

An Intelligent Bus Transit System Based on RFID & Wi-Fi Technology

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Abstract - Bus Transportation is still the most trusted and effective mode of transport for people as well as freight. However, the system is not full proof and it still lacks many of the much-needed technology to keep itself in tune with modern days. Due to the good maintenance of roads and the inherent problems with long distance road transportation, often the bus is preferred for transport of both people and goods. To earn the trust of the people and to cater to the ever-increasing demand, Buses should consider a number of initiatives including increasing the number of people, building more bus stands in urban areas. Capital becomes the need to serve all these and for ensuring high quality and customer satisfaction. Since money saved is money earned, the paper describes in depth on initiatives that could be incorporated with relative ease that could present solutions for a few major problems like cashless transaction and paperless ticketing. The paper based on RFID technology also proposes system to track route area, bus and store its information.

Key Words: RFID tag, Cashless, Paperless, RFID reader, Wi-Fi Module ESP8266, STM32F103C8, GSM Module Sim900.

1. INTRODUCTION

The project proposes usage of electronic tickets & curbs the conventional paper tickets in order to ensure smart & reliable working. The project is based on Radio frequency Identification (RFID) which is a wireless identification technology that uses radio waves to identify the presence of RFID tags. We are using ARM Cortex-M3 32-bit RISC processor for enabling all the operations including the identification of RFID card through reader, then deducting the amount of ticket fare through an account associated with it. The GSM module SIM 900 ensures message delivery on the passenger's mobile. An IOT cloud consisting of ESP8266 module makes sure the required authenticated information is stored in the database. Security is ensured through cryptography to avoid illegal access to the stored information. The project further emphasizes & promotes smart & efficient economical transactions & will be a boost for cashless economy.

