Speed Dictators for Forced Speed Limit at Critical places using Low Cost RF Transceivers with Integrated Immobilizer

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Abstract: An intention to work on the topic of this nature is emanated from the interest to explore alternative technological solution to achieve effective speed control. Objective of the study is to design and develop a new system that can effectively detect speed violations on the road and supports the driver to obey traffic rules while driving by maintaining the speed according to the speed limit prescribed. In the present day scenario traffic rules are frequently violated by the drivers and over speeding occur due to bad driving behavior. So, a driver assistance system is provided to prevent over speeding, violation of road rules and also to display alert messages. The proposed system has an alerting, recording and reporting system for over speed violation management. The proposed system automatically controls the speed of vehicles at speed restricted areas such as school and hospitals. The main reason behind developing this project is to avoid accident of vehicles at speed limit zones and also to help the passengers to cross the road safely without facing any danger from high speed vehicles. Normally, the vehicle drivers not consider the passengers who crosses road in speed limited areas and drive their vehicles at high speed. So, now accidents are increasing in these areas. The traffic police control the traffic but they are not able to avoid the accidents completely. To solve this problem we developed the proposed system, which not interrupts the vehicle drivers and controls the speed of the vehicles up to certain limit in these speed restricted zones. The LCD displays the lane speed limit. Even though the traffic police controls them we cannot achieve full response from them. Also it is not possible to monitor those areas at all time to regulate their speed. This project is very useful for the common people to walk safely in the roads of speed restricted zones¬¬ and also drivers can ride their vehicles safely.

Keywords: Intelligent Speed Adaptation (ISA), Zigbee, Cruise control system (CC), Curve Warning Systems (CWS), Geographical Information Systems (GIS), Vechicle Overspeed RF, RF Transmitter, RF receiver.

I. INTRODUCTION

Movement administration out and about has turned out to be extreme issue of today's general public due to development of the urbanization, industrialization and populace; there has been a gigantic development in the activity. With development in movement, there is event of heap of issues as well; these issues incorporate congested roads, mischances and activity administer infringement at the substantial movement signals. This thusly adversy affects the economy of the nation and also the loss of lives [1]. So issue given above will turn out to be most noticeably bad later on. Activity blockage and tidal stream administration were perceived as real issues in present day urban territories, which have caused much upsetting for the rescue vehicle. In addition street mishaps in the city have been unremitting and to bar the death toll because of the mischances is considerably more vital. Expanding the limit of the roadways is costly and, in a few zones where land is rare, is impossible. Enhancing the productivity of the present transportation framework through the execution of cutting edge advances may mitigate activity clog and lessening the vehicle crash-related casualty rate. Continuous movement reconnaissance is a standout amongst the most vital parts of this approach. Street mishaps can be anticipated by receiving measures, for example, [2] Traffic administration, enhancing nature of street framework and more secure vehicles. To Ensure decrease in mischances and to enhance street security, speed control procedures, for example, speed control in school and school zones by utilizing RF handset, programmed slowing mechanisms, Camera based recognition, RFID innovation based discovery are executed. The current systems still doesn't ready to lessen the quantity of mishaps. Thus there is a need to actualize Intelligent Speed Adaptation (ISA) in which infringement administration gives proficient checking, enrolling and revealing arrangement of speed of the vehicle which surpasses the utmost. The driving conduct of the driver is checked in view of which punishment sums are computed. A message is sent to the remote station where a prompt move can be made. Speed confine data is sent with the assistance of Zigbee which utilizes remote method of correspondence, ends up being compelling [3].

Late reviews demonstrate that 33% of the quantity of lethal mishaps are related with over the top speeds in spots where sharp turnings and intersections exist, and additionally changes in the roadway like the nearness of street work or sudden obstructions. This is expected to waiting hours together in car influxes, taking convoluted reroutes due to on-street works, attempting to spot speed breakers, exploring obscured turns, one-ways et cetera. Forked streets, railroad intersections, sudden invert curves and soak risings and plummets are only few of the street peculiarities that one may experience on the normal drive. Such street peculiarities are demonstrated by street signs. Required street signs uphold activity laws; Cautionary street signs are introduced in unsafe ranges to turn away mischances. Enlightening street signs give headings, areas and other data that is conceivably valuable to drivers in that territory. In any case, most vehicle drivers miss street signs as a rule. It is hard to watch out for street signs when one ought to be centered around driving [4]. Numerous Driver Assistance frameworks for speed control have been created in order to anticipate mischances. One of them is Cruise control framework (CC) that is equipped for keeping up pre-

