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Tag's Reader Design

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Abstract - *Nowadays, insecurity in the world has increased considerably, not only in the streets or public places, but also in homes of each family, that is why this project is thought and directed to this field. The main objective is to achieve a complete control of all the people who enter and leave a certain place, creating a unique and personalized identification. The system will work in real time and the process consists of designing an electromagnetic lock using an RFID reader (radio frequency identification) which is a remote data storage system that uses devices known mostly as RFID tags. The fundamental purpose of this technology, is to be able to obtain the information of the identifier of a person, by means of radio waves, making this lock become one of the main options for people as far as security is concerned, either at work, at home, etc., leaving aside the conventional lock. The lock will control the opening of the door with the help of the RFID reader, which will be programmed with an ARDUINO, using also an SD memory for the storage of all the data that are required, so that it allows the access only to the registered users. This project aims to provide innovative locks that ensure the security of families with systems easy to assemble and especially that are at an affordable price.*

Key Words: **Keyword 1 - RFID, (Radio Frequency Identification),** ***Keyword 2*** **- ARDUINO, (Hardware and software platform)**

1. INTRODUCTION

The locks are classified in a great diversity of types, its function is the opening and closing of doors of automobiles, homes and hotels, or also for some security systems such as safes, its utility is diverse. Nowadays, various electronic devices are being used, more and more. And yet there are still prejudices about their reliability. In the case of locks, for example, there is always someone willing to declare that "mechanics are more reliable". For the electronics of a lock to be reliable, it must be designed and made specifically for the task at hand, and its operation must be simple and intuitive. The aim of this project is the development of an electromagnetic lock for domestic or professional use, based on a standard mechanical lock, which will offer the advantage of not having to make any modifications to the door where it will be placed, thus distinguishing itself from existing electric locks.

With the introduction of RFID technology appears the possibility of reading multiple elements at once without significantly increasing the reading time and also eliminating the restriction of the line of sight between reader and code (or chip/tag in RFID). RFID tags can be active, semi-passive (also known as semi-active or battery assisted) or passive. Passive tags do not require any internal power supply and are purely passive devices (they are only activated when a reader is nearby to supply them with the necessary power). The other two types need power, typically a small battery.

The vast majority of RFID tags are passive, which are much cheaper to manufacture and do not require a battery. In 2004, these tags were priced from 0.40 dollars in large orders, for smart tags, depending on the format, and 0.95 dollars for rigid tags frequently used in the textile sector encapsulated in PPs or epoxy. The universal RFID market for individual products will be commercially viable with very large volumes of 10 billion units per year, bringing the cost of production to less than 0.05 dollars according to one manufacturer. Unlike passive tags, assets have their own autonomous power source, which they use to power their integrated circuits and propagate their signal to the reader. These tags are much more reliable (have fewer errors) than passive tags due to their ability to set up sessions with the reader. Thanks to their energy source they are capable of transmitting more powerful signals than passive tags, which leads them to be more efficient in difficult environments for radio frequency such as water (including humans and livestock, formed mostly by water), metal (containers, vehicles). The main advantage of active RFID tags, over passive ones, is the high reading range, of the order of tens of meters. As disadvantages, it is worth noting the price, which is much higher than passive tags and the dependence on battery power. The life time of the batteries depends on each tag model and also on the activity of this, usually of the order of years. In order to facilitate battery management, it is common for active RFID tags to send information on the battery level to the reader, allowing those that are about to run out to be replaced in advance. The way RFID systems work is simple. The RFID tag, which contains the identification data of the object to which it is attached, generates a radio frequency signal with these data. This signal can be captured by an RFID reader, which is responsible for reading the information and pass it in digital format to the specific application that uses RFID.

2. DEVELOPMENT

The project called access control through TAG´S or electromagnetic lock began to be developed with push buttons that allowed access and exit of a person. Subsequently we began to make a prototype with the

specifications required by the same users, to carry out this update needed to make drastic changes for better comfort to users.

Performing an update of the prototype we came to the need to acquire components for better performance, which are:

- RFID Reader
- LCD screen
- Micro SD Memory Reader
- RTC sensor
- Arduino
- Lock
- TAG´S

The function of each of these components is vital for the operation required by our prototype, because if we do not use the specific components our lock will not act as expected. These work in the following way:

RFID reader (radio frequency identifier).

This component works for the detection of TAG´S, this is vital for the project because inside it contains a tiny chip that reads the access cards that come in code form.

LCD display (liquid crystal display)

The LCD screen is used to display the graphical information of each registered user.

Micro SD Memory Reader and Micro SD Memory

These two components are used for the storage of digital data such as the registration of new users, times and dates of entry and exit.

RTC sensor (continuous time clock)

The RTC sensor is used to obtain the time measurements, and send pulses as signals that go directly to the programming, which will be information that will be stored in the micro SD memory.

