Real Time Transportation System and Location Tracking Using Android Application

C. Harish Prasad, K. Rahul, R. Sathya Narayanan, D. Sivachidambaram
Department of Computer Science and Engineering, Sri Muthukumaran Institute of Technology, Chennai, India.

Abstract – There are buses made available for passengers travelling distances, but not many passengers have complete information about these buses. Complete information namely the number of buses that go to the required destination, bus numbers, bus timings, the routes through which the bus would pass, time taken for the bus to reach, maps that would guide the passenger with his/her route and most importantly, track the current location of the bus and give the correct time for the bus to reach its bus stop. The paper focuses on to develop bus tracking system which provides the basic information about the free seats available in the bus and current location of the bus using cellular network location. It provides basic information about the location of the bus and empty seats which helps the passenger to determine the time of reach to next destination point.

Index Terms – ARM cortex m4 controller, wifimodule, smartphone, seat sensors.

1. INTRODUCTION

There are buses made available for passengers travelling distances, but not many passengers have complete information about these buses. Complete information namely the number of buses that go to the required destination, bus numbers, bus timings, the routes through which the bus would pass, time taken for the bus to reach, maps that would guide the passenger with his/her route and most importantly, track the current location of the bus and give the correct time for the bus to reach its bus stop.

The proposed system deals with overcoming the problems stated above. The system is an Android application that gives necessary information about all the buses travelling in Pune. This information overcomes the problems faced in the previously built application "Pune Bus Guide". The platform chosen for this kind of system is Android, reason being Android Operating System has come up on a very large scale and is owned by almost every second person. Also, Android is a user friendly platform, thereby enabling ease of access for all the users. A number of applications made for the Android Operating System is increasing on a large scale ever since its advent. Android is an open source mobile software environment.

2. RELATED WORKS

RFID is a technology similar to that of bar code scanning. An RFID system consists of tags, which use radio frequency signals to transmit its location information to a reader, which usually sends this information to a server that processes it according to the needs of the application. This paper presents a system that can track buses across a city by placing RFID tags in the buses and the readers in every alternative bus stop. The local server for the city recieves the location information, and alerts the forthcoming bus stops in the route of the bus, of the bus' number, route and expected time of arrival, which are then displayed at the stop.This system thus describes is a cost effective and easy to implement scheme for tracking buses in real time.

3. PROPOSED SYSTEM

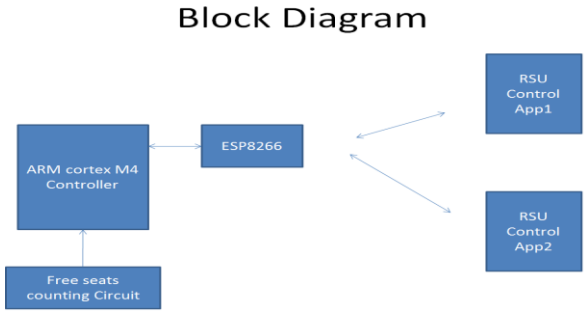
In the proposed system we provide a bus tracking system which provides the basic information about the free seats available in the bus and current location of the bus using cellular network location. It provides basic information about the location of the bus and empty seats which helps the passenger to determine the time of reach to next destination point.

The bus is equipped with ARM cortex m4 microcontoller to address digital signal control markets that demand an efficient, easy-to-use blend of control and signal processing capabilities, a wifi module is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor and seat sensors.

The core part is by using wifi module that is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor and seat sensor that present information regarding number of empty and occupied seats in the bus. The system is contolled by a ARM cortex m4 microcontroller which controls the esp 8266 module and seat counting circuit in the bus.

