Impact Factor (SJIF): 5.301

International Journal of Advance Research in Engineering, Science & Technology

e-ISSN: 2393-9877, p-ISSN: 2394-2444

Volume 5, Issue 2, February-2018

PEDESTRAIN DETECTION TO CONTROL ACCIDENTS FOR SAFE DRIVING USING BEACON

[1] Mrs.A.Jerrin simla , [2] M.Dharani, [3] A.Harshini, [4] S.Panimalar [5] A.Porselvi

[1,2,5] Assistant Professor, Department of CSE, Panimalar Institute of Technology.

[3,4] B.E., Student, Department of CSE, Panimalar Institute of Technology.

[1]jerrinsimla@gmail.com [2] dharanidharu215@gmail.com [3] harshinipa@gmail.com

[4] panimalarjerome@gmail.com [5] aporselvi20@gmail.com

CSE department, PANIMALAR INSTITUTE OF TECHNOLOGY

ABSTRACT: ***Accidents that occur in pedestrian crossing areas had been increased tremendously and to control these accidents we have used beacon sensors to capture the vehicles which follows rash driving .The detection of rule breakers in the pedestrian crossing areas will control the accidents occurring in these areas using this beacon sensors and simultaneously multiple rule breakers can be identified and there by motor speed of the vehicle is reduced and fined to control accidents .In existing model various cameras and sensors are used to capture the images ,colours, and background of the person or an image which is quite difficult and tedious to capture whereas it requires large data sets to store the data as well fluctuation in the accuracy so in order to overcome we have used beacon sensors to store the sensed data and doesnt require any camera to capture the image .***

KEYWORDS:

Beacon sensors, advanced driver assistance system (ADAS), sudden pedestrian crossing(SPC), near-infrared (NIR), far-infrared (FIR) cameras, Random early detection (RED)

INTRODUCTION:

- In recent days ,the advancement to the advanced driver assistance system (ADAS) has been increased tremendously and also importance towards the advanced driver assistance system (ADAS) via computer vision and therefore many researches started to concentrate more on the fields in specific detection of lane, detection of vehicles ,monitoring the drivers who feels drowsy as well as tracking and detection of pedestrian over an years. In particular, pedestrian detection is becoming an emerging part of an ADAS owing to the increase in the number of vehicle and

pedestrian accidents. The main challenging task in the detection of pedestrian via these specific techniques is that it uses camera for capturing the images so it provides an image which deforms in wider range and the image background are clupped together and forms a cluster and it doesn't support very much good results for the real -time constraints. By using this technique, advanced driver assistance system (ADAS) detection of sudden pedestrian crossing (SPC) triggers in their motion and doesn't provide accuracy.

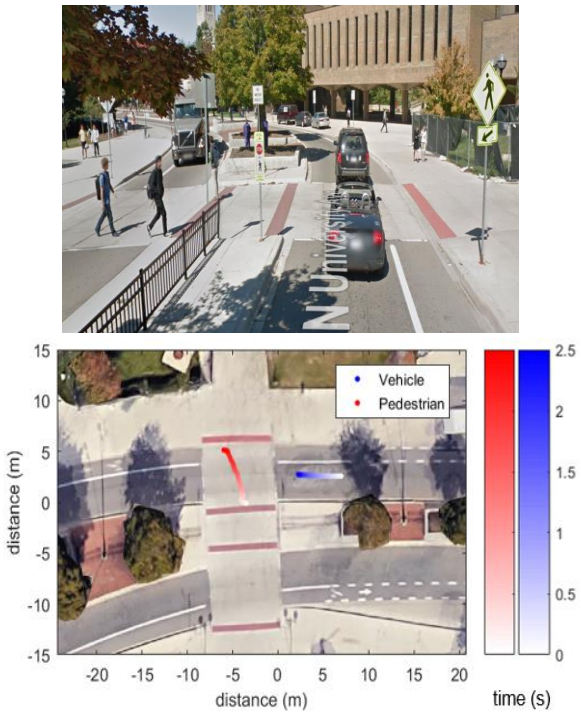
- The vision camera is installed in the vehicles in order to detect the sudden pedestrian crossing (SPC) such that the researches monitored these to avoid the collision among the vehicles. Near-infrared (NIR), video and far-infrared (FIR) cameras are the three types of cameras used in this monitoring technique
- Traffic control and accidents that occur in pedestrian crossing areas as well as to identify the rules breakers . In the existing system, human are used for monitoring the rules breaker during the Traffic signal and in stop condition the rule breaker can't find easily so the accident is highly possible. Where as in our proposed model we have used the beacon sensors which is the advanced version of Bluetooth which will easily identify and calculate the distance as well as the speed of the vehicles using the RSS value and the vehicle which breaks the rule are fined as well as the motor speed of the vehicles are reduced in such a way that the accidents can be controlled in traffic prone zones. The major advantage of our project is by using beacon based traffic control system it controls the rule breaker during stop traffic signal and also identifies automatically if any one break the rules and updated to the server to take further action.
- This project is developed using embedded C language. In this project beacon based traffic management system is implemented, so two microcontroller are used one microcontroller is placed in vehicle side for sensing the nearby traffic system for controlling the speed limit of the vehicle and another microcontroller ARM controller can change into master and slave during the green and yellow the traffic signal beacon act as slave ,so the vehicle can identified but in red signal the beacon automatically change to master to scan the vehicle distance, if anyone cross the level in RED signal then it automatically updates the person details in the server for taking action on the person and as well as vehicle motor speed is reduced to avoid accidents.

