# Automatic Detection System of Smart Speed Breaker with U-turn indicator

[1]Gauravi Shetty, , [2]Atiya Sultana, [3]Muneeb Afzal

[1]Assistant Professor, [2] Assistant Professor, [3]Assistant Professor
[1]Department of Electronics and Communication Engineering,
[1]Navodaya Institute of Technology, Raichur, Karnataka, India

***Abstract :*** ***This paper presents an automatic height adjustable speed humps, which are designed to get activated as long as vehicles are travelling above a particular speed and vehicles within the speed limit won't experience the discomfort of the hindrance . Since speed bumps aren't experienced for vehicles within the regulated speed and hence fuel consumption of vehicles due to road bumps may reduce. U-turn indications are sign board in present day. This paper indicates the fast paced vehicle on the most roads to hamper when another vehicle which is taking a U-turn/crossing the road median at a distance of 100/150 meters ahead***

***IndexTerms*** **– Ultrasonic sensor, LDR light control, LCD, Speed humps.**

## I. INTRODUCTION

Rash driving is that the explanation for many road accidents everywhere the planet. The main of general road safety through prevention of accidents that cause deaths of human beings and damage of vehicles can be achieved by installing speed breakers. The speed humps are used to get down the vehicle drivers from driving with excessive speed. These are typically comprised of concrete or solid humps that form a transverse ridge within the road and are generally above the paved surface . The vehicles, passing over the hump undergo a thrust, hence the drivers are encouraged to travel at lower speed. For vehicles which are within the regulation unnecessary fuel consumption may occur, thanks to gear changes during the hump. So the speed hump are may require only the vehicle is above the regulated speed.

Speed-breakers are traffic calming devices commonly installed to scale back speed related accidents. Speed-breakers are designed to be driven over at a preset comfortable speed, which causes discomfort if exceeded from a preset level. In an average vehicular speed significantly improves the safety of people in the neighbouring areas. Even though there's evidence that speed-breakers reduce speed related accidents, they need also been known to cause accidents and injuries. When a vehicle approaches a speed-breaker at a speed greater than a threshold value, then the danger of accident or injury to the passengers becomes more obvious.. Motorcycles and scooters are especially vulnerable because unnoticeable speed-breakers can throw them off balance. Crossing a hump at above recommended speed can also damage vehicles. Speed-breakers are inconspicuous under special conditions, like when there's snow, fog, or rain; or in the dark once they are hard to ascertain .

## II. PROBLEM IDENTIFICATION

The 50th percentile collision speed for all severities of injury is between 20-25km/h (12-16 mph). In any case, if by some stroke of good luck non-minor wounds are checked, the 50th percentile collision speed ascends to roughly 35 km/h (22 mph), and if by some stroke of good luck fatalities are thought of, to 50 km/h (30 mph). The relating 90th percentile collision speeds are, for all wounds 40km/h (25 mph), for non-minor wounds 50 km/h (30 mph) and for fatalities 65km/h (40 mph). (Ashton and Mackay 1979) Thus, virtually all (97%) fatalities and practically half (47%) of all wounds might be kept away from if the effect speed is brought down to 15 mph. This depends on considering the effect speeds, which will be lower than the driving rates as long as the drivers lead speed, way 6 or bearing changing moves to keep away from the accident. Assuming driving rates are kept up with at somewhat lower speeds, a few accidents might be stayed away from.

## III. RELATED WORK

Recent studies have shown that paved surface monitoring is important for the municipal corporations also as for travelers for selecting the simplest road possible. Such methods provide the security and comfort to the travelers. Paper [1] explain of a system with a vibration based technique for automatic detection of patholes and speed breakers equal with their co-ordinates. During this approach, a database is maintained for every road, which is formed available to the general public with the assistance of worldwide database or through a portal. Potholes and speed breakers are detected along side their severity using android's built-in accelerometer. The results of the proposed approach are tested over a 4 km flat road and compared to manual inspection of pothole and speed breakers on an equivalent considered road. The accuracy of the proposed concept came to be 93.75% for detection of patholes and speed breakers. This approach is cost efficient and really effective for paved surface monitoring.

