

Recommendation Based on Prediction of Commuter Flow and Occupancy in Bus Transport

M.Sreekrishna, N.Sankarram, Dinesh Sha, Dakshin, Ashwini



Abstract: *The current public transportation in India is found to have higher traffic congestion levels within the bus and is an inefficient transport system for the public. The traffic and the over congested public transports we see on the roads is an effect of this problem. Increasing the public transportation is not the only solution, to make it better we also need to make it smarter. Though there are many other proposals for smart transportation we have come up with a unique way of approaching it. The aim is to provide smartness to the existing transportation system so that it becomes efficient and user-friendly for the public. The public need not depend on the paper tickets anymore and instead can have a smart RF ID with themselves which is not a big issue since its just credit card sized. One big advantage with this system is that public who are waiting to board can know the number of passengers in the vehicle and can decide whether to board or not beforehand. By this way the higher authorities can also see if there is a scarcity in any particular route and can immediately send more vehicles in the particular route. Using this technique, the congestion of the vehicles can be reduced and it will be easier for the public to make use of the public transportation system.*

Keywords: *Smart transportation, RFID, Access, Congestion, Prediction*

I. INTRODUCTION

The economic growth and comfortable circumstances play a major role in the developed cities [1]. The population of India is increasing significantly from a range upto 540 million by the year 2021. The number and size of population in cities grows tremendously. Increase in the population means increase in the number of vehicles and a need of better transportation system. India have experienced tremendous increase in number of registered vehicles from about 0.3 million in 1951 to about 210 million in 2015 [2],[3]. With the increase in population responsibilities to maintain the quality of living also increases. A better urban transportation system for the people to commute increases drastically [4].

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The lack of good public transportation system causes people to depend on their own modes of transportation which in turn increases the vehicle rate in the roads and eventually leads to traffic and congestion. The present transportation system could not tackle this sudden upsurge of traffic impelling transportation system [5],[6]. It is found that there are various buses for the same route and congestion inside the bus during peak time are found to be a very great problem for the public who travel via bus. These reasons mark the need of smart transportation system. Smart or Intelligent transportation system is the application of present age technologies in the field of transportation.

The ticket provided for the passengers in the current system are paper based which is the main drawback for the prediction of people count in the bus are unknown to the persons who are waiting for the bus [7]. This system aims to provide intelligence to the existing transportation system so that it becomes efficient and user-friendly for the public [8]. Smart transportation using RFID is one of the intelligent systems which will be useful to tackle the above-mentioned problems. By using this way we can automate the ticket system in the public buses and also can help to identify the intensity of crowd in a particular bus. This system also increases the accessibility and maintainability of the public bus transportation and can decrease the congestion caused by the present system.

II. EXISTING SYSTEM

The head count of the passengers in the current system are calculated by the conductor in such a way that it exceeds the bus population limit. The people who are waiting in the stop to catch the bus are not aware in advance about the congestion in the bus which increases the waiting time of every individual to catch the bus [9]. This is because the general ticket fare in the buses are processed by the conductor where they collect money from the passenger and issue ticket in printed papers or via token.

The main disadvantage in this system is that the passenger must carry necessary bus fare with proper change. and they have to take care of the ticket till they reach the destination. In addition to this the process of dispensing ticket takes some time and adjournment arises during peak hours.

The passengers in the bus can trickster the conductor by providing fake notes or with not the correct amount. In the other way the conductor may not provide right ticket or not returning the right change. Upon the congestion in bus some may travel in footboard which may lead to disaster. Monitoring such activities in the bus is found to be tedious task for the government.

III. LIMITATIONS IN THE EXISTING SYSTEM

The current transportation has various issues that are listed below:

- 1) Congestion in bus
- 2) Paper based ticket issuing
- 3) Difficulty in money transaction while issuing the ticket
- 4) Missing the analysis for choosing the less populous bus
- 5) Peak time additional bus suggestion cannot be initiated

This can be astounded with the recommendation based prediction system developed by the upcoming proposed framework.

IV. PROPOSED SYSTEM

The number of passengers traveling in bus has its limitation which is often violated during peak hours that causes congestion and insecurity. In general, the passengers who are waiting for bus are not aware of the congestion within bus in advance. This is because the current bus system does not have intelligent way for prediction processing. But it can be achieved once when the system is made automatic. Each passenger is provided with a rechargeable swipe card which avoids cash transaction with the maestro.

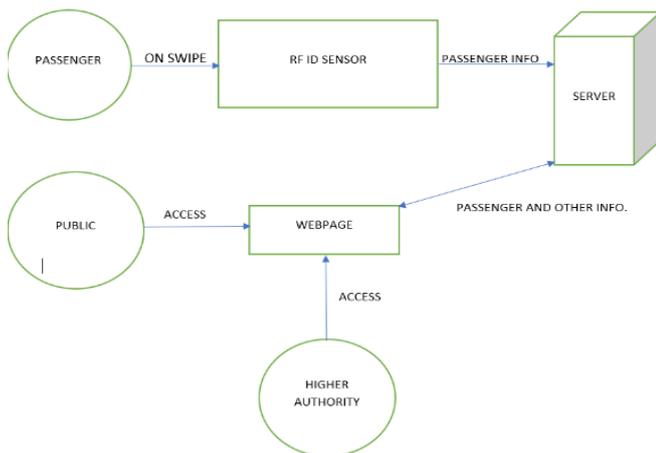


Fig. 1. General Architecture of the proposed work

The Fig. 1. Shows the general workflow of the proposed system where the ticket can be issued to the passenger on-swipe technology. The details were updated in the server based on the entry and exist of the passenger.

