EMBEDDED BASED ANTI ACCELERATION SYSTEM FOR PEDESTRIAN AND OBSTACLE DETECTION WITH SPEECH ALERT

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Abstract **-**In this day and age, street wellbeing is a noteworthy worry because of the expanding number of mischances which happen in everyday life bringing about genuine wounds to a man or even a deadly passing. Regardless of safe street outline systems, the issue still endures before our eyes – people on foot and creatures all of a sudden showing up before the vehicle in which the person on foot may be murdered or even the vehicle may even crash endeavoring to turn away the accident and furthermore the nearness of speed breakers, potholes and blockades along the street. Normal street wellbeing method just lies in restricting the speed of a vehicle to an edge an incentive to turn away accidents. As an answer, another sensor based installed framework can be executed, which on location of any living creatures, speed breakers and different obstructions the speed of the vehicle is decreased to an esteem, with the end goal that the driver of the vehicle can guide the auto to wellbeing. Alongside this, a general picture sign and voice ready framework for the forthcoming snag can be shown before the client.

Key Word**- Embedded system, Voice alert system**

1. Introduction

Street movement wellbeing alludes to the strategies and measures used to keep street clients from being slaughtered or truly harmed. Run of the mill street clients incorporate people on foot, drivers, cyclists and travelers of open vehicle transport framework. The fundamental technique of a Safe System approach is to guarantee that in case of a crash, the effect energies stay underneath the limit prone to deliver either passing or genuine damage. This limit will fluctuate from situation to situation, contingent on the level of insurance offered to the street clients. For instance, the odds of survival for an unprotected walker hit by a vehicle lessen quickly at speeds more noteworthy than 30 km/h, while for a legitimately limited engine vehicle tenant the basic effect speed is 50 km/h (for side effect accidents) and 70 km/h (for head-on crashes). In this manner, if the speed of the vehicle is controlled inside basic constrains, the odds of survival of mishap casualties can increment.

Another implanted based enemy of increasing speed framework can be proposed for vehicles (especially for electric vehicles) in which , the framework decreases the speed of the vehicle on location of people on foot; hindrances, for example, potholes, other approaching vehicles, blockades and speed breakers[6][14]; and issues a notice to the client of the vehicle about the up and coming obstacles[7].

2. Literature Survey

Markus roth, Fabian Flohr, Dariu M. Garvila [1] have exhibited a novel approach for vehicle-person on foot crash hazard investigation that consolidates common situational mindfulness, a level of potential movement coupling and the spatial format of the earth. The approach utilizes a Dynamic Bayesian Network (DBN) for displaying the individual question ways; crash hazard is in this manner figured by a crossing point activity. All the more particularly, the proposed DBN comprises of two sub diagrams for demonstrating passerby and vehicle way, separately. They comprise of inactive states over Switching Linear Dynamical Systems (SLDSs) to foresee changes in question elements. [8]The person on foot and vehicle-related sub-diagrams contain inert states to display whether the walker has seen the approaching vehicle, and then again, regardless of whether the driver has seen the passerby. The person on foot related sub-chart besides contains a dormant state displaying whether the passerby is at the curbside or not. At long last, an idle state is shared by the two sub-diagrams, which models the potential movement coupling (i.e. at full familiarity with the other movement member). Think about the situation of an intersection passerby, who may stop or keep strolling at the control, in blend with a moving toward vehicle, which may stop or keep driving.

Hojin Jung, Seong Kyung Kwon, Sang Hyuk Son [2] have proposed a movement alert framework for passerby wellbeing whose goal is to give a notice utilizing visual impact to both driver and walker to explain an absence of driver's and person on foot's street mindfulness. Their commitments are as per the following: person on foot identification and vehicle speed estimation utilizing ease sensors, unconstrained support of a driver for hazard mindfulness as per visual impacts (e.g., if LEDs are turned on, the driver puts the telephone down.), and change of street mindfulness of a walker and a driver utilizing visual impacts (i.e., high mindfulness out and about if LEDs are red, and direct mindfulness out and about if LEDs are yellow.).

