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✉ ijareeie@gmail.com

@ www.ijareeie.com



Bus Tracking and Passenger Counting System

S.Karnaboopathy , R.Kiruthigu Raja , R.Sudharshan , S.Arjun, Dr.D.Periyaazhagar

UG Final year students, Department of Electrical and Electronics Engineering, Krishnasamy College of Engineering and Technology, (Affiliated to Anna University), Cuddalore, India.

Associate Professor, Department of Electrical and Electronics Engineering, Krishnasamy College of Engineering and Technology, (Affiliated to Anna University), Cuddalore, India

ABSTRACT: In the 21st century majority of the human race uses transportation daily to commute to various places. A significant portion of daily hours are spent commuting, hence the transportation system needs to be efficient and effective. Various problems such as an irregular bus schedule and overcrowding are faced by the public transport systems in major cities in India. To overcome these problems a GPS based tracking system and IR sensors based passenger counting system is being used. The proposed system lets the passenger's track the bus on a particular route by getting the information sent on their cell phone. The real-time location of the bus is provided along with the approximate count of the number of passengers riding on the bus. This allows the passenger to know the estimated time of arrival (ETA) of the bus and gets the information about whether the bus is crowded or not. This allows the passenger to decide whether to wait or the upcoming bus or would he/she will have to ride the next bus after that. This also leaves them with an option to pursue other means of transport immediately rather than wait for a long period of time waiting for the bus and then deciding otherwise. This reduces the time and effort by a huge portion and makes the journey comfortable.

I. INTRODUCTION

population will be residing in the urban areas, according to a survey conducted by the UN State of the World Population. Many major cities are experiencing a rise in rural-urban migration. There is an influx of migrants from various parts of the country to major cities which puts a strain on its transportation systems. The middle-class working population is heavily dependent on public transport for the daily commute. Train and bus transport system comprised of a major role in public transport. Road transport incorporates bus transport systems. Busses make up to 90% of the total public transport in Indian cities.

Bus passengers commute can be made easy if they are informed about the arrival of the bus beforehand. Most passengers aboard the first bus which arrives and it gets packed to its full capacity as the passengers are unsure about the arrival time of the next bus.

II. LITERATURE REVIEW

Smart Bus Station - Passenger Information System

Cemil Sungur, Ismail Babaoglu, Aysegul Sungur

The people who use inner city public transportation vehicles want to get information about the current status of the public transportation vehicles and they want to know the travel time of the vehicles both while travelling and waiting at the bus stops. In this study, a smart bus stop- passenger information system was developed in order to enable administrators effectively monitor the public transportation system.

The smart bus for a smart city - A real-time implementation

S. Sharad, P. Bagavathi Sivakumar, V. Anantha Narayanan

The need for a real-time public transport information system is growing steadily. People want to plan their city commutes and do not like waiting for long hours, nor take a long route to reach their destination. The proposed hardware solution in this paper computes the shortest path to reach the destination in real time and gives that information to the bus driver. Artificial Neural Networks (ANN) is used to give an accurate estimate of the arrival time (ETA) to the commuter by means of an application.



Smart Bus Tracking and Management System Using IOT

K. Sridevi, A. Jeevitha, K. Kavitha, K. Sathya

Bus tracking is an application that tracks a bus and gathers the distance to each station along its route. Tracking System involves the installation of an electronic device in a bus, with an installed Android App on any SMART phone to enable the Administrator/User to track the bus location. Based on IOT this project is implemented as android application. There are two applications one for server and the other for the client. Buses carry GPS devices to track their positions.

II. EXISTING SYSTEM

- Tracking of the bus is proposed but the seating arrangement and vacancy of the seat is not proposed.
- It only shows the location, route of the bus and the bus number.

DISADVANTAGES:

1. Developing and maintaining the technology could be expensive, especially for smaller transportation agencies or companies.
2. Technical complexity : Integrating real time tracking, passenger counting sensors and data analytics may require advanced technical expertise.