The recommendation based on prediction for choosing the bus is visible to the passengers who waits for boarding.

A. TICKET ASSORTMENT SYSTEM

For each vehicle in the bus there will be a RFID reader. The RFID reader will be with the conductor so that each person entering the bus can swipe with the rechargeable card and this will add up to the count of passengers in the bus. The density of the bus and number of vacant seats are updated by this way.

B. UPDATION IN THE DATABASE:

Many passengers enter and exit from the bus on the basis of the destination. So continuous updation in the database occurs timely. This information helps in analyzing and

choosing the vehicle for further travel. The people who have planned to travel to a particular destination from their current source can view the online live data by providing the necessary information as shown in Fig. 2.

LIVE DATA

SOURCE :-	XXX
DESTINATION :-	YYY
DEPARTURE TIME IN HR:MIN FORMAT	17:00
NUMBER OF SEATS:-	<input type="text" value="2"/>
<input type="button" value="Submit"/>	

Fig. 2. Data Gathering from the passenger

Upon giving the source, destination and timing by the passenger the entire details are connected to the database as shown in Fig. 2.

Data Streaming Bus Intelligent System				
Source	Destination	Bus Number	Timing for Current Bus	Passenger Count
XXX	YYY	1234	17:05	34
		1342	17:15	31
		1432	17:20	39
		1324	17:25	28

Fig. 3. Sample Streaming of data

The Fig. 3. shows the live data inside the bus where the number passengers inside the bus gets updated at once when the passengers gets the ticket via RFID and the count gets automatically reduced when the passenger get down at the desired station.

C. PREDICTING AND CHOOSING THE TRANSPORT

On the giving the source and destination various time slots with head count gets displayed on the screen of the application that provides recommendations in choosing the bus based on the congestion inside the bus.

LIVE DATA

Bus Number:1234

Timing : 17:06

TOTAL NUMBER OF PASSENGES IN THE BUS:34

Prediction : Bus Not Congested

Fig. 4. Recommendation data analysis

Fig. 4. indicates the output displayed in the application that recommends the current bus that is on the way is not congested. The passenger who likes to travel via that particular route can make their plan However the below Fig. 5. provides the entire structure of the intelligent system that helps the passenger to plan their travel accordingly.

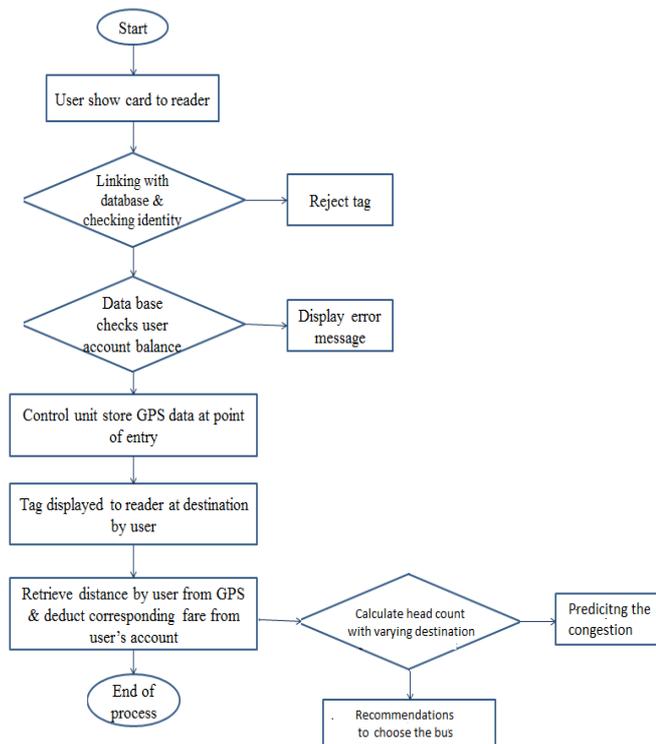


Fig. 5. Overall Bus Intelligent System

D. MONITORING THE PUBLIC TRANSPORT

The transport cooperation team can manage and maintain their transportation system via online by providing excess bus or reduce the bus count based on the congestion. When the number of passengers traveling count increases during peak hours on weekdays then the transport cooperation can provide excess bus on requirement basis to help the public. So that this can help to improve the transportation system much smarter than usual and avoid congestion.

Feedback is found to be an important component for developing smartness in the transportation.

We love to hear your ideas!
What would you like that would make us better?

Write your feedback here...

Submit feedback

Fig. 6. Feedback from the traveler

Feedback system introduced here creates a bridge between the passenger and the transportation department. With this feature feedback from the passengers were sent to the higher authorities which can be monitored regularly for improvement of bus transportation system.

V. CONCLUSION

The proposed smart transportation opens a new era in the public transport congestion. The work has been emphasized on to make the public transportation system user friendly. The use of IoT in the project and the Arduino based RF ID sensor is economically more suitable for the current scenario. As the sensor has been connected with the webpage where anyone can openly access it to view the passenger related information like the number of passengers in the vehicle. It is also easier for the higher authority to manage the transportation much smarter than usual. Further our application supports in providing alarm monitoring system for women safety, tracking the bus provide feedback regarding the travel to make further improvement in the public transport.

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