velocity is commonly given. By way of example, an offered sensor is needed to help sense the acceleration involving moving vehicles so to classify the vehicles' corresponding their predicted proportions . You

succeed targets in clearing up that efficient traffic direction test just by keeping track of vehicles in addition to classifying these in line with one's own span shape.

Merriman et. al studies show a powerful construction to enhance the safe practices from road travel around applying WSN and Wireless Bluetooth. Most people additionally discuss an ad-hoc mobile phone network creation relating to vehicles in addition to facts trading sensed as a result of detectors. Their simulation effects demonstrate which Wireless Bluetooth along with sensor system solutions aim for effective traffic management, safe road practices together with maximizing visitor knowledge.

Ji et al. presented the generic concept of the use of cloud-based intelligent car parking services in smart cities as an instrumental application that deploys the Internet of Things (IoT) paradigm. The correspondence of an IoT subsystem included a sensor layer, communication layer, and application layer. A high-level loop in the system architecture was outlined as a way of demonstrating the provision of car parking services with the proposed functions. A cloud-based intelligent parking system that could be used within universities was articulated along with the principles of design and execution. Wang and He designed and implemented a prototype of a reservation-based smart parking system that would allow drivers to efficiently locate and reserve empty parking spaces. They could learn the parking status from the sensor networks that were deployed in the parking spaces where the reservation process was impacted by the changes in the physical parking status, and the drivers were unable to access the cyber physical system with their personal communication devices. The researchers also studied and compared the performances of the smart parking policies of the smart parking system. The research results portrayed the proposed parking legislation as a potential tool in the simplification of the operations of parking systems as well as in the alleviation of traffic congestion made by parking searches.

3. Technical analysis of the literature

Vehicle creation has developed impressively over the past 30 years, as discussed More vehicles on the roads causes more fuel and time utilization and a developing interest in parking spots. These issues can be tended to by advanced stopping arrangements, which are perhaps the most well-known use cases in the concept of the smart city and are employed to improve the quality of the life pattern of a city.

The engineering of advanced stopping arrangements is chiefly addressed by three components: sensors, organizing conventions, and programming arrangements. Sensors are the main component as they gather data and feed the entire framework. Systems administration conventions are represented by an entryway that carries out remote IoT conventions and interfaces sensors to the product frameworks. Finally, programming arrangements guarantee that data are accessible to all users through some kind of administration. For example, individuals can utilize these data to observe heat guides of zones with the most elevated stopping space inhabitance
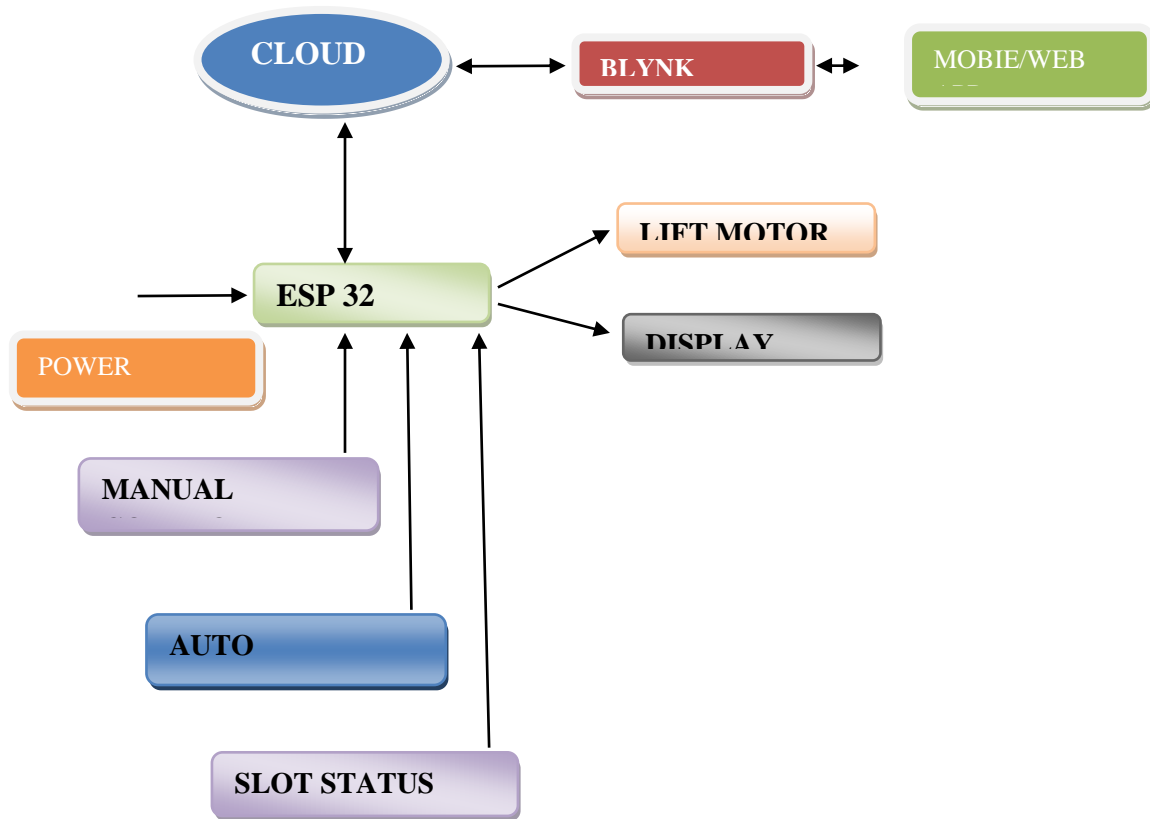
4. Working principle

