U.I BUS CONTROL 2.0 ALFA

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Abstract

Abstract: - As a final project for the course of Digital III we were proposed the search and solution of a problem either within the university or in the city of Ibagué, the chosen problem was the massive transport system in Ibagué (Buses) which was made an investigation of what is the main problem of this old service in the city of Ibagué on our part we observe that this system needs to innovate in the collection and handling of money also by keeping the service free of frauds or freight by users and keep a count of users and collections of the service a day, for this project we propose an electronic payment system.
KEY WORDS: innovate, system, money, user, service.

1 Introduction

The project arises by identifying the lack of public transportation system and its delay compared to the system of other cities which already have electronic payments (P eacute; rez and Pacheco, 2019). In this way, it is proposed how a system could be formed according to the needs of the city. At the moment in the city of Ibagué, the vans have a system of charges for manual transport, and only one person must be in charge of the bus, therefore the drivers must supply multiple tasks simultaneously; receive money, do mathematical calculations to correctly return returns, pick up and drop off passengers among other activities that distract you from your real responsibility, drive. In this way the drivers, pedestrians, passengers, and other drivers are at the mercy of the agility that the driver of the bus has to do multiple tasks simultaneously. This has also allowed some drivers to shine illegally by allowing people to use the service by evading the register and keeping their money, transporting more people than allowed or the famous penny war where drivers fight to collect as much of users regardless of whether they endanger the lives of others and even their own lives. With the aforementioned said it becomes evident the need for the city to have a more technified payment system in public transport as it has already been implemented in many other systems around the world and cities of the country. This would significantly reduce the level of stress that drivers handle and regulate the abuse imposed by bus owners by requiring them to perform many activities simultaneously for the same salary.

2 Objectives

OVERALL OBJECTIVE:
• Solve problems of the bus system in Ibagué improving the quality of service and security of this.
SPECIFIC OBJECTIVES:
• The system must be totally autonomous. • You must have a payment system, a recharge system and a laser detection system.
• Store money on the cards and discount it as

the card is used.

• The recharge system must be able to enter new users, as well as update and delete them, it must also be able to keep accounts of the recharges that are made in one day and send a report to the email of the company owner.

• The payment system must detect the balance of the card and rewrite it discounting the ticket.

• The detection system must take the data of the number of people who enter, leave the bus and those who enter through the back door without paying at the end of the day should send an email to the owner informed of the number of users, earnings and losses .

3   Developing

To carry out the project, the lessons learned in the course are implemented. For this reason, the source codes are built based on Python. To do this, we use a Raspberry pi zero which has a LINUX architecture that works Python, we also use several Arduino nano together With some RFID modules which will be the card readers, laser receivers (EL0505) are also used, which will be used with a detection edge to speed up their monitoring, these will take the people count. Taking into account the previous components, a diagram of system inputs and outputs is proposed:

Figure 1: Input and output diagram

4   System operation

• PAYMENT AND RECHARGE SYSTEM:

Figure 2: Payment, recharge and card (RFID) system boxes.

The payment system and recharges are separated. It was thought of a system of recharges in which an operator was responsible for the sale of the cards, entry of users to the system, update of the data of these users and recharges of the balance of the cards this for this two buttons were located at side of the recharge box which will be updated from the database (This will take the data of how much money is left in the card) recharge (This will allow the Rewriting of the cards). The main code of this system was made in Python which handles the Arduino that will be inside the box like a slave which will collect the card damage and will be uploaded to the page designed in flash. The payment system would be located at the entrance of the bus because this would be the one that gives the user access after paying the ticket with their respective card, the system must be autonomous since the driver must not interfere with its operation, it will start automatically when the bus is lit, it will be made up of a RassberryPI0 and this will be the master of an Arduino nano who will take the data of the money contained in the card and subtract the amount of the ticket followed by means of a speaker will indicate the remaining balance in The card or in case
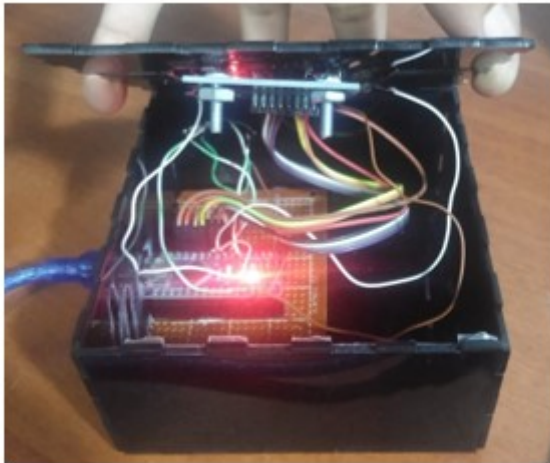
Figure 3: Recharge system box.

