A Literature Review Paper on Different Techniques used in Vehicle Over Speed Detection

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Abstract:- **Safety is a necessary part of man's life. The accident cases due to overspeed are reported daily on the major roads in all parts of the developed and developing countries. Therefore, more attention is needed in designing an efficient over speed detection system. It is expected that if such a device is designed and incorporated into every vehicle as a road safety device, it will reduce the incidents of accidents on roads and various premises, with subsequent reduction in loss of life and property. This paper considers the existing vehicle over speed detection systems.**

Keywords:- Over speed monitoring system, GSM, GPS, Raspberry pi, OBD-II, wireless sensor.

Techniques-A system for vehicle over speed detection with SMS alert is presented[1]. It consists of a controller designed using Arduino Mega to monitor the location and speed of the vehicle obtained using a GPRS+GPS Quadband Module (SIM908), GSM antenna, GPS antenna and SIM card. If the vehicle presents in any of the defined regions then the controller compares the speed of the vehicle with maximum allowable speed in that area. If over speeding is detected, a buzzer sound is generated from an active buzzer used in this system to alert the driver regarding exceeding the over speed.

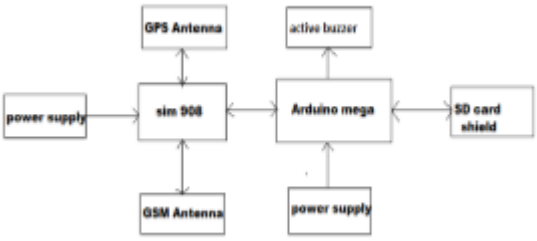

Fig. 1 Block diagram

Attention (AT) commands are used to access the SIM908 functionalities. GSM Antenna is required for sending and receiving messages. It is also needed for receiving calls. Max3232 module is used as an interface between Arduino and SIM908 module. The GPS coordinates and speeds of the vehicle which are continuously calculated are stored in a memory card along with the time.

A system which can be installed into a vehicle, possibly during manufacturing, to detect if a vehicle is breaching the speed limit and if so, the driver is notified of the fine via an SMS instantly and a copy of the ticket is printed on the administrator and can be mailed to the driver[2].

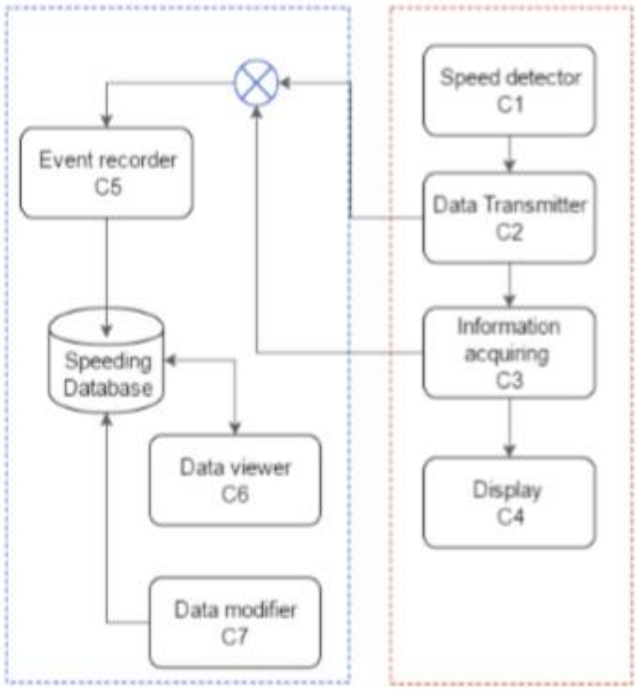

Fig.2 Architectural diagram of the system

After switching the device on, the microcontroller initializes all the hardware devices connected to it with the default values and then normal operation continues. After initialization, the timer and the ADC are started. At each ADC interrupt the measured accelerometer value on each of its axis is added to the average value. This average value is calculated at every 1 second, due to the timer interrupt. The average values for each of the axes are used as acceleration values, measured prior to the interrupts, to update the speed of the vehicle regularly. Once this value is updated, the output port for the 8-bit speed value is updated accordingly. The GSM module is used to send periodic updates of the signal strength, speed and location values to the server.

