International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 04 Issue: 04 | April -2020 ISSN: 2582-3930

Survey Paper on a Feature Extraction Technique for Detecting Use of Mobile While Driving

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Abstract –
Approximately 80% of crashes and 65% of near collision involved drivers inattentive to traffic for three seconds before the event. We are using contour and Gaussian blur algorithm which extract characteristics for allowing the identification of drivers image who using cell phone during driving a vehicle. We fit pi camera in front of driver in their car. This pi camera will be detected whether driver is using mobile phone while driving or not. If camera detect driver use mobile phone while driving then buzzer will play. We also plotted ultrasonic sensor in between both front mirror which will continuously measure the gap or distance between other vehicles. If the distance is less between vehicles that time sensor will detect the distance and buzzer will buzz. We also were applying image processing for drivers image. We use contour, Gaussion Blur, and Canny edge detection algorithm in our proposed system. For safe Driving we are developing some kind of system.

Keywords: Ultrasonic Sensor, Buzzer, GPS, Arduino, Driver distraction, cell phone, image processing, pi camera, r-pi, contour, Gaussion Blur and Canny edge detection.

1. INTRODUCTION

Mobile phone usage has developed into a primary source of driver distraction as it can induce drivers to take their attention off the road, thus making vehicle occupants more vulnerable to road crashes. We propose a highly efficient system in which we are using accelerometer for detecting speed of vehicle while driving. The entire solution requires only Sensor and R-pie camera to monitor the driver to recognize that is the driver using cell phone or not while driving. The buzzer will automatically alert the driver from the risk of crash. For example, when the driver talks on cell phone, the driver is distracted from the processing of speed of car and radiations while driving. In this way we can continuously detect while driver using cell phone during driving. When camera will detect mobile phone while driver is driving the car then the buzzer will be buzzed and get alert to driver about risk. Also we include the ultrasonic sensor in between the mirrors of front dash board. It will continuously measure the distance between front other vehicles. If vehicles has less distance in between then the second buzzer will buzz and also get alert to driver about crash of vehicles. For driver cell phone violation detection as these cameras have capabilities to enable night vision and are directed towards the front windshield of a vehicle to estimate the vehicle occupancy from captured images. Several image-based vehicle occupancy detection systems have been examined to estimate images.

2. LITERATURE SURVEY

Detection of Driver's Mobile Phone Usage

While driving, mobile phone usage is dangerous that it may cause accident or crash. Sensing and proof of usage should be identifying by a system. Anti-Distracted Driving Act that became a law last August 1, 2016 will now be enforced starting May 18, 2017 in the Philippines. So drivers may get distracted if they use mobile phone while driving. On this study it is intended to rise a neural network application that can detect mobile phone usage. Positive pictures and negative pictures were used to train the series Object Detector on MATLAB and for training and testing the system sample pictures will be used.

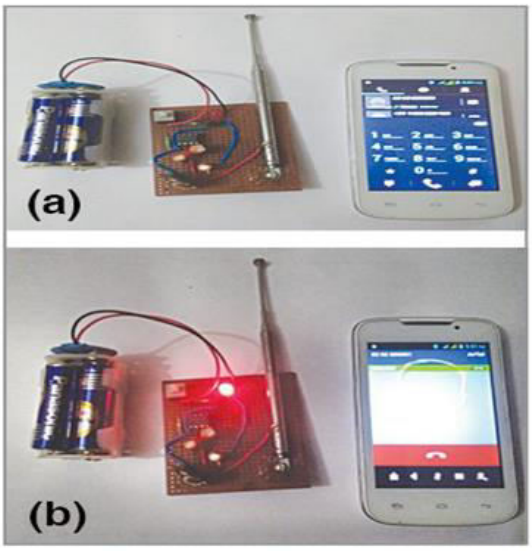
Detecting Driver Use of Mobile Phone Based on In-car Camera

It is dangerous for drivers to use a cell phone while driving, as it could easily divert the drivers' attention. In this paper, we present a method to detect the driver use of mobile phone based on an in-car camera. The in-car camera is mounted on the front windshield which can capture the video of the driver during driving, and an activity parsing algorithm is hired to identify whether the driver is using a mobile phone. We break down the phoning activity into three actions and use and-Or Graph (AoG) to represent the hierarchical method for composing the phoning activity and the temporal relationship between the actions. An online parsing algorithm for AoG based on Earley's parser is implemented to parse the video and detect the driver use of mobile phone. Trial results on collected video data set shows that the proposed method can detect the driver use of mobile phone precisely. We can use this method as a increment of the safety device inside the vehicle.