Figure 5: Payment system box.

Figure 4: Internal circuit of the charging system.

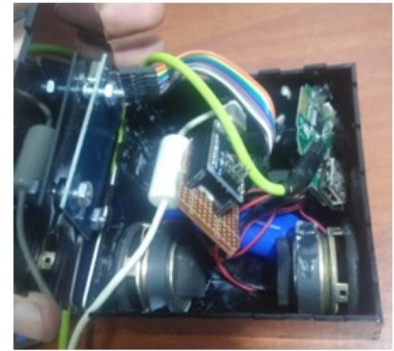you do not have a balance, this will inform the user through audio.

Figure 6: Internal payment system circuit.

- LASER SENSORS:
The laser sensors are managed with a single Arduino nano which is a slave of the Raspberry pi zero of the payment system these sensors are two per door, the sensors at the entrance door will only take the data of the people who enter and leave while the back door will take the data of those who leave additional this door will take the data of the people who enter through the back door without paying, the system in itself should keep track of how much money arrives and how much is lost because of the person's fault that enter through the back door and at the end of the day it must send an email to the company with the acquired data.

Figure 7: Simulation doors with laser sensors.

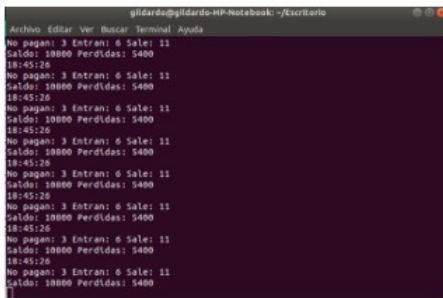Figure 8: Data collected by the sensors.

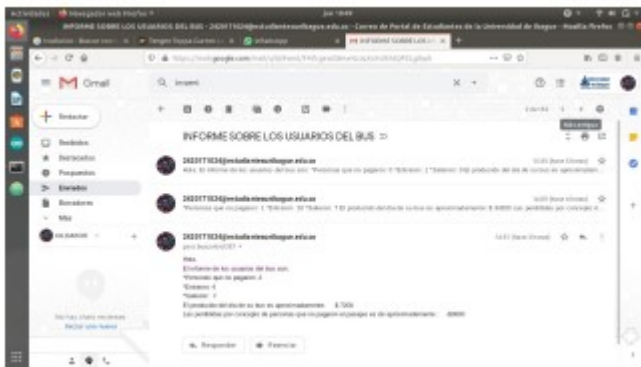Figure 9: Emails sent as a result of the tests.

5   Conclusiones

1. With this project it is evident that it is possible to update the mass transport in Ibagué using an electronic collection system like the one shown in this report.

2. This system by means of electronic cards adapts to the needs of a public transport system, however, its application is not limited only to it. It can also be implemented in other systems where an electronic payment is required such as an amusement park, a theater, a cinema etc. Also with electronic cards it is possible to carry out a system of access control of personnel in a company or the control of products in inventory. All this due to the ability of these cards to store information inside.

3. The operation of the system can be improved by becoming more intuitive and easy to use. This prototype works correctly (as evidenced in the video) and has a good processing efficiency by the program.

4. Something of great importance and achievement was to implement the use of IOTs in the system since they fulfill an important function by facilitating the use of the system.

5. In terms of cost this system can be expensive as it is, but this is due to the use of certain components that were used to facilitate the project, but in case costs can be minimized, be much more economical and fulfill its function in a way efficient.

6. In conclusion, the development of this project allowed us to enrich our knowledge in this technology and project future applications in the field of work. In the same way we managed to develop an IOT project that can be implemented and that satisfies the need that the city currently has.

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