Smart Bus Tracking System Using Nrf Technology

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Abstract: 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 system/SMART phone to enable the Administrator/User to track the bus location. Based on NRF this project is implemented as android application. There are two applications one for server and the other for the client. Buses carry NRF transmitter which transmit its ID and each bus station will have a NRF receiver which will receive transmitted ID from the bus. By this positions to server are periodically updated. Client application displays the position of bus. It shows where buses are and provide the updated information at different time interval using RTC. The server will monitor location and will store its data in the database. It is a real-time system as this method automatically sends the information on Wifi system to a system/SMART phone. The people can get flexibility of planning travel using the app, to decide when to catch the bus. Arduino UNO microcontroller is used to programming for software and hardware module. And it is connected to the cloud and following through the android app. The waiting time of the user can be reduced. Simple mode of communication is the key feature of the Bus Tracking system. This application can be easily extended for central tracking system to keep track of all the buses. The different queries and efficient route management can be easily done through central server system.
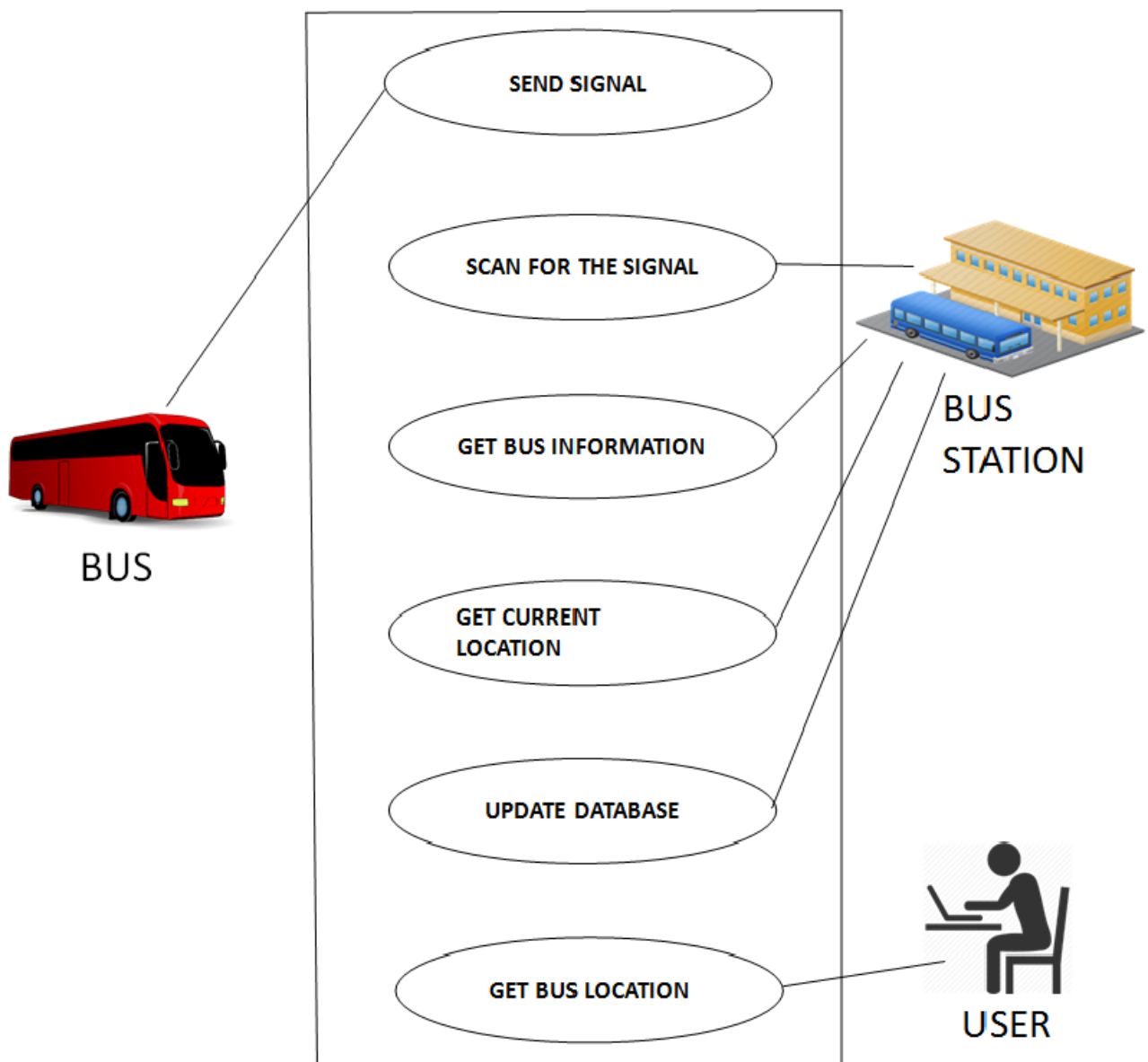
Keywords: NRF, RTC, Arduino UNO