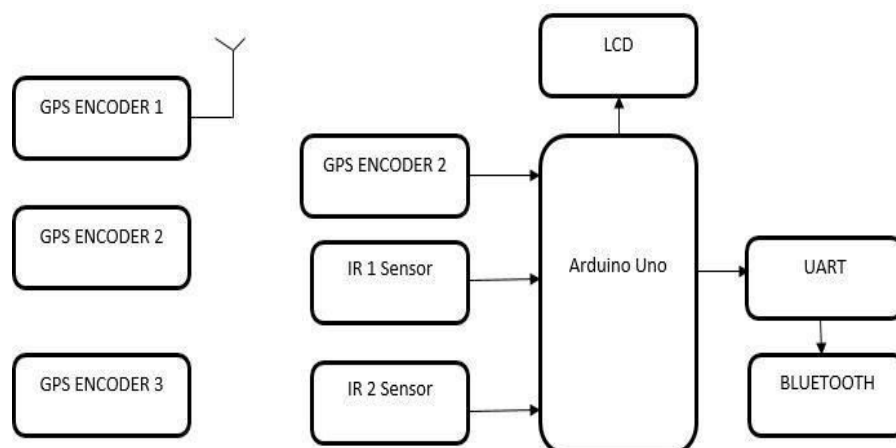
PROPOSED SYSTEM

A user gives input in the form of source and destination stops on a particular route. The route will consist of multiple stops. GPS modules are installed on the bus. The GPS module tracks the location of the bus in real time and sends the data to the server. To send data to the server Arduino module is used as it has built-in support for blue tooth connectivity. This data is constantly updated to the server and real-time data is continuously provided to the user .The estimated time of arrival (ETA) taking into consideration the traffic conditions is displayed. Number of passengers enter and exit is sensed.

ADVANTAGES OF PROPOSED SYSTEM:

- The most attractive feature of this system is its 100% coverage on the planet.
- GPS-GSM based solution does not work in rural areas due to poor signal strength and network connectivity problems.

BLOCK DIAGRAM:





COMPONENTS

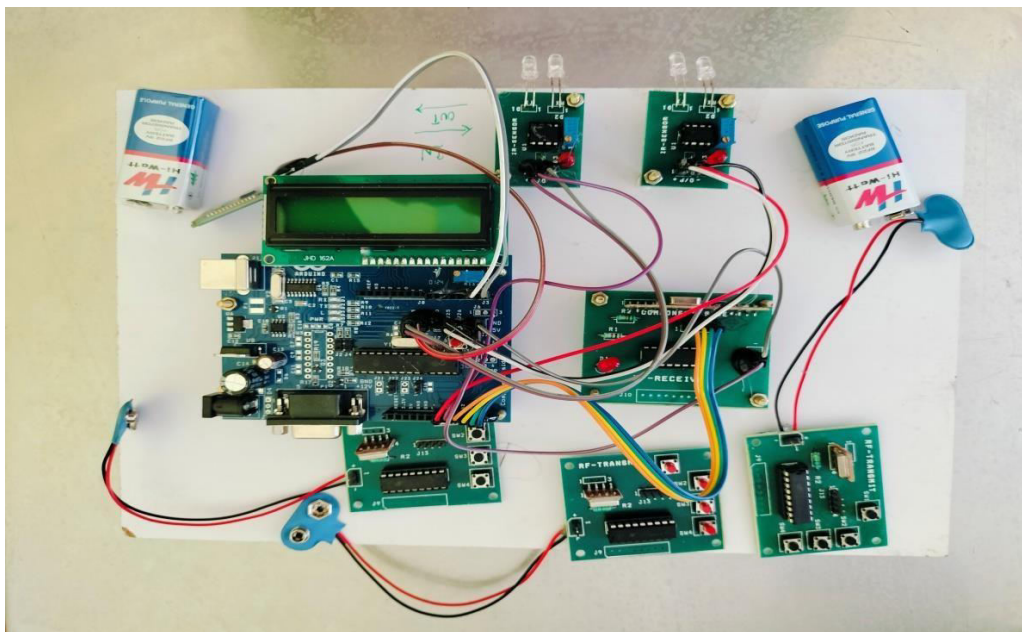
ARDUINO UNO : The Arduino Uno is a small computer that you can program to control electronic circuits. It's popular because it's easy to use and versatile, making it great for hobbyists and professionals to build all sorts of projects.

LCD Display : These displays are commonly used in various electronic projects, such as Arduino-based devices, to provide visual feedback or information to the user. They are relatively simple to use and offer a cost-effective way to incorporate text-based output into electronic projects.

IR SENSOR : An IR sensor detects infrared light, which is invisible to the human eye. It's used in electronics for tasks like detecting objects, sensing motion, and measuring temperature.

UART : UART is a common hardware component that enables serial communication between devices. It's widely used in electronics for transmitting and receiving data.

