A Survey on Current Issues Prevailing in Public Transport System

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Abstract: Public Transport system (PTS) is an important and an essential part of urban and rural dwellers. PTS enables a smooth mobility of people and goods. Without PTS no city can improve the standard of living of the people and can make progress. As the population continues to increase, many problems arise which make the PTS an unreliable and inefficient service provider. So, providing a good PTS is required in today's world. There is a need to check and know the causes and solutions for the effective transport system. The objective of the paper is to identify the major problems that make PTS an unreliable system and suggest possible solutions overcome the issues.

Keywords: Internet-of-Things (IOT), Navigation Assistance (Na), Public Transport System (PTS), Traffic Congestion (TC), Bus Arrival Time Estimation (Bate), Digital Technologies, Global Positioning System (GPS).

I. INTRODUCTION

PTS is an essential part of living in both urban and rural dwellers. PTS plays an important role in city transportation system, however, it has become very difficult to provide the comfort and better traveling assistances because of lack of real-time information. The reason for the anxiety and discomfort of the passenger in using PTS is that no timely information and update about the bus arrival, bus delay time, bus location tracking, crowd detection not only due to traffic but also for road blockages, processions, constructions going on etc. and also detailed assistances about the journey as progresses. The important challenge that PTS must solve is to provide information about the traffic congestion due to any reasons for the riders or the passengers and recommending them about the less congested or less crowded route. People are more enthusiastic about planning trips/journeys. For making a trip successful one has to get a good assistances for providing finely detailed information about their journey's progress even in remote/unknown areas too. This is a tougher task for PTS. Earlier people said 'Money makes a man' but currently people say 'Time makes a man'. Time is an important and essential factor of life. But the thing is people waste their precious time by unknowingly and unnecessarily waiting for a bus at the bus station. The reason for this is people are unaware of the arrival and delay time of the required bus. Due to this, the bus system which is the backbone of the PTS has reduced in its usage. Real-time tracking of the bus and providing a timely update about the location and time at which the bus would approach the passenger is essential. Thus in order to resolve all the challenges of PTS smart and efficient technologies are requested. All the issues related to PTS like crowd aware, navigational assistance, bus arrival and delay time estimation etc. can be addressed by using trending technologies in an efficient manner. Adoption of technologies like IoT, GPS and Digital technologies into PTS makes PTS an efficient system ever.

II. DRAWBACKS OF PTS

PTS is losing its popularity because of many reasons. According to the author Zhou et al (2004) in paper [9] there are many factors that contribute to the failure of PTS, among them some of them are privacy and comfort which are very essential for travellers as they can be caused due to overcrowding of a bus and a passenger is unable to find a seat. Use of time says that people should make the best use of their time in planning and scheduling trips even though they change the route. Safety is a necessary factor in PTS and familiarity of deboarding stops also adds to these problems. The attitude of people during vehicle riding corresponds to traffic

congestion. Reliability is the most important factor where the expectations of the public should be met by PTS by providing real-time updates. These reasons should be overcome to make PTS a reliable transport service provider.

III. FACETS FOR FAILURE

There are a lot of aspects that need to be considered while solving PTS problems. As per the survey made by W. R. Blunden in paper [12] the main reason for making PTS an unreliable service are wasting time in getting passengers loaded to bus which leads to variation in bus arrival and departure time, unable to forecast the travel time and vehicle arrival time accurately to plan and schedule trips, stress and frustration of riders due to traffic congestion cause road rage, no information about road blockage due to any special events or road construction, people often using their own vehicle with a negative perception of service quality of PTS, departure delay lengthen the waiting periods of people which may result in overcrowding of buses and cause uncomfortable for elderly persons or this may also result in buses with an empty seats.

(a)   (b)

Fig.1: (a) Traffic congestion, where people are wasting their energy waiting in traffic without the aware of alternate routes and alert about the crowd. (b) Represents the issue regarding no timely information about the bus arrival time. People are unknowingly and unnecessarily waiting and wasting the time at the bus stop without any information about their bus

(a)

(b)   (C)

Fig.2: (a) shows that people got frustrated waiting for the expected bus without knowing its arrival time and just got loaded into the bus which approached them. (b) People taking private mode for transport and missed the (c) expected crowd less bus which arrived later.

Fig.3: Figure shows the crowd congestion due to various reasons and wastage of energy without proper TC alert and recommendation of less crowded routes.

IV.   POSSIBLE SOLUTIONS

The Authors Kriezek and El-Geneidy, 2007, in the paper [13] proposed a system called 'Choice Riders that can find alternative routes and plan best trips according to passenger's wish. Also, a feedback system called Congestion feedback [3] can be taken from Vehicle riders to know about traffic jam and suggest an alternate route. People can follow some simple rules as a contribution for less traffic like Carpooling, Road lane occupancy, using Bicycle, and walk, promotion and use of Technologies to get real-time updates. PTS reliability and efficiency can be improved by using intelligent transit system that provides traffic updates through the means like radio, GPS, mobile applications and vehicle tracking system to provide real-time traffic counts. GPS based sensing resources can improve the vehicle locating systems and encourage people in having real-time vehicle updates. Using IoT contributes to fusion technologies in radio based positioning systems, digital map information etc.

V.   SUPPORTING TECHNOLOGIES

1. *GPS based methods:* This can be used to track the vehicle using satellite and the data can be updated into a database which helps in navigation and leads to the reliability of PTS as the Stops names can be identified.
2. *Smartphone-based monitoring:* Smartphone with sensors can track traffic speed and density. The accelerometer can also be used to know possible traffic jam and congestion.
3. *Sensing technologies:* Sensing technology like RFID gives motorist Safety benefits for PTS which can be embedded in the road and surrounding of the road to prevent road construction and maintenance.

4. ***Mobile Applications for real-time updates:*** Connecting to Social Media and Internet help in the gathering of information from transport agencies or local bodies can help in providing mapping facilities like Google.

CONCLUSION

Various issues related to PTS like the requirement of advanced and smart technologies in PTS, alert system, trip guidance, crowd congestion recommendation, time management issues etc., are encountered. Amongst all the important challenges ahead of PTS the TC alerting, BATE and delay time prediction and NA are the major challenges due to which the reliability and efficiency of PTS are reduced. The above challenges can be addressed using the trending technologies like IoT which helps in obtaining real-time information about the PTS, GPS, Digital technologies like smart sensors, mobile applications, IR sensors etc.

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