SMART PARKING ALERT SYSTEM AND DIGITAL DOCUMENT VERIFICATION FOR VEHICLES

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ABSTRACT

Parking is limited in almost all the major cities in the world which leads to traffic congestion, air pollution, fuel wastage and driver frustration. Due to lack of space available for parking the vehicles, the driver not knowing the parking slot in malls and many other places, struggles to park his/her car. The major challenges faced by many vehicle owners in big cities are where to park their vehicles. One can save precious time and fuel if the parking slot is known in advance. Hence there is a need for an intelligent parking system. In this paper, effective solutions for the Parking system and also Violation detection problems have been proposed. The proposed system also ensures the vehicle is not parked in 'violation areas' and thus avoiding traffic problems in high traffic city roads. It also captures the invalid road tax, insurance, emission test and chassis of a vehicle. The proposed system includes two modules namely vehicle unit and traffic unit. Traffic unit consists of Arduino Mega 2560, GSM (global system for mobile communication), RFID reader, voice kit and the vehicle unit adopts RFID Technology.

Keywords: NO PARKING Alert, ARDUINO, RFID Technology, GSM.

1.INTRODUCTION

In our daily life traffic is the major issue. The first part deals with the "Smart Parking Alert". Parking the vehicle in no parking place is one of the major reasons for increasing traffic. So many times knowingly or unknowingly we park our vehicle in "no parking zone" and will be punished or pay penalty. The IR Sensor component is used to detect the Vehicle parked in the violation area such as No Parking Zones. The output of the system is indicated using a Voice announcement, message and call alert. The second part deals with verifying the documents related to vehicle which is time consuming and may lead to traffic jam. It is done with the help of active RFID tag and reader. RFID tag is also called as transponders which receive a radio signal and in turn response to it by producing a radio signal. Here the tag stores the related information about vehicle i.e emission test, road tax, RC book and insurance and their expiration details. Reader reads all the details and sends those details to RTO unit with the help of GSM using UART. All the user details are stored in RTO PC which is easy

to verify all the documents and examine then and there accordingly. The Third part deals with violation of speed limit in the places like hospitals, school zones etc., there are chances for accidents. RFID technology will be used for automatic speed control of the vehicle near these zones.

