

E-Vehicle- Automatic Speed Control Using Android Mobile Application

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Abstract: In the rapidly changing world, the speed has become an important factor in humans' life. Everyone wants to get fast as much as possible. In the fast speed world, there are two perspectives, one is maintaining the speed and the other is to maintain the safety medium as well. In the smart speed world the technologies play a major role. Smart phones are the key part of the growing technologies in the globe. Android application is a one which is ruling almost 75% of the crowd. So our objective is to ensure maximum safety to the person who is driving the vehicle and to the people on the road in all parameters through a mobile app. Nowadays accident rates are increasing linearly causing demise of many people by making modest mistakes while driving in zones like school, college, hospital, market, highways and hill station. This paper is going to be a smart way of controlling the speed of the vehicles in all these zones. A mobile application is being created integrating with google map. The latitude and longitude position of the speed restricting zones like school, college, markets is being stored in the cloud. When the destination place is entered in the google map, it actually starts indicating the driver 100m before the speed restricting zone and if the driver doesn't reduce the speed of the vehicle according to the zone in 50m, the speed of the vehicle is automatically arrested using ARM processor. The next objective of this paper is to slow down the speed of the vehicle in speed breaker. The image of the speed breaker is being stored in the ARM processor and there is a camera attached to the car at its top roof. When the image captured by the camera and the image stored in the processor matches, the processor alerts the driver by an alarm caution before 100m and if the driver fails to reduce the speed in 50 m, the speed is reduced by using ARM processor. Further this project can be enhanced by fixing a strip sensor at the edge of the doors, such that it senses vehicle movement. When the door is opened and if the sensor senses the movement of vehicle before 5m from the door of the vehicle, door gets locked at that particular angle. i.e., when there is a movement of vehicles, sensor turns on and the door is locked at that particular angle. Implementation of this can avoid accidents in opening the doors.

Keywords: Cloud computing, Image processing, ARM processor

I. INTRODUCTION

The World Health Organization (WHO) in 1990 calculated that road accidents were the ninth most important cause of "years of life lost" around the world. It is being considered as a global 'epidemic'. Road accidents therefore portray a very major problem around the globe; although it is not given much attention than it deserves. The major cause for increase in rate of road accident in developing country is due to the negligence of the driver. The driver misses to view the signboards placed by the highway department to alert the drivers. The recent studies portray that the one third of fatal accidents are associated with excessive speed in places where sharp turnings and junctions exist, as well as changes in the road way like the presence of road-work or unexpected obstacles. There are enough sign boards and enough precautionary measures are done to avoid and minimize the count of accidents. In spite of all these cautions, the driver

misses to see the sign board. It is basically difficult to keep eye on the sign boards when the driver is more focused in driving. According to the statistical data, it is being interfered that the accidents occurring possibility is more. Statistical analysis for the occurrence of accident:¹

Cause	Percentage
Over speeding in unauthorised zone	44%
Over speeding in speed breakers	32%
Drunken Driving	12%
Red light Jumping	12%

The proposed system overcomes the major cause of occurrence of accidents i.e., Over speeding in unauthorised zone, Over speeding in speed breakers. A mobile application is being created integrating with google map. The latitude and longitude position of the speed restricting zones like school, college, markets is being stored in the cloud. When

the destination place is entered in the goggle map, it actually starts indicating the driver 100m before the speed restricting zone and if the driver doesn't reduce the speed of the vehicle according to the zone in 50m, the speed of the vehicle is automatically arrested using ARM processor. The next objective of this paper is to slow down the speed of the vehicle in speed breaker. The image of the speed breaker is being stored in the arm processor and there is a camera attached to the car at its top roof. When the image captured by the camera and the image stored in the processor matches, the processor alerts the driver by an alarm caution before 100m and if the driver fails to reduce the speed in 50 m, the speed is reduced by using ARM processor.

II. LITRATURE SURVEY

Gummarekula sattibabi^[2] has proposed that using RFID based intelligent vehicle speed controller system where passive RF transceivers are arranged in road close to the position of real traffic signals. RFID may get affected by the tags attached to insulating materials such as plastics. The problem is usually caused by friction and can occur when items rub against each other and build up an electro-static charge. Radio frequency identification technology is definitely more expensive. This however is justifiable as it requires parts such as hardware and software as well as architectural management. Maintenance of which doesn't only call for it on its initial phase. More likely, it is required throughout the whole duration of its function. Radio frequency identification is a more complex technology than barcoding, thus it involves unique installation and even trials and tests in order to minimize any factors which could alter its functions. The reliability parameter is less in RFID. The malfunction possibility is associated more in RFID.