Arduino

With Arduino was made the programming that required the lock to perform the correct functions, this with the help of the program called "Arduino" where you can enter programming codes that are loaded to the physical Arduino to be responsible for sending the signal to these components.

Lock

Its function is to open and close the door using the signals sent by the RFID sensor, when swiping a card of a registered user.

Tag's

This component has the function of accepting or denying the user, depending on whether or not it is registered in the data storage.

3. RESULTS

It was possible to minimize the cost of what an electromagnetic lock is worth in the market which has as a function to reduce the time of entry of an object or person to some place and with the security that this provides, having a cost of 1500.

For the visualization of the physical project a 3D drawing proposal was carried out, the software used was "Solid Works" where exact measurements were handled to scale, which was as follows:

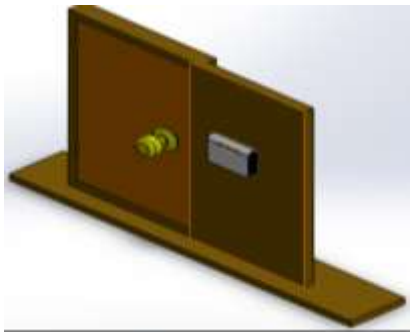

Fig- 1. Front view door design. Own fountain. 2019

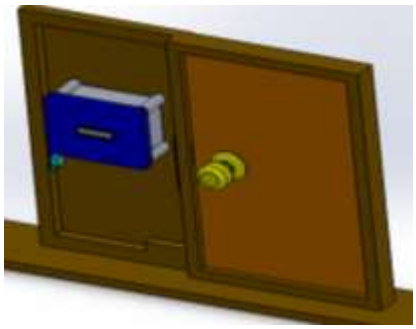

Fig- 2. Rear view door design. Own fountain. 2019

As a general explanation of the operation of this lock, the following flow diagram was made:

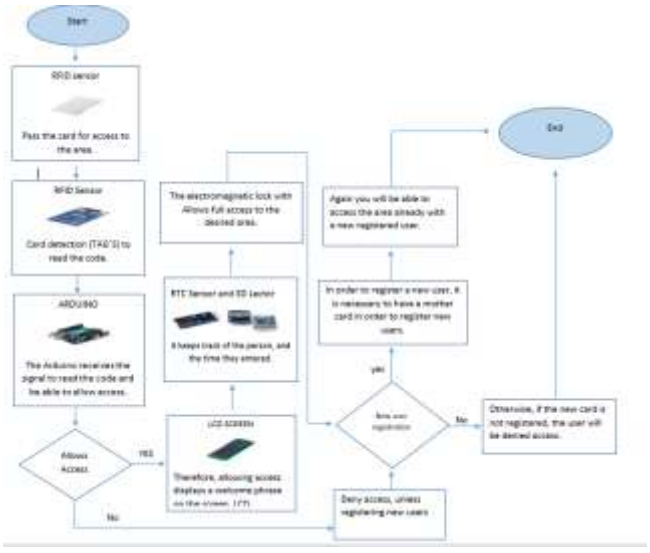

Fig- 3. Flow diagram. Own fountain. 2019

4. CONCLUSIONS

As mentioned at the beginning, a good lock is a wonderful first step to prevent intruders or unauthorized people from accessing certain areas or spaces of our property, and it is a luxury to know that we have wonderful electrical and electronic components with which we can give rise to many ideas and experiments, to turn them into products that help people have a better quality of life, In this case the electromagnetic lock was created, which when testing and implementing the system, was solved the problem raised at the beginning of this work, ie, the system solves the problem produced by a conventional lock that is the probability of being destroyed by people outside the site, when this would generate losses of both the building and the replacement of new locks. On the other hand, this system allows the user to keep safe the place where the lock is installed without the need of acquiring new keys to be able to enter his home, office, etc. In case of being lost or that the conventional lock has been forced.

The device has achieved the following objectives:

-To Offer a remote communication device between a device and the user, in this case by sending codes.
- To Make a device easy to use and configure. Thanks to an intuitive menu for the device manager, this allows you to easily change the operating parameters with a simple alphanumeric keyboard.
- To develop a device with several interactive elements. From sending information to the screen, through the exchange with memory cards, to the RFID reader.
- To offer our users a lock at a lower cost in the long term, but with the assurance that it will keep their family and properties safe.

5. REFERENCES

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BIOGRAPHIES

Claudia Michel Maldonado Cuevas graduated from T.S.U. in Industrial Area Maintenance at the Technological University of Tlaxcala in 2018. During the May-August period she worked in the company síntesis y procesados de Mexico S.A DE C.V. He is currently studying Industrial Maintenance Engineering at the Technological University of Tlaxcala.

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