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AN EFFICIENT VEHICLE TO PEDESTRIAN COMMUNICATION USING 5G/ WLAN TO AVOID PEDESTRIAN ACCIDENTS

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Abstract: *Pedestrians and bicyclists, among other vulnerable road users, are killed or critically injured in traffic collisions every year. Several study groups are working on various solutions to reduce the number of such traffic incidents. Wireless communications, such as WLAN and 5G/LTE, are used in this project's approach. An identified dangerous situation is communicated between people and cars using wireless communication. As one interesting context for identifying dangerous situations, this project investigates how to recognize pedestrians stepping onto the road. A potential solution is suggested for each challenge. The findings show that understanding "stepping onto the lane" is possible and that a 5G-based collision avoidance device is feasible. Additionally, this system recognizes the pedestrian who are using mobile phones on road and generate alert to make them aware of the vehicle approaching them. The responsive control method is used to improve pedestrian safety under V2P communication conditions.*

Key Words: 5G V2P Communication ,5G/WLAN, Vulnerable road users, Vulnerable pedestrian.

1.INTRODUCTION

Vulnerable Road Users include pedestrians, cyclists, and operators of motorised two-wheelers (VRUs). According to the International Traffic Safety Data and Analysis Group (IRTAD), the proportion of different forms of VRU deaths in the United States, Germany, Australia, and Korea was 1605 and 10,386 respectively in 2012. It demonstrates that different countries have different fatality rates for VRU classes. As part of Intelligent Transportation Systems, there have been many developments in automotive safety features (ITS). These features aid in the protection of both vehicle occupants and VRUs. V2X communication, for example, is a safety feature that establishes communication among various entities on the road for cooperative safety. Vehicle-to-Vehicle (V2V), Vehicle-to-Infrastructure (V2I), and Vehicle-to-Pedestrian (V2P) contact are all part of V2X. (V2P). V2P is an umbrella term that refers to all modes of vehicle-to-vehicle contact. VRUs will become active members of ITS and enable a variety of safety and convenience features by allowing V2P. Applications for ITS.

2. RELATED WORK

- A portable smart wireless control system for pedestrian crossing areas is designed and built in this current method to handle traffic automatically and enable pedestrians, such as schoolchildren, to cross the road safely and effortlessly.
- The device uses smart sensing to sense the presence of pedestrians and, as a result, regulates the crosswalk traffic lights automatically.
- The device consists of two Arduino microcontrollers, two infrared PIR motion sensors, and a bidirectional wireless communication connection based on Bluetooth for reducing wiring and signal transmission between traffic light units on both sides of the path.
- The system is fabricated and implemented as a portable LED-based traffic light test bed.
- The communication between both sides lights is successfully functioning and the PIR sensors will detect the existence of pedestrians.

3. METHODOLOGY

Solar panel is given to input power supply. In road side we fixed camera to monitor the human Activity. Image transform IR used to separate the various typed of thing's like human being, animals, tree, etc. Already we trained the person database so it only recognizes the pedestrian. Random Forest algorithm to monitor the human being. Once it detests the person it gives voice Alert to driver. Driver can control the vehicle speed. It also detects while person using mobile phones. This information is sent through UART communication. UART communication to transfer the information in atmeg328 controller. This information are sent to receiver circuit