EXISTING MODEL:

PEDESTRAIN DETECTION DURING UNSIGNALISED CROSSING:

In this technique mobile eye sensors are installed in the vehicles to monitor the automated vehicles that crosses the pedestrian. Many accidents that occur in the traffic prone zones

are because of these rash driving as well as not taking into the account of rules and signs of symbols. Though the automated vehicles are programmed with rules and crossing techniques it couldn't able to recognize the crowd ,distance between the peoples , the age factor and as well as crossing time of the peoples in the pedestrian areas. So ,in order to over come this problem and also to reduce the accidents in the pedestrian crossing areas by the automated vehicles they have installed mobile eye camera and GPS in the automated vehicles such that the GPS system recorded the latitude and longitude of the vehicles, while the Mobile Eye camera records the relative positions of pedestrians and these information are stored as a large data sets and guides the automated vehicles in signal crossing areas in order to avoid the accidents. The main adavantage is that the vehicles that are automated provide good performance and efficiency rather the vehicles with driver assistant and the limitation is that this procedure cannot be implemented in all pedestrian crossing areas and it requires human guidance support in some areas.



Fig(i)pedestrian crossing by automated vehicles
Fig(ii)calculation of the vehicles and pedestrian distance.

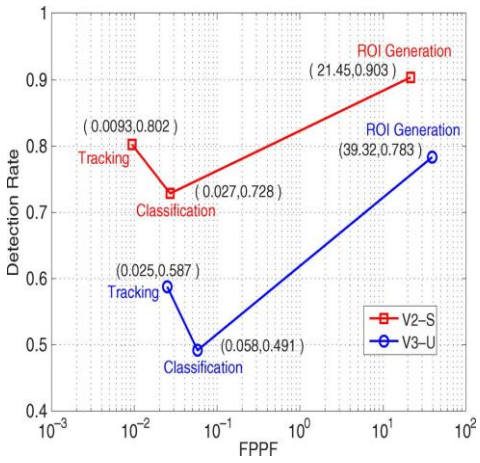
TRACKING AND DETECTION OF PEDESTRAIN DURING NIGHT TIME:

In this existing technique, monocular vision system is used for pedestrian detection and tracking them during nighttime by using a near-infrared (NIR)camera. During night time objects appear to me much brighter in the background and therefore dual-threshold segmentation algorithm has been implemented for segregation of the images in region-of-interest (ROI).Various laser sensors ,ultrasonic sensors has been used in different ways in

which the detection of pedestrian was very difficult with accuracy so in order to over come the have used video cameras which is more suitable for pedestrian detection since they are similar to the human visual perception system and also provides rich information for applying discriminative pattern recognition techniques. In this technique NIR camera with high resolution and great visual range has been used to detect the pedestrian from 20–80 m away from the camera.

This technique helps to capture the image at all sense during night time as well as provide information without any fluctuation and efficient when compared to FIR cameras. The main limitation is that the cost of implementation as well as doesn't support in all weather conditions.

Fig(i) capturing of the image in NIR camera



Fig(iii) performance efficiency achieved in NIR camera

DRAWBACKS OF EXISTING MODEL:

The existing models detect the pedestrian using various methodology and technology where the model is human dependent in monitoring which is difficult to find the rule breakers. In some cases, cameras like Near-infrared(NIR) camera, Infrared camera, Far-infrared camera are used in detecting pedestrian which needs complex algorithms for detection and tracking sometimes it may not produce an accurate result since the camera

are installed in vehicles also some false detections also occurs due to low resolution of images. Detection using camera may not support in all weather conditions and cost of implementation is increases when a high-resolution camera as well as the processing speed is reduced.

