INTELLIGENT TRANSPORT SYSTEM

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Abstract: The paper is coming up with enriched "real-time active tracking of public transports, provision of valuable data about traffic and intelligent ticket accessing portal with real time location status of buses as well as individuals. Products or any software services which are already exists are providing these technical solution to customer in an unaffordable accessing methods and technology which are being used there are need to be upgraded to current cutting edge technology such cloud computing etc.., Implementation of solution in updated environment such as Internet Of Thing architecture stack which includes following major layers such as sensor i.e., hardware, cloud, analysis and finally presentation would be an effective solution to solve real time issues faced under existing product and services.

Keywords: Internet of Things (IoT), Intelligent Transport System (ITS), Control Node (CN).

I.INTRODUCTION

Intelligent Transport System proposed a brief introduction to real time active and passive tracking and traffic feed updates actively along with enhanced ticket accessing portal, thus user can monitor the moments of their own fleet of vehicles lively and passenger can get the current location of vehicle for which they are waiting for and also they can reserve the tickets through the proposed system. As whole the entire system will consists of Internet of Things based real time active and passive location tracking through Fused Location ProviderApi which is the latest API and the best among the available possibilities to get location in Android. Data are forwarded to cloud storage where raw data stream will processed and went for analysis, thus analyzed information will be presented as package of visual components i.e, dashboard which would provide business values and enriched services to end users. Existing system provides those services as separate or major services rather the proposed system provide such services as a package through cutting edge technologies such as Internet of Things, Cloud storage and real time data web analytics and data presentation through desktops and mobile phones. The proposed system will overcome the disadvantages such server busy, data loss and major issues arises from client server architecture.

II.RELATED WORKS

The Internet revolution has opened up new technologies such as ubiquitous computing, Internet of Things (IoT), context-aware computing etc. Researchers in, demonstrated a survey regarding context-aware computing for IoT and the market research on the significant growth of sensor deployments over the past decade. There are many applications developed with IoT infrastructure in field of education, entertainment, healthcare, agriculture, transportation, real estates and so on. In specific, IoT has a big influence on transportation. Many researchers have explored ITS with respect to tracking vehicle systems. Authors in demonstrate an SMS based vehicle tracking system to transfer the latitude, longitude from GPS and automobile data to end systems and map their exact location in Google Earth using Keyhole Markup Language(KML). Researchers have also worked on SMS tracking system with theft identification and lock feature. Also, there are research that has performed Web-based vehicle tracking system where the latitude and longitude are transmitted to the server through HTTP protocols (GET Methods). The Authors in developed vehicle tracking system application for smart phone to trace the current location of the vehicle. The researchers then integrated RFID with the GPS for Public Transportation. The Radio Frequency Identification (RFID) are intended to record the flow of people getting on and off the bus through RFID tags. The information from GPS and RFID are transmitted through wireless communication system and can be shared with the public. Now a days we prefer NFC payments, which are similar to the RFID technology. This NFC technology is more simple and easy for transactions.

In countries like India and China people are slowly adapting technologies for commercial applications. NFC enabled phones (sender) can do transaction with the NFC reader (receiver/ ticket provider). Companies like Google and Apple uses mobile phones with NFC feature to make payments very simpler and easier. Authors in developed a NFC based virtual ticketing system with a NFC phone application, wherein it authorizes the purchase of public transportation tickets via a suitable smart poster and initiates a midlet applications for transactions. Previous works provide some insights about an ITS but none of them proposed/demonstrated a complete system. Through this work, we intend to propose a new IoT system for ITS, which will track the vehicle with GPS system. In the following sections, we will discuss about our system architecture and components for a smart bus, following with

our idea to integrate multiple smart buses to make an efficient ITS

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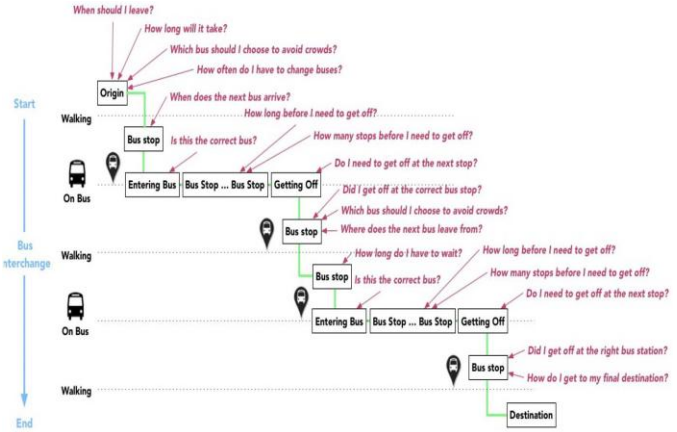

