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Driver Fatigue Level Prediction

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Abstract: Public transport networks (PTNs) are difficult to use when the user is unfamiliar with the areathey are traveling to. This is true for both infrequent users (including visitors) and regular users who need totravel to areas with which they are not acquainted. In these situations, adequate on-trip navigation information can substantially ease the use of public transportation and be the driving factor in motivating travellers to prefer it over other modes of transportation. However, estimating the localization of a user is not trivial, although it is critical for providing relevant information. I assess relevant design issues for a modular cost-efficient user-friendly on-trip Navigation service that uses position sensors. By helping travellers move from single occupancy vehicles to public transportationsystems, communities can reduce traffic congestion as well as its environmental impact. Here, I describe our efforts to increase the satisfaction of current public transportation users and help motivate more people to ride. I can help existing riders and encourage new riders by enhancing the usability of public transportation through good transit traveller information systems. The motivation for every location-based information systemis: "To assist with the exact information, at right place in real time with personalized setup and location sensitiveness". LOCATION-BASED services are increasingly important for modern mobile devices such as the Smartphone. An important feature of a modern mobile device is that it can position itself. Not only foruse on the device but also for remote applications that require tracking of the device. Furthermore, tracking has to robustly deliver position updates when faced withchanging conditions such as delays due to positioning and communication, and changing positioning accuracy. The realized system tracks pedestrian targets equipped with GPS-enabled devices. The face, an important part of the body, conveys a lot of information. When a driver is in a state of fatigue, the facial expressions, e.g., the frequency of blinking, are different from those in the normal state. In this project, we propose a system called DriCare, which detects the drivers' fatigue status, such as blinking, and duration of eye closure, using video images, without equipping their bodies with devices. Owing to the shortcomings of previous algorithms, we introduce a new face-tracking algorithm to improve the tracking accuracy. Further, we designed a new detection method for facial regions based on 68 key points. Thenwe use these facial regions to evaluate the drivers' state. By combining the features of the eyes and mouth,DriCare can alert the driver using a fatigue warning.

