SMART ENERGY CONSERVATIVE PUBLIC TRANSPORT SYSTEM

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Abstract— This paper presents an automated system for allowance of passenger according to availability of seats in public transport using count and de-count method. This project also carries cashless ticketing system. Our major aim is to reduce the fuel consumption, maintenance,congestion and also accidents due to over load in public transport by not allowing the extra passengers once after the seats are filled which will automatically count the number of passengers entered and left from the bus and deduct the passenger"s fare according to the stages travel led using the Radio Frequency Identification (RFID) card and Number pad very precisely. The cards being reusable, they are much more convenient compared to the paper based ticketing system. RFID cards are distributes among the public. The unique ID in the RFID cards are stored in a database in the internet along with personal data and creates accounts for each person. By accessing this database, it is thus possible to identify the passenger, check his account and deduct the fare from passenger"s account. Creating database facilitates efficient filtering of anti- social elements and gives firm assurance to both passenger and PTS about the transaction. Fare calculation is done with the help of internet. So a change in fare does not create any confusion as fare calculation is done by evaluating by number of stages travelled and rate through internet. System thus reduces overcrowding, human errors and efforts. The RFID reader used is EM- 18.Arduino mega is used as control unit and programming is done using embedded C. Keypad is used for the purpose of calculating the stage. Servo motors and LCD are used for controlling andmonitoring respectively

KEYWORDS: Arduino mega EM-18 RFID Reader, LCD, GSM module800L, Servomotor,ESP8266,Keypad

I.INTRODUCTION

As per RTO rules, an MTC bus could accommodate a maximum of 83 passengers including 48sitting and 28 standing. However buses carry over 160 passengers in some routes especially in peak hours considering this over loading of passengers and safety measures due to covid-19, we have designed a automated system for PVT to reduce over loading and overcrowding. This paper basically deals with the identification of passenger, count of passengers those have entered andexitedandalsoautomaticallycollectsthefareaccordingtoth estagestravelled.Thissystem allows passenger according to the availability of seat and restrict extra passengers it is possible through counting the number of passengers entered and exited in form of count and de-count using RFID and allowing passengers according to it[1]. The fair detection is possible by using RFID and keypad[2].The passenger details can be stored in Internet of things(IOT)usingesp8266, for the passenger‟s convenience fair detected for their travel will be automatically messaged to them using GSM 800L, so that passengers can check their travelling expenses[3].Number of seat available in a respective PTS will be displayed in the entering side, so that passengers can know the availability of seats of seats without punching the card, once some passengers exit the systemautomatically de count the number of passenger exit and retains the seats available. The door of the PTS won‟t open if their no seat available, servo motor is used for door setup. Our project mainly concentrate on reducing the fuel consumption, maintenance, congestion and also accidents due to overload in public transport [4][5].

II. SYSTEM COMPONENTS

2.1 ARDUINOMEGA

Arduino Mega Is an open source microcontroller board, which has more number of ports compared to other arduino boards. The board is equipped with sets of digital and analog pins that can be interfaced with components and circuits[6].The operating voltage of the board is5V.

2.2 EM-18RFIDMODULE

EM-18 RFID reader is one of the commonly used RFID reader to read 125KHz tags. It features low cost, low power consumption, small form factor and easy to use. It provides both UART and Wiegand26 output formats[7][8]. It can be directly interfaced with microcontrollers using UART and with PC usinganRS232converter.

2.3 LIQUIDCRYSTALDISPLAY

These LCDs are ideal for displaying text/characters only, hence the name „Character LCD‟. The display has an LED back light and can display 32ASCII characters in two row switch 16 characters on each row. The contrast and brightness can be adjusted by using simple voltage divider with a potentiometer. The operating voltage of LCD is 5V.

2.4 SERVOMOTORSG90

Servo is a general term for a closed loop control system. A closed loop system uses the feed back signal to adjust the speed and direction of the motor to achieve the desired result. Servo motorSG90 canonlyupto180degree

2.5 MATRIXKEYPAD

Matrix keypads are the kind of keypads you see on cell phones, calculators, microwaves ovens, door locks, etc. They‟re practically everywhere. However, in DIY electronics, they are a great way to let users interact with your project and are often needed to navigate menus, punch in passwords and control robots

2.6 ESP8266:

ESP8266 is a wifi module board, which is majorly used in IOT applications. The ESP8266 is a low-cost Wi-Fi microchip, with a full TCP/IP stack and microcontroller capability, This small module allows microcontrollers to connect to a Wiinet work and make simple TCP/IP connections using Hayes-style commands.

2.7.GSM800L

SIM800L is a miniature cellular module which allows for GPRS transmission, sending and receiving SMS and making and receiving voice calls. Low cost and small foot print and quad band frequency support make this module perfect solution for any project that require long range connectivity[7]. After connecting power module boots up, searches for cellular network and login automatically.

