Automatic Speed Control Of Vehicle Using Mobile Phone (ASCV)

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Abstract— *The basic idea is to ensure that the speed of the vehicle is regulated by an SPEED CONTROL MODULE(SCM) conforming to the local speed regulation. The TRANSCEIVER obtains the maximum permissible speed limit referred to as the value from the local tower. The SIM is used to communicate with the tower. Each SIM has an unique International Mobile Subscriber Identity Number(IMSI).The Mobile Phone is used to read the value stored in the SIM. The sim value is frequently updated by the local home tower, which transmits the maximum permissible speed limit in that area. This sim is regularly verified by the MICROPROCESSOR(MUP) which is interfaced with the RETRANSCEIVER. The MUP copies the value to its register. This is then sent to the SPEED CONTROL MODULE which controls the speed of the vehicle by controlling the flow of fuel into the engine.The vehicle will run only you connect the mobile with your vehicle. For ambulance, army vehicle a special will used and this system not affect the ambulance speed. The new technique makes sure that the speed of the vehicle is controlled. This makes the ASCV a very efficient speed regulatory and control system.*

Keywords— Traffic control, Speed control, SIM

1. INTRODUCTION

The incidence of accidents due to cynical attitude of people driving vehicles especially because of over speeding has been enormously high. The irony is that it has gone unchecked in the sense none of the several hundred regulations enforced by the government has made even the slightest of impact. It is of course left to the discretion of the people to follow the rules in most of the cases. This calls for a stricter set of regulation where in the people are bound by regulations they can't break but will be forced to follow. We have a new invention which will control the speed of a vehicle regardless of the willingness of the driver.

The main objective of our project is to establish a stringent control on the drivers by automated control of speed of a vehicle by using Mobile Phone and embedded SIM. It has a small memory in the range of a few KiloBytes(KB). Then we use a micro processor which can read data from a device and store it in its register. This then is sent to a control module which ultimately produces the signals required to control the speed.

2. EXISTING SYSTEM

Many innovations have been tried before to enforce the rules. The major disadvantage is that speed of a vehicle is calculated by LASER guns, RADAR, etc which are expensive. It is left to the officer to go after the over speeding vehicle and fine him, which by in itself no way stops him from speeding next time. Some innovations such as using IR transmitters to suggest speed limits placed at street ends were tried. They were expensive and required major changes in the existing automobile architecture.
So to sum up the existing systems have the following disadvantages

- They are expensive
- They suggest changes in automobile architecture
- They cannot be implemented anywhere
- They are only semi automatic

All these are the very things which our project by passes.

3. PROPOSED SYSTEM

ASCV encompasses the following modules:

A. Sim Card:A specially designed sim card which is compliant with all networks . It has a minimum storage area where it can store data.

B. Mobile Phone: It is like a intermediate component which here used as like a sim card reader. But it's used for some of our main features in the system.

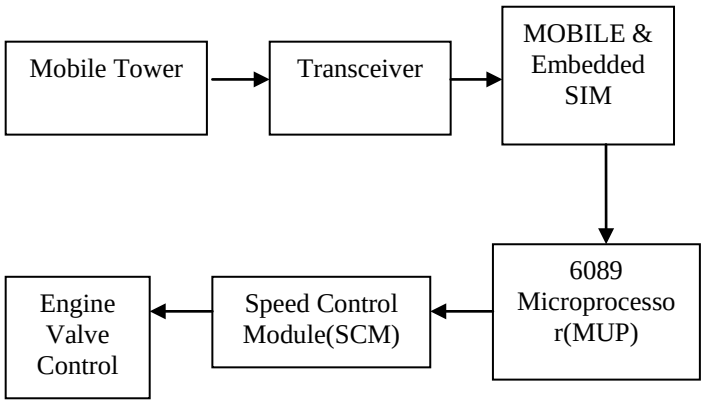
C. Embedded Sim:

It's embedded with microprocessor. Which is used for security system in the car and then cross check the value and then compare with speed of the vehicle.

