



ELECTRONIC PROTECTION FOR EXAM PAPER LEAKAGE

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ABSTRACT:

This project endeavors to establish an electronic protection system using Arduino, a keypad, and a DC motor to prevent exam paper leakage. The system employs password authentication via the keypad, granting access to the exam paper storage area when the correct password is entered. The hardware configuration involves connecting the keypad module to the Arduino, with the DC motor linked to the Arduino through potential motor driver integration. The software programming prompts the user for a password, verifies it against a pre-defined one, and activates the DC motor if the passwords match, thereby opening the door or gate to the exam papers. This secure solution ensures that only authorized individuals can access the exam paper storage area, effectively preventing unauthorized entry. The task portrays electronic assurance for test paper leakage which is a profoundly security system. Examination is the significant perspective for the educational system to test the abilities of understudy through on the web, orally on papers. Question paper goes to the college from university in electronic fixed box which is an embedded system planned with Arduino uno. A keypad will be given to the college authorities and password will sent to college before 10 minutes of test. By pressing on proper password, lock of electronic fixed box is open.

Key words: Arduino Nano, GSM, MEMS Sensor, DC Motor, Motor Driver, RC552, RFID Card, Buzzer, 16x2 LCD

INTRODUCTION:

Education is basically the motivating force of the society. An examination is the assessment planned to measure the skill, knowledge, physical fitness or aptitude and also classification in so many subjects. An exam may be on paper, on the computer, orally, in exam centers, which are conducted to test, calculate or examine the set of skills. Also the main purpose of the examination is to select the capable candidates for different positions. For the students main issues are question paper leakage, who suffer from the postponed or cancellation of the examination. Each and every year we hear news about postponed/cancelled exam due to paper leakages in the newspaper or on television. Sometimes the university itself doesn't know how there is leakage of any information content related to question papers.

So we have come up with a compact and portable solution and decided to design and implement an examination paper leakage protection system based on ARM processor. Along with the ARM processor (LPC2148), GSM modem, RFID module, keypad, LCD and electromagnetic lock are used in this system. First the question paper comes to the college from university in an electronic sealed box which is called Electronic Control Box. The Electronic Control Box is an embedded system that was designed using ARM processor, which has inbuilt RTC to monitor the Electronic Control Box. If anyone tries to open that box before and after the RFID swipe time duration, the system communicates to the university authorities by sending an SMS (Short Message Service) through GSM (Global System for Mobile communication) that "some malfunctioning has taken place with the Electronic Control Box".

The university authorities send a unique password to the chief authority of the college before 10 minutes of the exam. The chief authority has been given a valid RFID card along with a dummy RFID card from the university. The authorized person swipes the card. The system acknowledges for the password if the card is valid. Chief examiner needs to type the password which is provided by the university using the keyboard. If password is correct, the electromagnetic lock rotates and unlocks the Electronic Control Box. This system has two transceivers. The transceiver 1 is an embedded system related to the Electronic Control Box. The transceiver 2 is the mobile phone with the university authorities. The present module work deals with the hardware and software part.

PROBLEMSTATEMENT:

In this system we are using first level security which is an RFID card with a particular or unique number which is provided by university to every college. GSM is used for any unauthorized user tampering. If any unauthorized users try to open the box, then immediately a message will go to the university authorities through the GSM. The Keypad is the second level security in this system for date, time and password matching.