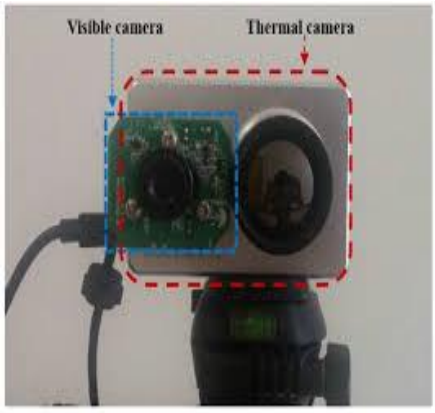
PROPOSED MODEL:

INTRODUCTION:

Nowdays,frequent accidents are occuring in pedestrain crossing areas even tough lots of technologies have been implemented to overcome this such as NIR,FIR,laser ,ultra sonic cameras etc the solution and the outcome differs from each other with an additional drawback with it.so,in oder to overcome this problem we have used Beacon sensors to provide an alterantive solution for this problem.

SENSING OF THE VEHICLE IN PEDESTRAIN AREAS:

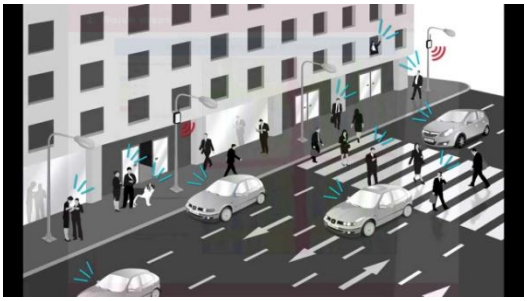
Each and every day various vehicles are crossing the pedestrain areas and various technologies have been used to capture the vehicles,peoples images but those techniques couldn't ale to achieve the best outcome but reached to some extent.In our technique we have used beacon sensors ,where the beacon sensors are installed in each and every vehicles as well as in the traffic signals in the pedestrian crossing areas.The vehicle which breaks the rules or crosses the signal when the signal is switched to RED is captured and monitored using the beacon sensor.



Fig(i) and (ii) they have used visible cameras in the existing model to capture the imges wheras in our model there is no possiblity or usage of cameras

WORKING OF BEACON SENSORS:

Beacon sensors are the advanced sensors of bluetooth technology where it senses the vehicles from farer distance than the bluetooth and those who breaks the rules are sensed using this sensors and there by the vehicles are captured.



Fig(i) sensing multiple vehicles as well as peoples in the pedestrain areas
fig(ii) intreaction among the vehicles with sensors in pedestrain areas

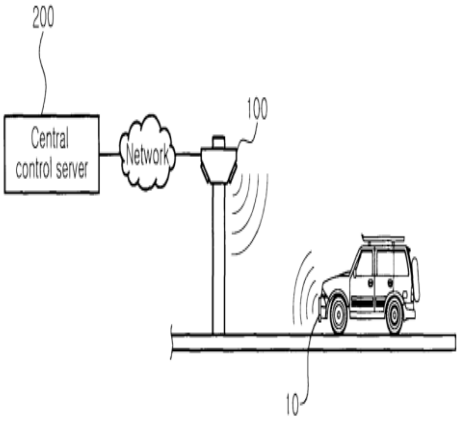
PROCESSES CARRIED AFTER IDENTIFICATION OF RULE BREAKERS:

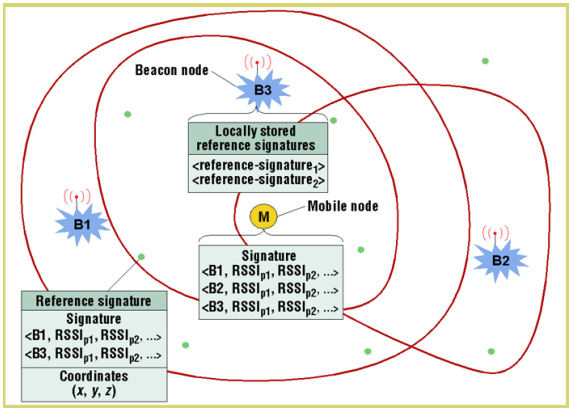
As soon as the vehicles are sensed which breaks the rule and it get connected to the database (i.e) the RFID calculation is done .The database consist of vehicles information as well as the information of the person who holds the vehicles.

CALCULATION OF THE RFID VALUE:

The vehicles which get caught are sense with certain RSS filed calculation such that the traffic signal get connected to the database .as soon as the vehicle caught the RFID value is sent to the data and in prior the database is fed with the required data such as user information.