Govindaraju^[3] has proposed that Cruise control system (CC) that is capable of maintaining pre-defined speed and its later evolution version Adaptive Cruise Control (ACC) which keeps the automobile at pre-defined safer distance from the preceding vehicle. But these systems fail to detect the curved roads where the speed of the vehicles have to be reduced to avoid the accidents. Later Curve Warning Systems (CWS) came into existence to detect the curved roads by using Global Positioning System (GPS) and the digital maps accessed from the Geographical Information Systems (GIS) to warn driver of approaching the curved road. But these maps need to be updated regularly and are not useful if there are unpredictable road diversions or accidents

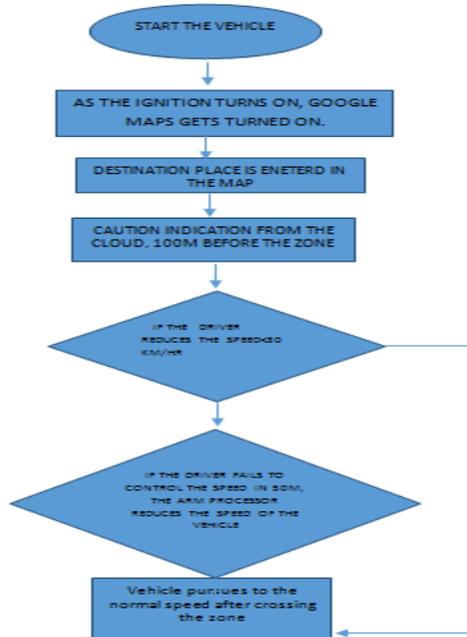
Munja Solanke^[4] has proposed that nearby period, in school areas speed breakers are provided to reduce the speed of vehicles, but the drivers do this manually. This process can be automated by means of RF communication. That is to say that each vehicle should be equipped with a RF receiver circuit that reduces the speed automatically on entering the RF communicated area. A RF transmitter, kept where the speed breakers are to be installed, transmits a digital code. This code is decoded by the receiver circuit in the vehicle, which controls the activities of a carburettor to bring down the speed of the vehicle. The circuit devised has hardware for microcontroller to microcontroller data communication using 433.92 MHz TX/RX modules. The receiver section microcontroller receives the data and brings down the speed of the motor of the vehicle model by pulse width modulation program in it.

III. PROPOSED HARDWARE:

3.1) Methodology: Speed Control In Zone

An android application is being created using android studio integrating with google maps. When the ignition of the car is turned on, google maps gets turned on. The latitude and longitude position of the speed restricting zones like school, college, hospital and market is being uploaded in the cloud. So that the Global Positioning System in the google maps alerts the driver 100m before reaching the particular zone. If the driver fails to reduce the speed of the vehicle in 50m, the ARM processor is programmed in such a way that it automatically reduces the speed of the vehicle. By implementing this technique actually the count of the accidents in the above mentioned zones can be reduced. An ARM processor is one of a family of CPUs based on the RISC (reduced instruction set computing) architecture developed by Advanced RISC Machines (ARM). ARM makes 32-bit and 64-bit RISC multi-core processors

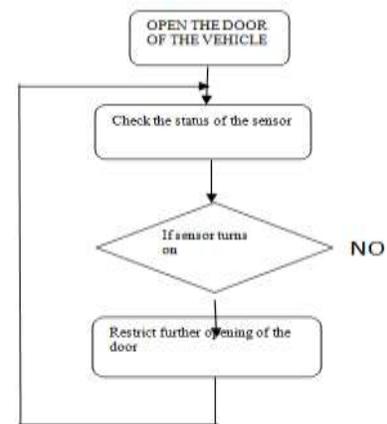
IV. FLOWCHART FOR SPEED CONTROL IN ZONE



ARM processors have high speed processing capabilities. It also consumes less energy than typical x86 processors generally used in our pc. It is highly compatible for small application purposes.. The purpose of arm processor in this project is to control the vehicle speed depending upon the various zone information obtained from the cloud. The zones which are to be accessed are schools, hospitals, markets. Schools and market zones are active only during certain time periods in a day. Whereas hospital zone should be monitored for 24*7.Hence depending on the latitude and longitude position of different zones and by means of zone codes. It is being programmed in such a way that the vehicle speed is reduced automatically in zone like school and college only from 7AM-7PM.The latitude and longitudinal data stored in cloud can be differentiated by adding prefix to address. So that that speed is controlled in according to the time. Every particular zone is denoted with a alphabet, so that when the latitude and longitude position of the zone is updated in clear manner. ZS is denoted for school zone, ZH is denoted for Hospital zone and ZM is denoted for market zone. For instance ZS 14 4' 59". The arm processor control the vehicle speed only for particular duration in a day for the zone codes ZS and ZM.The speed control varies depending on zones for school zone speed has to be limited to 30kmph and in market zone vehicle speed should be within 20kmph and in hospital zone speed limit is

