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Conceptual Design of Driver Assistance Application using IOT

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Abstract

The internet of things (IOT) comprise of software associated devices where the number of sensors are deployed to be used in the digital world. There is a significant growth in the market on sensor developments from decades which contributes to the rapid increase in IOT devices. In this paper the authors presents a design and developing an IOT application assistance which serves the driver of any vehicle to identify his immediate requirements such as petrol pump, service station, hospital, police station, toll booth etc. This application works like a Google map but can be customized for specific user of the application and his immediate requirements recognised by the sensors. The sensors used here are intelligent in nature and automatically recognises the emotional level of the user for safe driving and vehicle requirement to prevent any breakdown on road. The amount deducted in the toll booth is reflected in the driver's bank pass book and all the transaction done from the application is reflected in the driver's e-pass book. This will also contribute to the cashless transaction which is gaining importance in context aware environment.

Keywords: *Context aware environment, Sensors, Internet of things, Google map, Petrol pump, Service station, Toll booth, E-pass book, Cashless transaction, Hospital, Police station.*

INTRODUCTION

Driving from one place to another probably thousands of kilometres can be ones hobby but when the place or geographical area is unknown there comes the requirement for IOT application assistance where the driver needs to know the location of his requisites such as 1) petrol pump 2) restaurant 3) Lodge 4) Vehicle service station for smooth reaching from source to destination within a speculated time.

This application will take Google map and point the nearest reachable location on requirement. If the petrol is going to exhaust in next 50 kilometres it will identify nearest petrol bunk well in advance and indicate the driver and assist him to reach there with shortest available path. Similarly, If the driver is drowsy and the sensor recognises that the driver needs to get freshen up then it indicates him to go to the nearest available restaurant. This prevents the driver from encountering unnecessary accidents which may turn fatal. The servicing of vehicle needs to be done from time to time for better mileage and the application will automatically direct the driver to the service station when servicing is necessary. The Route map designed in application will be showing not only shortest reachable path but also optimal path and is the key feature of this application design.

The highway may have several tool booths and the driver needs to pay in every tool booth before passing through for which the amount needs to get deducted from his account. This account is linked with application and the application always indicates and reminds the driver to maintain minimum balance. The amount deducted in the tool booth is reflected in the driver's bank pass book and all the transaction done from the application is reflected in the driver's e-pass book.

The Hospital service comes under primary facility that must be available to any citizen in emergency as well as non-emergency condition. In non-emergency condition the application must guide the driver to the nearest available hospital and in emergency condition the application should automatically alarm the nearest hospital on occurrence of accident. The device however indicates the driver of possible occurrence of any accidents. The device will be able to locate nearest police station in an event of vehicle robbery as well as for an attempt of theft in vehicle.

LITERATURE SURVEY

The authors [1] has presented an innovative framework for the development, deployment and management of smart and context-aware mobile applications. The framework utilizes Cloud computing infrastructures and Internet of Things technologies allowing the seamless integration of smart objects and external services as well as the provision of scalable resources for data and application management.

In this paper [2]CASSARAM proposes the search and selection of sensors based on user priorities. The authors objectives is to highlight the importance of sensor search in IoT paradigm, identify important characteristics of both sensors and data acquisition processes which help to select sensors, understand how semantic and statistical reasoning can be combined together to address this problem in an efficient manner. Here, the author developed a tool called CASSARA to evaluate the proposed model in terms of resource consumption and response time.

In this paper [8] the author has presented a framework where IoT can enhance public safety by crowd management via sensing services that are provided by smart phones equipped with various types of sensors. In order to ensure trustworthiness in the presented framework, authors propose a reputation-based S2aaS scheme, namely, Trustworthy Sensing for Crowd Management (TSCM) for front-end access to the IoT.

In this paper [4] the authors have presented a system of IoT which captures the data from the environment and inside the vehicle using embedded sensors, wireless sensor network and internet to provide the contextual information for the driver to take timely actions for smooth and safety driving. This paper presents a report on the prototype design of Smart and Safe Driving Application (SSDA). The proposed Application is designed to avoid fatal road accidents by providing context aware alert information related to fuel status, overall condition of the vehicle, objects surrounding the vehicle, traffic rules and drowsiness state of the driver.

In this paper [9] the author has proposed project that aim to design and development of app for car driver. In this project they are presenting an IoT based system which will help drivers to drive the car safely and efficiently. This system consists of tracking and locating the location of accident using GPS and

communicates the co-ordinates via SMS using onboard GSM module, smoke detection using a gas sensor, obstacle detection in front and rear of car using ultrasonic sensor and simulation of physically unavailable sensors using logical functions. In this paper [10] the author provides Eye Blink Monitoring System (EBM) that alerts the subject during state of drowsiness. According to authors embedded system based on psychological state of Subject by monitoring eye movements and head movements are useful in warning drivers during initial sleep cycle phase of drowsiness.