Fig(i) connecting to data base
Fig(ii) calculation of RSS value





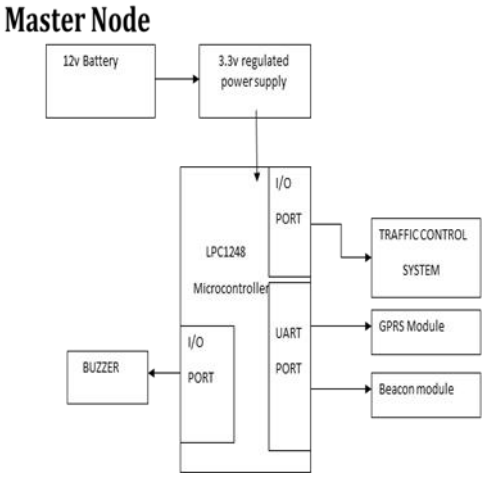
PROCESSING ON DATASETS:

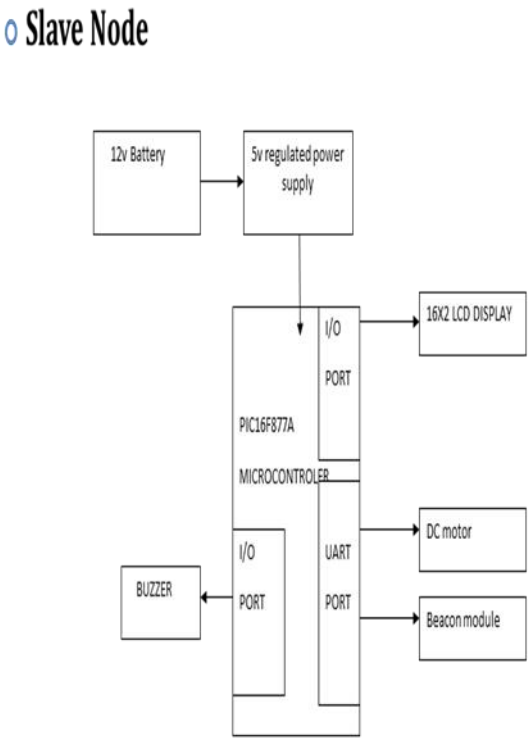
After connecting to the data base the respected vehicle speed is reduced as well as the person will be fined so that the person cannot accelerate to the speed that he was driving and action are taken for the vilotaion of the rules.as the motor speed is reduced the vehicle couldnt able to move and therby the level of accident can be reduced.

ARCHITECTURE DIAGRAM:

In this technique , architecture diagram are represented in two nodes namely master node(i.e)traffic signal and the slave node (i.e)pedestrian crossing vehicles which is drawn as follow.

BLOCK DIAGRAM





BLOCK DIAGRAM DESCRIPTION:

In this project beacon based traffic management system is implemented, so two microcontroller are used one microcontroller is placed in vehicle side for sensing the nearby traffic system for controlling the speed limit of the vehicle and another

microcontroller ARM controller can change into master and slave during the green and yellow the traffic signal beacon act as slave ,so the vehicle can identified but in red signal the beacon automatically change to master to scan the vehicle distance if anyone cross the level in RED signal automatically updated the person details in the server for taking action on the person.

MODULE DESCRITION:
MASTER MODULE:
MODULE I:

The ARM microcontroller (i.e.) LPC2148 Microcontroller acts as a master node. It is 16/32-bit in a tiny LQFP64 package. The LPC2148 contain one UART which provide a full modem control handshake interface. In this UART port both Beacon as well as GPRS modules are connected. Beacon module is used to sense the vehicle that approaches nearby to the signal and the GPRS module which keeps in track of the vehicles. It consists of two I/O port such that one I/O port acts as a traffic control system where signal with three LED lights are connected and another I/O port in which Buzzer is placed. The traffic control will be carried out by emitting the lights in pedestrian areas, the role of buzzer is to indicate the server to take further action when the vehicles violates or break the rule in pedestrian crossing area. The ARM controller which acts as a traffic signal is supported with 12V battery with 3.3V power supply.

MODULE II:
SLAVE MODULE:

PIC16F877A micro controller is used to setup the slave node which has 40pins.It is used widely as it has a large memory capacity. There are 5 I/O ports, 15 interrupts and 8 A/D input channel. The I/O ports are connected to the 16X2 LCD which can display 16 characters per line and there are 2lines.The buzzer is also connected with the I/O port to produce the alert alarm. The UART port is connected with the DC motor to monitor the speed of the vehicle and the beacon to track the vehicle. The speed of motor is sensed and reduced when the vehicle is nearby traffic signal. The beacon module is used to have connectivity between the traffic signal and the vehicle which helps to find the rule breakers. The microcontroller PIC16F877A is provided with 5V regulated power supply from a 12V battery.

