

Smart Door Locking System using RFID Reader in IoT Environment

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DOI: <https://doi.org/10.26438/ijcse/v7i5.801805> | Available online at: www.ijcseonline.org

Accepted: 15/May/2019, Published: 31/May/2019

Abstract: RFID tagging is an ID system that uses small radio frequency identification devices for identification and tracking purpose. An RFID tagging system includes the tag itself, a read/write device, and a host application for data collection, processing, and transmission. In simple words an RFID uses electromagnetic fields to transfer data over short distances. RFID is useful to identify people, to make transactions.

Keywords: Arduino Uno, RFID Reader, two RFID tags, Arduino Uno cable, Jumper wires, CD driver, Battery, IoT

I. INTRODUCTION

IOT is a network in which all physical objects are connected to the internet through network devices or routers and exchange data. IOT allows objects to be controlled remotely across existing network infrastructure. IOT is an intelligent technique which reduces human effort as well as easy access to physical devices. This technique also has autonomous control feature by which any device can control without any human interaction. The definition of the internet of things has evolved due to convergence of multiple technologies, real time analytics, machine learning, commodity sensor, and embedded systems. Traditional fields of embedded system, wireless sensor network, control system, automation and others all contribute enabling the internet of things. In the consumer market, IOT technology is most synonymous with products pertaining to the concept of the “smart home”, covering devices and appliances that support one or more common ecosystems, and other home controlled via devices associated with that ecosystem, such as smart phones and smart speakers.

II. RELATED WORK

In [1], ne et. Al(2006): RFID technology has generated much hype in the last few years. The major driver for its development has been the tagging of physical objects – people, places, and things – with single chip radios so they can interface with computer. RFID technology is both hailed as the key to the “internet of things” and condemned as invasive surveillance technology, and in more extreme circle it is feared as the mark of the beast. An RFID system can be

broken down into two key dimensions. The technical infrastructure includes the actual data capture technology comprised of tags, readers, and transmission medium. The logical infrastructure refers to the overall identification (ID) scheme used in representing objects. RFID is still in a developing phase and more is in the pipeline in terms of new application. Among application already developed, RFID tags are embedded inside animals for tracking purpose. RFID tags embedded in uniforms can be used to know the number of hours an employee spends to complete a particular task. There are several association that are protesting against the use of RFID to track people fearing the impact on peoples social life and privacy. In [2], industries use RFID for various application such a personal/vehicle access control, department store security, equipment tracking, baggage, fast food establishment, logistics, etc. the enhancement in RFID technology has brought advantages that are related to resource optimization, increased efficiency within business operation, and enhance customer care, overall improvements in business operation and healthcare. Other application includes automatic toll payments, department access control in large buildings. Personal and vehicle control in particular area, security of items which shouldn't leave the area, equipment tracking in engineering firms, hospital filing system. In [3], considering enormous scale on which RFID will be operating and considering the fact that it will be present everywhere on our lives it is absolutely necessary for it to be a secure system. Even though RFID is still not operational on large scale, some experimental shops, literature written about it is relatively extensive. There are three primary issues surrounding RFID and the need to protect proprietary

information: protecting data stored on the tag: protecting the integrity of the tag and securing data related to the serial number on a tag, which may be stored in a network database. In [4], the radio frequency identification (RFID) is slated to become a standard for tagging various products. As more and more products become RFID enabled, fast tag identification mechanisms will become important. Various tag identification algorithms have been proposed for RFID systems. An intelligent query tree (IQT) protocol for tag identification that exploits specific prefix patterns in the tags and make the identification process more efficient. IQT is a memory less protocol that identifies RFID tags more efficient in scenarios where tag ID's have some common prefix. In [5], RFID(Radio Frequency Identification) is recently becoming popular due to its convenience and economic efficiency. Furthermore, RFID nowadays comes to spotlight as a technology to substitute the barcode .on the other hand, RFID is jeopardized from various attacks and problems as an obstacle of widespread RFID deployment: reply, spoofing, traceability, de-synchronization, unscalability, and tag cloning. Two authentication protocols are proposed for RFID systems. Another authentication protocol with proxy, including the properties of the proxy, and how it helps in authentication is proposed. In [6], comparing with the classical barcode system, RFID extends the operational distance from inches to a number of feet or even hundreds of feet. Their wireless transmission, processing and storage capabilities enable them to support the full automation of many inventory management functions in the industry. Monitoring a large set of RFID tags and identifying the missing ones the objects that the missing tags are associated is difficult. Based on probabilistic method, design of a series of missing-tag identification protocol that employ novel techniques to reduce the execution time is created. Proposed protocol reduce the time for detecting the missing tags by 88.9% or more, when comparing with existing protocols. In [7], the vital parts of the business programs are the data warehouses and the data mining techniques. Especially these are vital in Radio Frequency Identification (RFID) application which brings a revolution in business programs. Manufacturing, the logistics distribution and various stages of supply chains, retail store and quality management applications are involved in the RFID technology in business. A large volume of temporal and spatial data is generated by the ubiquitous computing and sensor networks of RFID and these are often generated with noises and duplicates. The noises and duplicates in the RFID data declare the need of an effective data warehousing system. A novel data

