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RESEARCH ARTICLE



A HYBRID HARDWARE SOFTWARE MODEL OF AUTOMATIC TOLL TAX PAYMENT SYSTEM ON TOLL GATES

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Abstract— Tolls are the gateways to any city. For Every vehicle we have to charge some amount for toll gates. Here we are developing a new technique to reduce the time delay in toll gates section. RF Transmitter is placed in vehicle section, and receiver section should be placed in toll gate computer section, once the RF Transmitter and Receiver gets contact means the information about the vehicles in the transmitter section will be displayed in receiver section like (name, Vehicle number, and amount available and deducted). So once the amount is deducted the gate will be automatically open, the vehicle can cross without waiting. Our system deals with an improved form of tollgate billing system. An efficient utilization of communication link between RF Modems over a wireless channel to facilitate vehicle monitoring, vehicle authentication and automated toll collection on the highways is proposed. The system is implemented to automatically register vehicles getting on or off a motorway or highway, cutting the amount of time for paying toll in large queues. In this we are using active RF communication. This can take power supply from vehicle battery itself.

Keywords— component; formatting; style; styling; insert (key words)

I. INTRODUCTION

This paper deals with an improved form of tollgate billing system. Mainly concentrate on the automatic payment of toll tax without delaying on long lines for toll tax payment. It contains two modules Base module, and vehicle module. The base continuously transmits an interrogation message over its range so that if any vehicle enters the range it must get registered with the base. The vehicle module receives the interrogation message and sends the data stored in microcontroller (Vehicle Details). The base receives the data from the vehicle and checks whether the data is valid. Then it checks the amount availability for the corresponding vehicle. The vehicle module receives the authentication and goes into a wait loop till the time it reaches the barrier and sends its notification message. The vehicle identifies the toll collection center. It sends its specific notification message to the base to update its data base for billing purposes. The base receives that specific message and opens the barrier after authenticating that the vehicle passing by is a valid one and it automatically deducts the amount required as toll tax. The base will never open the gate if balance is not available.

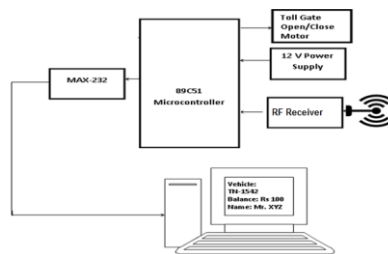
II. EXISTINGSYSTEM

Active wave Inc has currently deployed a system of active tag vehicle monitoring solution. Active wave vehicle products have a range of 30 meters and operate in the 916 – 927 MHz for the transmit operations and 433 MHz for the receive link. Active wave products are currently equipped with 256 Kbits of fixed memory. The tag is powered with a replaceable 3V battery and the total weight is 14 grams. Elementary signals are shown with the help of blinking LEDs and beeping sounds. Smart key Access Control Systems have a client – server model based system with an SQL server handling multiple vehicle monitoring systems. They have designed a user interface using the Microsoft .NET Framework. Smart key also operate in the 900MHz band but have a small range of 3 meters. *RFID based toll collection* system uses active RFID tag which uses car battery power. The implementation is divided into the design of two modules- the Vehicle Module (Active Tag) and the Base Module. The two modules communicate via RF modem connected to each module. These RF modules communicate over the ISM Frequency Range of 902 – 928 MHz.

III. PROPOSED SYSTEM

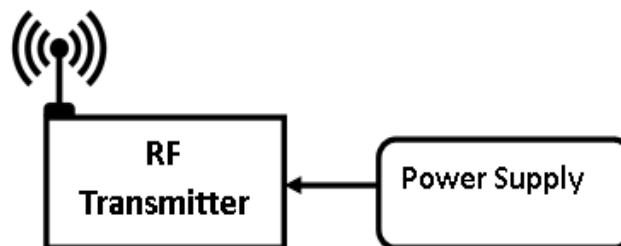
Our system creates the security hybrid system for automatic toll gate vehicle and Automatic Payment System. All this system coordinates with each other to create the output. Toll gate system is used to automatically control the gates. Vehicle section is used for the automatic toll gate process using RF Transmitter and receiver.

The RF Transmitter from the vehicle gets contact with the RF Receiver, here the distance about the contacts is 100 meter, once connection is established means, its start the transaction process and the information about the vehicle is Stored in the computer, the processing time taken by the transaction process is the vehicle travelling time itself once it reaches the gate means it automatically opens and no need to wait.



ARCHITECTURE DIAGRAM

1.1 FUNCTIONAL BLOCK DIAGRAM (Vehicle Section)



IV. MODULES

1. System Display Interactions
2. Communication protocol
3. Gate Control Settings
4. Data base control

SYSTEM DISPLAY INTERACTION:

- When the car attains certain distance the transmitter sends a signal to the receiver and the receiver displays the information.
- This screen is present here for displaying the information about the car like (registration no, name amount detected etc.) its also done by using DOT NET.

COMMUNICATION PROTOCOLS:

- Here we are using RF transmitter and receiver sections for communication process, the communication range of this device is about 100 meter range.
- Once transmitter gets communicate with receiver its automatically shows the vehicle information to the screen and automatically deducts the cash from car owner balance.

GATE CONTROL SYSTEM :

- Once the details of the car and transaction process is completed mean its automatically open no need to wait.
- Once the process gets finished means ,The gate will be automatically opened and closed the opening and closing time of the gate is 5 sec.

DATA BASE CONTROL:

- Here we are going to store the vehicle information in our database for security purpose.
- For the database, we have to create a separate Login and password for store the vehicle information .
- It is not easily hacked by the other persons .Its mainly for security purpose.

MICROCONTROLLER:

The 8051 family of micro controllers is based on an architecture which is highly optimized for embedded control systems.89C51 microcontroller belongs to 8051 family of microcontroller. It is used in a wide variety of applications from military equipment to automobiles to the keyboard on your PC. Second only to the Motorola 68HC11 in eight bit processors sales, the 8051 family of microcontrollers is available in a wide array of variations from manufacturers such as Intel, Philips, and Siemens.

These manufacturers have added numerous features and peripherals to the 8051 such as I2C interfaces, analog to digital converters, watchdog timers, and pulse width modulated outputs. Variations of the 8051 with clock speeds up to 40MHz and voltage requirements down to 1.5 volts are available. This wide range of parts based on one core makes the 8051 family an excellent choice as the base architecture for a company's entire line of products since it can perform many functions and developers will only have to learn this one platform.

V. CONCLUSION

Hence conclude to create an efficient hybrid system of automatic payment and waiting free automatic toll gate system. Our system is efficient to pay the amount automatically and do all necessary action for payment and gate opening. It also reduces the time taken on toll gates for payment and avoids traffic to reach destination in minimal time.

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