The unwanted use of speed breakers on national highways interrupts vehicle drivers unnecessarily. Also often drivers will not be able to recognize unmarked speed breakers and loose control of the vehicle, which may causes serious accidents and loss of lives. Within the literature, there exist a couple of methods to alert the on-road drivers about the upcoming humps which are highly error-prone and time consuming. Moreover, none of them pay any heed to trace the knowledge of infringing speed breakers. This paper[2] proposes with a system that facilitates autonomous speed breaker data collection, dynamic speed breaker detection and warning generation for the on-road drivers. This system also includes real-time tracking of vehicle, driver and timing information for any violations of speed breaker rule. The proposed system outperforms the state-of-the-art works with which it's compared to in terms of reaction time and accuracy.

The importance of the road infrastructure for the society might be compared with importance of blood vessels for humans. to make sure paved surface quality it should be monitored continuously and repaired as necessary. The optimal distribution of

resources for road repairs is feasible providing the supply of comprehensive and objective real time data about the state of the roads. Participatory sensing may be a promising approach for such data collection. Paper[3] describes a mobile sensing system for road non uniformity detection using Android based smart-phones. Certain processing algorithms are conferred and their evaluation is presented with positive rate as high as 90% by making use of real world data. The optimal parameters for the algorithms are determined also as recommendations for the application

The detection of the presence of the speed breaker is followed by reducing the speed of the vehicle[4]. This is done to make sure that there's no collision of the vehicle with the speed breaker just in case the driving force doesn't notice the detection of the speed breaker. this is often done by programming within the Arduino IDE. All Arduino boards are programmed with the assistance of Arduino IDE. Arduino programs are divided in three parts: Functions, Values (constants and variables), and Structure. Arduino is an open source platform supported easy-to-use hardware and software (named as Arduino IDE) which is employed to type and execute the code on the hardware of the machine. they're mainly wont to read analog or digital input signals from different sensors and turn it into an output like turning on/off the LEDs, ringing a siren, activating the motor etc. With the help of a USB cable, the code are often loaded onto the board. Upon receiving the signal from the RF transmitter, a signal are going to be sent to the motor instructing it to scale back the speed of the vehicle. The program being run within the Arduino IDE will request the motor to scale back the speed of the vehicle unless the RF receiver stops receiving signals from the RF transmitter. Thus, albeit the driving force is not conscious of the presence of the speed breaker, there will be no collision because the vehicle because it will move at a slower speed within the vicinity of a speed breaker.

## IV. PROPOSED METHODOLOGY

A Speed bump is the sort of speed breaker, yet in more modest size. In any case, Most of the occasions Speed bumps are most irritating thing in the running street, however at times it assumes most significant part in wellbeing. For example indeed, even a driver who is driving in lethargic speed needs to go over a hindrance which is irritating, for tackling this issue we are presenting Automated Smart Speed breaker which will be surfaced and will appear just if the vehicle speed is higher than reasonable cutoff points. This is exceptionally valuable in regions like Parking Lots, School/Colleges, and some more. To control height of the speed breaker Arduino based load up are used and for continuous control RTC circuit is utilized.

