Smart Public Transport System using Android Application

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ABSTRACT: As population is growing, the traffic management issues and public transport service information awareness is the need for passengers to be updated about. Thus, we propose a GPS based Intelligent Public Transportation System which provides the solution to most of these issues by combining existing technologies .This is a real-time system for tracking of public buses from any location at any time. With the advent of mobile technology and IOT in this system, one need not wait for the bus to arrive for a long time. The user is made aware with precise information about the current location of nearest buses approaching the bus-stop, average travelling time, adaptive travelling time dynamically, real-time seat vacancy on a mobile application. The passengers can get the desirable bus information like waiting time to help them decide when to catch which bus. Here, technologies like GPS and Android app are used which can satisfy passengers who travel by the means of public transport.

KEYWORDS: GPS, Wi-Fi module, Android, Web Server, IOT.

I. INTRODUCTION

Public transportation in today's world in urban places demands to increase rapidly due to the factors like population growth, travel means and availability. This requires designing a systemthat is affordable, reliable and economical from the user's perspective. Services are mostly run by government owned transport companies. This paper is to implement a user-friendly application that facilitates the public transport of the cities for effective journey for the commuters; thus reducing their waiting time .It can also help the Transport Department to manage an efficient public transport system by tracking of buses and others factors to be considered for buses during its travelling time. Abundant applications have been developed in market today which give the required details such as bus-routes, itstimings, and prediction of arrival and departure time of different buses. The paper presented here aims to build an android application that takes it to next levelby facilitating the passenger's details about the vacant seats, bus-timings and the current location of any bus in a real-time environment. The details would be made accessible to all the passengers using this application anytime anywhere using the concept of Internet of Things (IoT).

In existing system, waiting time is not provided and present conditions of buses as well as vacancy of seats are still not known. Thus, to overcome these vulnerabilities in the existing system, the system "Smart public Transport System Using Android Application" is being developed using IoT.

II. SAMPLE APPLICATION SCENARIO

This is a dynamic and a real-time application. It uses GPS module for tracking location of buses and Wi-Fi module for Internet connectivity for the system to get continuous server updates. An Android application is being developed for the users (client-side) where they can at any time or when travelling use it. Basically, the user just have to enter only the destination address and the source address as the input will be automatically generated in this application. Just by clicking on Get bus details, the passengers will get to know the required bus details in a tabular and well organised format. The functional details like average travelling time, adaptive travelling time dynamically, real-time seat vacancywould be sent to the passengers. As user requests, the server will immediately retrieve and update the information received from and to the database. Server will continuously and dynamically update all the details and will send the required details back to passengers saving their time in waiting for the buses.

III.PROPOSED ALGORITHM

A. *Design Considerations:*

- Passenger/user login page.
- Admin login page.
- Server for taking requests and responding them back.
- GPS module to track information.
- GPS and Arduino to send dynamic data to the server.
- Database to store data.
  .

B. *Description of the Proposed Algorithm*

- List of buses with different routes travelling to the same destination would be given in a tabular and well organized format and would be sorted according to the waiting time of each bus coming near the bus-stop.
- On basis of waiting time, passengers can choose the bus they desire.
- To calculate waiting time, shortest path algorithms are being considered.
- Four basic functionalities provided in the proposed system are:
  1. **Average journey time for the bus:** Overall and approximate time required for journey from source to destination.
  2. **Adaptive travelling time for the bus (passive):** Time calculated when the bus starts and is travelling towards its destination.
  3. **Adaptive waiting time for the buses (active):**Time calculated according to current conditions for the bus to reach its stop.
  4. **Real-time seat vacancy:** Dynamically updated information about the number of passengers in the bus according to current scenarios.
- E.g.Dijkstra's algorithm.

