Rfid Based Exam Paper Leakage Protection System

Keerthan K S[1], Mukesh[2], Manjunatha G[3], Karan R Aithal[4], Dr. K M Sudharshan[5]

[1]School of Electronics and Communications Engineering, REVA University, India
[2]School of Electronics and Communications Engineering, REVA University, India
[3]School of Electronics and Communications Engineering, REVA University, India
[4]School of Electronics and Communications Engineering, REVA University, India
[5]School of Electronics and Communications Engineering, REVA University, India

Abstract: The soul of the society is Education as it passes from one generation to another. However today, when we read news articles, we realize that, This has been corrupted by question paper leakage.. We propose an electronic protection in order to prevent exam paper leakage. Question papers will be stored and sent to the examination centres in a sealed electronic box. The device will ask for the main examiner to scan his RFID tag. Then the box lock is open .And invigilator must scan his card to print question paper and distributed to the exam candidates . This will enable the papers to be locked and sealed till the point in time when the papers need to be brought out for the distribution to the students in the examination hall.

Keywords: RFID, PRINTER, UART, I2C, ARDUINO UNO, ELECTRONIC *CONCEALED BOX, SOLENOID..*

1. Introduction

In recent years, many government and private agencies depend on various type of exam to recruit or select an individual for a certain role. At present, the leakage of question paper has increased causing such organization or agencies hard to recruit the best candidate or individuals. This has caused such organization to loss money and decreased the efficiency of the work in the organization.

Every year during time of exam we will come across News in the newspaper and television about question paper leakages and hence the exam is being postponed or cancelled .Sometimes the information related to question papers leakage will not be known to the universities or organization itself. This causes the organizations to loss money and time

We have come up with a project which can be easily moved to carried to one place to other and which has accurate results for all the conditions. So with this in mind we can execute the project "RFID based question paper leakage protection system" which makes use of arduino, LCD, RFID tag and readers, L293D motor driver IC, Printer, Solenoid lock.

In this project we develop a "Electronic Concealed Box" through which college or organization will send the question paper to the exam center, This Electronic Concealed box is electrically sealed box , which might have been proposed utilizing "the Arduino processor" that has RFID Reader on the "the electronic concealed box". Where the main examiner will swipe to unlock the solenoid lock which opens the box which contains the printer or question paper and then the invigilator has to swipe his card to print the question paper and then distribute the question paper to the students.

We have tried to create the project, that can help the organization or universities to provide a good examination experience to his candidates who are genuine.

1.1 Problem Statement

In the context of question paper leakage system, we aim to provide good examination experience for exam candidates. Each candidate is important to us so we make sure all get the position based on their result not by malpractice. So we propose a project that can give you the best result.

1.2 Organization of the paper

The remaining of this article is organized as follows: Section II provides survey of related work. Section III presents the performance of the proposed architecture. Section IV Flowchart of our project. Section V gives an overview of result we achieved in this project.

2. Literature review

In [1], In his paper, they declared an effective system which includes a Real Time Clock (RTC), Radio Frequency Identification (RFID), and a GSM module which helps for dual verification of owner to open a sealed box. The Design is implemented using an ARM microprocessor. This framework containing a locked box which is opened only after RFID tag is verified by the reader, using radio frequency for reading data from and to the tag attached to the box. It can either have a fixed or programmable logic which processes data between transmission and reception of sensory data.

Thus, this method can be used to transmit Confidential Information like used the above as examination question papers to various universities of a particular board without worrying about tampering and leakage of paper. The universities can later produce many copies of the paper and be given to students at the right time of exam and then the examination methodology follows.

It includes lots of limitations. The sever may might be lost, the website might have a chance to be hacked, and more than 100 colleges must take Xerox copy that includes the threats such as errors in printing and power cuts, and the paper cannot be produced and leakage may follow. The electronic security is similar to current equipment like the Automated

Teller Machine (ATM) and Safe Lockers. This framework incorporates many electronic components that operate on the methodologies which depend and follow the following, Radio Frequency for RFID tag and Mobile Networks like GSM for OTP verification and use of protocols like UART and I2C for transmission.

In [2],In their analysis, they have produced a product to help electricians like BESCOM Linemen who control and maintain the electric current and power supply to all the areas.

They are under a constant threat from high voltages passing through the AC lines carrying current. During repairs they have to use circuit breakers to stop the flow of current and sometimes can be wrongly interpreted and used by other workers which lead to electric shocks or fatal paralysis

Basically, they have used a Keypad consisting of alphabets and numbers to enter a password so that only the in charge line-man can access the circuit breaker and break the voltage across particular line while working on those electric lines.