COMPARISION TABLE:

Table 1 Comparison between different sensor modalities for pedestrian detection.

Sensor type	Field of view	Angular resolution	Detection range	Range resolution	Hardware cost
Conventional Camera	Med.	Med./High	Low/Med.	Med.	Low
Wide FOV Camera	Large	Low/Med.	Low	Low	Med.
Near IR	Med.	Med./High	Med.	Med.	Low
Thermal IR	Med.	Low/Med.	Low/Med	Low	High
RADAR	Low	Low	High	High	Med.
LASER Scanner	Large	Med.	Med.	High	High

EXPERIMENTAL RESULTS:

This pedestrian detection technique in which the sensing of vehicles are done with ease and the vehicles that crosses the pedestrian when the signal is switched to RED are recorded and the speed of the vehicles are monitored in prior itself . the rule breakers are captured and the information about them are send to the server and based on the data the person will be fined as well as the speed of the motor is reduced so that the person couldnt drive fast as well as the accident can be controlled.

ADVANTAGE:

The beacon sensor is the major advantage of this setup which controls the accidents occurring at pedestrian crossing by calculating the distance between the vehicle and pedestrian it slows down the vehicle speed. The distance is calculated using the signal strength and the vehicle is identified using the RFID value. The system reduces the human dependency in detecting and tracking the pedestrian. Also, the setup can control more than one vehicle at time when nearing the traffic signal. The rule breakers details are updated in the server to carry out further action.

CONCLUSION:

Various technologies like infrared camera, monocular vision system and car mounted cameras are used in order to detect the pedestrian crossing vehicles as well objects in these pedestrian crossing areas are also observed. Many of these techonogies have increased the scope of accident reduction in pedestrian crossing areas and there by many vehicles are fined as well monitored to obey rules and to protect peoples from accidents. In these

technologies ,light capturing ,color diffrentation ,recognision and image processing in various dimensions are used and by using these capturing of the image is very tedious process as well as differentiating the colours and recognising them is very difficult and to overcome all those drawback we have used Beacon sensors which doesn't follows any image capturing or processing and there by easy to implement without any fluctuation and detection of accidents in pedestrian crossing areas is easier and implementation cost is also reduced when compared to existing technique.In future,this technique coulnt be implemented in various cities in order to control accidents as well as people can cross the pedestrian without any scare .

REFERENCES:

1. D. M. Gavrila and S. Munder, "Multi-cue pedestrian detection and tracking from a moving vehicle," J. Comput. Vis., vol. 73, no. 1,pp. 41–59, Jun. 2007.
2. Mira Jeong, Byoung Chul Ko, *Member, IEEE*, and Jae-Yeal Nam, *Member IEEE,* "Early Detection of Sudden Pedestrian Crossing for Safe Driving During Summer Nights", VOL. 27, NO. 6, JUNE 2017.
3. N. Nagamine, "A study of sensing for sudden pedestrian movements,"in Proc. 19th ITS World Congr., Oct. 2012, pp. 1–1
4. P. F. Felzenszwalb, R. B. Girshick, D. McAllester, and D. Ramanan,"Object detection with discriminatively trained part-based models,"IEEE Trans. Pattern Anal. Mach. Intell., vol. 32, no. 9, pp. 1627–1645,Sep. 2010.
5. P. V. K. Borges, "Pedestrian detection based on blob motion statistics,"IEEE Trans. Circuits Syst. Video Technol., vol. 23, no. 2, pp. 224–235,Feb. 2013.
6. R. M. Anwer, D. Vázquez, and A. M. López, "Opponent colors forhuman detection," in Proc. 5th Iberian Conf. Pattern Recognit. ImageAnal., Jun. 2011, pp. 363–370.
7. R. M. Anwer, D. Vázquez, and A. M. López, "Color contributionto part-based person detection in different types of scenarios," inProc. 14th Int. Conf. Comput. Anal. Images Patterns, Aug. 2011,pp. 463–470.
8. T. Gandhi and M. M. Trivedi, "Pedestrian protection systems: Issues,survey, and challenges," IEEE Trans. Intell. Transp. Syst., vol. 8, no. 3,pp. 413–430, Sep. 2007.
9. J. Ge, Y. Luo, and G. Tei, "Real-time pedestrian detection and tracking at nighttime for driver-assistance systems," IEEE Trans. Intell. Transp.Syst., vol. 10, no. 2, pp. 283–298,Jun