## V. BLOCK DIAGRAM

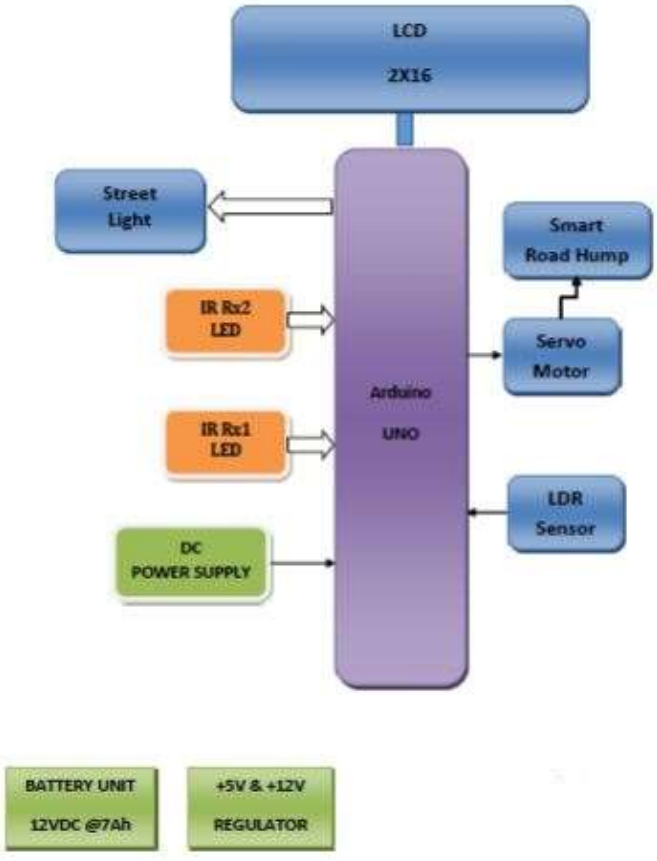


**Fig.1 Block Diagram**

The Block diagram of speed breaker(height adjustable) is displayed in Figure 1. It comprises of four significant blocks, they are IR sensors, Raspberry Pi, Servo engine, and LCD Display. Two IR sensors are utilized to distinguish the speed of the moving vehicle and the recognized signs are transmitted to the Arduino board. The signs from the IR sensor are utilized in Arduino to figure the speed of the vehicle on street and compare the vehicle speed and the restricted speed and convey message to servo engine. In the event that the vehicle speed is higher than the restricted speed the servo engine raises the protuberance, else it stays in the normal position. In view of the speed of vehicle the presence or absence of hump is shown on LCD to demonstrate to driver about the hump. The height adjustable speed breaker systems flow chart is shown in Figure 3. At first when the circuit is fueled, the state of the servo is at zero degree which makes the hump level flat and "DRIVE SAFE" is displayed on the LCD. Two IR sensors are put and the distance between them is steady. At the point when the vehicle passes before the principal sensor the beginning time

is acquired and when the vehicle passes before second sensor the stop time is obtained, time is determined and the Arduino registers the speed of the vehicle utilizing the formula speed=distance/time. In light of the speed determined there are two cases.

**3.1 Working**

CASE 1: If the speed of the vehicle is lesser than the restricted speed, the hump is made level zero by making a point of the servo 0 degree and "DRIVE SAFE" is shown on the LCD.

CASE 2: If the speed of the vehicle is more than the restricted speed, the hump is raised by making the point of servo 45 degree and "HUMP AHEAD" is displayed on the LCD.

**3.2 U-Turn Indicator:**

The U-Turn indicator's block diagram is displayed in fig.2. The U-turn indicator system comprises of Laser Beam, LDR, LED Indicator, and Buzzer. Laser beam and LDR circuit are utilized to recognize whether any vehicle is taking a U-turn at the intersection. Alarm and LCD are utilized for indicating the vehicles moving from opposite direction to get slowed down since another vehicle is taking a U-turn/going across the street. There are two cases in this.

CASE1: Within the sight of light for example no vehicle is going across street intersection, the LDR will offer low opposition and the provided voltage will stream straight from VCC to GROUND and the semiconductor will be in switch off condition henceforth the alarm turns on and LED's will be in off condition no sign.

CASE2: Without light for example vehicle is going across street intersection by slowing down laser beam, the resistor will offer high opposition and the provided voltage won't stream straight from VCC to GROUND and the semiconductor will be in switch on condition consequently the alram/buzzer goes off and drive sign will be ON and warning will be ship off IoT cloud.

