Control of school routes by Rutamigapp

Santiago Cortes - 2420171013
Valentina Gomez - 2420171072
Digital Electronics III

Abstract— **This article exposes a problem that directly affects all parents who are in need of having a school transport service for their children, who if they access it do so with distrust, where they do not meet the legal requirements raised by the ministry of education and ministry of transport.**

On the other hand, once the student enters the vehicle, the life of this person is the responsibility of the transport company, for this reason Rutamigapp is created which provides both the transport provider and the customer with a real-time record of All the activities carried out on the route in this way seek to generate security, well-being and quality of service.

I. INTRODUCTION

This application is born from the need that is presented by advancing the years in the school transport industry, which is increasing exponentially and also forgets small details such as providing a comfortable and safe service with the main objective to optimize the time of the father who works all day and therefore it is difficult for him to take and pick up his son at school.

The transport companies or the person in charge of the minibus have put aside the importance of safety in public transport by avoiding the standards set by the Ministry of Transportation which should be followed to the letter even more

if it is minors as in school transport.

It is necessary to emphasize that the purpose of this document is to know all the problems surrounding in the field of school transport and propose a technological solution that prevents any situation that endangers the life of a student and improves the quality of life of the parents of family who feel insecure with this mobility service, which forced them to analyze all the factors that could put the life of the person inside the vehicle at risk and satisfy the conditions established by the ministries.

The most common situations encountered are the following:

A. The speed

One of the main benefits of school transportation is to ensure punctuality, which means that the process must be very fast and the managers forget to pick up the students at home or in the worst case leave them at school, while The student's guardian is paying for a service that does not comply with the most basic, which is why the application developed will not leave room for such a situation, thanks to its database that informs who entered or did not enter the vehicle, in this way monitors and ensures the number of passengers in transport.

B. The insecurity

The insecurity felt by parents when leaving the most important thing for them that is the life of their children in charge of the transport service, is a great responsibility for the company, where 70 percent of parents do not He has enough time to take care of them [1], which means that they need help from a third party who will be in charge of delivering it to the route monitor.

Who assures the parent that their child entered the route or arrived at home or school on time?, By means of the automatic alert system that was designed for these cases, the parent from his mobile device will be informed of each movement of your child by having contact with the means of transport.

It is important to take into account the problem situations that can be seen if there is no transport system or coordination.

C. Legal problems

If at any time an accident occurs to a student on the route, the transport company will be legally involved, it is very common for children under 7 years of age to fall asleep in the back seats of the vehicle and for their The size is difficult to see, at the end of the tour they leave the child locked up running the risk that he may die asphyxiated, the cause of this is the lack of monitoring and systematization.

Having the above in mind rutamigapp will take care of avoiding all these problems and solving them.

II. THEORETICAL FRAMEWORK

According to decree 348 of February 25, 2015 School routes must install GPS and security cameras so that parents have more control over what their children do. Gabriel Zurakowski, together with developer Ivn Sarmiento, created Tu Ruta Escolar, an application that allows parents to see, in real time, the progress of school buses, as a complement to the decree, which requires the

GPS to be accompanied by school routes. [2]

Having knowledge about the mobility of school transport in the country, it was possible to innovate in the solution posed to these problems, in accordance with Decree 431 of 2017, school routes must have a companion who has experience in providing this service and knowledge of vehicle safety, traffic, road safety and first aid [3]. This companion will be the main author in charge of executing the designed application responsible for the care of students and their ascent and descent of the vehicle.

III. OBJECTIVES

Innovate in the school transport industry as educational institutions must include the option of a transport service to facilitate the mobility of the parents' children to school, reason that allows to involve this application in all schools with the principle of keeping in constant communication with the attendant in charge, who will be informed of the students activity record on the route. Design a route planning proposal to ensure a safe school transport service for students and parents with the development of an optimization model, to improve the efficiency of the routing process for the school route logistics company.

IV. DEFINITION

Educational institutions and parents need to monitor and verify the route of the buses in order to avoid all the legal problems that may arise if at any time a problem situation occurs.

For this reason we start from the following question: How to provide parents and transport company an automatic control and tracking of the vehicle through a technological solution? The main function of the application developed in python with a flask website interface is to keep in constant communication with the client responsible for the student who approached the vehicle, what the app does is:

- Instantly alert autonomously each time the student enters the route.

- Alert every time the student leaves the vehicle.

- If the vehicle is located near the students home, Rutamigapp will notify the responsible adult in advance to avoid hearing contamination and delayed travel.

- Once the vehicle is located in front of the students house the application creates a countdown of 5 minutes and at the end it warns that the person does not enter the transport.

- In certain cases where the driver exceeds the speed limit, the application shall notify the manager of the transport undertaking of the imprudence committed.

The sequence that was developed to make the project a reality is as follows:

First of all a block diagram is made as shown in Figure 1. It organizes the inputs and outputs of the system, thus establishing an order of the hardware and software that the application will have.
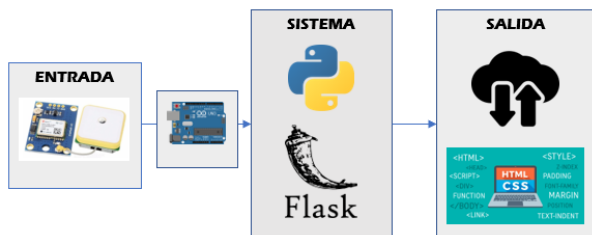

Figure 1. Diagram of system inputs and outputs. Source: Authors

V. MATERIALS

- GPS Module (NEO-6m)

- Arduino

- Raspberry

This is followed by the development of an Excel database which contains the basic information of the student as shown in Figure 2. The above-mentioned database communicates with python through a library for data analysis known as pandas.Figure 2

The database is the bridge that relates the project directly to the internet of things (Iot) in search of a human machine interaction, by obtaining the email of the adult responsible for the minor.