Youssef Azdoud , Aouatif Amine , Nawal Alioua , Mohammed Rziza [3] have proposed an approach starts by removing highlight's protest and arrange them by a Support Vector Machine with a specific end goal to recognize the nearness of a person on foot. They have used another picture descriptor called Histograms of Oriented Laplacian (HOL), which separate the most important picture highlights. The strategy is created and approved with the exploratory outcomes to assess the approach's proficiency against different descriptors. A few tests were performed with numerous channels, by changing their coefficients, to get the best parameters, to extricate the picture highlights. Since the aftereffect of utilizing Laplacian channel are important and

better, Laplacian channel was connected rather than the Gradient. Bolster Vector Machine is a managed learning calculation utilized for arrangement and relapse. Actually, SVM was picked on account of its ability and speed [9] .

Dr. Padma Sai, V. Naveen Kumar, N Mohan Krishna [4][12] have gone for outlining a framework which naturally recognizes the nearness of any people on foot close to the vehicles and controls the vehicle engines and furthermore cautions the walkers through ringer alert and furthermore utilizing ARM Cortex-A8 Beagle Bone Black processor with USB camera interfaced. They have propose a framework that coordinates a dream based off board person on foot following subsystem with an installed confinement and route subsystem. The task made utilization of an installed camera, which is regularly named as Beagle Bone Black processor. The locally available camera can effectively speak with the yield and information modules [10]. The task went for planning a framework which consequently recognizes the nearness of any people on foot around vehicles and controls the vehicle engines and cautions the walkers through ringer alert by utilizing ARM Cortex-A8 Beagle Bone Black processor with USB camera interfaced.

3. System Overview

Mahbuba Afrin, Md. Redowan Mahmud, M. Jain, A. P. Singh [5][11] have proposed with a framework that encourages self-sufficient speed breaker information accumulation, dynamic speed breaker discovery and cautioning age for the on-street drivers. Their framework likewise fuses constant following of driver, vehicle and timing data for speed breaker administer infringement. The proposed framework beats the cutting edge works with which it is contrasted with as far as reaction time and precision.

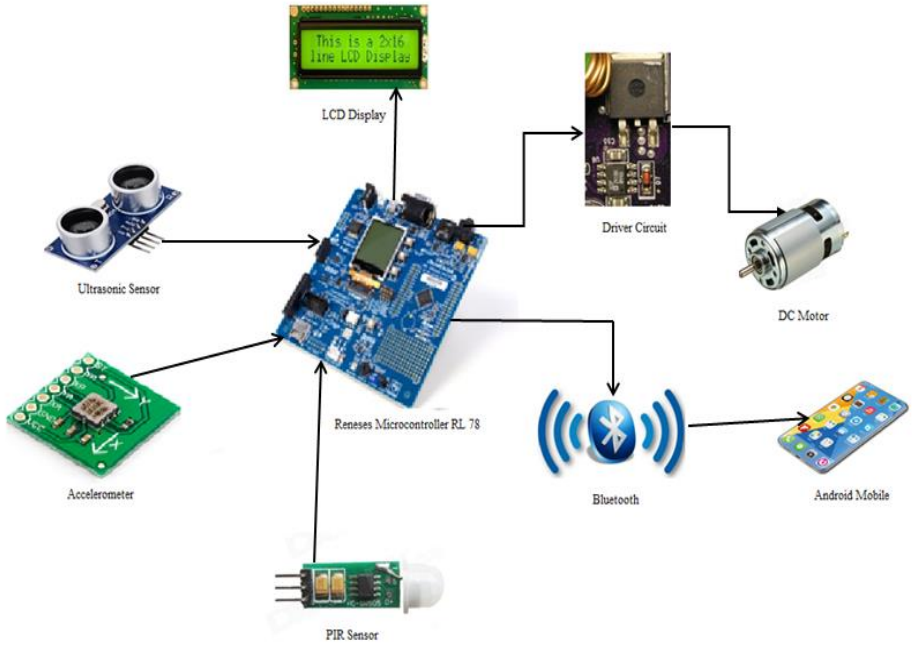

Figure 3.1. System design anti acceleration system for pedestrian and obstacle detection with speech alert

