Intelligent Traffic Rule Controller

Nikhil Sonje, Deep Patel, Nirav Raval, Sahil Sejpal, Prof.Sunil Patil

***Abstract*— This thesis, aim to design to avoid jumping of traffic signals in day to day life. This module uses an RFID technology and IR sensor. This module is divided into 2 parts that is transmitter section and receiver section. Transmitter section consists of IR Transmitter which is kept on road while Receiver section consist of microcontroller, RFID and IR receiver which is mounted below the car. Whenever a receiver crosses the transmitter section during red signal then balance is deducted from the RFID TAG. Whenever balance is not sufficient in RFID TAG then, that RFID TAG would be blocked and same cannot be used for driving.**

***Index Terms*— RFIDTAG, RFIDREADER , MICROCONTROLLER, IR TRANSMITTER, IR RECEIVER**

I. INTRODUCTION

In today's world, increasing traffic is a major concern. The traffic police are inefficient to handle the traffic conditions. Today many people break the law by breaking the traffic rules. The traffic rules are broken often at the signals. People start moving ahead even though the signal is red and many culprits get away since there is no police at the signal further such driving practice is an invitation for serious accidents. Same are the problems faced by different schools. Accidents are major concern for the school authorities as children are not always cross the roads properly. To solve all the above problems we have come up with an innovative soln. of intelligent traffic rule controller. Now a day's problem of traffic is much critical especially in the areas of schools as well as the places where crowd is more. In such cases, there is always requirement of collision free traffic with the control of speed. Because of advancement in technology, for every vehicle we have good driving speed & easily availability of vehicles adds the traffic as a result driving of a vehicle is quite difficult on the roads.

II. PROPOSED MODEL

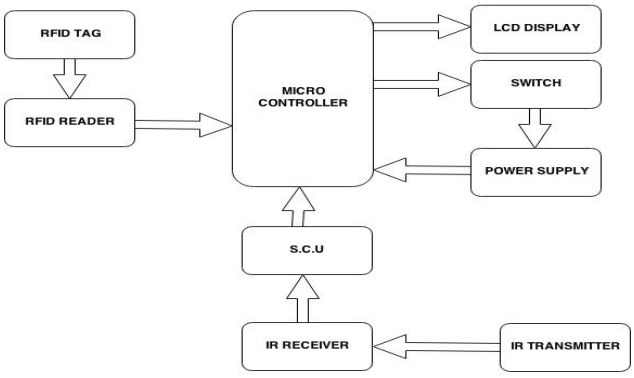

Fig. 1 Basic Block Diagram

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A detailed block diagram of the system is shown in Fig.1.

A) RFID TAG:

RFID (Radio Frequency Identification) is one member in the family of Automatic Identification and Data Capture (AIDC) technologies and is a fast and reliable means of identifying objects.

There are two main components:
1. The Interrogator (RFID Reader), which transmits and receives the signal and the Transponder (tag) that is attached to the object.
2. An RFID tag is composed of a miniscule microchip and antenna. RFID tags can be passive or active and come in a wide variety of sizes, shapes, and forms.[8]

Types of RFID tags:
Passive tags: These transponders are only activated when within the response range of an RFID Reader.
Active tags: These incorporate their own power source. The tag is a transmitter rather than a reflector of radio frequency signals which enables a broader range of functionality like programmable and read/write capabilities.
Functioning:
Communication between the RFID Reader and tags occurs wirelessly. The RFID Reader emits a low-power radio wave field which is used to power up the tag so as to pass on any information that is contained on the chip. The frequencies used cover a wide spectrum.

1. Very long wave 9 - 135 kHz
2. Short wave 13.56 MHz
3. UHF 400-1200 MHz
4. Microwave 2.45 and 5.8 GHz [8]

The allocation of frequencies is regulated by government agencies .High-frequency systems offer long reading ranges and high reading speeds but at higher costs. Environmental conditions, particularly at the higher frequencies, can also influence the range of communication. [3]

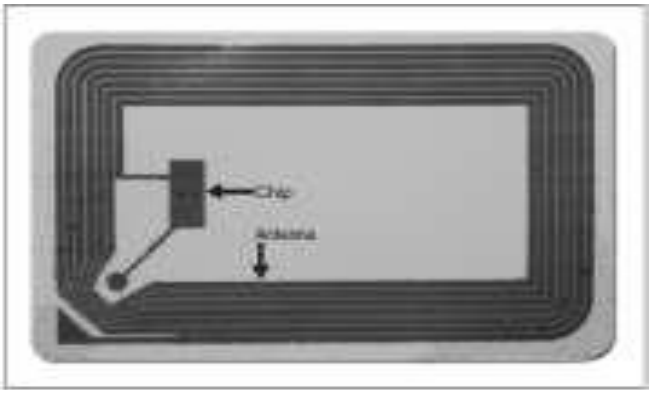


Fig2. Internal structure of RFID TAG

B) RFID READER:

An RFID reader is a device that is used to interrogate an RFID tag. The reader has an antenna that emits radio waves; the tag responds by sending back its data. A number of factors can affect the distance at which a tag can be read (the read range). The frequency used for identification, the antenna gain, the orientation and polarization of the reader antenna and the transponder antenna, as well as the placement of the tag on the object to be identified will all have an impact on the RFID system's read range. The antenna in an RFID tag is a conductive element that permits the tag to exchange data with the reader. Passive RFID tags make use of a coiled antenna that can create a magnetic field using the energy provided by the reader's carrier signal.[8]