cleaning, transformation and loading technique which makes the data warehousing system employed for any RFID applications more effective proposed. In [8], the health management has become increasingly important in personal health care in modern life The system we have designed provides a method to help facilitate health management through an associated smart phone with Radio Frequency Identification(RFID),which is a new type of application .This system consists of medical knowledge and health management. In the application of medical knowledge, we use the human model as well as the operation of RFID to obtain medical knowledge concerning human organs. The two main functions of the health management system are medication remainders and drug identification. In [9], they developed semi-passive RFID tags can help implementing and attacking security-enhanced RFID systems is shown. Its main applications are in developing hardware prototypes of passive tags, extending RFID protocols with security functionality, and for attacking real RFID devices with side-channel analysis. In [10], the study has identified and explained the key benefits of RFID technology. RFID will open doors to a pool of applications from a plethora of industries. Although the focus challenge to thwart the adoption is its investment cost, RFID technology provides an ocean of lucrative business opportunities that could convince several firms adopt it. The first part of the paper explains the evolution of RFID technology and the role of its individual components within the system. The second part of the paper discusses the feasibility of employing RFID technology and how it is benefactor of improved efficiency at lowered costs. The last part of the paper highlights one of the numerous practical implementation of RFID technology.

III. PROPOSED SYSTEM

In the proposed method the downloading of the arduino software is done and next connect the arduinouno to the arduino software by using USB cable.Then we upload the source code into the arduino and port using port COM6(ARDUINO/GENUINO UNO). Then we run the program ,by clicking on tools and selecting screen monitor and if the authorized RFID card reader is scanned by the RFID sensor then the access is granted or else if the unauthorized RFID card is scanned then the access is denied.

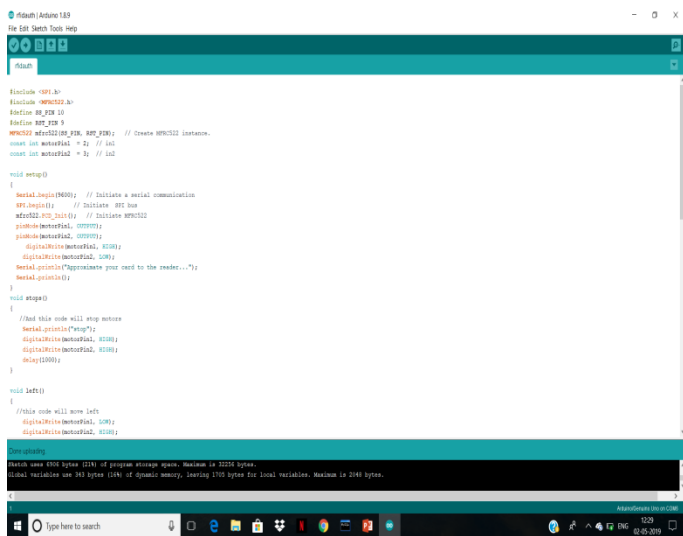


Fig. 1 Shows uploading of the source code into the Arduino Uno.