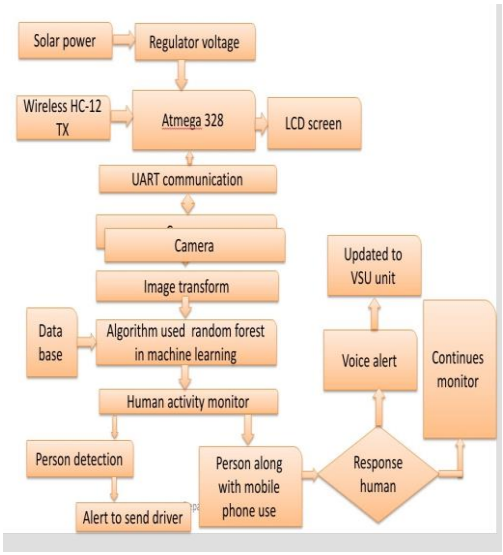

Fig -1: Block Diagram for road side unit

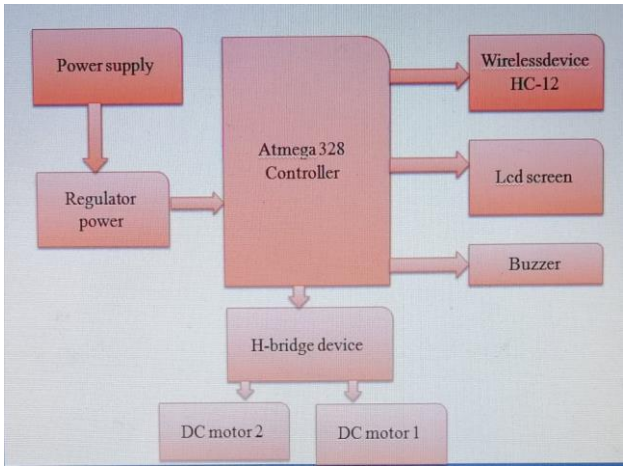

Fig -2: Block Diagram for vehicle side unit

4.RANDOM FOREST ALGORITHM

Random Forest is a well-known machine learning algorithm that uses the supervised learning method. In machine learning, it can be used for both classification and regression problems. It is based on ensemble learning, which is a method of combining multiple classifiers to solve a complex problem and improve the model's accuracy. "Random Forest is a classifier that comprises a number of decision trees on different subsets of a given dataset and takes the average to boost the predictive accuracy of that dataset," according to the name. Instead of depending on a single decision tree, the random forest takes the predictions from each tree and calculates the final performance based on the majority votes of predictions.

5.EXPERIMENTAL RESULT

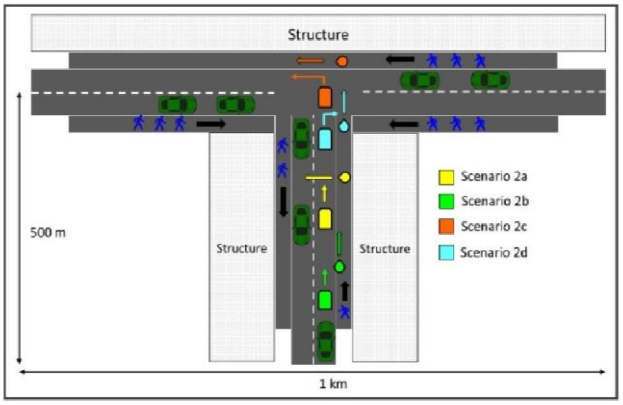

Fig -3: Simulation scenario

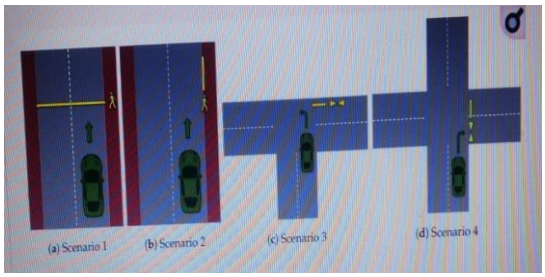

Fig -4: a) Pedestrian crossing in front of vehicle
b) Pedestrian moving parallel to vehicle
c) Vehicle turning left into cyclist's path
d) Vehicle turning right into cyclist's path

5. CONCLUSION

In the coming years, V2X systems for VRU protection and convenience are expected to be deployed. V2X systems, on the other hand, must take into account a variety of target VRU classes and scenarios. This paper proposes a V2P device design framework that can be used to create a system based on a specific V2P use case. It also conducts a review of current V2P initiatives and identifies design requirements based on the structure proposed. Every aspect of the design framework is discussed in great detail. This paper also conducts a case study of the Active and Passive VRU participation processes for two separate VRU classes under the most common pre-crash scenarios. The case study demonstrates that for certain pre-crash situations, 802.11p-based V2P protection systems must consider additional mechanisms in order to provide appropriate warnings of impending collision. The paper also goes through some of the technical problems of integrating V2X and VRU. We plan to work on the network congestion problem caused by V2X-VRU integration in the future.

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