CONDUCTOR LESS BUS TICKETING SYSTEM USING RFID AND GPS

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ABSTRACT

Smart Bus Fare Collection System implemented by RFID card. This is a user friendly system, which will automatically identify the passenger and deduct the passenger's fare according to the distance travelled. The Radio Frequency Identification (RFID) card is used to make the identification of passenger and transaction very precise. Compared to the paper based ticketing system using of RFID cards are more convenient and reusable. RFID cards are distributes among the public. By collecting the personnel details an account will be created and unique ID will be assigned to each person with RFID cards .By accessing this database, it is thus possible to identify the traveler, check his account and deduct the fare from his/her account. Creating database facilitates efficient filtering of anti-social elements and gives firm assurance to both passenger and Public Transport System (PTS) about the transaction.

Keywords: IR Sensors, Esp 32, Wi-Fi,Servo motor, Rfid &Internet of Things.

I.INTRODUCTION

A methodology for estimating the destination of passenger journeys from automated fare collection (AFC) system data is described. It proposes new spatial validation features to increase the accuracy of destination inference results and to verify key assumptions present in previous origin-destination estimation literature. The methodology applies to entry-only system configurations combined with distance-based fare structures, and it aims to enhance raw AFC system data with the destination of individual journeys. This paper describes an algorithm developed to implement the methodology and the results from its application to bus service data from Porto. The data relate to an AFC system integrated with an automatic vehicle location system that records a transaction for each passenger boarding a bus, containing attributes regarding the route, the vehicle, and the travel card used, along with the time and the location where the journey began. Some of these are recorded for the purpose of allowing onboard ticket inspection but additionally enable innovative spatial validation features introduced by the methodology. The results led to the conclusion that the methodology is effective for estimating journey destinations at the disaggregate level and identifies false positives reliably.

II. LITERATURE SURVEY

PaulHamilton and Suresh Sankaranarayanan (2013) proposed in this paper consists of a RFID which is used for recording the timings of the buses and it is done with the help of sensors situated in the traffic stop lights, intersections and other places. This timings will be send to the person's mobile phone whose RFID is used for getting the bus timings and also the persons details is also stored in the RFID for future details.

Arun Das .S .V and K. Lingeswaran (2014)proposed in this paper consists of a smartcard which contains the information about the users and Global Positioning System (GPS) is used to track the locations, so that the distance can be calculated and the amount is debited from the smart card.

Paul Hamilton and Suresh Sankaranarayanan (2014) proposed in this paper consists of RFID,Global Positioning System (GPS) and LCD. The location of the buses are identified by the GPS and the arrival time of the buses are send to the bus stops where it is displayed using LCD's. The RFID is also used for tracking of the buses.

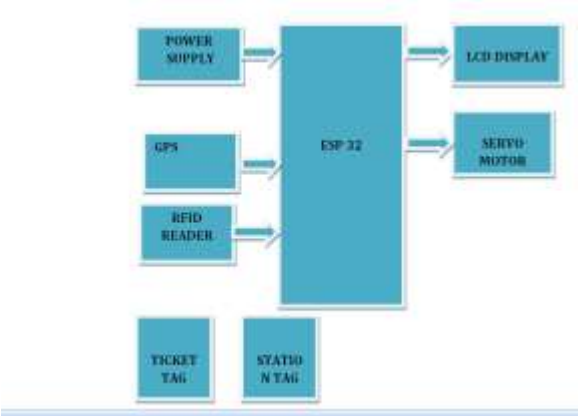
III.EXISTING METHOD

In existing methods, for fare allocation a conductor is needed to provide the ticket to the passenger according to the destination. But there may be chances of human errors like listening errors and getting the ticket of other than destination, not reliable for conductor to monitor each passenger boarding in bus, which may lead to loss of revenues to respective transportation departments.

IV.PROPOSED METHOD

On roads with proper vicinity the tags have been placed and when ever bus enters into the particular area from the tag the location will be updated and the stop arrival is also updated automatically through RFID then the bus is stopped and door will be opened, here there is also scope for replacement of conductor i.e. passengers are provided with RFID tags and the tags shown by passengers valid means then only the door will be opened. After reading ticket tags present station and its destination station will be calculated and automated fare will be generated and deducted from the card.

V.BLOCK DIAGRAM



ESP 32

ESP32 based boards come in a variety of shapes and sizes and pinout of each board is different to other. Also, not all pins of the ESP32 Microcontroller SoC will be available on a development board as some pins might be permanently tied to a dedicated function.