Detection of obstacles using ultrasonic sensor

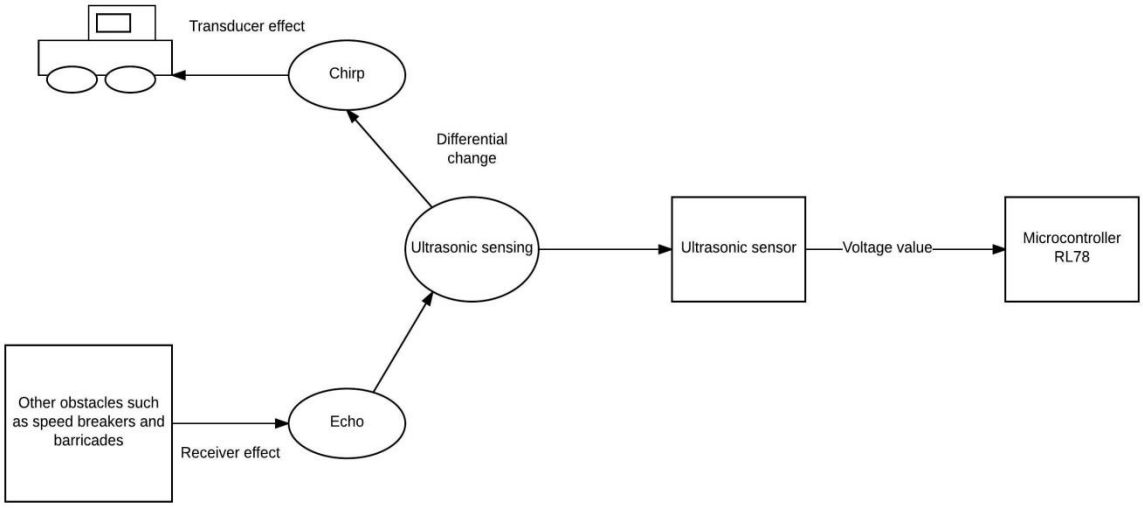

Figure3.2 Detection of obstacles using ultrasonic sensor

The ultrasonic sensor is a circuit on which a SONAR is mounted. The SONAR has a transmitter and a receiver. The transmitter produces and emits ultrasonic pulses. The frequency of ultrasonic pulses range above 43Khz which is inaudible to the human ear. The range of ultrasonic pulses can be tuned depending on the application. The emitted ultrasonic pulses are reflected by any obstacle which are received by the receiver[6]. The receiver is just a sensitive microphone which listens to the reflected pulses from the obstacles. If there is any presence of any obstacle then the input to the microcontroller input pin is a high voltage from the ultrasonic sensor.

Interaction between Bluetooth and android cellphone

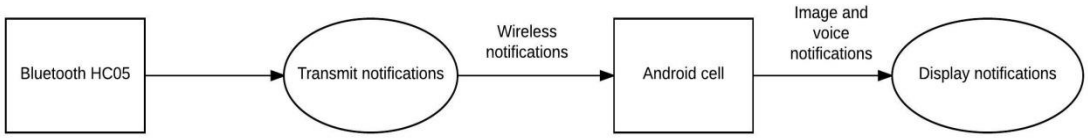

Figure 3.3 Bluetooth and android interaction

The Bluetooth module used is HC05 which supports UART0 channel communication with the renesas RL78 microcontroller. The bluetooth is used to transmit notifications to the android cellphone. The android cellphone consists of a dedicated android app to display image notifications and also alert the driver with a voice notification simultaneously.

