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ptoelectronic IOT Parking system

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Abstract— Residents continue to hear a lot in smart cities. Despite the uncountable smart services and applications that have transformed substantially of our lifestyles in a wide range of domains, namely transportation, health, education, services, and business. Users however, desire more of these highly intelligent simpler-to-use services in their life. One of the most relevant issues that smart cities try to address is traffic congestion. To do this, they resort to a wide range of IoT technologies, artificial intelligence algorithms, and complex developing infrastructure processes. The research presented here reveals whether parking on select streets and important urban locations contributes considerably to traffic congestion. The proposed web application and these is based on the web services, introduces the idea of an intelligent system that handles such a problem through permitting users to immediately pre-reserve seats before coming in at the venue, and then adjusting the process based on automatic detection of the composite plate.

Keywords—Smart Services, traffic congestion, IOT, Pre-Booking, Revenue, Reserved

INTRODUCTION

We employ IR sensors to detect the vehicles that arrive at the parking space in order to demonstrate this concept. In order to send and receive data between the mobile application and IR sensors, we use the NODE MCU8266 Wi-Fi module and the Arduino UNO as the primary hardware components. A Wi-Fi module is already included inside this Nodemcu8266 to provide web connectivity and other services. To manage an online database, the hardware signals going to and from the MCU 8266, and the user application, we use Firebase as a cloud-based server space. The TR innovation is used to determine whether a car has arrived at the parking area and the IR sensors determine whether the parking space is used or not. This framework reads the quantity of parking spaces accessible and refreshes information with the cloud server. Internet of Things (IOT) and Android app technology form the foundation of smart parking. Globally, the issue of traffic congestion is getting worse every day. One of the main causes of this problem is parking, which is getting worse in major centers as the size of fancy vehicles increases. Every driver agrees that finding parking places is the most difficult task they must complete, which has increased the demand for effective smart parking systems that can speed up the process. As a result, we created a framework for IOT and Android applications. Smart Parking Management Systems, Smart Gate Control, Smart Cameras that are able to identify various kinds of motorized vehicles, ANPR (Automatic Number Plate Recognition), Smart Payment Systems, Smart Entry Systems, and numerous additional advances have been developed produced in the smart parking sector. A smart parking solution will be constructed today using a similar methodology. It will employ an ultrasonic sensor to detect the presence of a vehicle and cause the gate to open or close automatically. Here, the main controller for all the peripherals connected to the ESP8266 NodeMCU will be used.

The services which the Intelligent Parking System should provide in the future are:

- ✓ The parking availability information system and parking reservation system should provide advanced navigation services.
- ✓ The mobile electric commerce system and a continuously working gate system should collect the toll charges electrically.
- ✓ An automated navigation system should assist in safe driving.
- ✓ An in-facility navigation system should provide the best possible traffic management • Provision of effective security for the safety of cars.
- ✓ Provision of strong functions for facilitating administrators and managers in management of the parking facility.

II. LITERATURE SURVEY

To better optimize the parking lot to meet needs, numerous scholars have contributed to the topic and formalized it using a number of techniques. The author presented a short message service (SMS)-based smart parking reservation system. To increase security, he employs the Global System for Mobile (GSM) and a microcontroller [1]. In order to authenticate at the gate management service (GMS) and allocate a specific slot, the system automatically verifies the unique registration number recorded with RFID. The system has a feature that allows for online parking lot monitoring [2]. The author utilizes a wide-angle camera as a sensor to find and record only available parking places. The incoming user is then given a parking place based on these records [18]. A record of each entering vehicle is created by the Intelligent Transportation System (ITS) and electronic toll collection (ETC) utilizing optical character recognition (OCR) [3]. Understands the parking areas that are only occupied by cars by processing visuals using Artificial Intelligence (AI) algorithms [4].