Fig-1. Block Diagram for parking system

The initial condition for the lift is at ground. At the ground controller always check for the car to park and to retrieve car. Car Parking process starts with the car enters in the slot. Each floor

consist of two sensors, upper extreme& lower extreme to setstop the position of the lift A display is provided at the ground floor which is basically a counter that displays number of cars in each floor
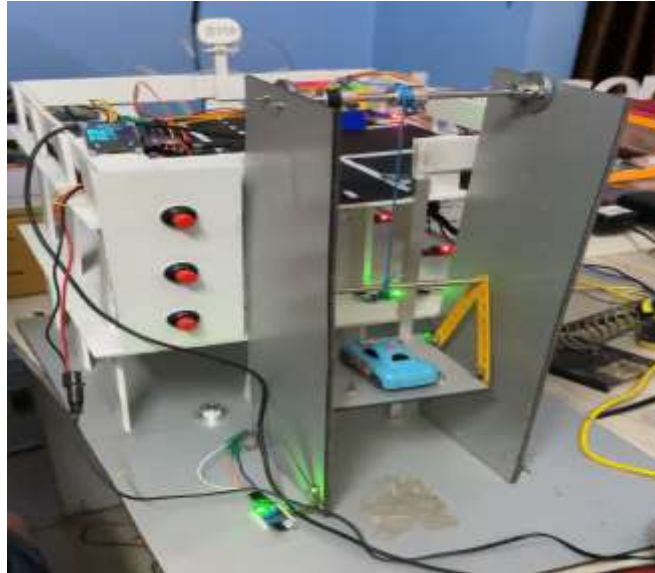

Fig.-2 (Automatic parking system)

It informs whether the floors are fully filled with the cars or is it having place in a particular floor or not. There is facility of lift to carry the car to up and down. Movement ofLift is controlled by stepper motor. When the lift reaches the first floor, the processor compares the filed amount to that of the already fed capacity of that floor, and if it finds that the first floor is fully filled, it goes to the second floor and thus the procedure stops here. As soon as a car is placed in a particular floor, the display counter at the ground floor increments as to indicate the floor capacity has decreased by one. After the lift places the car in a particular floor, it comes back to its normal position and that time, the motor that drives it also stops. When a person needs to come down from a particular floor to ground floor, he is expected to focus the headlight onto the LDR placed in that floor. Now sensor section sends signal to motor that the lift has to be send back to that particular floor and sends a signal to glow RED LED indicating that the lift is busy. As soon as the it reaches that particular floor Car should come inside the it, the display counter at the ground floor decrements by one as to indicate the floor capacity has increased by one. Lift comes back to its normal position and the that time, motor that drives.

5. Hardware Description

The hardware component required microcontroller, LCD, LDR, relay, DC motor, voltage regulator.

5.1. Microcontroller

The Microcontroller AT89S52 is a low-power, highperformance CMOS 8- bit microcontroller with 8K bytes of in-system programmable flash memory and data memory is 256 bytes RAM this chip is manufactured using Atmel's high-density nonvolatile memory technology and it is compatible with the industry- standard 80S52 instruction set and pin out. The on-chip flash memory allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer.