Working of sensors along with accelerator and D.C motor

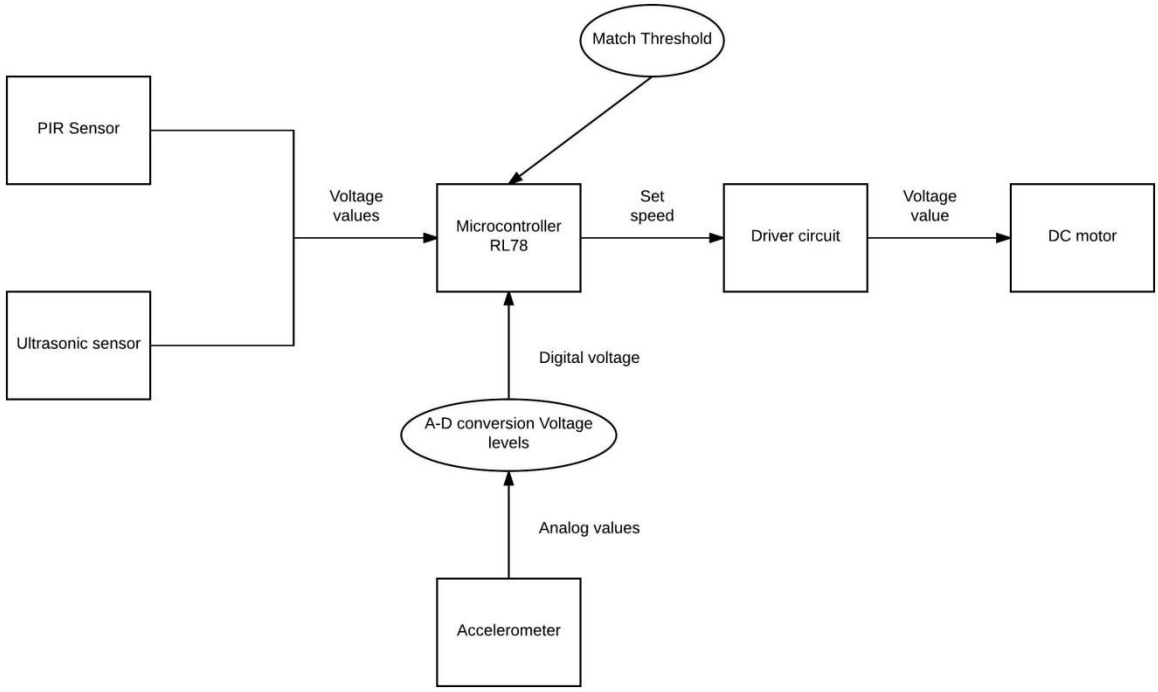

Figure 3.4 Working of motor and sensor network

The input to the microcontroller from the output of both the PIR and ultrasonic sensor are digital voltages. The microcontroller is programmed in such a way that if the input voltage to the microcontroller is a digital 1 value, then it means it is a confirmed pedestrian or obstacle. For potholes, it is a digital 0 from the ultrasonic sensor. The analog x values from the accelerometer is converted to digital values using analog to digital conversion because the D.C motor runs on digital voltage values. The motor speed reduces in case of potholes or becomes zero in case of pedestrians and obstacles.

Display of notification in android cellphone via Bluetooth and channel configuration

The Microcontroller output pin it connected to the bluetooth module. The ports connected to the bluetooth are configured to be output ports. The communication channel between microcontroller and the bluetooth module is selected as UART0 channel because the data has to be transmitted serially. If there is a presence of obstacle, then a user defined string is transmitted via Bluetooth to the android cell phone. In the android cell phone, an android app is created in such a way that the transmitted string is matched with the user defined strings in the android program for the type of obstacle.The matched string is then used to invoke a particular function which will display image notification and also give voice alert [13] to the driver of the vehicle. Notification and speed values are also displayed through LCD screen.