III. IMPLEMENTATION

A. BLOCK DIAGRAM

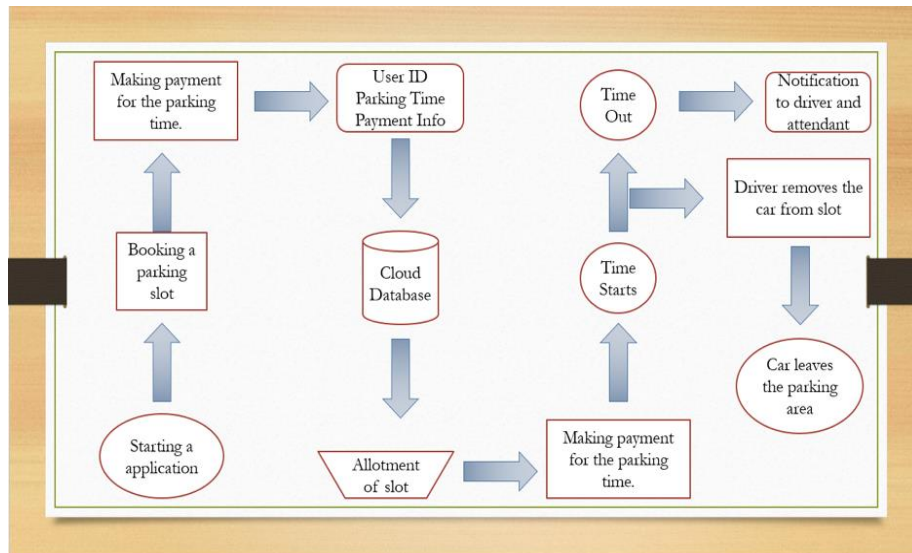


Fig. 1 Block Diagram of smart parking system

B. Methodology

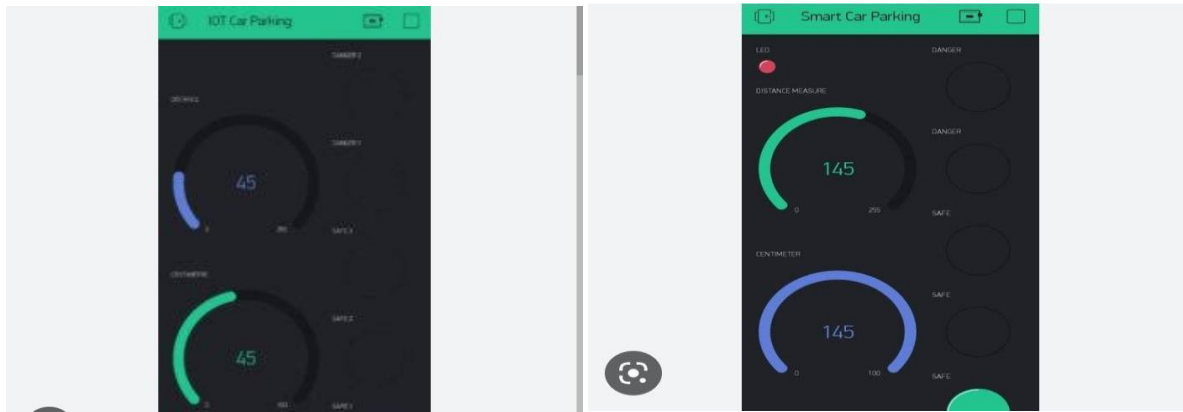
Microcontroller is the heart of the system The product is an 8-bit microcontroller. Customers can enjoy significant cost and reliability improvements because to the split gate cell design and thick -oxide tunneling injector. The gadgets use a pin-for-pin compatible 8051 microcontroller and the 8051 Instruction set. Internal memory is divided into primary blocks that take up 64KB and secondary blocks that take up the lowest 8KB. The main control device for reading signals from the IR sensors and motors and connecting the parking lot to the WIFI device is an Arduino board based on the ATmega328 AVR microcontroller. A tri-band GSM engine that operates at 900 MHz for EGSM, 1800 MHz for DCS, and 1900 MHz for PCS. It enables internet access and is used to transmit messages. The sensors have a straightforward 4-pin interface with digital and analogue outputs. It may function between 4 and 9 volts when functioning. The +V and pin should receive the input power. The third pin provides an analogue output. when the sensor is turned on Analog output is provided on third pin. Once the sensor is powered up you will have to calibrate with specific environment. It utilizes a technique known as electro optical modulation. This indicates that it changes the amount of light that travels through it using electricity. The parking lot will be connected to a cloud service using an ESP8266 NodeMCU WIFI module so that we may access the parking lot online using a mobile phone application.

IV. RESULT

Parking spots can be checked on a regular basis to see if they are empty with the support of this independent thinking. An ultrasonic sensor placed in the parking spots is used to determine regardless of whether or not a slot is filled or empty, and an IR sensor is employed to track the arrival of automotive products. The data will be uploaded to the cloud if a slot is available so that the administrator is constantly checking to determine if the slots are being utilized or not. The entire process will be controlled by the ESP8266, which will additionally make use of the internet to transmit information related to the parking status to Google Firebase so that it can be retrieved from anywhere in the world.

- The fuel consumption of vehicles is decreased by the Smart Parking System simply because it requires fewer minutes to find them in parking spaces.
- Furthermore, it discourages automobiles simply passively driving across cities' crowded parking lots.
- A potential remedy to the pollution problem that plagues a city is the implementation of smart parking systems.

•Fuel reductions (A current study claims that Smart Parking could save 2,20,000 gallons of fuel by 2030 and approximately 3,00,000 gallons of petroleum by 2050).



V. CONCLUSION

The integration of the Arduino, NodeMCU, Firebase, and mobile application produced a satisfying result for the Smart Parking System. This system's correctness and compatibility have been demonstrated by the fact that all of its modules have been tested and are operating meaningfully. I also examined into security issues; since real-time data, user information, and vehicle information are all kept on Firebase, it can be simple to keep track of everything. Without wasting time looking for parking, the driver is able to quickly locate a place on the mobile app and reserve it. Additionally, it benefits in energy, fuel, and preserving the environment. The total amount of emissions has been substantially reduced. If the limiting factors—better components, for example—are backed with adequate money. We might improve it further so that it becomes a fully functioning system having market value. High levels of flexibility and convenience, as well as mobile payment possibilities, are expected to contribute to the commercial segment's growth. As a result, a successful Smart Parking System is built, installed, and tested.

VI. FUTURE SCOPE

The Smart Parking System (SPS) is being implemented in the future so that drivers can view the availability of spots for parking on a mobile phone application or even a satellite navigation device. In addition, notifications can be sent to the user's mobile phone when a vehicle enters aware shopping malls and specific streets in a city, between many other features. By establishing a central management system that guarantees that the client addressing the security issues receives only correct instructions. Additionally, questions are frequently generated using historical parking information so that users can receive information or recommendations on places to park and possibilities in the days to come. According to this analysis, can be employed to set the price of a parking slot when a user reserves a slot or after leasing a slot. The system is able to create a smartphone application that will assist automobiles find spots to park at specific retail centers or multiplexes.

VII. REFERNCES

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