D. Transciever:

A transmitter and receiver found in a mobile phone is used to connect sim card to a network. The MOBILE PHONE and the transceiver for embedded sim are embedded as a single system called RETRANSCEIVER as it incorporates both a reader and a transceiver. This setup which is capable of exchanging value with the home tower. The value is actually the maximum permissible speed limit in the service area where the mobile tower is located.

E. Architectural Diagram Of ASCV



F. 6809 Microprocessor:

The 6809 microprocessor is interfaced with the retransceiver. The microprocessor frequently checks the value stored in the SIM and copies it into its register B. This value is then sent to the speed control module.

G. Speed Control Module:

The speed control module is frequently updated by the 6809 microprocessor with the latest "value". Also the speed control module constantly checks the actual speed of the vehicle with the given speed limit. If the actual speed is below the given limit it remains idle. Else it generates a control signal which decelerates the vehicle to the maximum permissible speed thereby forcing the vehicle to adhere to the speed limits. All these occur within microseconds and hence the speed control of the vehicle is assured.

4. Establishing Connection

As already mentioned, for enabling communication between Vehicle and the home tower we have

- A universal mobile phone connector
- A transceiver similar to the one in a mobile phone both collectively known as RETRANSCEIVER.

The following are the initial actions in establishing connection with the home tower:

- Once Mobile is connected with the vehicle, it's switched on the embedded sim is powered on by a battery supply automatically.
- It obtains the IMSI from the Mobile phone and transmits it to the tower.
- The operator network searches its database for the incoming IMSI and its associated Ki.
- The operator network then generates a Random Number (RAND) and signs it with the Ki associated with the IMSI (and stored on the SIM card), computing another number known as Signed Response (SRES_1).
- The operator network then sends the RAND to the Mobile Equipment, which passes it to the SIM card. The SIM card signs it with its Ki, producing SRES_2 which it gives to the transciever along with encryption key Kc.
- The transciever passes SRES_2 on to the operator network.
- The operator network then compares its computed SRES_1 with the computed SRES_2 that the transciever returned. If the two numbers match the SIM is authenticated and sim is granted access to the operator's network.
- Kc is used to encrypt all further communications between the transciever and the network.

5. Speed Information

The maximum allowable speed limit in that particular area is stored in a database in MTSO(Mobile Telephone Switching Office).

- This is transmitted by the tower
- The data is received by the mobile retransceiver in the vehicle
- The sim card stores this 8-bit value in its memory temporarily.(Since the speed limit will be just two digits in decimal form,it can be easily represented in binary within 8 bits.)

6. Description About The Microprocessor

The Motorola 6809 is an *8-bit* (arguably, an 8/*16-bit*) *microprocessor CPU*.it has two 8-bit *accumulators* (A and B, which could be combined into a single *16-bit register*, D), two 16-bit *index registers* (X, Y) and two 16-bit *stack pointers* (U, S). The *instruction set* and register complement are highly *orthogonal*, making the 6809 easier to program than nearly every other microcomputer CPU .It has a fast *interrupt* system.This Microprocessor(MUP) has read instructions and when interfaced with the Mobile can be used to read data from its memory. This then is stored in its register 'B'.

7.Speed Conrol Module:

In a speed control system for vehicles, a speed difference calculation circuit calculates an absolute value of a time difference between a predetermined period of time corresponding with a desired speed and an instant period of time corresponding with actual speed, an acceleration calculating circuit calculates an absolute value of time difference between the respective instant periods of time and a correction signal generator calculates the sum of absolute values in consideration with the actual speed when each sign of calculated time differences is positive or negative and calculates difference between the absolute values in consideration with the actual speed when respective signs of the calculated time differences are opposite to each other. The signal generator selectively produces correction signals related to the calculated sum and calculated difference. A distribution circuit produces a control signal in response to the respective correction signals, and an actuator controls the opening angle of the engine throttle in response to the control signal. The command signal is the signal least of the value got from the microprocessor and the actual speed desired. The engine valve is closed to restrict the flow of the fuel thereby decelerating the vehicle. During this period the speed control module keeps track of the vehicle speed. When the speed reaches a value which is 10 kmph less than the original speed limit, it opens the throttle again thereby controlling the vehicle speed.