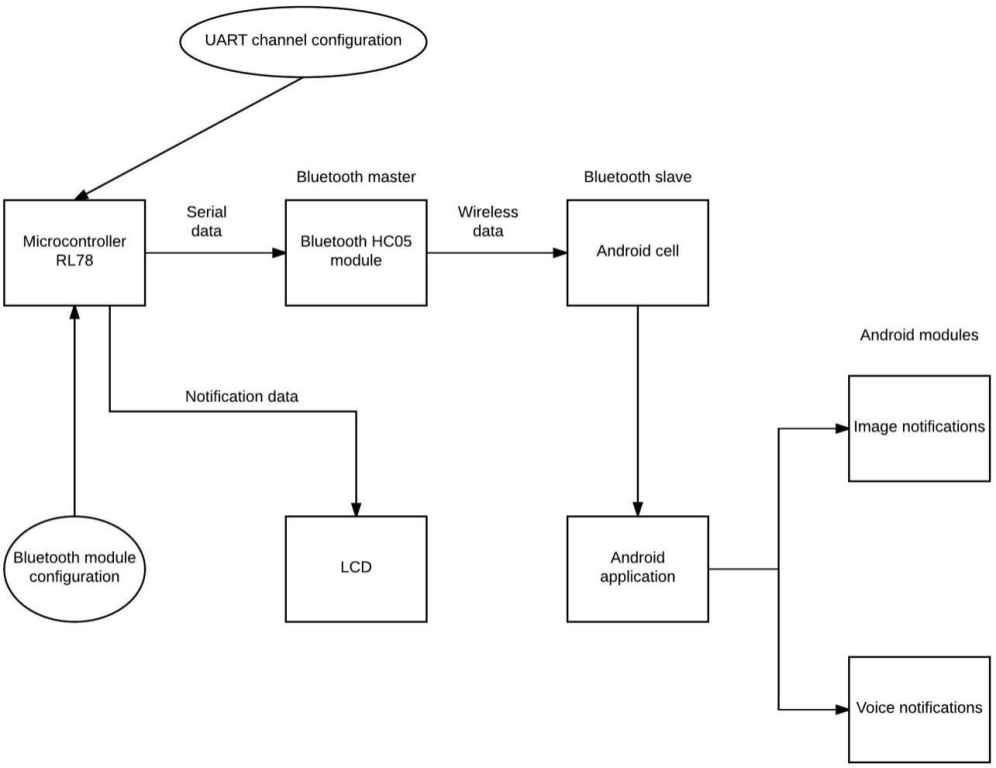

Figure 3.5 Design of embedded system model

4. Results and Snapshots

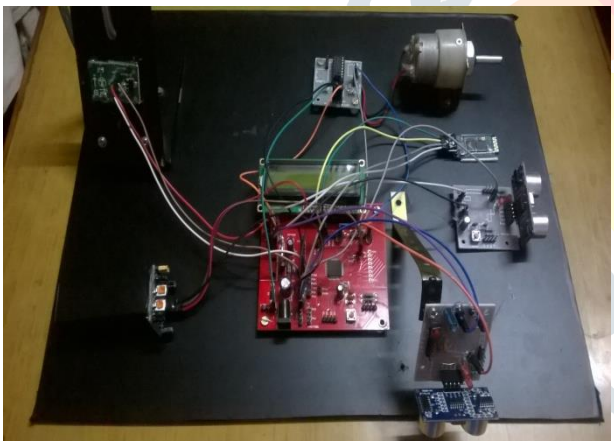

Figure 4.1Embedded System

Figure 4.2Obstacle Detection

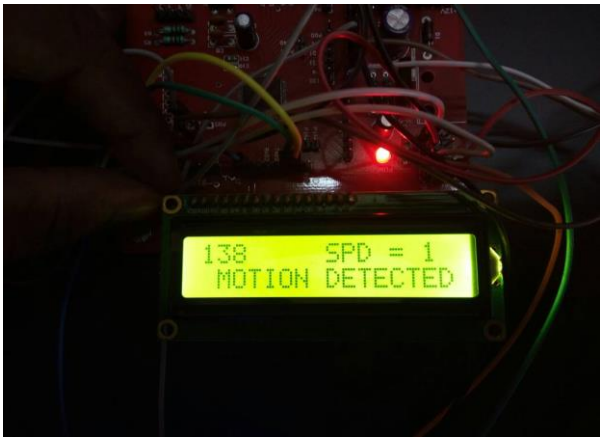

Figure 4.3 Speed reduction after Motion Detection

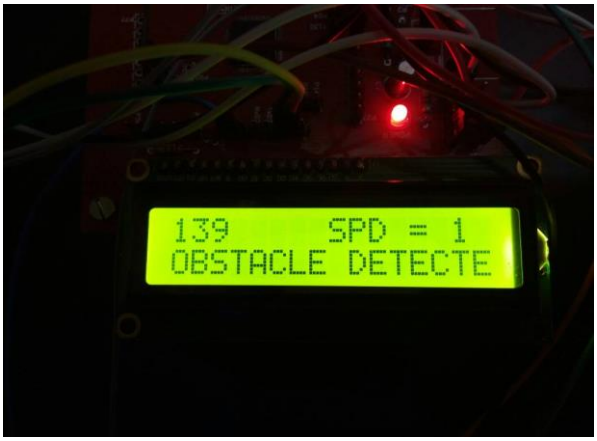

Figure 4.4 Speed reduction after Obstacle Detection

Figure 4.5 Speed reduction after Pothole Detection

Figure 4.6 Speed Level while driving

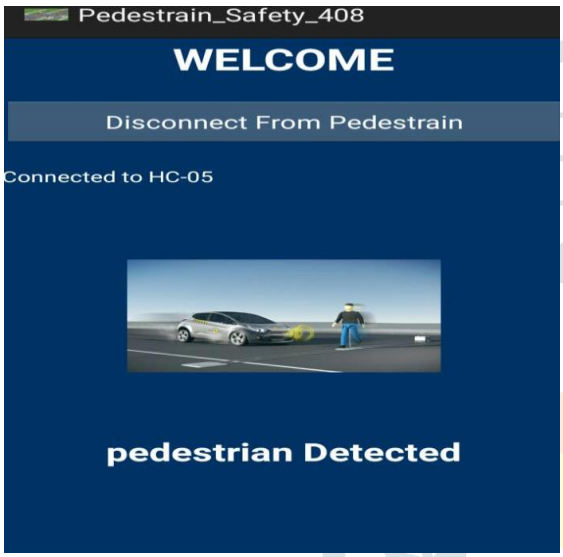

Figure 4.7 Speech Alert about pedestrian detection

Figure 4.8 Speech Alert about obstacle detection

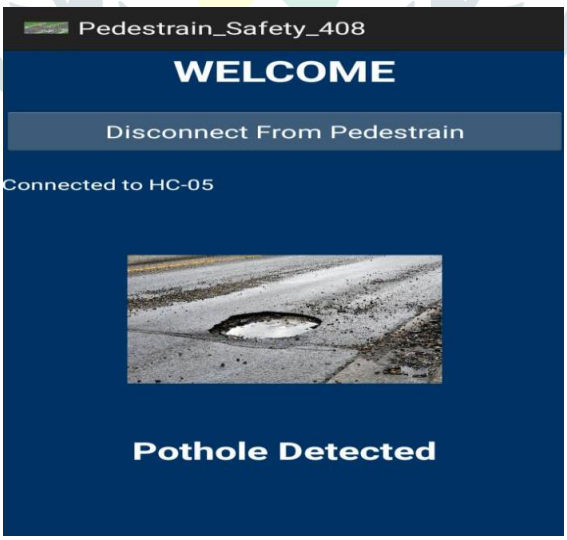

Figure 4.9 Speech Alert about Pothole detection

5. Conclusion and future scope

Another implanted based enemy of increasing speed framework utilizing sensors is created for vehicles, which distinguishes impediments or people on foot before the vehicle and decelerates the vehicle speed productively. The deceleration of vehicle speed is shown effectively with the implanted framework. Alongside this, android based warning framework comprising of picture and voice yield worked proficiently amid the testing of implanted framework. This work in advance opens open doors for extra investigation and usage. The estimating qualities of sensors are for low speed conditions. At the point when connected in higher speed circumstances, top of the line and improved sensors with higher range can be executed. The warning application created is just for android stage, in future the application can be ported to different stages. We intend to deliver more able framework in future to defeat the false positive conditions to guarantee better nature of administration.

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