Figure.1

III.SYSTEM DESIGN

GPS sensor present in the mobile devices are used to tap the current location of user or any one of the control node which was placed in every individual vehicles, Rather than using normal AndroidLocationAPI to get the location coordinates of the user Fused Location Provider API which is the latest API and the best among the available possibilities to get location in Android devices. Once location is identified each and every user will be connected to any one of control node on location basis, if user is connected with the control node then user's location services will be automatically switched off immediately.

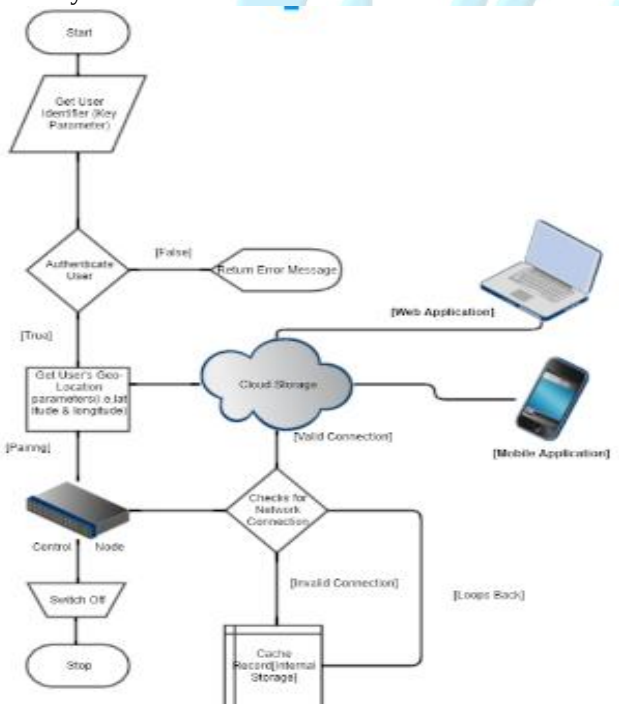

Figure.2

Real time data which was gathered from the sensors will be actively uploaded into cloud environment where it is stored in table format for ease of use as like data stored in traditional databases, if connection is lost then data would be saved on local storage of control nodes when it gets back its consistent internet connectivity locally stored data will be automatically pushed into cloud storage along with timestamp hence data never be lost. PHP script will be available in form of API thus whenever the user wants to get the location updates of any victim, they can access that services once after valid authentication and then by providing identification factor of that victim from android phones or from any browser. These real time location data is also used to provide traffic updates of that particular area where which the vehicle is moving currently. Analyzed information is presented as a dashboard with rich context which holds multiple business values. Users can access the dashboard from desktop as well as from their smart phones itself. Since Microsoft Azure App Services provide scalable, consistent service continuously without any fail. Any user or control node under the proposed system will be monitored

IV.IOT ARCHITECTURE

The ITS is based on an IOT architecture which involves a set of distributed software and hardware components which are tightly integrated with the bus system. The ITS system that has been deployed in Madrid is composed of three key components (see Fig. 3).

- The network-enabled urban bus system with WiFi equipped vehicles. WiFi is used to establish local networks for sharing bus data with the passengers' mobile phones. In addition, a crowd density estimation system has been integrated into the bus system.
- The ITS navigation app for bus riders. The ITS app is a smart phone application that is able to track a user's bus journey and support micro-navigation decisions by setting up connections to bus vehicles and recognizing on which bus and direction the passenger is currently riding.
- The bus crowd information server to collect real-time occupancy information from buses operating on different routes in Madrid. The server encompasses an enhanced transit route planning engine to recommend bus routes with lower predicted occupancy for avoiding crowds. All three components of the ITS system are interconnected. Thus, ITS facilitates novel interactions compared to existing communication links found in state-of-the-art bus information systems (see solid lines). In particular, the architecture supports direct communication between the riders' mobile devices and bus vehicles as a way to design passenger-aware information services. In the following, we present each constituent component of the ITS system in detail.