Keywords— Fatigue, DriCare, Navigation

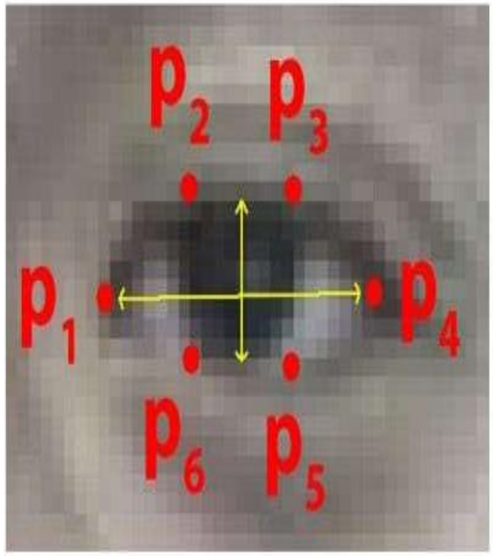
I. INTRODUCTION

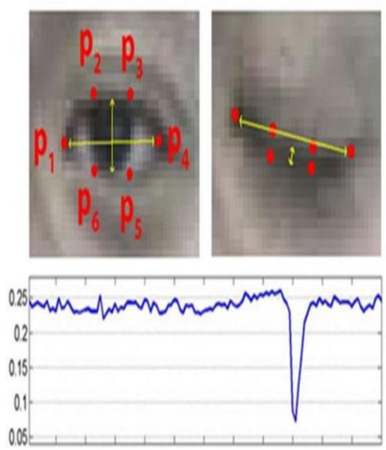
Public transportation systems play an increasingly important role in the way people move around their communities. I consider some of the benefits of public transportation, the challenges facing its widespread adoption, and the role transit traveller information systems can play in meeting those challenges. For individuals, public transportation provides mobility to those who cannot or prefer not to drive, including access to jobs, education, andmedical services. In general, transport mobility - the abilityfor people to move around their community - is a strong indicator for employment, with studies showing, for example, a direct connection between car ownership and employment. By helping travellers move from single- occupancy vehicles to public transportation systems, communities can reduce traffic congestion as well as its environmental impact. Here, I describe our efforts to increase the satisfaction of current public transportationusers and help motivate more people to ride. An important feature of a modern mobile device is that it can position itself. Not only for use on the device but also for remote applications that require tracking of the device. Furthermore, tracking has to robustly deliver position updates when facedwith changing conditions such as delays due to positioning and communication, and changing positioning accuracy. The realized system tracks pedestrian targets equipped withGPS-enabled devices. I concentrate on the tools it provides for real-time arrival information, which is available through a variety of interfaces for mobile devices. Such information is valuable for both new and frequent riders. users could access information by navigating through a list of stops for a particular transit route. For the full Web interface, users could see stop and route information displayed on a map butstill had to search for stops by stop number, route, or address. Motivated by this consideration, I develop a location-awarenative Smartphone application for BEST Bus that leveragesthe localization technology in modern mobile devices to quickly provide users with information for nearby stops andimproved context-sensitive responses to their searches. In recent years, an increase in the demand for modern transportation necessitates a faster car-parc growth. A reportby the National Highway Traffic Safety Administrationshowed that a total of 7,277,000 traffic accidents occurred in the United States in 2016, resulting in 37,461 deaths and 3,144,000 injuries. In these accidents, fatigue driving caused approximately 20% − 30% traffic accidents. Thus, fatigued driving is a significant and latent danger in traffic accidents. In recent years, the fatigue-driving-detection system has become a hot research topic. The detection methods are categorized as subjective and objective detection. In the subjective detection method, a driver must participate in theevaluation, which is associated with the driver's subjective perceptions through steps such as self-questioning, The associate editor coordinating the review of this article and approving it for publication was Gustavo Olague. evaluation and filling in questionnaires. Then, these data are used to estimate the vehicles being driven by tired drivers, assisting the drivers to plan their schedules accordingly. However, drivers' feedback is not required in the objective detection method as it monitors the driver's physiological state and driving-behaviour characteristics in real time. The collected data are used to evaluate the driver's level of fatigue. Furthermore, objective detection is categorized into two: contact and non-contact. Compared with the contact method, non-contact is cheaper and more convenient because the system that not require Computer Vision technology or sophisticate camera allow the use of the device in more cars. Owing to easy installation and low cost, the non-contact method has been widely used for fatigue-driving detection. For instance, Attention Technologies and Smart Eye employ the movement of the driver's eyes and position of thedriver's head to determine the level of their fatigue. In this study, we propose a non-contact method called DriCare to detect the level of the driver's fatigue. Our method employsthe use of only the vehicle-mounted camera, making it unnecessary for the driver to carry any on/in-body devices. Our design uses each frame image to analyse and detect thedriver's state.

II. LITERATURE REVIEW

SR. NO.	IEEE PAPER	AUTHORNAME	YEAR
1.	Real- Time Driver Drowsiness Detectionusing Facial Action Units	1.Malaika Vijay2.Nandagopal Netrakanti Vinayak 3.Maanvi Nunna 4.Subramanyam Natarajan	2021
2.	DriveCare: A Real- Time Vision Based Driver Drowsiness Detection using Multiple Convolutional NeuralCorrelation Fillers	1. GopikrishnanU. 2. Dr.Renu Jose	2020
3.	Real-Time Driver- Drowsiness DetectionSystem using FacialFeatures	1.Wanghua Deng 2.Ruoxue Wu	2019
4.	Analysis of Bus Tracking System using GPS on Smart Phones	1. Pradip SureshMane 2. Prof. VaishaliKhairmar	2014

III. Methodology





Each eye is represented by 6 (x, y)-coordinates, starting at the left-corner of the eye (as if you were looking at the person), and then working clockwise around the remainder of the region. Based on this image, we should take away on key point: 1.There is a relation between the width and the height of these coordinates. Based on the work by Soukupová and Čech in their 2016 paper, Real-Time Eye Blink Detection using Facial Landmarks, we can then derive an equation that reflects this relation called the eye aspect ratio (EAR):
Where
p1, …, p6 are 2D facial landmark locations. The numerator of this equation computes the distance between the vertical eye landmarks while the denominator computes the distance between horizontal eye landmarks, weighting the denominator appropriately since there is only one set of horizontal points but two sets of vertical points.

