Design of Intelligent Mobile Vehicle Checking System
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Abstract— ARM7 is used as the main processor, this intelligent mobile vehicle checking system integrates many hardware and software modules like image capturing, number plate recognition of the vehicle, GPS, GSM. The system software design uses the embedded software platform as keil. Making use of hardware/software co-design, this system implements the functions of image capturing, wireless transmission, GPS positioning, this system helps in traffic auditing department’s needs.

Key words: ARM7, embedded system, GSM, GPS, image capture, keil

I. INTRODUCTION
With the growth of technology, publics have higher hope of living, nation has spent a huge quantity of money to the capital construction, particularly to roads infrastructure. In this condition, the road infrastructure is developing at faster rate, due to the enormous increase in the road mileage there is an increase in percentage of vehicles on the roads. Because of the increase in the number of cars on the roads, it has a problem of its own such as car thefts, lost and violations of guidelines which are given severe attentions.

The time which is consumed on monitoring the roads by the department of traffic control has been taken too much. Meanwhile, overloading of vehicles is getting worst around the country. Due to the advantages of high capability, huge services and economy, public vehicles like busses have become key means of city traffic. If the bus which carries many people had a traffic accident, the resulting situation would be severe. The main cause of those accidents is overload, therefore we need to find some new way to resolve this problem. Many traffic departments are taking care of this problem in traditional way vehicle checking such as manual way of checking and road inspection, so we need to find a new way of vehicle checking. The new approach for the vehicle checking and monitoring is through mobile, so that it will meet all these needs.

II. SYSTEM FUNCTION AND COMPOSITION
This system constructs a new way of vehicle checking system through mobile using ARM 7, IOT smart phone application for vehicle number plate recognition, GSM wireless telecommunication, GPS technique to identify the location of the vehicle, send SMS to the owner mobile and check the vehicle which disrupts the traffic rules. This system has following features:

1) Image capture: The smart phone takes the image of vehicle number plate, it collects the data of image automatically and save it.
2) Number plate recognition: The data of the captured image will be collected and process it for the number plate recognition using number plate recognition software.
3) Communication function: In hardware of the system signal side and vehicle side are considered. The signal side is at the tool booth and the other side is at the vehicle. These two sides are communicated by the SMS message using GSM network.
4) GPS system: This system correctly sends the position and time of the vehicle in which string of a number clubbed with latitude and longitude coordinates from the GPS. This Intelligent vehicle checking system through mobile is composed of ARM7 microprocessor, peripheral equipment, capturing of image, GPS, GSM module SIM300 and gas sensor.

III. SYSTEM ARCHITECTURE
The different modules that are present in the system architecture are:

1) ARM7
2) IOT Smart phone
3) GSM
4) GPS
5) LCD
6) Gas sensor
7) Power supply

![Fig. 1: System block diagram](https://www.ijsrd.com)

A. ARM 7:
The circuit of ARM7 microprocessor and other associated hardwares includes ARM7 chip, reset circuit and a clock circuit. Here we have used LPC 2148 ARM7 chip. LPC 2148 is a 32 bit controller. It is operates on 3.3V DC. It is having inbuilt multichannel ADC. It has two 32 bit Timer/Counter, with PWM unit. It is tiny 7mm x 7mm LQFP packaging. It is stuffed with lower power features and advanced peripherals.

B. IOT Smart Phone:
The internet of things (IOT) is defined as the objects which are interconnected collect data between intervals, analysed and initiates required actions, providing a network for planning and making decisions. IOT’s are developing faster such that it is going to offer advanced connection of devices and services beyond machine to machine communications. In this design we proposed IOT smart phone for capturing the vehicle number plate, this captured number plate will be sent to the vehicle side through GSM.
C. GSM:
The Global System for Mobile, also abbreviated as GSM, is a digital communication system which has gained wide recognition and market shared worldwide. GSM also initiated low-cost implementation of the short message service (SMS), also called as text messaging which allow users to send and receive point to point alphanumeric messages up to few terms of bytes. In this system we use GSM SIM300 module, SIM300 is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900MHz, DCS 1800 MHz and PCS 1900MHz. SIM300 features GPRS multi-slot class 10/ class 8 and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4.

AT commands can be used to get information in SIM card. The SIM interface supports the functionality of both the GSM Phase 1 specification and GSM Phase 2+ specifications for FAST 64 kbps SIM. SIM cards are supported for both 1.8V and 3.0V. An internal regulator module having nominal voltage of 2.8V, is used to power the SIM interface. All pins will reset as outputs driving low.

D. GPS:
It is the global positioning system. The satellite broadcasts the signal from space that provides three dimensional location i.e., latitude, longitude and altitude. The reliable positioning, navigation and timing services are provided by the GPS receiver to worldwide users on continuous basis in all weather conditions, anywhere on or near the earth. In this model we have used the mobile GPS.

E. LCD
Here we have used 16x2 LCD. i.e. 16 characters and 2 lines, used to display the message on LCD.

F. Gas Sensor:
Due to urbanisation and developing technology, gas monitoring plays an important role. In home appliances such as air conditioners and safety systems such as industries monitoring and checking of gases plays an important role.

G. Power Supply:
In this system ARM 7 requires approximately 3.3v power supply and GSM requires 2.8V supply.

IV. CIRCUIT DIAGRAM
The figure 6 shows the circuit diagram of the vehicle side. The vehicle side consists of ARM7, GSM, LCD display and Gas sensor. When the smart phone captures the image of the vehicle number plate that image gets recognized by the vehicle number plate recognition software in smart phone. By using the IOT in smart phone the recognized number will be sent to the vehicle side. The received number will be compared with the number in the processor and if that vehicle did not do emission then the owner will get the information regarding vehicle theft along with the warning message to do the emission through GSM.

V. PROTOTYPE IMPLEMENTATION

The new mobile vehicle checking system using mobile is designed with the help of signal side and vehicle side. We have considered ARM7 as the core processor, IOT smart phone is used for capturing the vehicle number plate and recognizing the captured image, GSM is used for communication and GPS is used for sending the longitude and latitude coordinates. Gas sensor to sense the gas emitted by the vehicle.

VI. CONCLUSION

By using the embedded technology, constructed on ARM7 LPC 2148 along with Gas sensor, GPS, GSM module the new vehicle checking system using mobile is designed to capture the image of the number plate by using smart phone and also to check the emission test of the vehicle. This system finds the position of vehicle and sends its location to the owner and to the police station. By using wireless communication techniques, this system can meet the traffic inspecting department requirements. This system has the benefits of low cost, small size and powerful expansibility.

REFERENCES


