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THE SMART PARKING SYSTEM

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Abstract: —Parking allocation has become a major problem in modern cities for which numerous smart parking systems (SPS) have been developed. This paper aims to provide a comprehensive study, comparison, and extensive analysis of SPSs in terms of technological approach, utilized, networking technologies, computational approaches, and service provided. Moreover, the paper fills up the research gap by providing a clear insight into the suitability of SPSs in various environmental conditions and highlights their advantages/disadvantages. The extensive comparison among multiple aspects of SPSs would enable researchers, designers, and policymakers to identify the best suited SPS and understand the current trends in this sector

Index Terms **- Ardunio IDE, Proteus, RFID reader, and tags**

I. INTRODUCTION

rivers searching for parking are estimated to be responsible for about 30traffic congestion in cities. Historically, cities, businesses, and property developers have tried to match parking supply to a growing demand for parking spaces. It has become clear, though, that simply creating more parking spaces is not sufficient to address the problem of congestion. New approaches using smart parking systems look to provide a more balanced view of parking that better manages the relationship between supply and demand. This kind of parking management is of utmost necessity in all the parking areas and to a greater extent in a more commercial and crowded parking spaces. This achieves easy identification of the empty slots thus providing easiness in parking and reducing the traffic congestion, especially in parking spots where it would be very difficult to handle this issue like in limited parking spaces. The efficient and smart algorithm developed will be helpful for effective allotment of the parking slots thus making thus entire process human-free, more efficient and effective process for management of parking. The rapid advancement in the internet, communication, and information technology have paved the way for developing efficient smart parking systems at a relatively lower price. Due to this reason, many researchers have implemented various SPS based on different approaches and sensors. Considering the facts mentioned above, the authors in reviewed various smart parking solutions developed by researchers by providing short descriptions about their advanced solutions.

II. PROPOSED SYSTEM

The main objective of this project is to provide smart, automated and human free parking management system for efficient and effective management of parking systems in turn reducing the traffic congestion and allotment of free slot problems. This section narrates the methodologies adopted in this research work to review the existing works and create a bird's eye view of the SPS concept. To gather existing information on SPS, this research has considered reputed publishers such as IEEE Xplore, ScienceDirect, Springer Link MDPI, ACM Digital Library, Hind awi. This paper adopted the research method described in the adopted method categorized the paper's reviewing scheme into three major stages. The stages are planning stage, review stage, and result Stage. The planning stage defines guidelines to search for different review materials. The review stage focuses on strict guidelines for developing search strings to find the correct review materials from different repositories. This stage also collects preliminary results, extracts pertinent research papers, and sorts the aspirant papers. Finally, in the result stage, a thorough review of the selected documents is conducted.

III. METHODOLOGY

The Proteus Design Suite is a proprietary software tool suite used primarily for electronic design automation. The software is used mainly by Command register stores various commands given to the display. Data register stores data to be displayed. The process of controlling the display involves putting the data that form the image of what you want to display into the data registers, then putting instructions in the instruction register. In your arduino project Liquid Crystal Library simplifies this for you so you don't need to know the low-level instructions. Contrast of the display can be adjusted by adjusting the potentiometer to be connected across VEE pin.

IV. MATERIALS AND METHODS

A. Arduino IDE The Arduino Integrated Development Environment (I D E) is a cross- platform application (for Windows, MacOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public Licence, version. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware. By default, avrdude is used as the uploading tool to flash the user code onto official Arduino boards. With the rising popularity of Arduino as a software platform, other vendors started to implement custom open source compilers and tools (cores) that can build and upload sketches to other MCUs that are not supported by Arduino's official line of MCUs.

V. DEMONSTRATION

Our project aims to reduce the traffic congestion in the parking areas, also to provide easiness in parking a vehicle and also taking away the vehicle from the parking. All these are aimed by making the entire process human free. This entire process takes a series ofsteps for execution. This involves stages like empty slot identification, enquiring the vehicle owner regarding time of parking which will definitely be approximate, bill calculation, guiding the vehicle owner for a particular allotted slot etc. The empty slot identification stage will be continuously running. For identification of any empty slot we propose usage of distance calculating sensors which is ultrasonic sensors. Based on the reading from the sensors the microcontroller takes a decision regarding the slot being occupied or not. Multiple sensors are fixed in a single slot for better decision taking and better coverage.