A keypad to enter the password, a controller and ROM to store the lineman data and to control a relay atta ched to a circuit breaker.
If the Line man enters the correct password, they will be able to switch the relay and line open or closed.

In [3], Here the Automated door lock system is made in a different way than previously used locking mechanisms and electricals. This project shows us an easy method to get the required output. The method showed in this project makes use of hardware like arduino, L293D motor driver IC as the heart of the project. Importing Keypad header files to control and edit keyboard input and using a motor driver to control a motor which in turn is attached to hinges or edge of a door to move it back and forth opening and closing the door when entered combination on the keypad is correct.

It blinks a green LED and waits for 30 secs and displays a red LED before closing the door and the loop repeats itself allowing numerous users from accessing the physical portal. While the same can be done using a servo motor or a relay.

[4][6],This idea helps in the security of the lockers in a bank.A 4*4 matrix keypad is used in this project to lock a customized door locker. The keypad consists of 16 keys totally. Out of all the keys, 4 keys in Rows (R1, R2, R3, R4) and 4 keys in Columns (C1, C2, C3, C4). Whenever a key is pressed, a connection will be established between the corresponding rows and columns.

A 16×2 I2C LCD to Arduino is connecting the SDA and SCL pin to Analog Pins of Arduino and connecting the power and ground to power up the display. Here information related to user and password is displayed and it helps guiding the user to unlock the security and use it.

[5], In this proposed work, the RFID reader and tags are extensively used to provide a wireless non-contact interaction for transmission of sensor data between the reader and tags. Here a common mounted reader is programmed to accept a large number of RFID tags to accept the users ID or number for comparisons. It acts as a compare validator to grant access if tag is valid else deny access.

RFID tags and a single reader is used, Where RFID tags can store a range of information from one serial number to several pages of tag data. RFID Readers can be mobile so that they can be carried by hand, or they can be mounted on a fixed base or wall of a room, cabinet or a building. It uses Radio Waves at different frequencies to pass information from the tags to the reader.