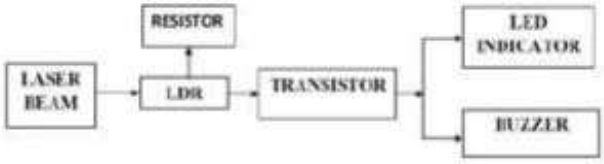


**Fig.2 Block Diagram of U-turn indicator.**

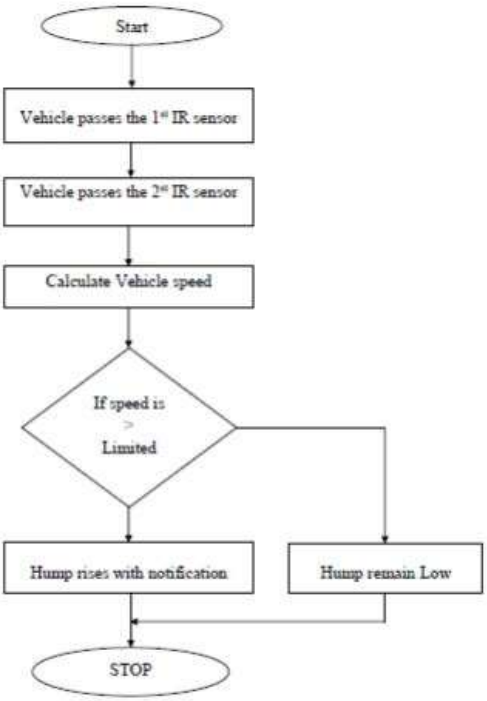


**Fig.3 Flowchart of speed breaker system.**

**IV. RESULTS AND DISCUSSION**

The speed of the vehicle determines the raising and falling of the speed breaker. This system has been created to keep away from road accidents that occur due to over speeding of the vehicles. This sort of framework may reduce fuel utilization in vehicles. The U-turn indicator is also implemented. This framework maintains a strategic distance from road accidents while vehicles are going across street intersection.

This assistance system will turn an alarm ON giving early indication if the vehicle is moving towards the speed breaker or an uneven road (hump). Apart from simply giving an early warning of the vehicle, it also gives the vehicle another option and a superior course. The proposed system in this work is a type of publicly supported project where vehicle owners share and get information, consequently making the framework easy.

**References**


[1]. Vinay Rishiwal et al., "Automatic Pothole and Speed Breaker Detection using Android System", 39th International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO), 2016, IEEE.

[2]. Mahbuba Afrin et al., "Real Time Detection of Speed Breakers and Warning System for on-road Drivers", International WIE Conference on Electrical and Computer Engineering (WIECON-ECE), IEEE, 2015.

[3]. A. Mednis, G. Strazdins, R. Zviedris, G. Kanonirs, L. Selavo, "Real Time Pothole Detection using Android Smartphones with Accelerometers", IEEE, DOI: 10.1109/DCOSS.2011.5982206, 2011.

[4]. Navaneeth Varier, Abhishek Sehgal, "Smart Speed Breaker System Using Internet of Things", Volume 118 No.22 2018, IEEE.

[5]. Gonzalez L C, Moreno R, Escalante H J, Martinez F, Calors M R, "Learning Roadway Surface Disruption Patterns Using the bag of words representation. IEEE Trans Intell Transp Syst 18:2916-2928, 2017.

[6]. M. Briday, J.-L. Bechennec, and Y. Trinquet. Task scheduling observation and stack safety analysis in real time distributed systems using a simulation tool. In Proc. of the IEEE Conference onEmerging Technologies and Factory Automation, pages 299– 306, 2005.

[7]. 6. A. Cervin, D.Henriksson, B. Lincoln, J. Eker, and K. E. Arzen. How does control timing affect performance? Analysis and simulation of timing using Jitterbug and TrueTime. IEEE Control Systems Magazine, 23(3):16–30, 2003.

[8]. ] H. Hautakangas and Nieminen, "Data mining for pothole detection," Presented at the Pro gradu seminar, University of Jyväskylä, February 2011.

[9]. R. Stoleru, T. He, and J. A. Stankovic, "Walking gps: A practical solution for localization in manually deployed wireless sensor networks," in Proc. of the 29th Annual IEEE International Conference on Local Computer Networks, ser. LCN '04. IEEE Computer Society, pp. 480-489, 2004.

[10]. W. Liang, "Vehicular Ad Hoc Networks: Architectures, Research Issues, Methodologies, Challenges, and Trends," IJDSN, pp. 2015.

[11]. R. Stoleru, T. He, and J. A. Stankovic, "Walking gps: A practical solution for localization in manually deployed wireless sensor networks," in Proceedings of the 29th Annual IEEE International Conference on Local Computer Networks, ser. LCN '04. Washington, DC, USA: IEEE Computer Society, 2004, pp. 480–489. [Online]. Available: http://dx.doi.org/10.1109/LCN.2004.136.