1. INTRODUCTION

In our City many people are not aware of exact timing and location of the local buses. So we have planned to implement a smart bus tracking system for easy transport facility using NRF. The location of the bus is tracked using NRF Technology and sends the collected data to a remotely located server using NRF. Using application, people can locate the bus at any time when they need. The collected data is retrieved and processed by the server using an application that we installed. Bus transport system having many buses and that provides people for convenient travel from the long distances. But some are not aware of timing and directions of the buses. In this case we have planned to do a project for easy transport system. In our project we develop an application on smart phones and website to monitor a location and timing of the college bus using NRF. It works using NRF technology designed to continuously monitor a moving buses for doing so a microcontroller is interfaced serially to a NRF transmitter and NRF receiver used to send the position of the buses from a remote place. NRF

places the major role that provides the all details of the buses through the application on the smart phones for easy transport system. This android application will be helpful to people for convenient transport system.

2. DESIGN

USE CASE DIAGRAM

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Due to rapid increase in population, there is need for efficient public transportation system. There is increased burden on public transportation like bus just because of population. Therefore remote user needs a smart system which provides real time information of bus. So we proposed a new system which solves the drawback of current public transportation system. So our system handles all the data like current location of bus, management of buses and its schedule. The real time tracking of bus can be done by our proposed system.

3. REQUIREMENTS FOR THE PROJECT

Hardware Interface

A. NRF

It gains its name from the fact that it is able to provide '**S**hort **Ra**nge' communications using very low power levels. A NRF network can be arranged to provide coverage similar to that of a cellular network. Indeed many NRF operators are cellular network operators who will be able to use existing masts to mount NRF antennas. In some instances the NRF antennas may be combined with cellular antennas as the frequencies may be close and combining antennas will provide significant cost advantages.

B. WiFi

Wi-Fi also allows connectivity in peer-to-peer mode, which enables devices to connect directly with each other. Devices that use Wi-Fi technology include personal computers, Smart phones.

C. System/Smart phone

Used to get the tracked position of the bus.

D. Arduino Uno

It is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button.

Software Interface

A. PHP

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PHP is a server scripting language, and a powerful tool for making dynamic and interactive Web pages. PHP is a widely-used free, and efficient alternative to competitors such as Microsoft's ASP.

B. MySQL database

MySQL is the most popular database system used with PHP. The data in a MySQL database are stored in tables. A table is a collection of related data, and it consists of columns and rows. Databases are useful for storing information categorically.

C. Apache server

The Apache HTTP Server, colloquially called Apache, is free and open-source cross-platform web server software, released under the terms of Apache License 2.0. Apache is developed and maintained by an open community of developers under the auspices of the Apache Software Foundation.

