



SMART PARKING MANAGEMENT SYSTEM

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ABSTRACT

A handful of articles concerning parking space reservation with the help of IoT technologies are there to be found. However, it surprisingly less to find about the parking system itself. The problems regarding vandalizing towards public parking accommodation and restriction for payment fee option are discussed in this paper. A mobile device combined with internet connection for real time IoT monitoring purpose is created plus features that can also works as safety components such as Global Positioning System (GPS). A microcontroller NodeMcu (ESP8266) from Arduino act as a main brain for this device. The device resulting LED output with mere button as the input for common folks' comfort. In tabulation of data from cloud platform are automated in collective format is provided. Future improvements on the design for more safety precaution which is camera that gives the device ability as same as dashboard camera are discussed. As a conclusion, not only this device is mattered for convenient value in mind but also considerate amount of cooperative well-being between consumer and provider for this parking system.

1. INTRODUCTION

A public paid parking space for vehicles, cars especially was provided by government in this modern society. It is one of services that provided by government to organize the cars placement and user comfort in this big and crowded place.

IOT (Internet of Thing) is being developed rapidly nowadays. Aiming for wireless communication is to gather information or perform certain task in the environment. IOT is a new technology paradigm proposed as a global network of machines and devices capable of interacting with each other.

This research objective is to develop a parking management system with IOT technology. It is a cooperation system between physical device and cloud platform

where the activity of the device can be monitored and analyzed in real time through selected cloud platform by connection of the device to internet.

By apply of this research, car user can pay their parking fee equally appropriate to the amount of time they spent parking their cars in the parking spot. Not only that, users and government staffs can also keep track of the car status and even its current location not just as in terms of monitoring purpose but the pin point of the car coordinate in the online map with the help of GPS module[1][2].

2. MATERIAL AND METHODS

2.1. Materials

This research was developed using 2 main segments. The first segment is the physical mobile device. This mobile device will serve as the parking timer and timer indicator set by the buttons and LEDs on it. Second is that the monitoring platform via IoT services. The processing that connect both of the segment are done by the Arduino module then the data will be submitted to the IoT server and can be monitored through mobile phone or desktop monitoring.

2.2. Methods

This research is adopting methods approach involving develop a system of calculating the parking fee proportional to the amount of time parking time consumed the moment the parking timer start. After that, monitoring system is including data display of thus parking timer and also their balance available. It also includes the information and the data of the parking location in coordinated and the device status. The acquisition of data processed by the ARDUINO microcontroller goes to data processing and lastly data display & user interface in the cloud platform.

2.3. Characterization

System for monitoring is including the usage of ARDUINO ESP8266 combined with GPS module application to construct programming while conduct the experiment and also Thingier.io that act as IoT server.

3. RESULTS AND DISCUSSION

Figure 1 showed the monitoring of cloud platform in Thingier.io of 2 parking devices tested. The information that can be seen is that the individual amount of balance available for the device, the device status, and lastly the timer display counter.

When the device is activated and successfully connected to the Thingier.io platform, the device status will light up green. When the start button is pressed, the timer will start counting up. When the stop button is pressed, the timer will stop and at that moment of the timer stopped the balance will be deducted according to the amount of the time have been counted up then the timer will be back to zero.



Figure 1. The line graph of measurements data

4. CONCLUSIONS

This research provide a convenient way of paying a parking fee according to the amount spent of parking time used. In the same time of the device working, another convenient data preservation and monitoring serve to back the device up with the help of IoT technology. This technology successfully provides a method to calculate and gather the needed information in real time and without worrying about physical data preservation. This research can also be further improved by adding another yet one feature that can serve as both monitoring and security aspect to the device which is a live camera so the device then can also indirectly can act as the dashboard camera.

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