PHOTOGRAPH OF MACHINE:



III. CONCLUSION

The "Bus Tracking and Passenger Counting System" project marks a transformative milestone in the evolution of public transportation infrastructure. Through meticulous planning, innovative technology integration, and rigorous testing, this project has ushered in a new era of efficiency, reliability, and accessibility in urban transit systems. By providing real-time tracking of buses and precise passenger counts, it has not only optimized route planning and resource allocation but also revolutionized the passenger experience. This comprehensive solution has empowered transit authorities with actionable data insights, facilitating informed decision-making and continuous improvement. As a result, the project has not only enhanced the efficiency and effectiveness of public transportation but has also significantly contributed to the development of smarter, more sustainable cities.

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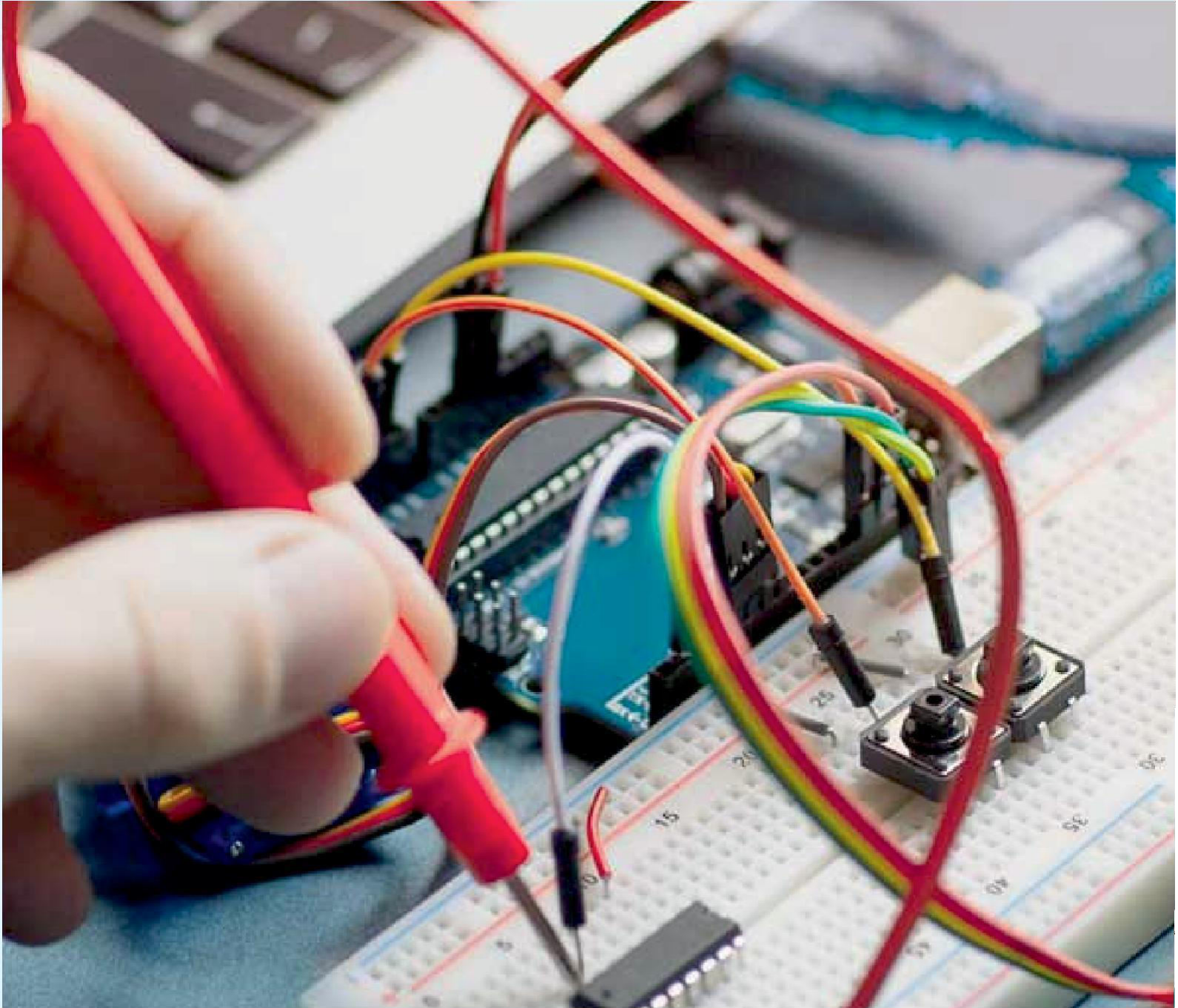
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