VI. IMPLEMENTATION

But in real life implementation, any kind of component or device can be used for display purpose. This also helps us in getting then real time status of any particular slots and We can also take necessary actions whenever all the slots are full. Because of this kind of parking every decision will in our control. This also reduces the case where the user is clueless regarding which slot is unoccupied and completely roaming in the parking space creating very complexions and heavy traffic. Multiple sensors will give us an opportunity to eliminate the redundant measurements by a single sensor and any other un appreciable situations. This way our project eliminates the redundant cases often faced during any parking scenario and leaves with the best choice for effective and efficient method of parking which is completely contact-less that is becoming a very ,major concern in present day scenarios and situation.

VII. RESULT AND DISCUSSION

Entire process is made human free for the efficient usage of the resources and to implement social distancing and contact life specially during these covid-19 crisis time and also post covid-19 crisis. Parking slot allotment is made faster and simpler by the usage of the smart algorithm

Before the slot is occupied :

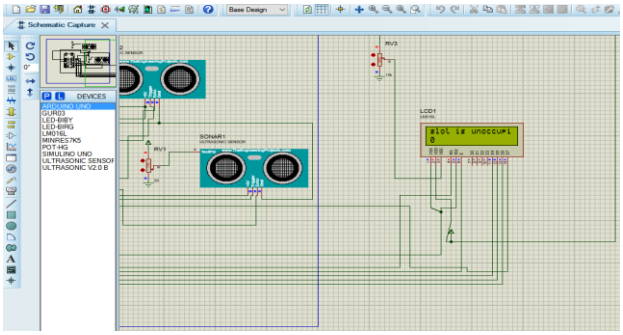

Fig 7.1 : Result slot 1

After the slot is occupied :

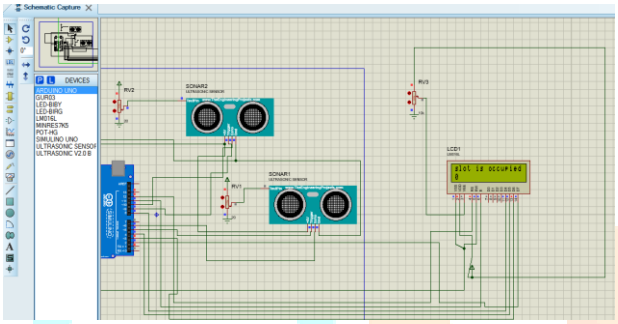

Fig 7.2 : Slot result 2

After vehicle leaving the slot :

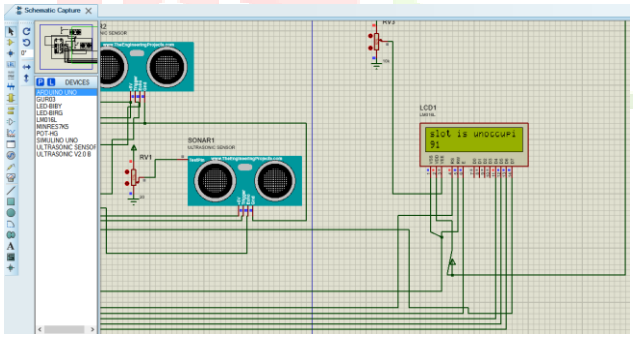

Fig 7.3.3 : Result slot 3

Sensors readings and results

UR1	UR2	UL1	UL2	U01	U02	SR	SL	S0	ST
<50cm	<50cm	<50cm	<50cm	<50cm	<50cm	2	2	2	6
>50cm	<50cm	>50cm	<50cm	>50cm	<50cm	1	1	1	3
<50cm	>50cm	<50cm	>50cm	<50cm	>50cm	1	1	1	3
>50cm	>50cm	>50cm	>50cm	>50cm	>50cm	0	0	0	0

Sensor1	Sensor2	Remarks
Yes	No	Unoccupied
No	Yes	Unoccupied
No	No	Unoccupied
Yes	Yes	Occupied

IV. Conclusion

An effective and efficient parking management system is developed by which the problems with allotments of empty slots and traffic congestion are resolved. The system benefits of smart parking go well beyond avoiding the needles circling of city blocks. It also enables cities to develop fully integrated multimodal intelligent transportation system that don't rely on cars in the first place. Developing smart parking solutions within a city required data standardization hardware and software innovation and coordination among various stakeholders. These technical solutions and stakeholders are the same data structures and development groups integral to making a smart phone enable, multimodal, fully integrated transportation solution a reality. In effect, the technical enablers and multi stakeholders coordination effort behind development of a local smart parking solution creates a launch pad toward fully transportation.

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