The data sent from the GSM module are extracted from the url-encoded parameters. The speed limit at the specified GPS coordinates is acquired from speed-limit API. If a violation occurred the fine amount is calculated based on the speed and the speed limit of the location. Once all the data is available, the database connection is made and inserted into the table of 'fines'. Once the database is updated, the SMS notification is sent and the PDF is printed with the details of the speeding event.

The proposed equipment/device will compare the present position and speed of the vehicle with applicable traffic

rules and on occurrence of any violation, will caution the driver in his/her choice of language and will also send the violation information to the supervising authorities[3].

Fig. 3. Working of the system

The availability and precision of worldwide Global Positioning System(GPS) gives more effectiveness and safety for vehicles utilizing highways, roads and mass transit system. The GPS allows the automatic localization of vehicles and navigation systems in today's widely used vehicles around the world. By combining GPS positioning technology with systems that can display geographic information or systems that can automatically transmit data to screens or computers, a new dimension is achieved in surface transport.

A vehicle speed detection and travel time estimation system using Raspberry Pi to estimate the speed of passing vehicles through this system is presented[4]. The Raspberry pi is a low cost, credit card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing and to learn how to program in languages like scratch and python. The system is designed to detect the moving vehicles and calculate its velocity. The system uses OpenCV as an image processing software to detect and track the moving vehicles.

Raspberry pi works as the main processing board. Raspberry Pi is furnished with two USB2.0 ports. These are joined with the LAN9512 combo centre point/Ethernet chip IC3, which is itself, a USB Gadget associated with the single upstream USB port on BCM2835. The USB Ports empower the connection of peripherals, for example, consoles, mouse, webcams that furnish the Raspberry Pi with extra usefulness. The camera is connected via USB port and used to grab the current frame before it's been processed by the Raspberry Pi. After the result been calculated by Raspberry Pi, the speed of the vehicle is displayed on the monitor. The vehicle speed result can be used to calculate the travel time and user can plan their trip without exceeding their vehicle speed.

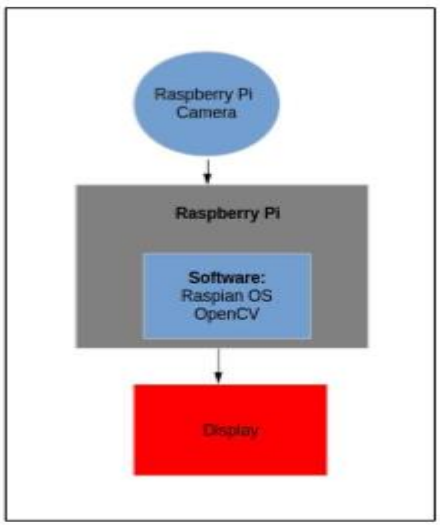

Fig.4 overall system design

A study to design and develop a low-cost system that can accurately detect speed by using an array of active infrared sensors enabled by specialized algorithm and submit violation-related data to the data-center[5].

The system consists of (1) a series of an Active Infrared Sensors (from Sensor 1 to Sensor N) to detect vehicles, (2) a Microcontroller to read the sensor's outputs, enforce the backtracking mechanism, calculate speed, and submit the speed to another microcontroller that works as an access point and camera controller to take a photo of over speeding vehicle the picture with other related information such as, detected speed, location and date, will be sent to the data centre for further processes. As illustrated in Fig. 5.

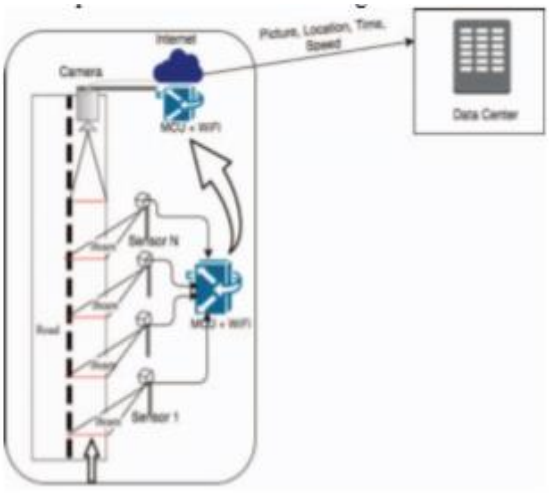

Fig. 5 hardware design

An automatic wireless system for monitoring vehicle speed on the road, identify a speeding vehicle and imposing penalty for the speeding offenders[6].