characterized speed and its later development adaptation Adaptive Cruise Control (ACC) which keeps the car at pre-characterized more secure separation from the previous vehicle. Be that as it may, these frameworks neglect to recognize the bended streets where the speed of the vehicles must be lessened to maintain a strategic distance from the mishaps. Later Curve Warning Systems (CWS) appeared to identify the bended streets by utilizing Global Positioning System (GPS) and the computerized maps gotten to from the Geographical Information Systems (GIS) to caution driver of moving toward the bended street. In any case, these maps should be refreshed consistently and are not helpful if there are eccentric street redirections or mishaps [5, 6]. Here we propose a dynamic model where the framework controls the vehicle as per the information outline that is transmitted by the RF transmitter settled to the close-by street signs. The information casing is gotten by the microcontroller in car which controls the speed of vehicle. This is a RFID-Based Intelligent vehicle speed controller framework where uninvolved RF handsets are masterminded in the street near the position of genuine movement signals. This model can likewise be better used to enhance the fuel productivity by forcing the most extreme speed restrict on the cars at which the mileage will be more [7].

National reports distributed every year by Transport Research Wing of the Ministry of Road Transport and Highways and National Crimes Records Bureau of Ministry of Home Affairs, Government of India depict national measurable patterns and standardized pointers of street mischances, wounds and fatalities. This article highlights patterns, pointers, interstate examinations and the most recent attributes of street auto collisions in India. While the official street movement casualty information might be near the real number, the harm information are gross thinks little of. According to bibliometric investigation, India contributed just 0.7 for every penny papers on street activity wounds and had short of what one article on street movement wounds per 1,000 street movement related passings. To be compelling, approaches on damage counteractive action and security must be founded on neighborhood confirmation and research. Wellbeing experts and their expert bodies crosswise over wide teaches need to take an activity for the same with dynamic duty [8].

II. LITERATURE REVIEW

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An intention to work on the topic of this nature is emanated from the interest to explore alternative technological solution to achieve effective speed control. Objective of the study is to design and develop a new system that can effectively detect speed violations on the road and supports the driver to obey traffic rules while driving by maintaining the speed according to the speed limit prescribed. In the present day scenario traffic rules are frequently violated by the drivers and over speeding occur due to bad driving behavior. So, a driver assistance system is provided to prevent over speeding, violation of road rules and also to display alert messages. The proposed system has an alerting, recording and reporting system for over speed violation management. The Zigbee transmitter sends the speed limit of the particular lane entered by the vehicle and also gives alerts like ―road works, ―steep slopes, ―school zone

in the form of acoustical messages and also in LCD [9]. The receiver unit placed in the vehicle receives the messages and sends to the microcontroller. When speed of the vehicle nears the speed limit it displays the warning and if exceeds the limit, the microcontroller records the violated speed and time. The LCD displays the lane speed limit and shows the number of times, speed was violated. At the same time our system will control the speed, if vehicle user does not slows down the speed to that of particular zone speed limit. System will keep on counting the no. of times speed exceeded, record of which sent to the control room. Increase in the count of violation increases the penalty amount which can be collected in toll gates located nearby. Ultimately driver's behavior can be improved here. A GSM module sends message to the nearest traffic personnel immediately after a violation occurs. An authenticated device is also provided, which can be operated only by the traffic police in whom he can retrieve the data stored at any time [10].

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The proposed system automatically controls the speed of vehicles at speed restricted areas such as school and hospitals. The main reason behind developing this project is to avoid accident of vehicles at speed limit zones and also to help the passengers to cross the road safely without facing any danger from high speed vehicles. Normally, the vehicle drivers not consider the passengers who crosses road in speed limited areas and drive their vehicles at high speed. So, now accidents are increasing in these areas [11]. The traffic police control the traffic but they are not able to avoid the accidents completely.. To solve this problem we developed the proposed system, which not interrupts the vehicle drivers and controls the speed of the vehicles up to certain limit in these speed restricted zones. The LCD displays the lane speed limit. Even though the traffic police controls them we cannot achieve full response from them. Also it is not possible to monitor those areas at all time to regulate their speed. This project is very useful for the common people to walk safely in the roads of speed restricted zones and also drivers can ride their vehicles safely.