In Python is made the interface that will make real the human interaction machine by the framework Flask, in this website it is graphically seen the database and buttons that will have functions like recording the entry, descent, absence and waiting of the student. Each function is given with a respective programming that notifies the activity by an email.

To finish the GPS, which records the current location (latitude and longitude) and speed of the route. In order to compare the location of the school bus and the location of each child, analyzing which is the closest address (student to pick up), he also warns the next student who is close to being picked up, improving the times of the route and in the same way defining the auditory pollution that occurs when the collective honks. With regard to speed, registration is carried out so that there is greater control with this avoiding accidents.

VI. RESULTS

At the end of the project, a great result was obtained with respect to the initially planned objectives, which are: to maintain a constant communication of part of the route to the parents, this was evidenced in the messages sent by Rutamigapps mail and those received by the mail of the visitors.

Also, the good implementation of the GPS showed in fact the closest student, the next student and the speed with great precision effectively alerting the overtaking of 80 km/h.

The route showed greater order for the students and also the great functioning of the mail, sending the correct messages at the appropriate time to each attendant,as can see in figure 3 and 4.

VII. CONCLUSIONS

It is concluded that Rutamigapp is an excellent tool for school collectives, since it covers most of the problems associated with this work. Because they bear responsibility for the lives of other people and more if they are minors, it is of great care and for this requires a great vigilance and above all a great service.

It is also evident that Rutamigapp is an easy-to-use application for the assistant on the bus, as its interface is very well explained. Although in the beginning complications were obtained with the use and implementation of the GPS, the inconvenience was solved and the project was taken forward.

VIII. REFERENCES

[1] M. N. Espn, El 70 de los padres no tiene tiempo para estar con sus hijos, 16 Marzo 2016. [En lnea]. Available: https://www.hacerfamilia.com/familia/noticia-70-padres-no-tiene-tiempo-estar-hijos-20160316095922.html.

[2] G. Zurakowski, tu ruta escolar, [En lnea]. Available: www.turutaescolar.com

[3] S. d. e. d. distrito, Educacion bogota, 20 10 2017. [En lnea]. Available: https://www.educacionbogota.edu.co/portal-institucional/node/4849.

IX. ANNEXES

|	Codigo	Nombre	Direccion	Numero	Acudiente	Correo
1						
2	1001	Felipe Osorio	4.4388021,-75.2065075	3002966296	Kevin Osorio	2420171013@estudiantesunibague.edu.co
3	1002	Luisa Gutierrez	4.4394198,-75.2052309	3002966296	Maria Diaz	2420171072@estudiantesunibague.edu.co
4	1003	Valeria Polo	4.4396067,-75.2034654	3002966296	Omar Lozada	2420171072@estudiantesunibague.edu.co
5	1004	Jhon Mendoza	4.4397194,-75.2030432	3002966296	Jose Mendoza	2420171013@estudiantesunibague.edu.co
6	1005	Santiago Cortes	4.4399893,-75.20200491	3166284430	Yasmin Cabrera	2420171013@estudiantesunibague.edu.co
7	1006	Miguel Gonzalez	4.4394129,-75.20008587	3002966294	Martha Calle	2420171013@estudiantesunibague.edu.co
8	1007	Juan Leon	4.4405966,-75.1995315	3002966296	Camilo Leon	2420171013@estudiantesunibague.edu.co
9	1008	Juan Ardila	4.4407049,-75.197964	3002966294	Roberto Ardila	2420171013@estudiantesunibague.edu.co
10	1009	Sofia Bonilla	4.4418824,-75.1978071	3002966294	Nelly Beltran	2420171072@estudiantesunibague.edu.co
11	1010	Valentina Gomez	4.446075,-75.1970125	3002966294	Lucy de la Barrera	2420171072@estudiantesunibague.edu.co

Figure 2. Pandas data base. Source: Authors
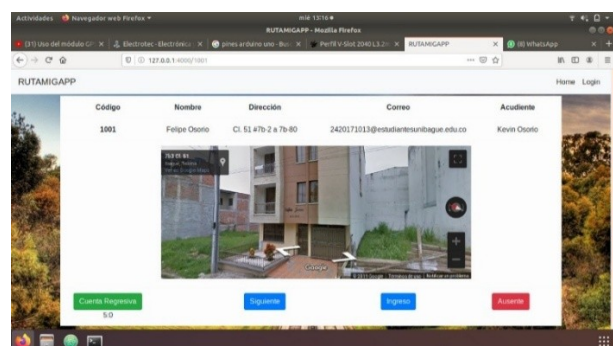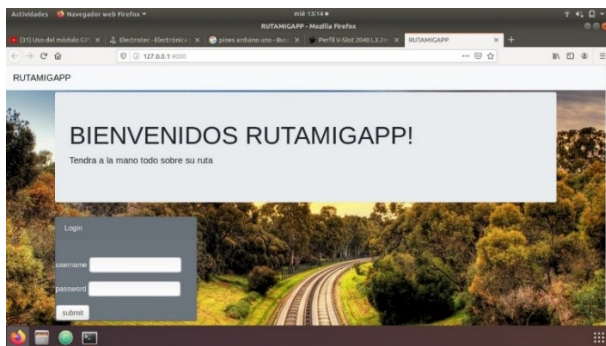
Figure 3. Rutamigapp website. Source: Authors