2.PROPOSED SYSTEM
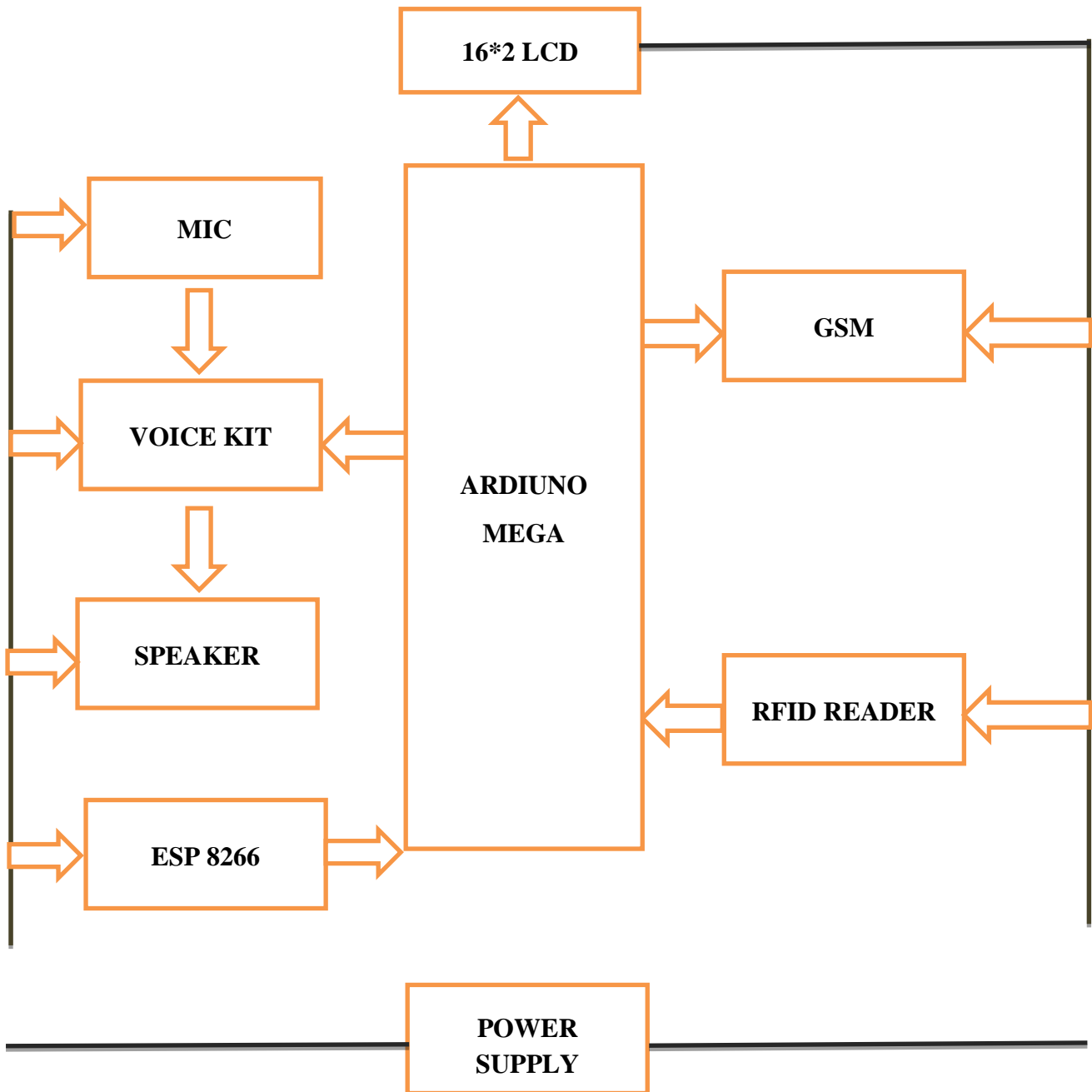
2.2WORKING

The block diagram gives the details of the working of the proposed system which consists of different blocks.

The system contains the Arduino mega which is interfaced with many components.

The components which is used is as follows:

2.2.1 RFID READER

The RFID is interfaced to know the area information.

Each area placed with RFID tags contain the area information.

2.2.2 Voice Kit

It can operate at 12V or 5V.

It has 8 channels.

It can be used for recording about 30sec.

It is a 16 bit digital audio processor.

In order to record "Short two pins on the voice kit" and if cathode and anode are not short the recorded voice on the channel will play.

Fig.2.2.2.1 Voice Kit APR33A-R2

2.2.3 GSM Module

SIM800a is Quad band GSM Module.

It can transmit Voice, SMS and data information with low power consumption.

Fig.2.2.3.1 SIM800a

2.2.4 ESP 8266

ESP 8266 offers complete and self-contained Wi-Fi network

It either allows to host the application or to offload all Wi-Fi networking functions from another application processor.
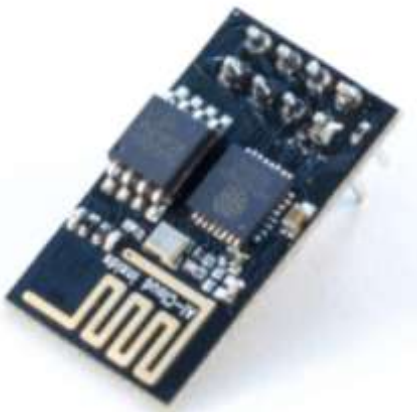

Fig.2.2.4.1 ESP 8266

2.3 SYSTEM DESIGN

The system design is divided into three parts. The first part is the design of 'PARKING VOILATION DETECTOR', second part deals with the design of 'DIGITAL DOCUMENT VERIFICATION' and the third part is the design of 'AUTOMATIC SPEED CONTROL OF VEHICLES'. The design and working principles of the system are discussed in discussed in the following sections.

PARKING VIOLATION DETECTION:

The first part of the system design is the Parking Violation Detection. Many times not knowing of 'no parking zone' a vehicle might be parked at that place which causes traffic violation. Thus at these 'no parking' places by implementing our system consisting of IR sensor and RFID module. The output is indicated using 'Buzzer'. The Infrared (IR) LED is used as a transmitter and photo detector is used as receiver to detect the obstacle. In our project the detection of obstacle (vehicle in no parking), then it alerts the owner indicating that the vehicle is parked in the no-parking area. Firstly the alert to the owner is through buzzer or voice announcement and incase the vehicle is not removed from the no-parking area call alert and offline messages are sent to the owner's mobile phone using GSM. Here the inputs from the IR sensor receiver go to arduino which processes the signals from IR sensor gives output as voice announcement, call and message alert. Arduino an open-source electronic prototyping platform based on flexible, easy-to-use hardware and software has been used for implementation.

DIGITAL DOCUMENT VERIFICATION:

This section consists of arduino, RPS, GSM, LCD display and RFID module (RFID reader and RFID tag). The arduino is used for data processing and then RPS is used for power supply. Here the RFID tag is connected to the vehicle unit and as a whole this block is fixed in the vehicle. When the vehicle stands in the traffic junction or when the vehicle is going to reach the traffic junction the tag present in the vehicle is read by the RFID reader in the traffic junction. The traffic junction unit mainly consists of GSM, RPS, Active RFID reader. Active RFID reader is used to read all the details about owner's documents that had been loaded In the RFID TAG present in the vehicle unit. GSM is used in this unit which acts as both transmitter and receiver since it sends information to owner and RTO vice-versa.

AUTOMATIC SPEED CONTROL OF VEHICLES:

When the vehicle's speed exceeds to some extent it is considered as rash drive. In our project the limit is set to 40 (in school, hospital zones etc), when the vehicle speed exceeds more than 40 then the vehicle is automatically slowed down using RFID technology. Here the vehicle consists of RFID reader and the areas with certain speed limits or junctions have RFID tags.

3. ADVANTAGES

- Smart road safety measures.
- It saves times.
- It saves money too as it avoids paying off penalty.

4. CONCLUSION

Using IR sensor circuit, we can detect the vehicles that are parked in the no parking area and prevent the vehicles from flaunting the traffic laws which is efficient and cost effective. Document verification using RFID technology is very convenient and time saving which also avoid traffic congestion and driver frustration. Lastly automatic speed control of vehicles can avoid accidents.

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