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Nowadays people drive very fast, accidents occur frequently and there is loss of property and life. In order to avoid such kind of accidents, to alert the drivers and to control their vehicle speed. RF technology is being used the main objective is to design a Smart Display controller meant for vehicle's speed control and monitoring of zones, which can run on an embedded system. Smart Display & Control (SDC) can be custom designed to fit into a vehicle's dashboard, and displays information on the vehicle. The project is comprises of two separate modules: zone status transmitter unit and receiver (speed display and control) unit. Once the information is received from the zones, the vehicle embedded unit automatically alerts the driver, to reduce the speed according to zones, it waits for few seconds, and otherwise vehicle's SDC unit automatically reduces the speed [12].

III. METHODOLOGY

ZigBee conventions are proposed for implanted applications requiring low power utilization and enduring low information

rates. The subsequent system will utilize little measures of energy — singular gadgets must have a battery life of no less than two years to pass ZigBee confirmation. ZigBee is an IEEE 802.15.4-based determination for a suite of abnormal state correspondence conventions used to make individual territory systems with little, low-control computerized radios [13].

The accompanying figure portrays zigbee convention stack,which comprises of four layers viz. PHY,MAC,network and security and application layer. The initial two are shrouded in IEEE 802.15.4 WPAN standard and the later two are canvassed in records distributed by zigbee cooperation.

Application Layer:

Pl. allude our article on Basics of OSI and TCPIP to comprehend application layer when all is said in done. There are two profiles at this layer. 1. Maker particular application profile-Operate as shut frameworks and furthermore guaranteed that they can coincide with other zigbee frameworks. 2. Open application profile-for this to work interoperability between different zigbee gadgets is an absolute necessity. A solitary zigbee hub underpins up to 240 application objects called end focuses. An end point indicates particular application, for instance, 0 devoted to ZDO (Zigbee gadget question), gives control and administration charges. 6 utilized for control of light. 8 utilized for oversee warming and aerating and cooling [14].

Arrange Layer:
Specially appointed on-request Distance Vector Routing convention (AODV) is utilized at system layer. Allude zigbee AODV convention for additional.

Security Layer:
On the off chance that security is empowered C will start up utilizing a 128 piece AES encryption key. Gadgets having same security key can convey on PAN. How to get this key? 1. Pre-establishment 2. Key is gotten over the air amid joining.

Macintosh Layer
Every MAC outline comprises of three fields MAC header, MAC payload and MFR (FCS).

Every MAC edge will contain Frame control field (16 bit), which convey outline sort, tending to fields and other control banners.

This MAC control field contain outline sort field, which is the primary separating variable in distinguishing one MAC outline with the other. It is 3 bit long [15].

The MAC edges are isolated into taking after four noteworthy classes, which is utilized by zigbee gadgets to build up association with the PAN by trading framework data.

1. Reference point
2. Information
3. Affirmation
4. Macintosh summon

The ZigBee convention is intended to impart information

through threatening RF situations that are normal in business and modern applications.

ZigBee convention highlights include:

•   Support for different system topologies, for example, indicate point, indicate multipoint and work systems

•   Low obligation cycle – gives long battery life

•   Low dormancy

•   Direct Sequence Spread Spectrum (DSSS)

•   Up to 65,000 hubs for each system

•   128-bit AES encryption for secure information associations

•   Collision evasion, retries and affirmations

Work Networks
A key part of the ZigBee convention is the capacity to bolster work organizing. In a work organize, hubs are interconnected with different hubs so that various pathways interface every hub. Associations between hubs are progressively refreshed and enhanced through advanced, worked in work steering table.
Work systems are decentralized in nature; every hub is fit for self-disclosure on the system. Likewise, as hubs leave the system, the work topology enables the hubs to reconfigure directing ways in light of the new system structure. The attributes of work topology and specially appointed steering give more noteworthy strength in changing conditions or disappointment at single hubs [16].
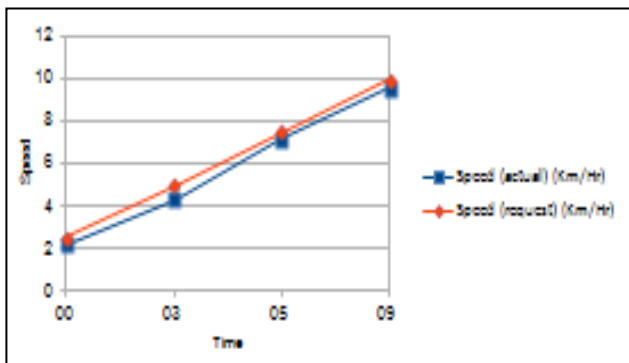
IV.   RESULTE