3.   Architecture
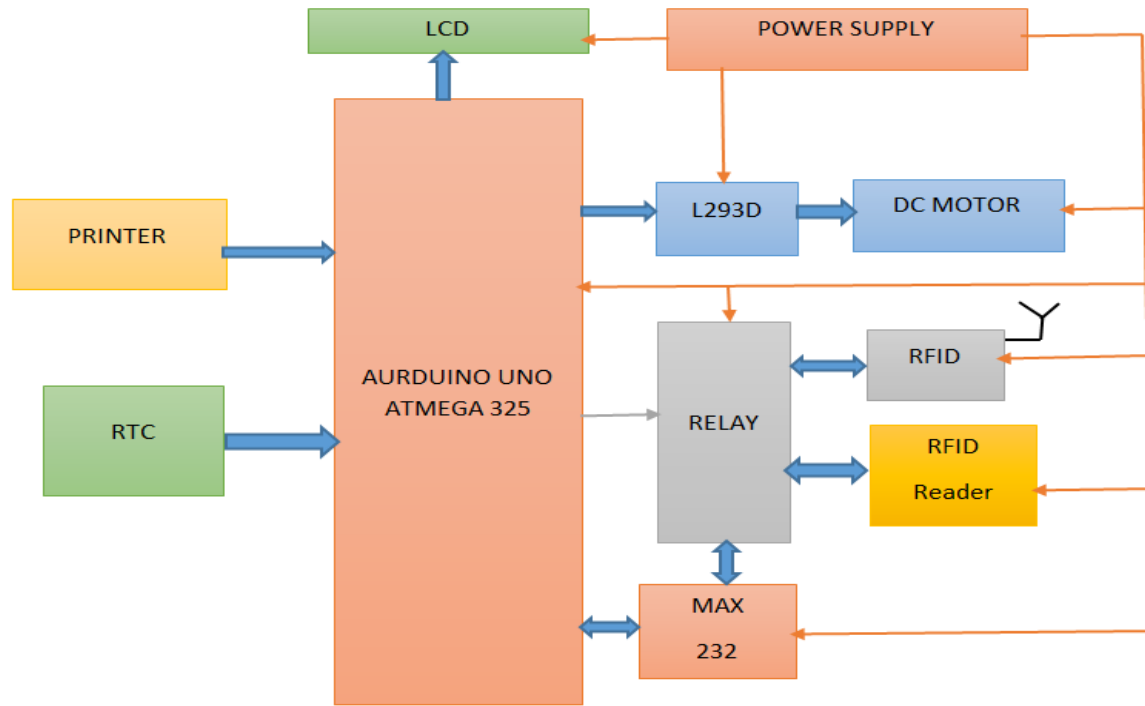
Fig 1: Block Diagram

1. RFID (radio frequency identification) it works on the principle of wireless systems, It is made up of two components RFID tags and RFID readers. Where RFID tags are portable chips and RFID readers are mounted on Electronic Concealed Box. The RFID tags are given to the main examiner and the invigilator and there data is stored in arduino memory. When ever a tag is swiped on the reader it detects the tags is valid or not using electromagnetic fields of tags. There are two types of tags active tags and passive tags. Active tags uses power from its power storage where as passive tags depend on RFID readers for power. RFID is a best protection layer for this layer because we can manage who can assess the Electronic Concealed Box from RFID.

2. An "Solenoid lock" is a locking gadget, which uses microcontroller or microprocessor to control it or take guidance from. There are 2 types of locking system one is fail-open which gets unlock if the power lost or power is cut-off and other type is fail-closed which will remain locked when the power is lost or power is cut-off. Some solenoid lock has the capacity to hold upto 1000kg, Solenoid is a type of electro-magnetic lock. Nowadays, the quality of solenoid locks compete greatly with that of conventional door locks and the magnetic locks price is cheaper than conventional light bulbs to work.

3. Arduino UNO module, a microcontroller that has 14 digital pins(D0-D13) and as 6 analog pins(A0-A6). We used arduino microcontroller for this project because it consumes less power and it's cheaper. We choose arduino because we don't need any communication from Electronic Concealed Box and arduino does not have inbuilt communication module so its cheaper compatible. We use arduino to basically deals with the receiving the signal from RFID reader and give signal to servo motor and electronic lock to open.

4.LCD is Liquid Crystal Display. We use 16*4 display, which shows or guides the invigilator to do next step to open the box and print question paper through displaying messages on it.

5. Motor driver L293D is used in this project which has 16 pins it is used drive motors in this case it is used to drive dc servo motor which controls the locking and unlocking of solenoid lock. This motor driver receives input from arduino which guides it to perform the function.

6. Printer it prints out the question paper which is then given to the candidates. The question paper is digitally stored in arduino memory so it can't be hacked into or physically read during transportation.

7. Power supply we use 5v and 12v.

4. Flow Chart
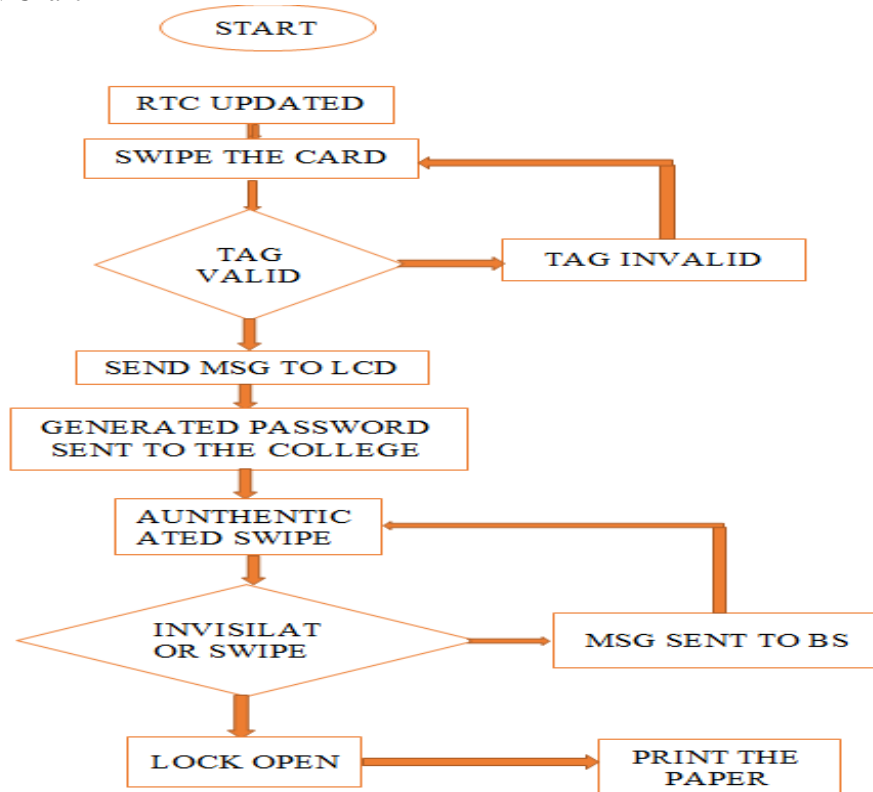
Fig 2: Flow Chart

In this project we have developed an "Electronics Concealed Box" which consists of Arduino, RTC (Real Time Clock), RFID Reader, RFID tags(Main Examiner and Invigilator), LCD, Solenoid Lock, Printer, L293D Motor Driver.