4. IMPLEMENTATION

Our system provides the relevant information regarding all the bus numbers going from users source & destination along with the route details, real time location. Generally our system is operated by NRF which is attached with the bus. Firstly NRF receives the signals and then the positions are determined by it. The location is determined with the help of NRF and transmission mechanism. After receiving the data the tracking data can be transmitted using any wireless communications systems. A real time clock (RTC) is a computer clock that keeps track of the current time. In this project Arduino UNO is a microcontroller to program with RTC. Based on NRF the people can access this information of a bus based on users source and destination through the android application. Our proposed system gives the real time location of bus. Smart bus tracking technology is advantageous for tracking and monitoring a bus.
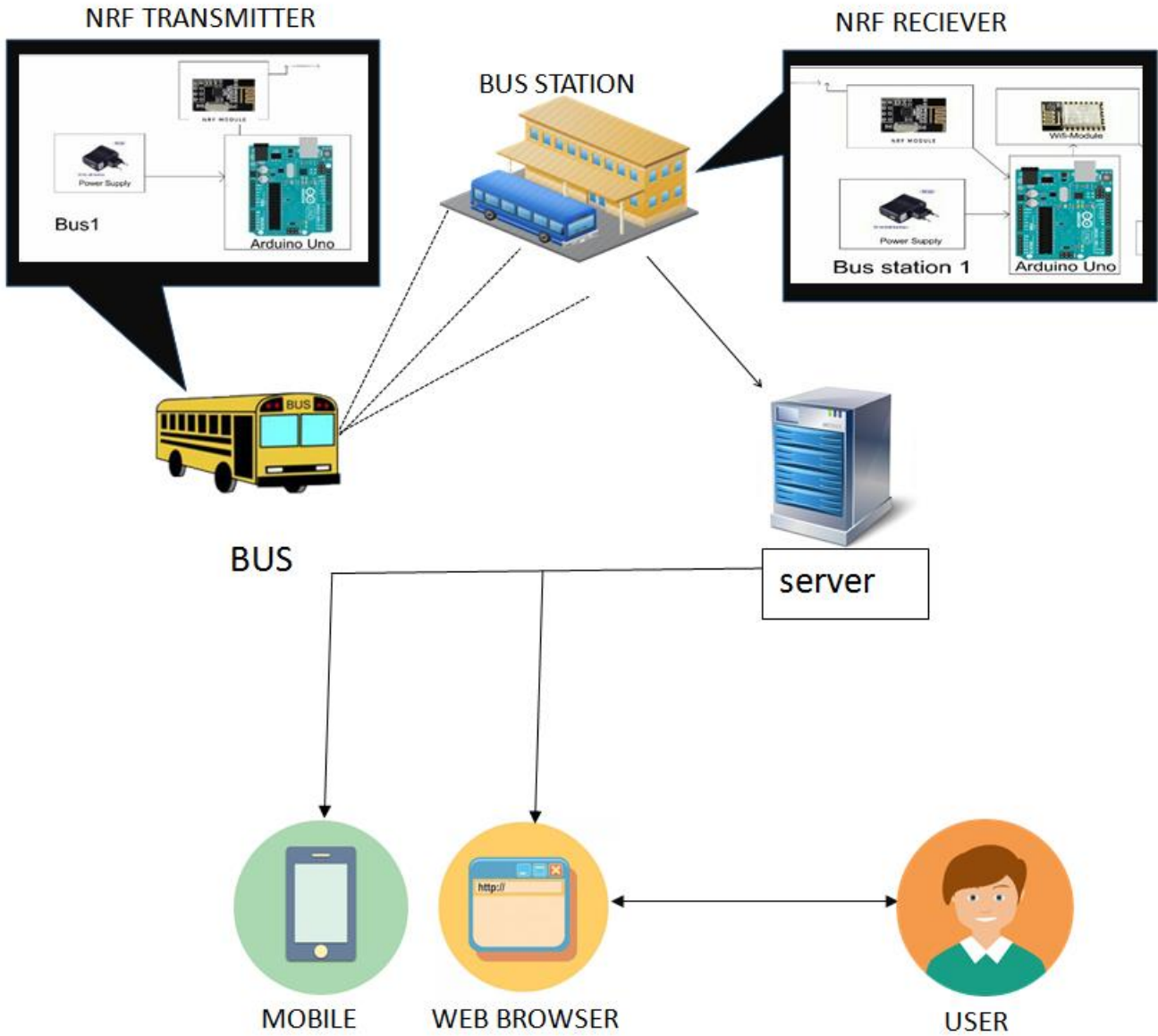
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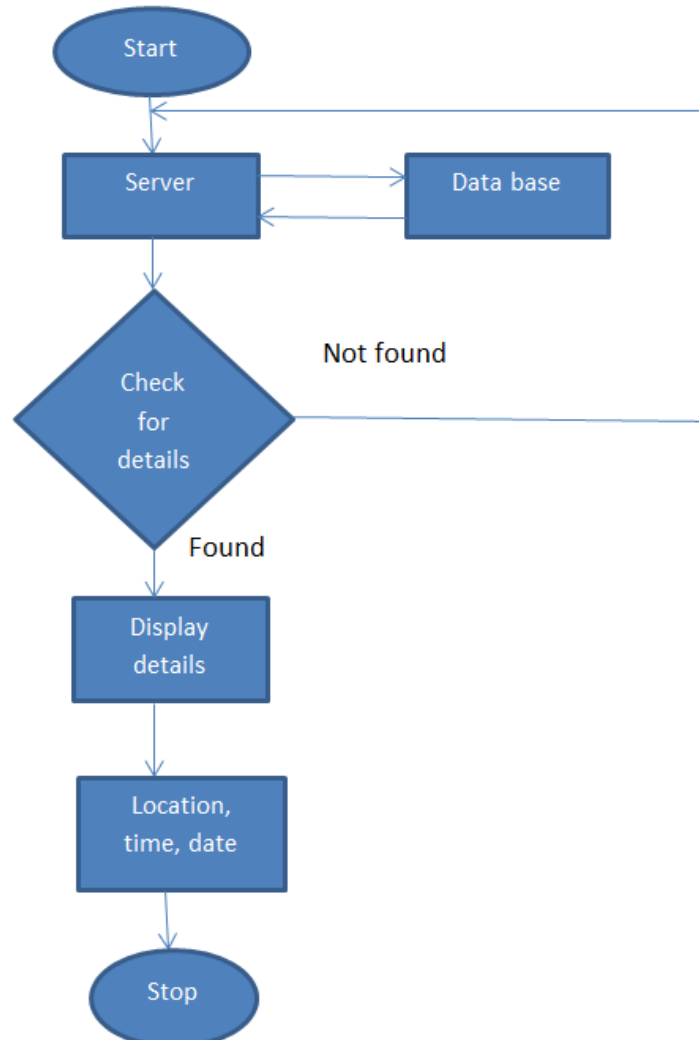
6. CONCLUSION

In this paper we have reviewed a various existing techniques of bus tracking. By implementing this idea, we can improve the transportation safety and the quality of services to the buses. The system will have latest technology and optimized algorithms with moderate cost. The android application gives the information about the bus for people. The proposed system is more user friendly than existing system. And it also gives greater performance. The

system may focus on accurate arrival time prediction and real time position of bus. The system can be installed in android phones.

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