Pseudo code for Dijkstra's Algorithm:

```
function Dijkstra(Graph, source):
•      create vertex set Q
• for each vertex v in Graph:     // Initialization
•   dist[v] ← INFINITY        // Unknown distance from source to v
• prev[v] ← UNDEFINED       // Previous node in optimal path from source
•        add v to Q// All nodes initially in Q (unvisited
   nodes)dist[source] ← 0                  // Distance from source
    to source
whileQ is not empty:
u ← vertex in Q with min dist[u]  //Node with the least distanceselected
first
remove u from Q
• for each neighbor v of u:          // where v is still in Q.
alt ← dist[u] + length(u, v)
```

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```
• if alt < dist[v]:              // A shorter path to v has been found
•                  dist[v] ← alt
•                  prev[v] ← u
• return dist[], prev[]
```
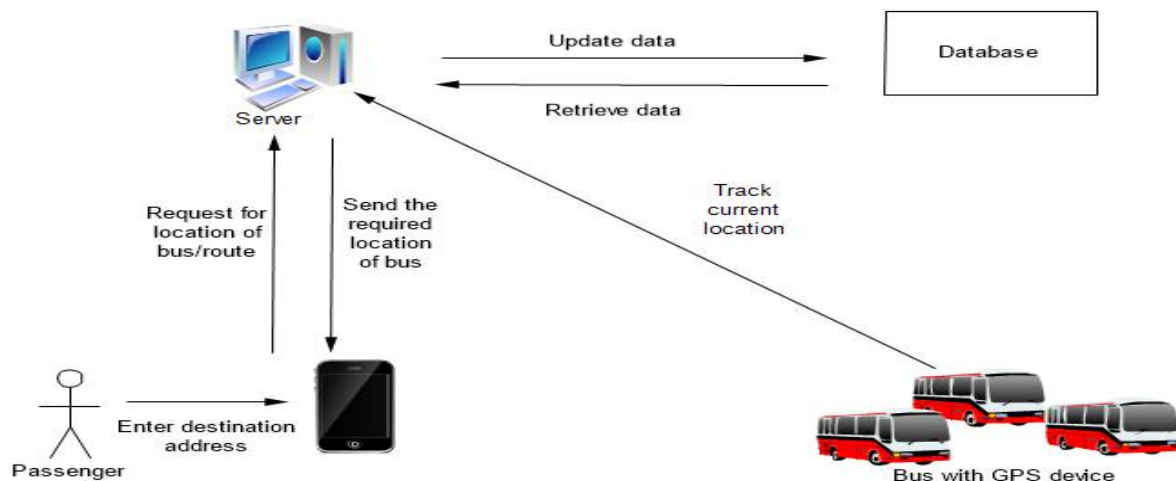
V. PROPOSED SYSTEM ARCHITECTURE

Fig: Smart Public Transport System Architecture

Smart Public Transport System was previously based on the regular manmade timetable the passengers standing on stop except main depot have to suffer from the various bus issues. Previously the passenger is completely unknown about the location of bus and the arriving time of the bus. Sometimes the bus fails so passenger does not know until the next bus comes also if the bus is crowded or not or the passenger should choose another option to reach their destination.

Then the Google maps was showing some interests towards this but not completely like the waiting time is the same and condition of bus as well as vacancy of seats was still not known. The solution for this entire problem is "Smart public Transport System Using Android Application"
Which will overcome the problem.

In previous system there are many disadvantages such as passengers are not known when the bus will arrive, even though they know when the bus is coming then they are totally unaware of vacant seat in bus. The main disadvantage was the passenger was waiting for bus even if bus broken down because there is no way that the passenger will know he bus is failed.
Every GPS tracking system is a common approach to get vehicle location information in real-time. The proposed system uses this advantage only. The system includes GPS/GPRS hardware for location acquisition and data transmission. GPS supported Android application for city Bus scheduling and tracking system develop a GPS supported application for android to track a city bus and displaying data. The architecture is broken into two part one is client that is user side and another one is server side.

IV.CONCLUSION

By using this system, users will be made aware of the updated information of the buses reaching their destination easily. This is a dynamic and a very user-friendly, cost-free application developed using technologies like GPS and Android Application for the users to plan their public travelling in buses in a much easier way. This system can also be useful to the Travel management department for the efficient management of public transport system.

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