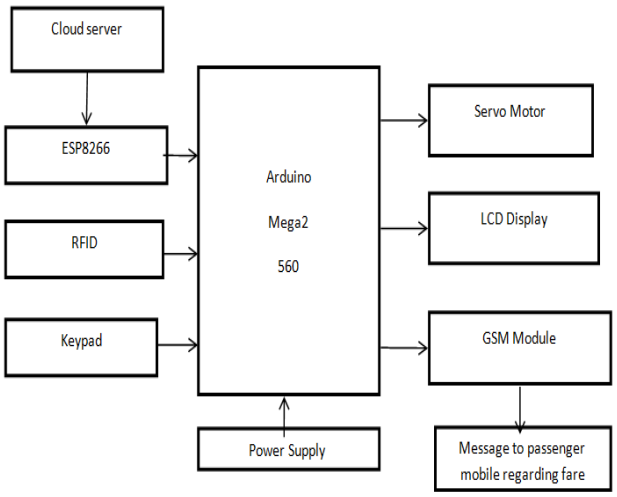

Fig.1. Block Diagram of the system

The power supply is given through board for other components, RFID reader reads the passenger card and takes the passenger details from the cloud server through esp8266, if there is a seat availability and minimum balance in their card then the servo will open otherwise remains closed[9]. LCD displays the number of seats available. The number of stages travelled by a passenger is calculated using keypad, once the passenger exit from the public transport, their fare collected will be messaged to them using GSM[10].

Initially when the passenger‟s tap their RFID at the entering side, our system checks the availability of seats and the account balance in their card, when both the conditions are satisfied automatically door will open and allow the passenger to travel, also take a respective count. When passenger reach their destination they can tap the card at exit side, our system will calculate the stages travelled by the passenger and detect the fare automatically and send message to passenger regarding fare detected

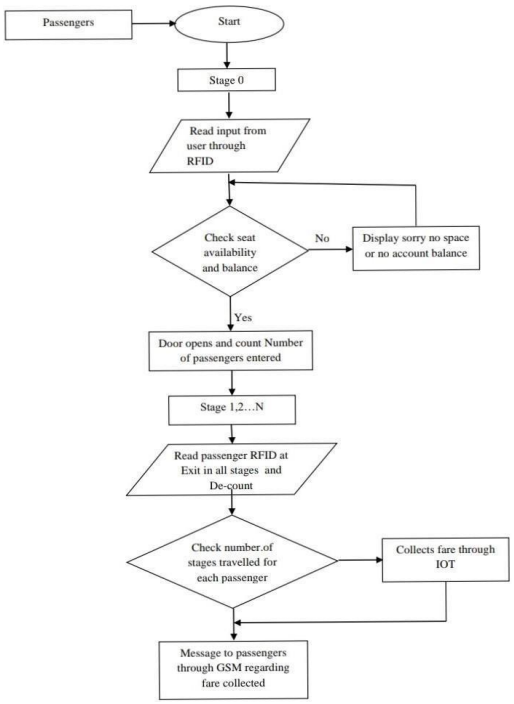

Fig.2. Flow chart of the system

III. RESULTS

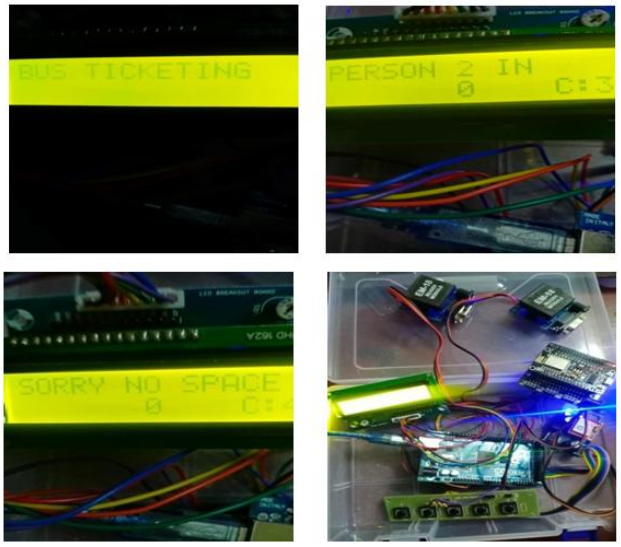

Fig.3. proposed system results

Fig 5.1 is the initial stage of the project , Fig 5.2 describes that some one entered in the bus, C represents about number of available seats and Fig 5.3 shows that the system is not allowing extra passengers than seat availability, Fig 5.4 shows the initial connections of the project

CONCLUSION

Thus, the proposed paper will definitely bring solution over loading and over crowding in public transports, due to this we can avoid high fuel cost, more maintenance and also congestion in this pandemic situation, we may also avoid accidents that causes due to overload. In future passengers can travel comfortably and safely

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