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A Survey on Riding Quality Evaluation and Driver Physiology Detection through IOT

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ABSTRACT: Public transport is an important aspect in our daily lives, especially for those who live in cities and towns. The public transportation infrastructure in India is of very poor quality especially regarding comfort of passengers and safety. Driving quality of drivers in public transport as well as their behavioral aspects such as alcohol abuse at the time of driving is also a serious issue. The information related to passenger's satisfaction is very beneficial for public transportation to optimizing the transportation service. This paper investigates an application of IOT to detect and analyze the riding quality of public transport system as well as transport infrastructure system such as road conditions, traffic etc. with the use of sensors installed in the vehicle. The lightweight system leverages sensors equipped on hardware in driver cabin to collect surrounding information. By analyzing the uploaded data at a server, we are able to estimate both aggressive driving behaviors and environment contexts. We tend to achieve real-time monitoring of riding quality, driver physiology and public transportation infrastructure.

KEYWORDS: Public Transport System, Intelligent Transport System, IOT, Riding quality, Passenger satisfaction, Driver physiology, Public transportation infrastructure.

I. INTRODUCTION

Public transportation should be used by all, as much as possible to travel, since that helps reducing carbon emissions, eases traffic congestion and allows passengers to read and relax during the trip. Public-transportation service planners should not only focus on the ticket costs but also take passenger's feelings and experience into consideration to increase passenger's satisfaction. Riding quality is usually the capability of the vehicle to maintain the motion within the range of human comfort.

Public transport plays an importation role in our daily life. The information related to passenger's satisfaction is very beneficial for optimizing the transportation service. Driver behavioural and physiology detection is an important task to ensure safety of passengers as well as pedestrians and other vehicles. Erratic driving patterns, over speeding and alcohol abuse are detrimental and cause accidents. Driving quality detection plays important role in increasing Quality of Service (QoS) of transportation system and public infrastructure.

Normally, the feedback of public-transport quality by the users has been monitored by questionnaires or feedback on phones. Both these methods are manpower-intensive and time-consuming and do not generate accurate output. Now, since smart phones and sensors can be widely deployed and used by IOT infrastructure, it allows ways for effectively gathering and analyzing the environmental information for transportation systems.

For example, sensors can be applied to monitor aggressive driving behaviors, such as abrupt acceleration/deceleration. Road conditions and traffic-congestion monitoring can also be done by sensors, e.g. to sense trajectories, vibrations and GPS location of the vehicle and to estimate approximate arrival time.

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We propose to measure riding quality and passenger comfort in two perspectives: the environmental contexts such as road conditions, traffic and driver behavior, such as aggressive accelerate/break, sharp turning which cause jerks. We also propose an accident avoidance and detection system where emergency alerts are generated.

II. LITERATURE SURVEY

In [1] authors used mobile crowd sensing technique to gather data of riding comfort of passengers. By use of mobile sensing analyzing the uploaded data at a server, we are able to estimate both aggressive driving behaviors and environment contexts. Use of mobile sensing is not feasible as it depends on participant permission to share data or not.

In [2] authors used A Smartphone-based sensing platform to model aggressive driving behaviors. Driving aggressively increases the risk of accidents. Assessing a person's driving style is a useful way to guide aggressive drivers toward having safer driving behaviors. In this only driver perspective is considered.

In [3] authors used accelerometer-based transportation mode detection on smart phones. It presents novel accelerometer-based techniques for accurate and fine-grained detection of transportation modes on smart phones. In this mode of transportation is detected, no detection of driving quality, road quality and comfort.

III. EXISTING SYSTEM

Many approaches have been introduced for recognition of several specific activities such as, detecting road conditions while driving such as potholes using sensor equipped vehicle, system to recognize driving style and driving habits by use of smart phone, system to keep check on alcohol abuse of driver using alcohol sensor, system for early warning and detection of accident, crowd sensing to detect comfort of passengers. Besides this pioneer studies focus on a specific issue. Our system will leverage these works for detecting and analysing riding comfort, safety and environmental context of passengers.

IV. PROPOSED SYSTEM

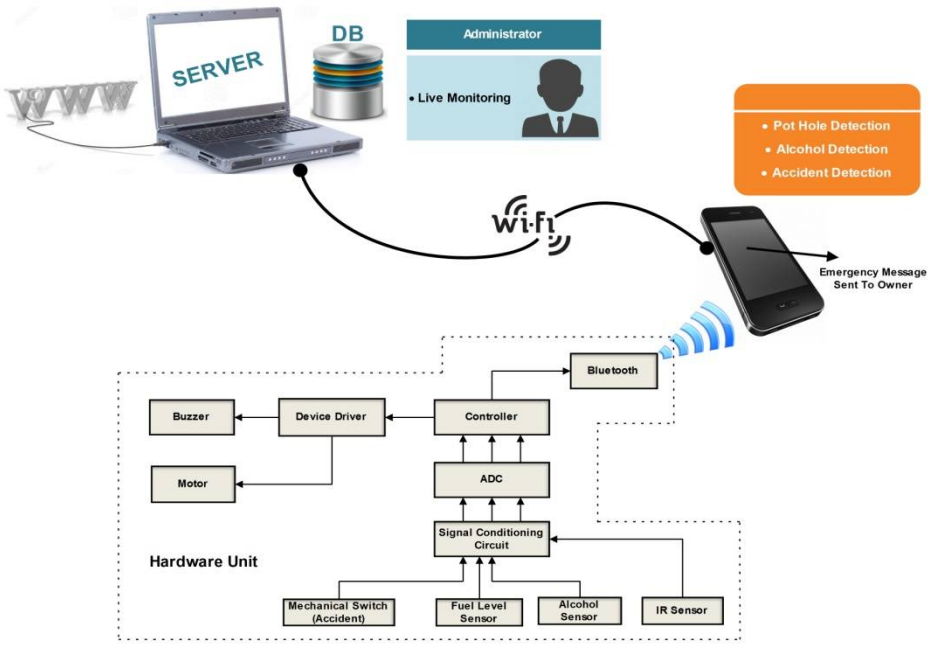

Figure 1: Proposed System

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Our proposed system for riding quality evaluation and driver physiology detection is depicted in figure 1. The system is implemented through sensors embedded on hardware, this sensors sense various parameters such as jerks caused by rough driving, potholes on roads, distance of vehicle from other vehicles, alcohol sensor, and GPS location from drivers smart phone.

Threshold values can be set by administrator as per need, if any sensor value reaches threshold or crosses threshold then a buzzer is activated at the same time emergency message is send to administrator server and owner.

The onboard hardware is connected to the drivers smart phone through Bluetooth, the values of sensor are collected and sent to drivers phone and then through Wi-Fi connection to the server. If an emergency occurs the phone sends alert text message to the owner.

Data collected on the server is used to analyze erratic driving behavior, road conditions, traffic, and location. This data analysis is useful in optimizing public transport system, transport infrastructure and Quality of Service of transportation system.

V. CONCLUSION AND FUTURE WORK

This paper presents an innovative and cost effective idea to improve riding quality and safety in transportation system and improve Quality of Service of public infrastructure through IOT.

In future proposed system can be extended to create a fully fledged Intelligent Transport System where, data collected from this system can be used to train future drivers and auto driving systems and can be used to optimize transportation system as per amount of passengers.

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