Why is this equation so interesting?
Well, as we'll find out, the eye aspect ratio is approximately constant while the eye is open, but will rapidly fall to zero when a blink is taking place. Using this simple equation, we can avoid image processing techniques and simply rely on the ratio of eye landmark distances to determine if a person is blinking. To make this clearer, consider the following figure from Soukupová and Čech: On the top-left we have an eye that is fully open — the eye aspect ratio here would be large(r) and relatively constant over time. However, once the person blinks (top-right) the eye aspect ratio decreases dramatically, approaching zero. The bottom figure plots a graph of the eye aspect ratio over time for a video clip. As we can see, the eye aspect ratio is constant, then rapidly drops close to zero, then increases again, indicating a single blink has taken place.

Module Information

1. Camera Interface
2. Face Detection
3. Eye Tracking

4. GPS Tracking
5. Accident Detection
6. Cloud Interface[firebase]

Requirement(Front End/Back End)Front end: - Android App

Back end: - Firebase cloud

IV. SYSTEM ARCHITECTURE

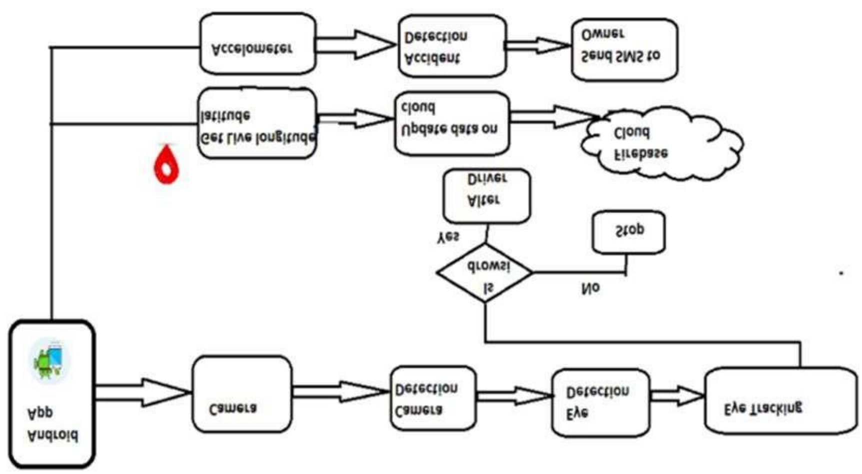


FIG: BLOCK DIAGRAM OF DRIVER FATIGUE LEVELPREDICTION

Block Diagram /flowchart working:-

1. First we start android camera
2. We extract frame from camera then detect face3.From face extract eyes
4. We detect 6 points of eyes
5.We calculate eye blinking ratio then detect drowsy6.If drowsiness detected then we ringing the phone
7. Using accelerometer we detect accident and send sms toowner with vehicle location
8.Using GPS we get latitude and longitude then update thison firebase cloud and owner site we get this location and track vehicle on map.

V. CONCLUSION

I have presented my dissertation on the value of BEST Bus information systems, demonstrating a number of widely deployed tools and evaluations of those tools that show their utility. Specifically, I have described the system, which provides riders tools across a Smartphone and interfaces. I have demonstrated a real-time mobile trip planning tool andalso a method for crowd-sourcing the detection of errors in public transit data. Finally, I have presented evaluations that show improves satisfaction with public transit, reduces wait times, increases transit usage, encourages walking, and improves perception of safety among riders. Sustainable urban mobility is a key factor for a citizen's quality of life, as an increasingly larger amount of the population lives in urban areas. The integration and interoperability of differenttransport networks are seen in that document as a key feature for the improvement of urban mobility, together with improved travel information. We propose a novel system for evaluating the driver's level of fatigue based on face tracking and facial key point detection. We design a new algorithm and propose the MC-KCF algorithm to track the driver's face using CNN and MTCNN to improve the original KCF algorithm. We define the facial regions of detection based on facial key points. Moreover, we introduce a new evaluation method for drowsiness based onthe states of the eyes and mouth. Therefore, DriCare is almost a real-time system as it has a high operation speed. From the experimental results, DriCare is applicable todifferent circumstances and can offer stable performance.

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