8.Way Through Towers

As the vehicle moves through many towers the value received from the nearest tower is used to update the sim. Also signals which are feeble are weeded out. The minimum signal strength must be above 80% in order to avoid confusion from receiving signals from different areas simultaneously. If for some time no signal is received, then the sim assumes a default value applicable to highways. This is then used to control vehicle speed as usual.

9.Emergency Cutoff

In case of emergency when the vehicle driver has a genuine reason for speeder transit such as giving way for ambulances, etc he should be given a chance to speed up. This is enabled by an emergency cut off button which powers off the battery supply to sim reader for 10 minutes. The last one minute of the cut off period is marked by an alarm to the driver before the automatic control takes over. The vehicle cannot be cut off for the next half hour or till it is switched off.

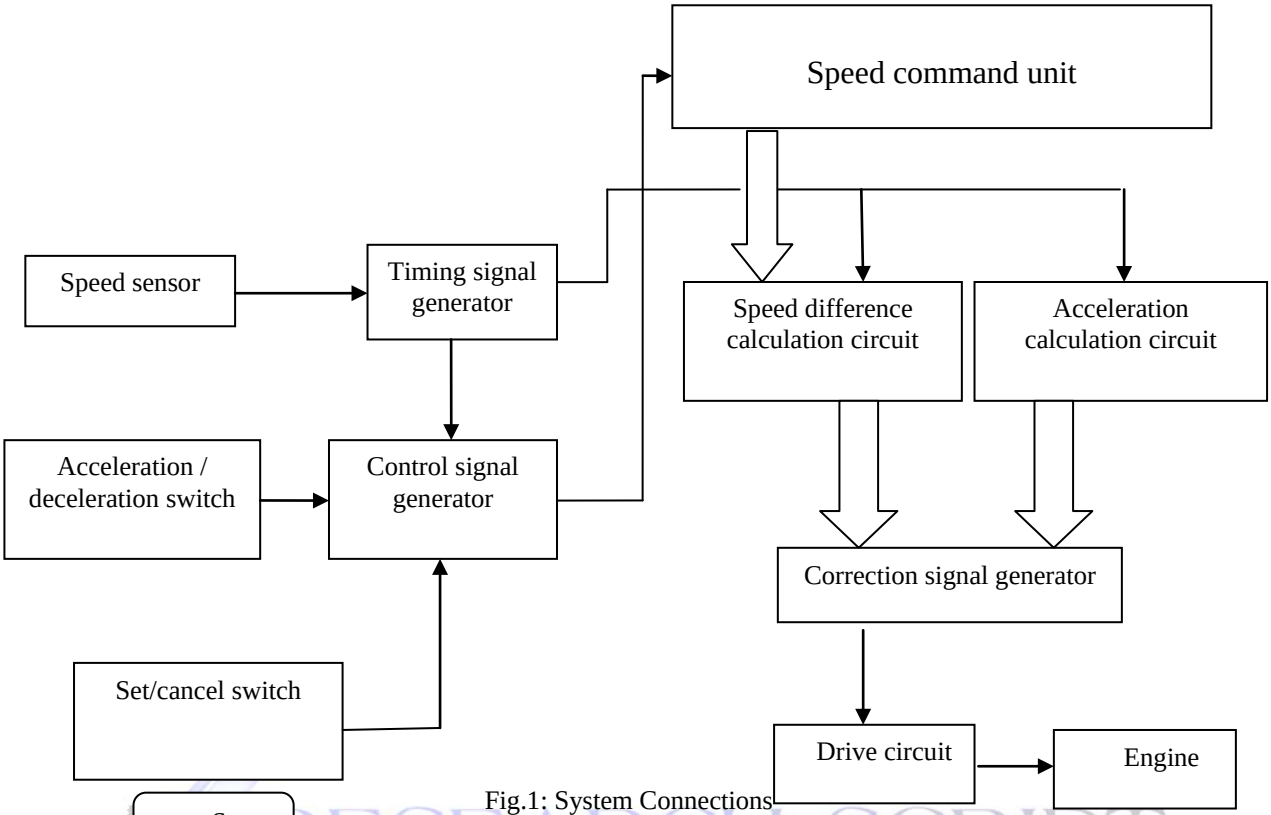


Fig.1: System Connections

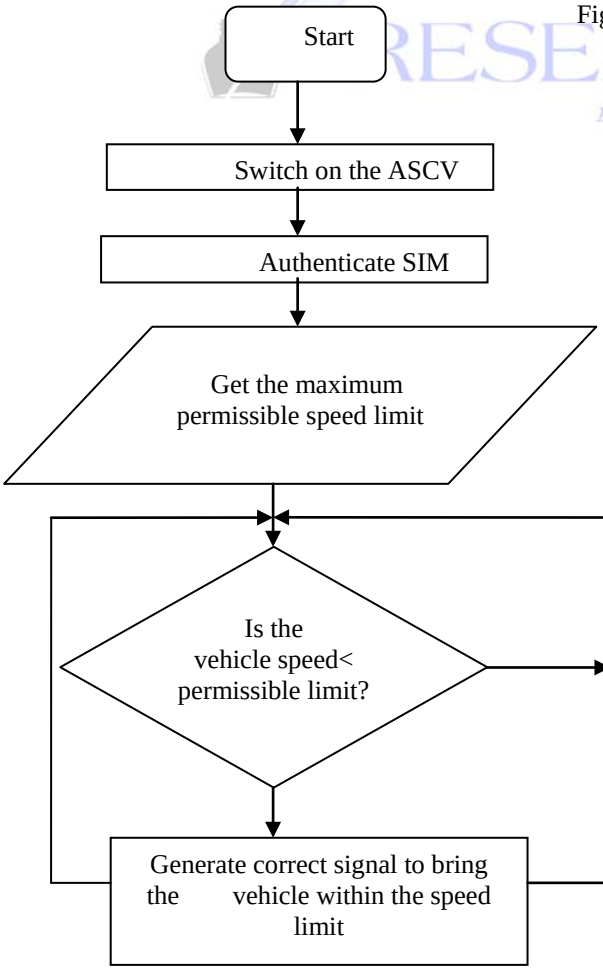


Fig.2: Flow chart of ASCV

10. ADVANTAGES

The following are the advantages which our system hold in preference to other systems that are currently in use: Availability: Since the mobile towers are omnipresent in this age it is no big deal to obtain a consistent signal almost everywhere. Simple: It is simple in the way that it requires only a small amount of data be stored in an MTSO and only 8 bits are transmitted. Restrictive: This ultimately restricts the user from over riding the law rather than being a suggestive measure. Preventive: It is a preventive measure and not one that punishes non-followers

11. SECURIT&PREVENTIONAL SYSTEM

The following future enhancements we have in our mind to develop:

- To develop an accident informing system wherein the ASCV would inform the tower about the accident and which would call the local hospital for help. For this we propose to use a Global Positioning(GPS) system.
- A group of sensors around the vehicle can be used to receive special signals from other vehicles around it. For example ambulance can have a special code or even a vigilance jeep could have one which can release the speed constraint temporarily on the vehicle.

- The Mobile Phone can be used to provide security by making it to ask for a password to even start the car thereby making the vehicle almost theft-free!

The above flowchart gives a rough idea about the working of ASCV

13. CONCLUSION

The ASCV designed to control the speed of the vehicle to prevent accidents is efficient. It is also cost effective. Further it reduces the work of the traffic policemen. It is targeted towards every vehicle driver ranging from motor bikes to lorries. Many ideas have been put forth to provide control of speed in vehicle but none has been comprehensive enough. The mobile towers available everywhere will ably suggest and provide control signals. Instead of rapidly decelerating the speed of vehicle after over speeding or switching the vehicle off or even providing alarms this provides an ultimate solution and also an acceptable one. No risk is involved as the vehicle never over speeds .It is prevented from doing so. Also there is no danger to the vehicle. The usage of our contraption in everday world will greatly benefit in saving the lives of thousands of people who die due to road accidents. The vehicular traffic is also regulated with ease. Also the emergency cut off feature prevents the slow down of fast moving vehicles such as ambulances which need not slow down due to slower vehicular traffic. Thus our idea of controlling the vehicle is safe, effective and ultimate way towards decorum in the roads.

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