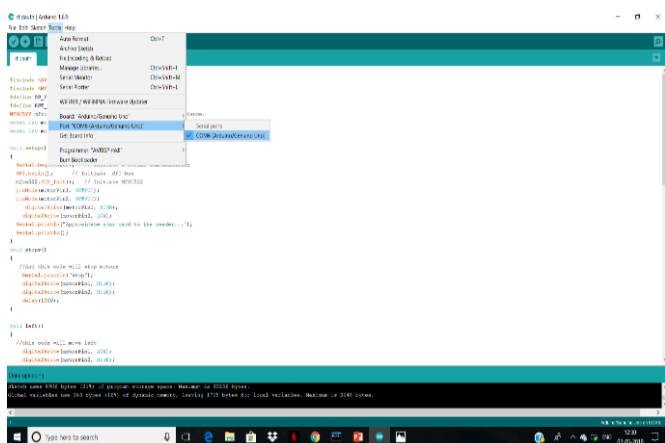


Fig. 2 The code is successfully ported.

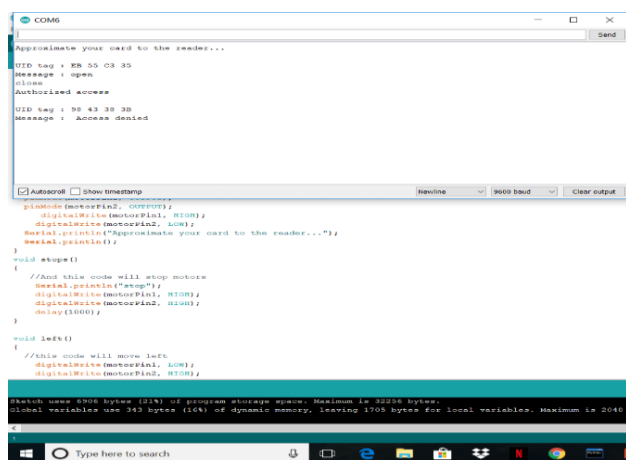


Fig. 3 Shows serial monitor

Interent of Things (IoT)

Global network of “smart device that can sense and interrelate with their environment using internet for their communication and interaction with users and other system. The main conception behind every IoT technology and implementation are “Device is integrated with virtual world of internet and interacts with by following, sensing and monitoring object and their environment”.

Hardware Components

(a)Arduino Uno: Arduino was introduced back in 2005 in Italy by MassimoBanzi as a way for non-engineers to have access to a low cost, simple tool for creating hardware. Arduino is an open source programmable circuit board that can be integrated into a wide variety of makerspace projects both simple and complex. This board contains a microcontroller which is able to be programmed to sense and control objects in the physical world.

By responding to sensors and inputs the Arduino is able to interact with a large array of outputs such as LEDs, motors and displays. Because of its flexibility and low cost, Arduino has become a very popular choice for makers and makerspaces looking to create interactive hardware projects.



Fig.4 ArduinoUno

(b) RFID reader: A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read. RFID technology allows several items to be quickly scanned and enables fast identification of a particular product, even when it is surrounded by several other items.



Fig. 5 RFID Reader

(c)Two RFID tags: A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. RFID is a technology similar in theory to bar codes. The RFID tag does not have to be scanned directly, nor does it require line-of-sight to a reader. The RFID tag must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read. RFID technology allows several items to be quickly scanned and enables fast identification of a particular product, even when it is surrounded by several other items.



Fig. 6 The RFID Authorized and Unathourized cards

(d) Arduino Uno Cable: Arduino Uno cable is used to connect ArduinoUno to the computer.



Fig. 7 ArduinoUnocable

(h) JUMPER WIRES: A jump wire (also known as jumper wire, or jumper) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes

without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.



Fig.8 Jumper Wires

(f). CD Driver: CD driver is used as a door lock tool.



Fig.9 CD Driver

(g) BATTERY: The nine-volt battery, or 9-volt battery, is a common size of battery that was introduced for the early transistor radios. It has a rectangular prism shape with rounded edges and a polarized snap connector at the top. Lithium 9V battery, an Arduino-based project will only last for 1 or 2 days of continuous use.



Fig. 10 Battery

IV. CONCLUSION

In today's technologically advanced world, autonomous systems are gaining rapid popularity so the advancement in latest technology is continuously and rapidly made on different latest automatic door lock security systems. The need for an advanced door lock security systems using new technologies is increasing day by day as security becomes very important or serious issue for everybody. Due to the recent trends in various methods of security for home, buildings, companies, vehicles etc, there is no need to worry about this security any longer, as automatic security systems are here to deal with it. This project tries to focus all recent door lock security systems in a comprehensive way.

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