A hybrid vision system for detecting Use of mobile phones while driving

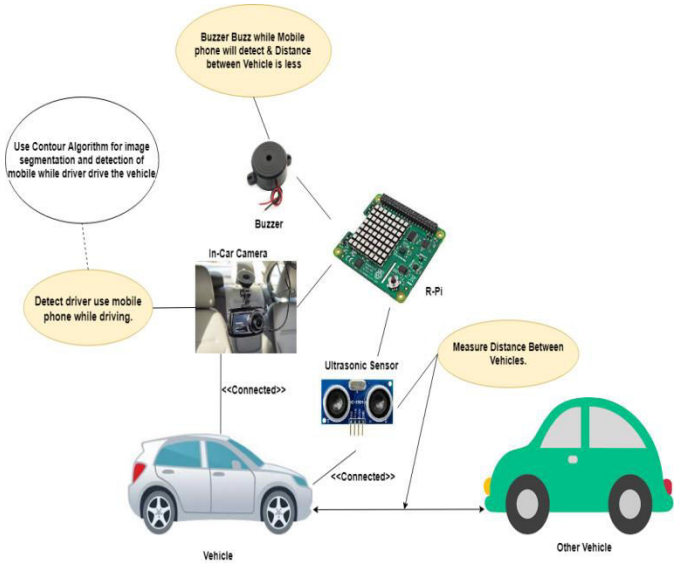
In this work, a vision system has been developed using a frontal camera to monitor the driver, enabling to recognize the use of a cell phone while driving. Approximately 80% of car crashes and 65% of near collisions involved drivers who were

in attentive in traffic forth re e seconds before the event. To test the proposed system five videos in real environment were generated. The solution is a hybrid system and that uses a pattern recognition system (PR) for classification and a movement detection system (MD) for choosing the PR parameters at the end of each period of 3 seconds. The PR parameters are the threshold (frames identified as a cell phone use) and classifier selection. The classifiers are based on ANN, furthermore, the value of constants in neuron activation function and network training parameters were adopted with a genetic algorithm. Experimentally, it was established that when the movement indicates a possible use of the cell phone, the threshold 60% and an MLP/Gaussian classifier with seven neurons in intervening layer are suitable; otherwise, a threshold of 85%, and MLP/Gaussian with two neurons in intervening layer for classification are used. The average accuracy achieved was 91.68% in real environment scenes.



3. METHODOLOGY

3.1 Block Diagram



Incoming Call Handling Operation:

When a caller requests to driver for a response and if driver receives the call after 15s the system will capture the driver's position and start to notify the driver to disconnect the call and concentrate on driving safely. Once the message is conveyed to the driver, he/she have to disconnect the call otherwise it will disrupt the communication by the systems notification

Outgoing call handling operation:

If the driver is on phone call the system will capture handheld position of the driver and start notifying by alarm control in different ways of alarms i.e. Short term and long term.

3.1 Aim and Objectives:

Aim:

The aim of this project is to understand how feature extraction technique will work for detecting use of mobile phone while driving using various techniques. It will also notify the risk of accident or crash to the driver while driving.

Objectives:

- To enhance efficiency of concentration during the act of driving.
- To reduce the chances of crashes or accidents.
- To reduce the habit of mobile phone use when driving.
- To notify possibility of risk.
- To prevent vehicle form collision.

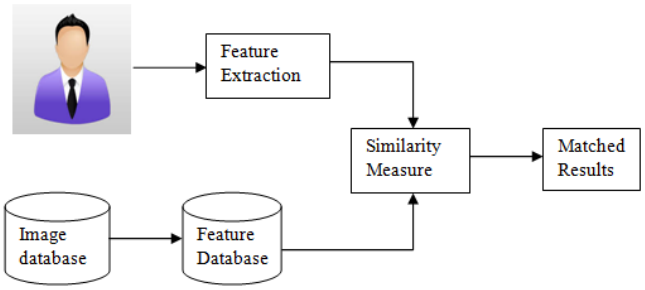
3.2 Skeleton Data

It is used to track parts of driver's body which is useful for extracting 3D data from their posture. It is used to measure and extract all input features. The human body is a joint of the skeleton; the proposed approach is used and tracks 5 joint of driver: Head, Left shoulder, Right shoulder, Left hand, Right hand. It is used to detect human poses and the 3D position of human body joints using a single image. Skeleton is obtained all its data by just using information from present frame. Skeleton process uses machine learning techniques, which classify each pixel in terms of body parts. At last all the 3D body joints are calculated based on the classification result.