5.2. Relay

It is used for auto switching device.

5.3. RFID Tag/Reader:

RFID Identification. An RFID system consists of two parts .i.e., a reader, and one or more transponders, which are also known as tags. RFID systems have evolved from barcode labels as a means to automatically identify and track products as well as people. In this system, the user is assigned a unique ID corresponding to the specific trolley. This helps in quick identification and movement of the same

5.4. Software Description

Proteus 8 is the best simulation software for various design with microcontroller. It is mainly popular because of availability of almost all microcontroller in it. So it is a handy tool to test programmers and embedded designs for electronic people. Simulation can be done using proteus 8 software.

6. Conclusion

In this study, the various types of smart parking system and has been presented. From the various examples of the implementation of the smart parking system being presented, its efficiency in alleviating the traffic problem that arises especially in the city area where traffic congestion and the insufficient parking spaces are undeniable. It does so by directing patrons and optimizing the use of parking spaces.

With the study on all the sensor technologies used in detecting vehicles, which are one of the most crucial parts of the smart parking system, the pros and cons of each sensor technologies can be analysed. Although, there are certain disadvantages in the implementation of visual based system in vehicle detection as described earlier, the advantages far outweighs its disadvantages.

The major object of this project is to evaluate the work load and time frame of implementation a similar or equivalent project on the topic of autonomous vehicles in student senior project and final project of instrumentation/mechatronics courses. It took seven months for one student to modify the vehicle and achieve the functions of automatic parking mentioned above, including several weeks planning and discussion in the beginning. The result shows that it is a suitable project with proper work load to implement in a course or a student project on mechatronics and vehicle automation in a single semester. This course/project is designed for senior students who have taken courses such as Instrumentation, Electrical Machines and Power Systems, Micro and Programmable Controllers, and Control Systems as prerequisites. The student outcomes, in terms of the capabilities defined by ABET include General engineering technology (Bachelor):

References

[1] Barton, J., J. Buckley, B. O'Flynn, S.C. O'Mathuna and J.P. Benson et al., 2007. The D-systems project-wireless sensor networks for car-park management. Proceedings of the 65th Vehicular Technology Conference, April 22-25, 2007, VTC2007-Spring, pp: 170-173.

[2] Benson, J.P., T. O'Donovan, P. O'Sullivan, U. Roedig and C. Sreenan et al., 2006. Car park management using wireless sensor networks. Proceedings of the 31st Conference on Local Computer Networks, November 14-16, 2006, Tampa, FL., USA., pp: 588-595.

[3] Bi, Y.Z., L.M. Sun, H.S. Zhu, T.X. Yan and Z.J. Luo, 2006. A parking management system based on wireless sensor network. Acta Automatica Sin., 32: 877-968.

[4] Bong, D.B.L., K.C. Ting and K.C. Lai, 2008. Integrated approach in the design of car-park occupancy information system. IAENG Int. J. Comput. Sci., 35: 1-8.

[5] Bong, D.B.L., K.C. Ting and N. Rajaee, 2006. Car-park occupancy information system. Third Real-Time Technology and Applications Symposium, RENTAS 2006, Serdang,

[6] Cheung, S.Y., S. Coleri Ergen and P. Varaiya, 2005. Traffic surveillance with wireless magnetic sensors. Proceedings of the 12th ITS World Congress, November 6-10, 2005, San

Francisco, pp: 1-13. [7] Chinrungrueng, J., U. Sunantachaikul and S. Triamlumlerd, 2006. A vehicular monitoring system with power-efficient wireless sensor networks. Proceedings of the 6th International Conference on ITS Telecommunication, June 21-23, 2006, Chengdu, pp: 951-954.

[8] Chinrungrueng, J., U. Sunantachaikul and S. Triamlumlerd, 2007. Smart parking: An application of optical wireless sensor network. Proceedings of the International Symposium on Applications and the Internet Workshops, January 15-19, 2007, Hiroshima, pp: 66-69.

[9] Ebling, M. and E. De Lara, 2007. New products. IEEE Pervasive Comput., 6: 11-13.

[10] Farhan, B. and A.T. Murray, 2008. Siting park-and-ride facilities using a multi-objective spatial optimization model.