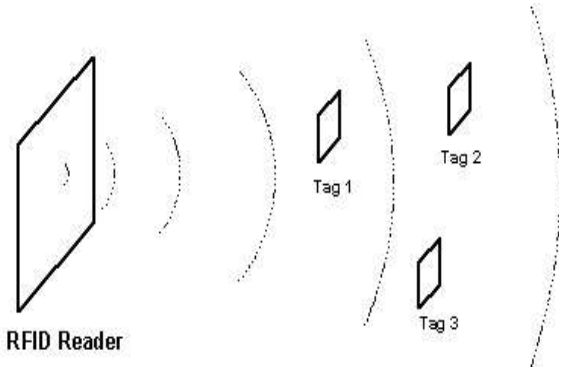


Fig3. RFID READER

C) Microcontroller (89C51):

AT89C51 is an 8-bit microcontroller and belongs to Atmel's 8051 family. ATMEL 89C51 has 4KB of Flash programmable and erasable read only memory (PEROM) and 128 bytes of RAM. It can be erased and program to a maximum of 1000 times. In 40 pin AT89C51, there are four ports designated as P1, P2, P3 and P0. All these ports are 8-bit bi-directional ports, i.e., they can be used as both input and output ports. Except P0 which needs external pull-ups, rest of the ports have internal pull-ups. When 1s are written to these port pins, they are pulled high by the internal pull-ups and can be used as inputs. These ports are also bit addressable and so their bits can also be accessed individually. Port P0 and P2 are also used to provide low byte and high byte addresses, respectively, when connected to an external memory. Port 3 has multiplexed pins for special functions like serial communication, hardware interrupts, timer inputs and read/write operation from external memory. AT89C51 has an inbuilt UART for serial communication. It can be programmed to operate at different baud rates. Including two timers & hardware interrupts, it has a total of six interrupts. [7]

D) IR TRANSMITTER AND RECEIVER:

The IR Transmitter Receiver gate we are using in our project to detect the exact location & position of the vehicle on the traffic signal.

The IR transmitter is continuously emitting the IR rays towards the IR receiver. When the vehicle is going to come across the gate the rays are deflected from the vehicle & IR receiver doesn't get any signal. The IR Receiver will give the replying signal to the controller and further a fixed amount will be deducted from RFID TAG.
Here for IR transmitter we are using IR LED's. The IR transmitter we may design in our home by just connecting desired value of resistance in positive arm & another is grounded. The IR receiver has three pins i.e. 5V supply, GND. Line, signal line.

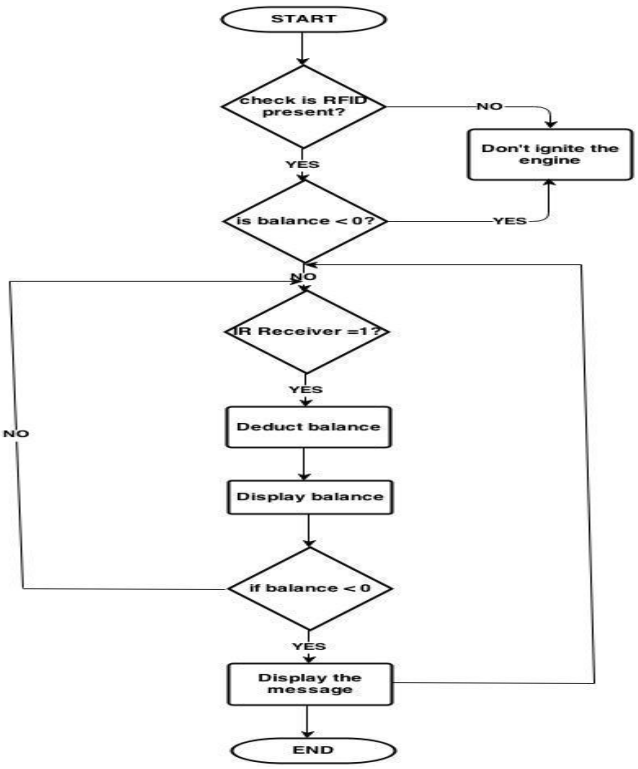
E) SIGNAL CONDITIONING UNIT (SCU):

The signal conditioning unit is the device which converts the analog signal coming from analog sensor and digital signal coming from digital sensor will be converted to 0-5v which is suitable for controller.

F) LIQUID CRUSTAL DISPLAY (LCD):

From the controller the updated balance information will be displayed on liquid crystal display (LCD).

III. ALGORITHM



Flowchart description:-
The above flowchart describes how project is going to work.
Step1. As soon as person turns the key in car it will boost the micro-controller.
Step2. Micro-controller will check for the presence of RFID on the reader. If RFID is present it will send a signal to

micro-controller to move ahead on flowchart. If RFID is not placed on reader, ignition of the engine will be blocked.
Step3. As the presence of RFID is sensed it will check the available balance in the RFID tag. Here, 2 possibilities can be seen:
a) When balance is less than zero:-
If the balance is less than zero, Micro-controller will block the ignition of the engine.
b) When balance is greater than or equal to zero:-
If the balance is greater than or equal to zero, Micro-controller will ignite the engine.
Step4. After the ignition of the engine IR receiver is set ON. So as soon as IR receiver senses the signal from IR transmitter, an equivalent voltage is sent to the Micro-Controller using SCU.
step5. SCU triggers the algorithm installed in the Micro-controller to deduct balance from the RFID and balance is deducted.
Step6. After deducting the balance, message is displayed on the screen with flashing the available balance.
Step7. Further Micro-controller check for balance amount. If the balance is less than zero message of low balance is displayed.
Step8. Again receiver is set ON.

IV. CONCLUSION

This system presents a simple but more efficient, fully automatic, human free, quick responsive system could be achieved with low accident rates and practically null corruption.

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