3.3 Extraction of Features

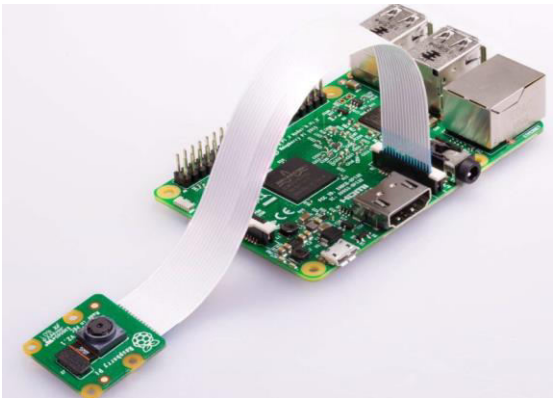
The features are obtained from 3D position of left and right hands of driver's skeleton. From the features the two new reference origins are created. The first reference origin is Steering Wheel, and its position and orientation are established on an established on an initial calibration. The second one is Drivers Head, its position is the same position same as the head joint of the driver's skeleton as Its orientation is used the steering wheel orientation rotated by X

axis in 180 degrees. It calculates 20 candidate features for each data frame, 10 features are extracted for each origin. After calculating the feature: the 3D position of left and right hand of the driver is converted to the system coordinates of Steering Wheel and Driver's Head (SW DH). The minimum (minDistHands) and maximum (maxDistHands) distance of both hands to each origin, the distance (distLHdistRH) and their components (xLH, yLH, and xRH, yRH, zRH) for SW and DH are obtained.



3.4 Raspberry Pi Camera

It attaches to Raspberry Pi hardware through a custom CSI interface. The sensor has 5 megapixel native resolutions which are used in still capture mode. In video mode the sensor supports to capture resolutions up to 1080p at 30 frames per second. The camera module is light weight and the small size makes the ideal choice for mobile projects.



3.5 Alarm Clock

There is output for each frame is given by alarm clock with three possible beep volumes for driver: Alarm", Alarm" and Alarm". There is no beep when there is no risk i.e. No Alarm. When the risk is predicted by the Short-Term subsystem it gives short term alarm (small advice). At last the Long term alarm (strongest advice) when both subsystem long term and short term predict ".

4. Algorithms:

4.1: Gaussian Algorithm:

We are using a Gaussian blur algorithm for convolving an image with a kernel of Gaussian values. It has separable property which divides the process into two passes. In first pass, a one-dimensional kernel is used to blur the image in only the horizontal or vertical direction. In the second pass, the same one-dimensional kernel is used to blur in the remaining direction. The result of algorithm is same as convolving with a two-dimensional kernel in a single pass, but requires fewer calculations.

We are using Gaussian blur algorithm for reducing the size of an image. When downsampling an image, it is common to apply a low-pass filter to the image prior to resampling. This is to ensure that spurious high-frequency information does not appear in the downsampled image (aliasing). Gaussian blurs have nice properties, such as having no sharp edges, and thus do not introduce ringing into the filtered image.

4.2 Canny edge detection algorithm

Canny edge detection is a technique to extract useful structural information of driver or person and dramatically reduce the amount of data to be processed. It has been widely applied in various computer vision systems. Canny has found that the requirements for the application of edge detection on diverse vision systems are relatively similar. Thus, an edge detection solution to address these requirements can be implemented in a wide range of situations.

The general criteria for edge detection include:

- Detection of edge with low error rate, which means that the detection should accurately catch as many edges shown in the image as possible
- The edge point detected from the operator should accurately localize on the center of the edge.
- A given edge in the image should only be marked once, and where possible, image noise should not create false edges.

5. CONCLUSION

This paper presents a low-cost, non-invasive, small-size system and a sensor which helps to detect only the drivers mobile when he uses the mobile phone and not the fellow passenger in the vehicle that rather is using mobile phone. The extracted feature of an image can be present by an algorithm which shows the use of cell phones by driver in car. Though Engineers, researchers or scientist innovate various new technologies, methods or system to prevent road accident, but still road accidents continues. To reduce this type of situation all the people must realize and give more attention along with new technology to decrease the rate of road accidents.

ACKNOWLEDGEMENT

It gives us great pleasure to acknowledgement our deep sense gratitude to present our preliminary project entitled "A Feature extraction technique for detecting use of mobile phone while driving". It places a deep sense of appreciation and regards to our project guide Prof. and Prof. K. B. Dhomse. For her valuable support and guidance towards to our partial project completion. Her encouragement and inspiration help us in every phase of our project work and every related work to this project as well as contributing her knowledge in project related work and related task and also thankful to our H. O. D Prof. S. V. Gumaste for his kind co-operation of this project. Last but not least we are very thankful to the staff members and people, who helped us directly or indirectly for this project.

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