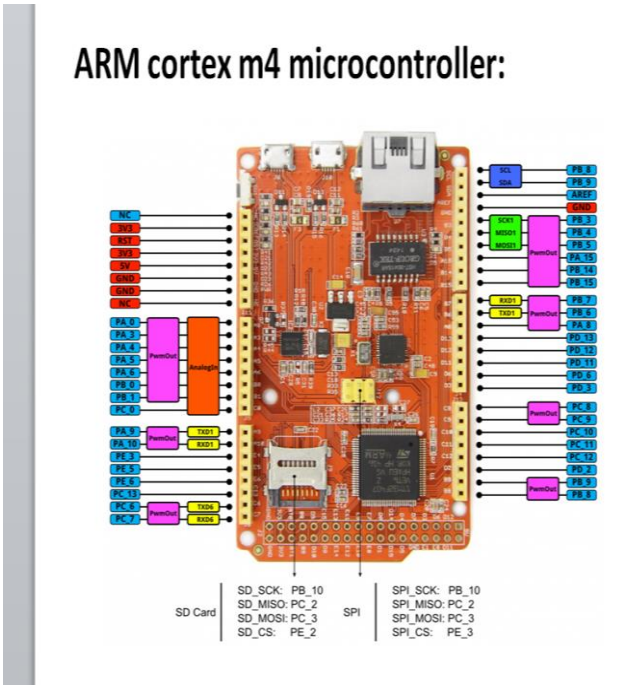
4. SYSTEM ARCHITECTURE

1. Hardware design



A. ARM Cortex-M4

The ARM Cortex-M4 processor is a high performance embedded processor with DSP instructions developed to address digital signal control markets that demand an efficient, easy-to-use blend of control and signal processing capabilities. The processor is highly configurable enabling a wide range of implementations from those requiring floating point operations, memory protection and powerful trace technology to cost sensitive devices requiring minimal area.

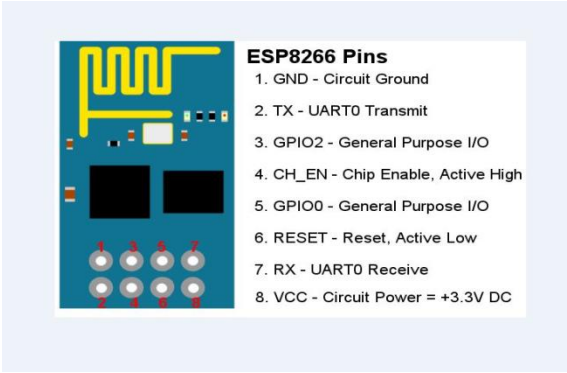


B.Counting circuits

Binary Counters are one of the applications of sequential logic using flip-flops. A counter is a device which stores (and sometimes displays) the number of times a particular event or process has occurred, in form of a clock pulse. Counters can be formed by connecting individual flip-flops together. On application of pulses, the flip-flops in the counter undergo a change of state in such a manner that the binary number stored in the flip-flops represents the number of pulses applied at input. When clock pulses are applied to a counter, the counter progresses from one state to another and the final output of the flip-flop in the counter indicates the pulse count.

C. Wifi Module:

The ESP8266 Wifi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wifi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wifi-ability as a Wifi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.



D.RSU control

With the remote system upgrade feature, enhancements and bug fixes for FPGA devices can be done remotely. In an embedded system environment, firmware needs to be updated frequently over the various type of protocol, such as UART, Ethernet, and I2C. When the embedded system includes an FPGA, firmware updates can include updates of the hardware image on the FPGA. MAX10 FPGA devices provide the capability to store up to two configuration images which further enhance the remote system upgrade feature.

2.Software design

1.Android SDK

Integrated Development Environment (IDE) is used in Android development in order to make it more straight forward and quick. It has been recommended for the developers because of its simplicity in working.

Android is basically a multitasking platform. To give an example, the application has one application for navigation, another application for games, and another messaging. These applications can work simultaneously because of this multitasking ability of the Android platform.

ii. ADT Plugin

ADT (Android Development Tools) is a plugin developed by Google. Its main purpose is for developing Android mobile applications in Eclipse. It makes it easy and convenient for all the Android developers working in Eclipse environment to quickly create Android projects and debug the programs whenever needed.

Text editor should not be used in the development of large applications having a large amount of code as the text editor cannot highlight wrong spellings.

iii. Android Emulator

Android emulator is a virtual mobile device which is included in every Android SDK which runs on the users computer. Android emulators are used to test Android applications, so there is no need of any physical device.

Android emulator supports Android Virtual Device (AVD) configuration, which in itself is an emulator containing specific Smartphone Operating System. Using AVD, one can easily test his applications.

5. CONCLUSION AND FUTURE SCOPE

The conclusions of this study suggest that knowledge of specific domain improves the results. This Project has been implemented on Android platform. Also, different attributes have been added to the project which will prove to be advantageous to the system. The requirements and specifications have been listed above. Using this system, the application will automatically display the current locations of the bus easily.This project will be put up on the cloud platform, so that it will be accessible by every Android user. The application will prove beneficial for every bus traveler, or even tourists. Not just buses, but this application will be useful for every person travelling by any means of transport. The Location Tracker will give the exact location of the bus which will make it easy for the passengers to travel.

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