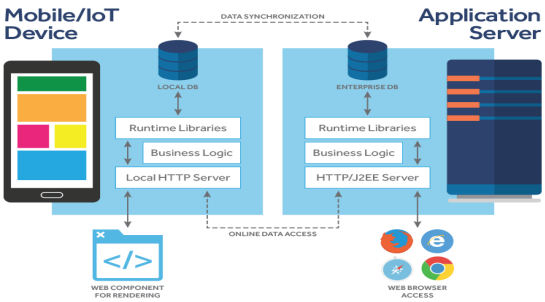

Figure.3

V.SYSTEM ARCHITECTURE

The system architecture is classified with respect to sensing, monitoring, and displaying systems. All operations are performed by keeping Internet as the backbone. There are different sensors used in this system. All these sensors produce raw data which will be stored in a central database. This raw

information need to be carefully monitored, analyzed and then made into a meaningful context. If any issues, actions are taken automatically by the system. At last, the meaningful context are displayed to the public.

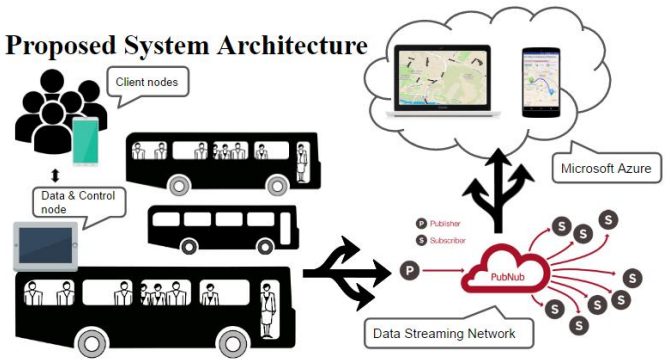

Figure.4 System Architecture

VI.MOBILE APPLICATION

Users of the proposed system will access the services provided by the system through android mobile application, hence an application is developed from scratch to do following functionalities such as user authentication, tracking the client until they are connected to any one of the control node if they connected to control node then this mobile application have to take responsibility to switch of gps tracking automatically and vice versa. Every data captured are uploaded into microsoft cloud platfrom thus microsoft azure app service is used to achieve those featutes and its also take the backup locally to prevent data loss due to network issues.

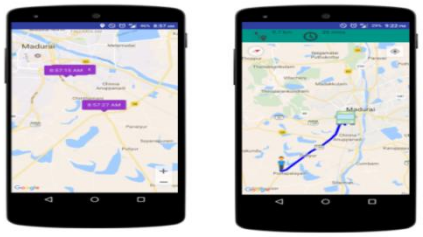

Figure.5

VII.EXPERIMENTAL RESULT

Below shown figure 6 explores the result of the experiment done over the implementation of proposed system, which plots multiple real time location co-ordinates of bus as well as passenger one who waiting for the bus those data feeds are sent to Microsoft azure cloud storage platform where it is visualized as shown below.

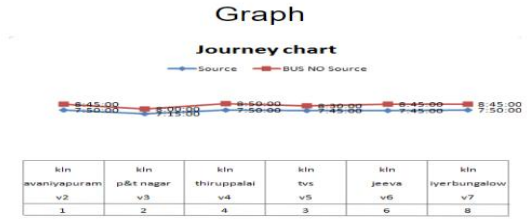

Figure.6

VIII.CONCLUSION

Thus the proposed system is providing enriched "real-time active tracking of public transports, provision of valuable data about traffic and intelligent ticket accessing portal with real time location status of buses as well as individuals. Products or any software services which are already exists are providing these technical solution to customer in an unaffordable accessing methods and technology which are being used there are need to be upgraded to current cutting edge technology such cloud computing etc.., Entire Solution is implemented in updated environment such as Internet Of Thing architecture stack which includes following major layers such as sensor i.e., hardware, cloud, analysis and finally presentation would be an effective solution to solve real time issues faced under existing product and services. The extendibility of proposed system is too high and well defined interfaces will help in deploying the proposed system in great extent, as like in vehicle the proposed system can be implemented in classrooms, university, office, entertainment malls, public places hence crowd-source will be tracked and monitored once they connected with any one of IOT gateway device for example attendance enter system in classrooms and etc.., Thus the proposed system will be integrated with cyber security system of Indian government. Since the proposed system is capable of providing fleet monitoring service along with inherited geo-fencing facilities can be used by transportation subsystem of any smart city system enabled infrastructure.

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