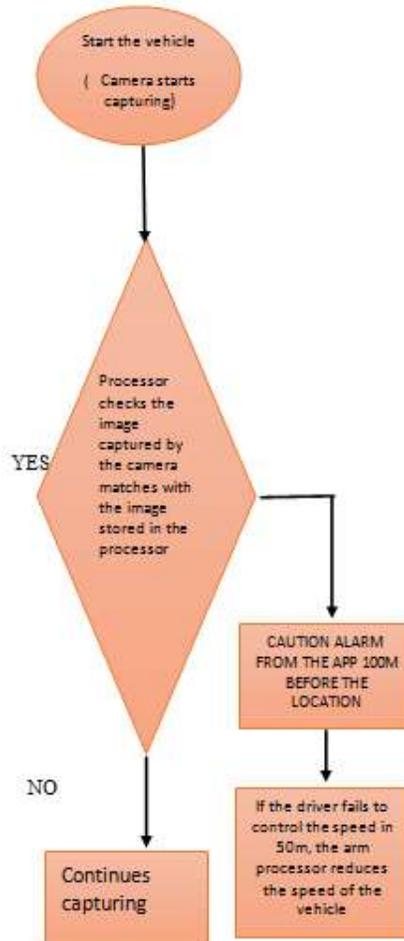
35kmph.Dependng on zone codes the ARM processor controls the vehicle speed.Further this project can be enhance by fixing a strip sensor at the edge of the doors, such that it senses vehicle movement for the radius of 5m.when the person inside the car opens the door and if the sensor senses the vehicle at 5m , the door locks at that particular angle. Such that it cannot be moved neither front nor back. Implementing this technology avoids accidents in the instance of opening the door unknowingly.

3.2) Methodology- Automatic Door Control System



The next objective of this paper is to control the speed of the vehicle in speed breaker. The image of the speed breaker is being stored in the controller in possible patterns. A camera enhanced with image enhancement algorithm is fixed at the roof of the car. If the image captured by the camera and the image stored in the processor matches, the app gives an alarm caution to the driver before 100m of the speed breaker and if the driver fails to reduce the speed, the speed is reduced by using ARM processor automatically. By implementing this technology the accident counts in arena like speed breakers can be minimised. Rash driving in this arena leads to a injurious accidents. One of the major reason for accidents in the city is harsh driving in the speed breaker.

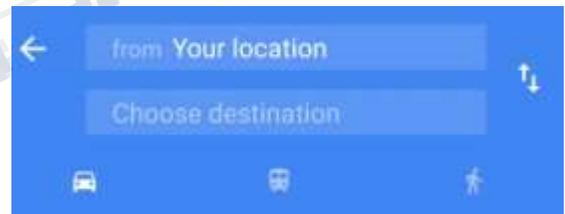
V. LOW CHART FOR SPEED BREAKER SPEED CONTROL:



Step 4: i) when the car reaches 100m before the speed restricting zones, app gives a alarm caution to the driver.

ii) Processor checks the image captured by the camera matches with the image stored in the processor and if it matches, an alarm caution is given to the driver 100m before the speed breaker

Step 5: If the driver fails to control the speed in 50m, the arm processor reduces the speed of the vehicle.



Mathematical expression relating the speed

$$d = (v_f - v_i) / t$$

where,

d=deceleration

v_f =final velocity

v_i =initial final

ALGORITHM:

Step 1: start the vehicle

Step 2: The android app integrated with google maps turns on.

Step 3: i) The latitude and longitude position of the speed restricting zone is being uploaded to the cloud.

ii) The possible patterns of the speed breakers are stored in the processor

VI. CONCLUSION:

The proposed system mainly designed in order to avoid accidents and to alert the drivers about the speed limits for safe travelling. An effective solution is provided to develop the intelligent vehicle which will operates on safest speed at critical zones and monitor various parameters of vehicle. Controlling the vehicle speed automatically in real

time is very difficult. Future scope of that is to control the accidents and positioning the accidental vehicle. Thus the contribution from the part of a engineering community is being required in a enormous scale to reduce the accident counts. Implementation of advanced technologies is the most preferable logistic to reduce the counts of accidents.

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