A prototype system has been developed in a laboratory environment to generate random speed data using a mechanical wheel, measure the speed data with a Shimmer wireless sensor and transfer the data wirelessly to a client computer for further analysis. Software has been developed using a Java based socket programming technique to monitor

the vehicle speed in a server computer and to send the data associated with a speeding vehicle to a remotely placed client computer. The graphical user interface (GUI) can visually display the speed of a vehicle at any particular time. The functionality of the software has been tested by simulating different traffic scenarios with low and high speed limits (40 and 60 km/hr respectively). To do that a high or low speed limit can be set in the GUI. The mechanical wheel is run at different speeds and the GUI continuously displays the speed. If the vehicle speed is higher than the set speed limit for the road, the system automatically detects it and generates a report with the time of speeding, vehicle number, vehicle speed etc. to be saved in the client computer in order to take further necessary actions for the speeding offender.

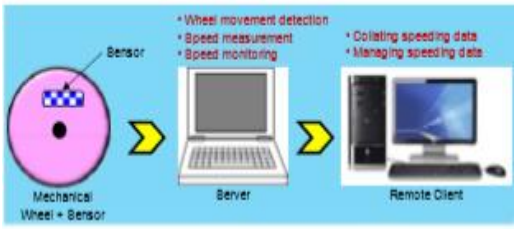

Fig. 6 Prototype system architecture for monitoring speed.

The development of a data acquisition system embedded within a vehicles equipped with OBD II interface[7]. The system is coupled to a GPS allowing tracking both engine data and vehicle speed and position along a driving path. Several track records are achieved, among them, a urban and a suburban driving path are presented. Their data are analysed in order to show engine behaviour and energy consumption.

The OBD-II PIDs (On-board diagnostics Parameter IDs) are codes used to request data from a vehicle following the SAE J1979/ / ISO 15031-5 standard. CAN car interface based on the standard controller ELM327. The device interfaces to the car through a standard OBD-II plug and to the computer or the Smartphone through a Bluetooth interface under the Serial Port Profile (SPP). A software "VHO PNR" is developed running on Windows Mobile 6.x Smartphone in order to get PID data through OBD-II CAN bus and also vehicle position, speed and direction through the embedded GPS.

Fig. 7 Embedded software for tracking real time engines and vehicle signals.

REFERENCES

[1] Ravi Kishore Kodali and Sairam, M Department of Electronics and Communication Engineering National Institute of Technology, Warangal WARANGAL, INDIA. **"Over Speed Monitoring System"**.

[2] P.R. Kambadkone, G.P. Hancke and T.D. Ramotsoela Department of Electrical, Electronic and Computer Engineering University of Pretoria Tshwane**. "Real Time Speed Detection and Ticketing System"**.

[3] Zakaria Khan Department of Aeronautics & Astronautics Institute of Space Technology Islamabad, Pakistan Zakisss@hotmail.com. Ayesha Department of Aeronautics & Astronautics Institute Technology Islamabad, Pakistan Ayeshashafiqueaz@gmail.com. **"Wireless Speed Monitoring System using GNSS Technology".**

[4] Iszaidy1, A.Alias2, R.Ngadiran3, R.B.Ahmad4, M.I.Jais5,D.Shuhaiza6 1,2,3,4,5,6affiliations Embedded, Network and Advance Computing (ENAC) School of Computer and Communication Engineering University Malaysia Perlis Pauh Putra, Perlis, Malaysia**. "Video Size Comparison for Embedded Vehicle Speed Detection & Travel Time Estimation System by Using Raspberry Pi"**.

[5] Butare Jimmy Damascene and Ryosuke Okuda Department of Information Systems Graduate School of Information Technology, Kobe Institute of Computing, Kobe, Japan**. "Low-cost Speed Limit Monitoring System for Developing Countries Using a Series of Active Infrared Sensors "**.

[6] M. Ahsan*, J. McManis** and M. S. J. Hashmi* *School of Mechanical and Manufacturing Engineering, Dublin City University, Dublin, Ireland **School of Electronic Engineering, Dublin City University, Dublin, Ireland. **"Prototype System Development for Wireless Vehicle Speed Monitoring"**.

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[8] UVHC, LAMIH, CNRS, UMR 8201 F-59313 Valenciennes, France. **"Development of a Data Acquisition and Tracking System for Vehicles"**.