The "Electronic Concealed Box" has a RTC which gives the time of the swipe of RFID tag of main examiner on RFID reader to the Arduino. And arduino checks the time with the predetermined time by the exam board if it's same it moves to next step or else it display's the message "Exam has not started" on LCD. If the time of swipe is same as the time determined by exam board it display's the main examiner name who has swiped his RFID tag (card) on LCD in the format "Main Examiner <name of main examiner>". And opens the solenoid lock which closes the box which contains the Printer, Then it shows the message "Swipe Invigilator card" on LCD telling that it's time for invigilator to swipe his RFID tag on RFID reader. Once the invigilator swipes his RFID tag (card) the arduino verifies the invigilator card with invigilator credentials previously stored by exam board saved in arduino, If it's not same as the invigilator credentials previously stored by exam board its display's message "Wrong invigilator card". If it's same it print's the question paper from the printer which can be distributed to the exam candidates.

The "Electronic Concealed Box" is effective in reducing the physical damage to the question paper which is caused during transportation of the paper. And it reduces the question paper leakage to a great extend.

5. Applications

1. The main purpose of this project is to avoid exam paper leak during competitive exams or board exams and various other exams.
2. This project protects the exam paper from any physical damage.
3. It can be used in situation where two steps verification is needed.
4. It can be used to transfer important data from one place to another without the fear of data breach.

6. Result And Conclusion
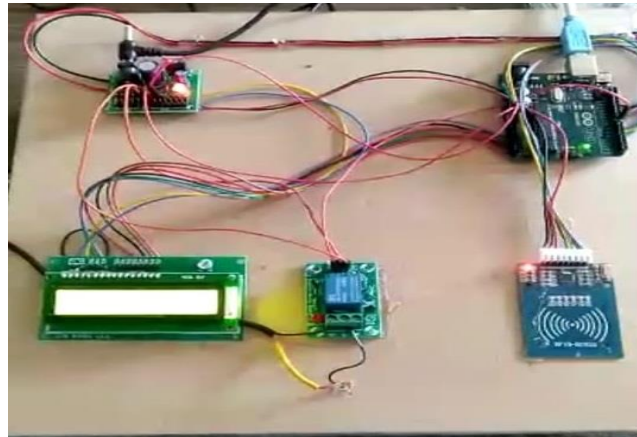
Fig.3 (a): Hardware Model - Outside Electronic Concealed Box
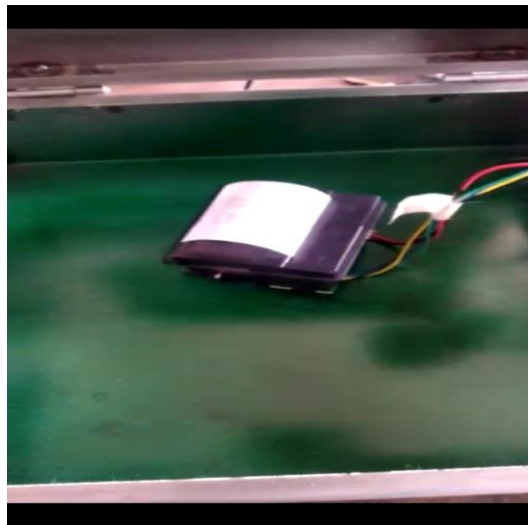
Fig.3 (b): Printer - Inside Electronic Concealed Box

The hardware components are connected as shown in the block diagram and arduino is programmed as explained in the flowchart, Our project model works without any error for all the conditions of arduino, RFID and motor driver hardware model and produces accurate output for all condition. The main advantages of this project is Its cheap, It can be carried or sent to anywhere even to the remote locations, It consumes less number of pins of arduino compared to other models existing in market, It consumes less power. The design and development of RFID based question paper leakage protection system is implemented and tested for all condition. We can extend this project by using GSM module to generate OTP and use keyboard to enter the OTP to sent from GSM module to entered phone number which can act as a additional layer of protection to the project and we can program arduino to close the Electronic Concealed Box after the completion of exam.

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