Table 1 Mode1: Warning Mode

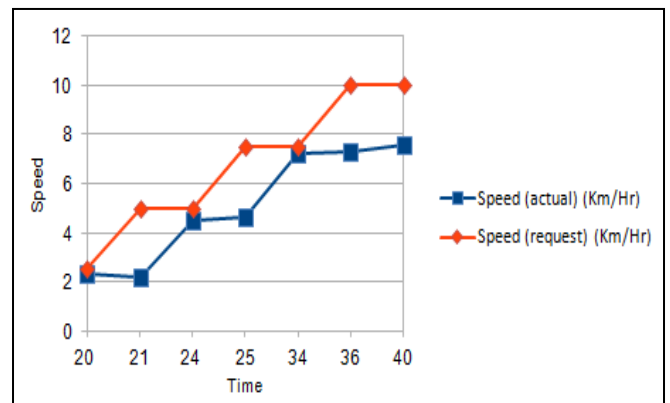| S. No.	Dated Time	Command Issued	GUI Response	Vehicle Response (LCD)	Actual Speed
1	4-10-2016 06:00 PM	Speed 1	None	Speed : 1 Zone : 1	2.2 km/Hr
2	4-10-2016 06:01 PM	Identify	Immobilizer No : UXIDZ - 1234 Vehicle No. : RJ27-CA-5678 Speed : 24 Time Stamp : 2016-10-04 06:01:30	None	2.2 km/Hr
3	4-10-2016 06:03 PM	Speed 2	None	Speed : 2 Zone : 1	4.3 km/Hr
4	4-10-2016 06:04 PM	Identify	Immobilizer No : UXIDZ - 1234 Vehicle No. : RJ27-CA-5678 Speed : 51 Time Stamp :2016-10-04 06:04:40	None	4.3 km/Hr
5	4-10-2016 06:05 PM	Speed 3	None	Speed : 4 Zone : 1	7.2 km/Hr
6	4-10-2016 06:07 PM	Identify	Immobilizer No : UXIDZ - 1234 Vehicle No. : RJ27-CA-5678 Speed : 78 Time Stamp : 2016-10-04 06:07:45	None	7.2 km/Hr
7	4-10-2016 06:09 PM	Speed 4	None	Speed :4 Zone : 1	9.6 km/Hr
8	4-10-2016 06:12 PM	Identify	Immobilizer No : UXIDZ - 1234 Vehicle No. : RJ27-CA-5678 Speed : 94 Time Stamp : 2016-10-04 06:12:55	None	9.6 km/Hr

The above table shows the warning mode and zone mode of vehicle. And shows the Date & time, Command Issued, Gui Response, Vehicle Response and Actual Speed. At the time 4-10-2016 and time 06:00 Pm and command Issued speed 1, Gui Response is None, Vehicle Response is Speed 1 aand zone 1, achual speed is 2.2 Km/Hz. At the time 4-10-2016 and time 06:01 Pm and command Issued Identify, Gui Response is shown TABLE, Vehicle Response is NONE aand zone 1,

achual speed is 2.2 Km/Hz. At the time 4-10-2016 and time 06:03 Pm and command Issued speed 2, Gui Response is shown in table, Vehicle Response is Speed 2 aand zone 1, achual speed is 4.3 Km/Hr. At the time 4-10-2016 and time 06:04 Pm and command Issued Identify, Gui Response is shown TABLE, Vehicle Response is NONE aand zone 1, achual speed is 4.3 Km/Hr. At the time 4-10-2016 and time 06:05 Pm and command Issued speed 3, Gui Response is shown in table, Vehicle Response is Speed 3 aand zone 1, achual speed is 7.8 Km/Hr. At the time 4-10-2016 and time 06:07 Pm and command Issued Identify, Gui Response is shown TABLE, Vehicle Response is NONE and zone 1, achual speed is 7.8 Km/Hr. At the time 4-10-2016 and time 06:09 Pm and command Issued speed 4, Gui Response is shown in table, Vehicle Response is Speed 4 aand zone 1, achual speed is 9.6 Km/Hr. At the time 4-10-2016 and time 06:12 Pm and command Issued Identify, Gui Response is shown TABLE, Vehicle Response is NONE, achual speed is 9.6 Km/Hr.