DESIGN OF PROPOSED SYSTEM

The conceptual design of the proposed system is illustrated in Fig1. The proposed conceptual is described below:

Description

1) Application UI (Notification bar): is designed for easy interaction between the user and system. Here, cool saturation of colors is used so that user won't feel stress and feels relaxed.

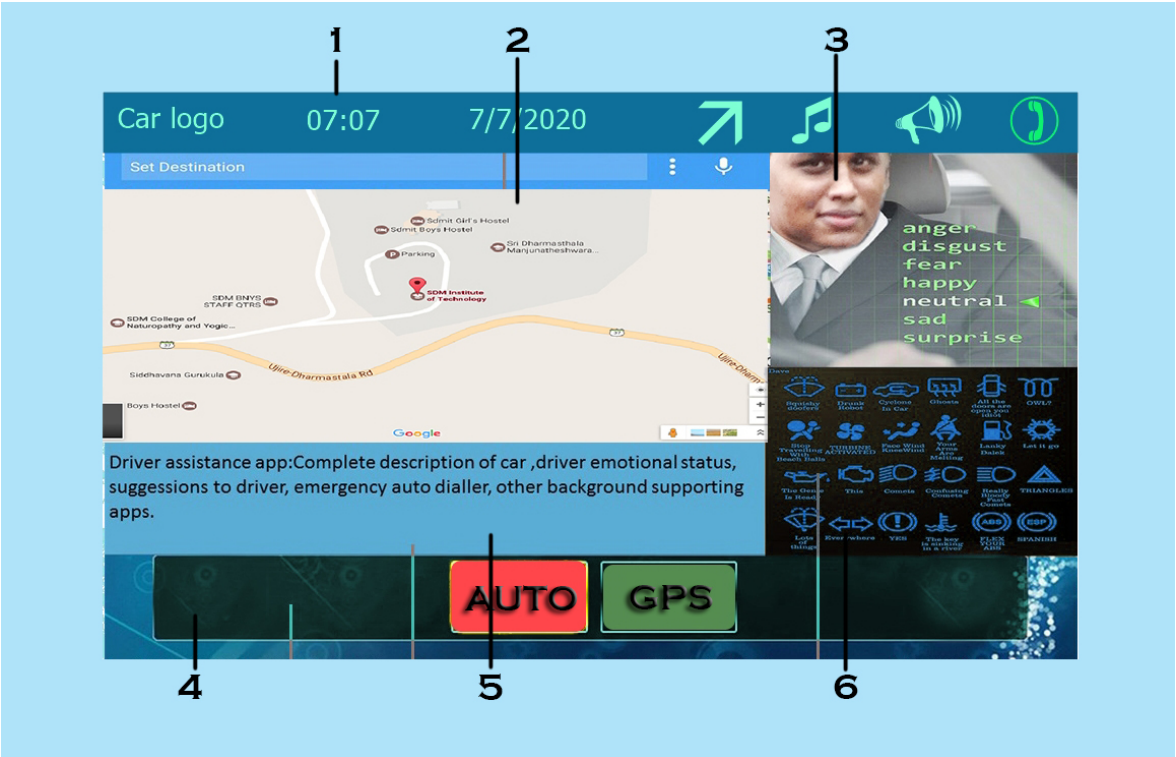

Fig1: Conceptual design of Driver assistance application using IOT

Notification bar is used which shows basic system date and time and other user information, when app drive over other app like system UI/launcher, Google maps, Dialler etc. All the information gets displayed in this bar from time to time and as per OS initiation.

2) Smart map: This portion of application is mainly dependent on Google map, either it accesses map data from Google servers or from Google application which is installed in OS. In these applications few more icons are added so that user is more accurate over his geographical area is which unknown.

3) Artificial Intelligence Powered Faced Detection: Here the application has access to Camera, also EDS(Emotion Detection System) and HBAS(Human Behaviour Analysing Software) helps the user to drive vehicle in proper physiological conditions only. In case of failure or breakdown the application will guide using map data, emergency services and artificial intelligence.

4) Bottom scroll bar: Here, UI is used to navigate to different options and sensor data.

5) Driver conveyer: The data which needs to be conveyed in text and graphical formats are shown here. The data from (2), (3) and (6) will have access to this UI.

6) Vehicle's Engine status: The complete data from Vehicle's Engine is accessed with high refresh rate, so that engine health will be in track of user and suggests him with service required.

The proposed design can be implemented using Artificial Intelligence, sensors such as Force sensor and GPS.

CONCLUSION AND FUTURE WORK

The research work proposed in this paper describes a Conceptual design of Driver assistance application using IOT which can be developed using several sensors which can give timely suggestions and notifications along with recommending contextual actions to the driver of the vehicle. The arrays of sensors are used toserve the driver of any vehicle to identify his immediate requirements such as petrol pump, service station, hospital, police station, toll booth etc. It also recognises emotional level of the user of application for safe driving and vehicle requirement to prevent any breakdown on roadAs a future work the system will be

designed using these sensors and can be deployed in real time vehicles.

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