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(57) Abstract :

The present invention relates to the development of a Web Platform for Wireless Sensor Management. [02] BACKGROUND OF THE INVENTION A very important part of man's life has always been technology, he has used his intelligence to create artifacts and tools to facilitate his work. Today, information and communication technologies (ICT) are in all areas of human endeavor; every day we interact with them, many times without realizing it. One of these is the so-called internet of things. The Internet of Things (IoT) is a technological area that refers to the design and implementation of embedded electronic devices connected to the Internet, such devices are embedded within all kinds of objects of daily use, allowing easy control or monitoring of their status. objects through the internet thanks to the electronic device inside them. In this context, there is an application subarea called smart cities, whose purpose is to apply IoT techniques to environments inside buildings. Applied research is a way to achieve solutions of a high scientific level in the problems of today's society; and it becomes extremely important for the peoples when the implementation allows them to provide them with collateral benefits. At present, specialized service institutions are obliged to improve their internal processes and user or customer service. This responsibility involves many actions and implementations in various areas, from administration, production to customer service, be these human, logistical, structural and technical improvements. The attendance record in an educational center allows for greater control of the student population, with which certain statistical data can be obtained in short and long-term decision-making. In addition to this, because the Salvadoran reality demands greater attention in the area of security every day, there is a need to have a mechanism that provides the registry of those who enter the institution, and also that is a clear warning to people outside the university that the level of monitoring is permanent and effective. The viable proposal in economic cost and rapid implementation, are radio frequency identification systems (RFID, for its acronym in English). This work proposed an inexpensive IoT electronic system that was placed at the entrance of the classroom, which registers each student who enters through the use of an RFID card, and also that the same system notifies in real time, via access to a site web, information of assistants to the administrators of the educational center. The results of this work are estimated to be replicated and of benefit not only for the institution studied, but for other industries such as supermarkets, markets, warehouses, importers, exporters, etc. A system for student registration with the ability to notify by internet, to different people, each class time segment does not exist in the local educational system. It should be noted that a computerized system for registering people with the characteristics proposed by this work is not available on the market (Ejie, 2017). [03] SUMMARY OF THE PRESENT INVENTION The IoT system designed for the automated registration of people entering a classroom meets the general objective set; and it becomes an economical technological tool that supports the logistical work of an institution where the registration of attendees is a large, periodic and very important task within the administrative work of the center. With this research, it has been possible to contribute new scientific knowledge, in such a way that a new way of making an efficient IoT system has been shown to solve problems of automation, monitoring and remote control of processes, with recent, low-cost technological tools. and efficient, such as the ESP8266 microcontroller and the Google platform, accessible in the local environment. The use of the aforementioned components allowed the design and construction of an embedded electronic circuit, which fulfills the function of allowing the scanning of an RFID card, reading its unique internal information, decoding it and sending it via Wi-Fi to the Internet. This circuit is also easy to configure and reproduce, to produce and implement it on a massive scale, for example, on a campus. [04] BRIEF DESCRIPTION OF THE DRAWINGS The invention will be better understood and objects other than those set forth above will become apparent when consideration is given to the following detailed description thereof. Such description refers to the annexed drawings wherein: Figure 1. Design of the architecture of the proposed system Figure 2. Design of the proposed embedded electronic circuit Figure 3. Implementation of the electronic reading circuit. Figure 4. Site captures for data visualization. DETAILED DESCRIPTION OF THE INVENTION Method In the development of this work, the experimentation method without hypothesis was used, which is a method used in cases where the purpose of the investigation is to provoke certain phenomena that do not usually occur in nature and whose knowledge may be interesting or important in the advancement of science and technology. Based on the above and with the proposed objective of designing and implementing an IoT system for the registration of classroom attendees, the work was carried out in stages, as described below. Architecture of an IoT system. The first step in implementing an IoT system is designing the application's block architecture. Based on the investigations on the state of the art, the following functional stages were established for the implementation of the system that would be proposed: 1) Sensors: reading of physical magnitudes and signal conversion. 2) Electronic processing: usually implemented with a microcontroller, which includes memory for firmware storage. 3) Connectivity: for connection to some type of wired or wireless network to access the Internet. 4) IoT Platform: computer service on the Internet where the information received from the electronic device will be stored and processed. 5) Visualization: services used for user access and visualization of the information produced by the sensors. Figure 1 shows the architecture designed for this proposed system. Selection of IoT system components Based on the above and the information collected from the state of the art, the following technological tools were selected for the implementation of each stage of the proposed IoT system: 1) Sensors: devices with RFID technology were used, specifically of the model MFRC522, with a working frequency of 13.56 MHz. Each student in the test group was given an RFID card or tag, which was previously recorded with the corresponding card number. 2) Electronic processing: the ESP8266 microcontroller was used, together with the NodeMCU development board, for the implementation of all the electronic processing and firmware that will govern the sensors and the processing of the signals produced. 3) Connectivity: The NodeMCU board, in addition to the ESP8266 microcontroller, already includes a WiFi transceiver capable of connecting to an available wireless network at the deployment site. 4) IoT platform and presentation: looking for the best cost-benefit option, the services included in the Google suite were used to perform the functions of this block. IoT platform design The stage called IoT Platform of the designed system is based on Google services, specifically the Google App Script and Google Sheets applications were used. First, a code or script was designed that was stored and executed on Google's cloud servers. This is a program in Java programming language that is responsible for receiving, through HTTP protocol, the data from the scanned electronic circuit card, which in turn are sent to a spreadsheet in Google Drive, for storage. and display within a website designed in the Google Sites application. Results Embedded electronic circuit An electronic connection circuit was designed for the embedded system in charge of capturing the information from the scanned RFID card, which is based on the NodeMCU development platform and the ESP8266 microcontroller, which allows a minimalist but technically efficient design. Figure 2 shows the circuit designed for the stage of capturing, processing and sending data to the Internet. The electronic circuit was programmed using a firmware, using C programming language and based on the basic but effective algorithm of four functions: capture, processing, connection and sending to Google App Script, this every time a new RFID card is presented. Figure 3 shows the implemented circuit. IoT application and data visualization In this system block, which will handle the connection between the electronic sensor and the presentation stage, the services of Google App Script were used together with Google Sheets. In the visualization stage (Figure 4), the Google Sites tool was used to set up a website.

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