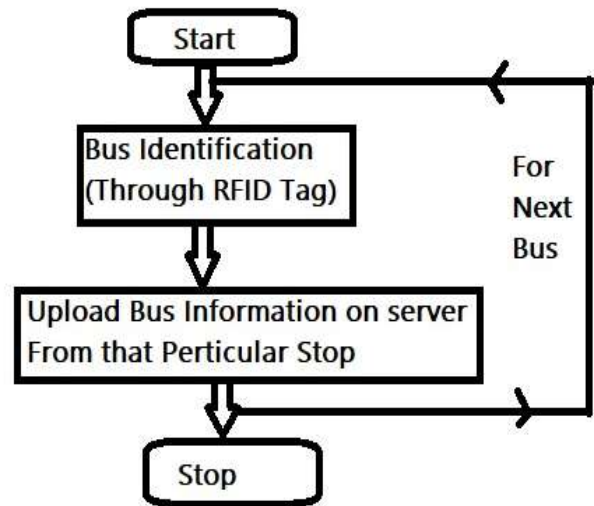


Fig -1: Flow chart for Bus tracking

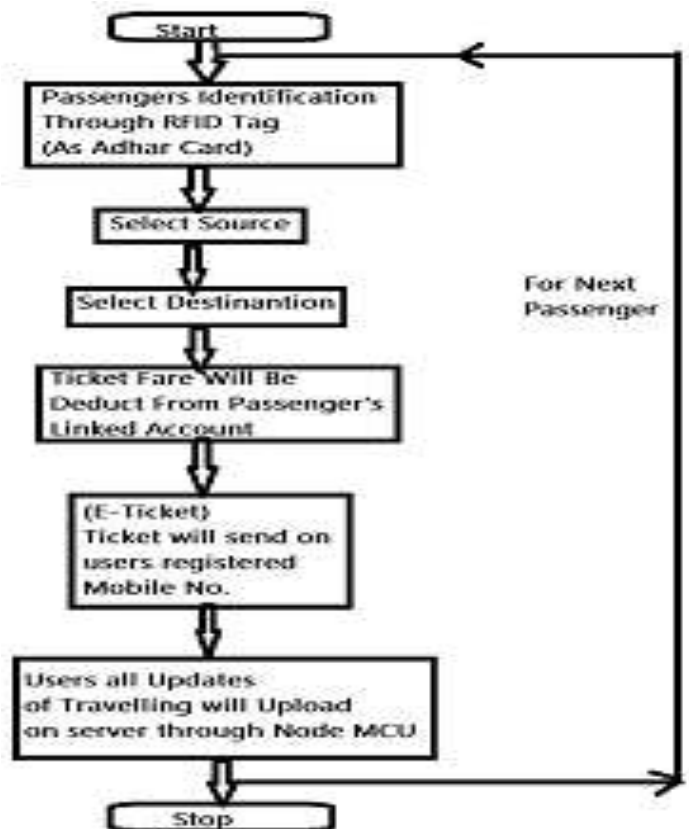


Fig -2: Flow chart for Ticketing

2. Block Diagram

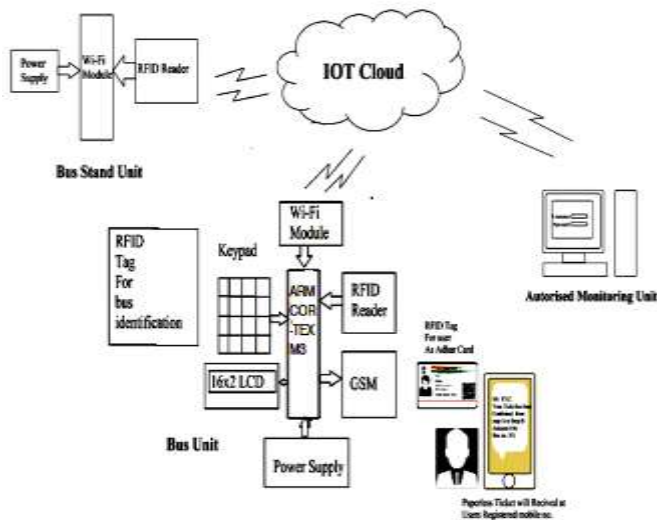


Fig -3: Block diagram

Radio frequency Identification (RFID) is a wireless identification technology where digital data is encoded in RFID tags and is captured by reader through radio waves. Similar to Bar code reader, RFID technology identifies people, objects in their presence. Bar code technology is based such that, the bar code is optically scanned by keeping in front of reader, but for RFID technology we bring RFID tags in range of readers. Even, barcodes get damaged or unreadable, while it is not the case for RFID.

RFID Tag

This card must be unique id of user aadhar will be printed on this kind of id so that this card can be recognized by RFID reader every person will have its own id.

STM32F103C8

The STM32F103xx medium-density performance line family incorporates the high-performance ARM Cortex-M3 32-bit RISC core operating at a 72 MHz frequency, high-speed embedded memories (Supports flash memory up to 128 Kbytes and SRAM up to 20 Kbytes), and also includes extensive range of enhanced I/O and peripherals connected to two APB buses. All the devices provide three general purpose 16-bit timers plus one PWM timer, two 12-bit ADCs and also consist of standard and advanced communication interfaces: three USARTs, an USB, a CAN, up to two I²Cs and SPIs.

3. Hardware Simulation

A real-world process or system is imitated through simulation. The act of simulating something first requires that a model be developed; this model represents the key

characteristics, behaviors and functions of the selected physical or abstract system or process.

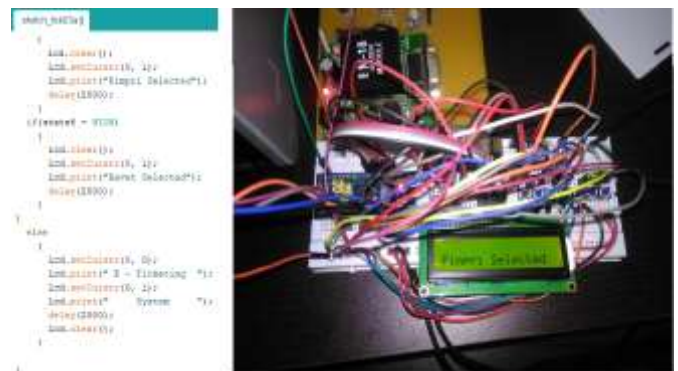


Fig -4: Source Selection with code

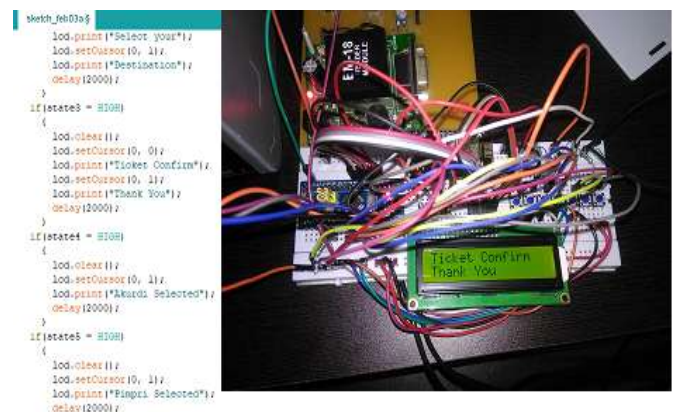


Fig -5: Ticket Confirm with code

4. Future Scope

Promoting cashless India, this is a concept which will find its way in public as well as private transportation system. Adapting to this we are creating smarter atmosphere and encouraging technology innovations which would replace the traditional methods and modernize the society for better growth.

5. CONCLUSIONS

The project ensures cashless tickets through use of RFID cards, the RFID card is read by reader & user authentication is carried out and the required fare cut is indicated on a mobile phone, an IOT cloud is set up through ESP8266 Wi-Fi module and required authenticated information regarding passenger & bus route is stored in the database. At the same time security is ensured through cryptography.

6. RESULTS

The project eradicates the conventional paper based existing system, by providing a technologically advanced RFID based ticket system at the same time emphasizes faster operation & security, differentiating it from the prevailing systems.

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