One such case is the Flash Memory. We know that all ESP32 boards come with 4 MB of Flash Memory to store the programs. So, some of the GPIO Pins (6 to be specific) are connected to SPI Flash IC and those pins cannot be used as regular GPIO Pins.

Hence, it is important to understand the pinout of popular ESP32 boards so that you will know what pins are available for use in projects.

WIFI MODULE ESP8266

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.

This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces; it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF part.

RFID (radio frequency identification)

RFID (radio frequency identification) is a form of wireless communication that incorporates the use of electromagnetic or electrostatic coupling in the radio frequency portion of the electromagnetic spectrum to uniquely identify an object, animal or person. Use cases for RFID technology include healthcare, manufacturing, inventory management, shipping, retail sales and home use.

RFID and barcode technology are used in similar ways to track inventory, but three important differences make each one a better choice in certain situations:

- RFID tags do not require a direct line of sight to be read.
- Data stored in an RFID tag can be updated in real-time. In contrast, bar code data is read-only and cannot be changed.

- RFID tags require a power source. In contrast, bar codes only require the technology reading the bar code to have a power source.

GPS MODULE

The Global Positioning System (GPS) is a satellite based navigation system that provides location and time information. The system is freely accessible to anyone with a GPS receiver and unobstructed line of sight to at least four of GPS satellites. A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites. GPS is nowadays widely used and also has become an integral part of smart phones.

The GTPA010 module is easy to use, having RS232 as well as USB interface. It operates over 3.2 to 5V supply range thus enabling interfacing with microcontrollers with 3.3V as well as 5V. The module outputs GPS data in NMEA0183 format. Each of message string starts with '$' and then the message identifier. Each parameter is separated using a comma so that the message can be parse with the help of the commas.

SERVO MOTOR:

A **servo motor** is a type of motor that can rotate with great precision. Normally this type of motor consists of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motors to rotate with great precision. If you want to rotate an object at some specific angles or distance, then you use a servo motor. It is just made up of a simple motor which runs through a **servo mechanism**. If motor is powered by a DC power supply then it is called DC servo motor, and if it is AC-powered motor then it is called AC servo motor.

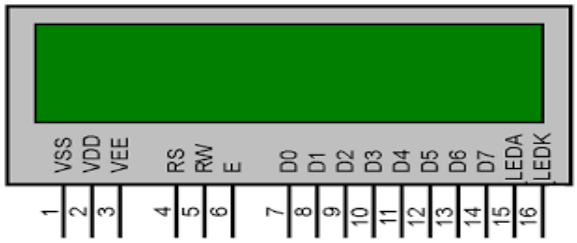
For this tutorial, we will be discussing only about the **DC servo motor working**. Apart from these major classifications, there are many other types of servo motors based on the type of gear arrangement and operating characteristics. A servo motor usually comes with a gear arrangement that allows us to get a very high torque servo motor in small and lightweight packages. Due to

these features, they are being used in many applications like toy car, RC helicopters and planes, Robotics, etc.

IR SENSOR

An infrared sensor is an electronic device, which emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only infrared radiation, rather than emitting it that is called a passive IR sensor. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation. These types of radiations are invisible to our eyes that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode that is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received.

LCD



It is called Liquid Crystal Display. We are going to use 16x2 characters LCD. This will be connected to microcontroller. The job of LCD will be to display all the system generated messages coming from the controller. LCD will provide interactive user interface. This unit requires +5VDC for it proper operation. This module is used for display the present status of the system.

VI.RESULT

By this project, automated fare will be generated and deducted by destination estimation in bus. Also the problem of standing in queue for tickets is also avoided. When the person reaches the bus station he can find the buses that pass through a particular location with the help of RFID technology.

VII.CONCLUSION

The manual fare collection system has many issues which are overcome by our proposed system. Automated fare collection system for public transport is an innovative idea which reduces man power. It is believed that by implementation of these system problems such as underutilization of buses fleet will be reduced. So both passenger and bus station administrators will benefit from the system as Real time information are provided. The ticketing systems using RFID can be merged to solve the above mentioned problems. This project actually suggests a much more public friendly, automated system of ticketing with the use of RFID based tickets. This smart Embedded System can be implemented in the transport system, which will perform the fare collection automatically.

VIII.FUTURE WORK

Using cluster analysis, different user patterns can be identified and clustered into similar groups. Currently, the automatically collected data do not contain information about travel purposes, but by identifying typical temporal patterns of boarding for smart cards of similar classes, it may be possible to partition card users into commuters, students and possibly seniors who travel less than others. If the smart card number is tracked over time, the survival model of transit users and retention of different ticket types can be analyzed, which would provide longitudinal information about the network use and better information for fare planning and revenue analysis.

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