Time vs. Speed Graph (Actual and Request)

Table 2 Mode1: Resticted Mode

S. No.	Dated Time	Command Issued	GUI Response	Vehicle Response (LCD)	Actual Speed
1	4-10-2016 06:20 PM	Speed 1	None	Speed : 1 Zone : 1	2.3 km/Hr
2	4-10-2016 06:21 PM	Identify	Immobilizer No : UXDZ - 1234 Vehicle No. : RJ27-CA-5678 Speed : 26 Time Stamp : 2016-10-04 06:01:30	None	2.3 km/Hr
3	4-10-2016 06:24 PM	Speed 2	None	Speed : 1 Zone : 1	2.3 km/Hr
4	4-10-2016 06:25 PM	Identify	Immobilizer No : UXDZ - 1234 Vehicle No. : RJ27-CA-5678 Speed : 25 Time Stamp : 2016-10-04 06:01:30	None	2.3 km/Hr
5	4-10-2016 06:27 PM	Zone 2	None	Speed : 1 Zone : 2	2.3 km/Hr
6	4-10-2016 06:29 PM	Speed 2	None	Speed : 2 Zone : 2	4.4 km/Hr
7	4-10-2016 06:32 PM	Identify	None	None	4.5 km/Hr
8	4-10-2016 06:34 PM	Speed 3	None	None	4.5 km/Hr
9	4-10-2016 06:36 PM	Identify	Immobilizer No : UXDZ - 1234 Vehicle No. : RJ27-CA-5678 Speed : 25 Time Stamp : 2016-10-04 06:36:12	None	7.2 km/Hr
10	4-10-2016 06:38 PM	Zone 2	None	Speed : 3 Zone : 2	7.2 km/Hr
11	4-10-2016 06:40 PM	Speed 4	None		7.5 km/Hr

At the time 4-10-2016 and time 06:20 Pm and command Issued speed 1, Gui Response is None, Vehicle Response is

Speed 1 aand zone 1, achual speed is 2.3 Km/Hr. At the time 4-10-2016 and time 06:21 Pm and command Issued Identify, Gui Response is shown TABLE, Vehicle Response is NONE aand zone 1, achual speed is 2.3 Km/Hr. At the time 4-10-2016 and time 06:24 Pm and command Issued speed 2, Gui Response is shown in table, Vehicle Response is Speed 1 aand zone 1, achual speed is 2.3 Km/Hr. At the time 4-10-2016 and time 06:25 Pm and command Issued is zone 2, Gui Response is shown TABLE, Vehicle Response is speed 2 and zone 2, achual speed is 2.3 Km/Hr. At the time 4-10-2016 and time 06:27 Pm and command Issued speed 2, Gui Response is shown in table, Vehicle Response is None, achual speed is 4.4 Km/Hr. At the time 4-10-2016 and time 06:29 Pm and command Issued Identify, Gui Response is shown TABLE, Vehicle Response is NONE, achual speed is 4.5 Km/Hr.

Time vs. Speed (Actual and Request)

This graph shows that relation between time and speed (Actual and Request), as shows in the figure. At the time 20 Min speed is 2.3 (Km/Hr) Actual speed and 2.5 (Km/Hr) is request speed. At the time 24 Min speed is 4.5 (Km/Hr) Actual speed and 5.0 (Km/Hr) is request speed. At the time 34 Min speed is 7.2 (Km/Hr) Actual speed and 7.5 (Km/Hr) is request speed. At the time 40 Min speed is 7.6 (Km/Hr) Actual speed and 10.0 (Km/Hr) is request speed.

V. CONCLUSION AND FUTURE SCOPE

Conclusion

The author has presented a prototype design of a system that can enhance road safety significantly by controling speed limit of vehicles via secure zigbee protocol. The proposed system is simple & durable & offer low cost implementation. As zigbee molules are used, the system consum very less power. The described system is easy to implement on a present system which ensure maximum safety for drivers, passengers & pedestrains. The driver gets all the information on a LCD, for distraction free operation. Driving safety is highly enhanced, which offers a positive cost differential to the government.

Future Scope

The author are innovating various methods & artificial all the pros 7 cons ssociated with the system. In this prototype only one vehicle at a time is considered, practicaly system approach that can later to many vehicle simultaneously can be in operated. The system can further be enhanced by providing near field vehicle to vehicle communication to prevant vehicle collision & accidenrs. Also can be included to aid in

determination of vehicle location & speed for stricter low enforcement. Also there is scope for utility pole mounted transcievers connected to each other & then to Intanct for truly remoteused based control & Monitorning.

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