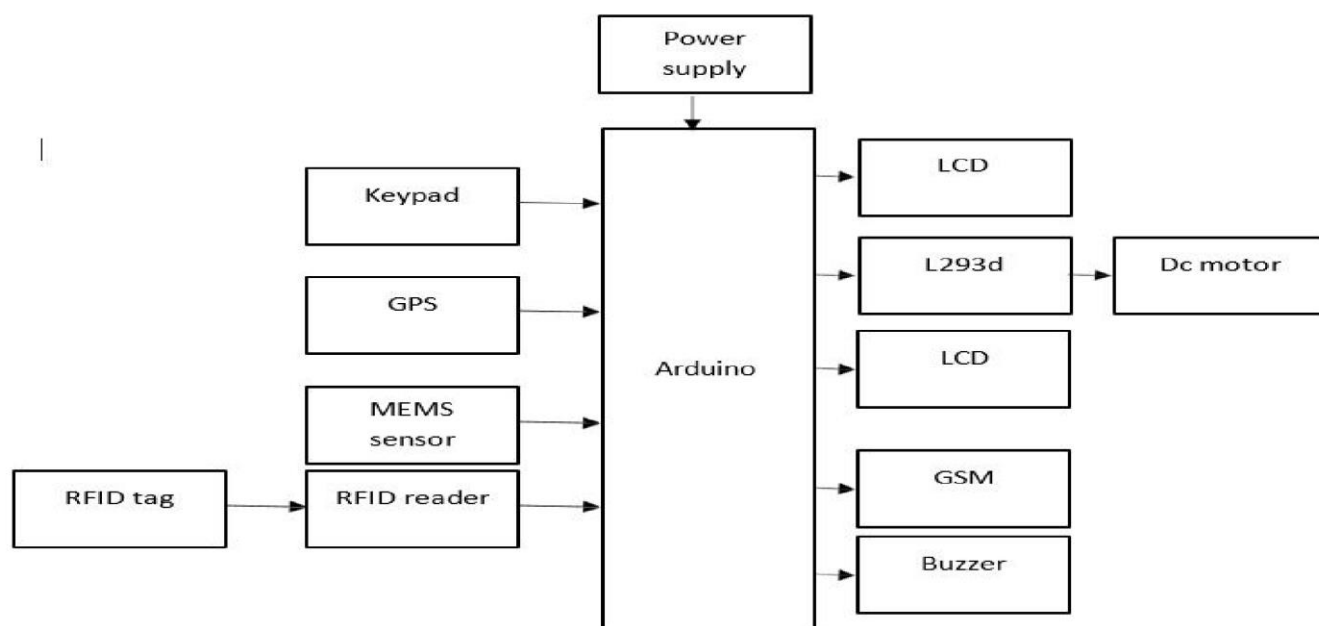
SYSTEM IMPLEMENTATIONAND WORKING:

The Block Diagram consists of Power supply section, 16X2 LCD Display, 4*3 Matrix, RTC, Microcontroller ARM7, Transistor based relay driver, DC Motor, MAX 232, GSM, RFID Reader. In the power supply section, the AC power (230-0-230V) from the transformer is converted into 12V dc after passing through full wave rectifier. By switch on the kit, 12v dc is applied to the kit. This 12v is applied to AMS1117 regulator. The output of this regulator is 5V. This 5V is distributed to all devices which are operated with 5V like LPC2148, GSM, RFID, LCD, MAX232 etc.. First of all, LCD is displays "exam paper leakage detection" and then "wait for the time" in RTC. Then we have to set the time in RTC by using s1, s2, s3 switches. If it is time for the exam buzzer on by applying 5V to buzzer from the output of the port0.7 and again LCD displays "enter ur mobile number". Then we have to enter the mobile number through keyboard. By pressing the any number, that particular row and column are activated and send high pulse (5V) to microcontroller. Then the particular microcontroller pin is high and the number is displayed on LCD after that, OTP is generated by the microcontroller as per given logic and send to mobile through GSM. We have to load the password into the microcontroller through keyboard. If it is correct further process is done otherwise lcd displays "invalid otp". If entered otp is correct, lcd displays " show ur valid rfid card ". When we placed the rfid tag near the rfid reader, which is operated with 13.56mhz frequency in high frequency band. The reader sends a RF signal to the tag. The power system of tag is charged and detected this signal and again sends back the response of tag to rfid. This response contains serial number of card and other related information. The rfid reader will convert this data into digital and send to LPC2148 microcontroller.

Fig 1 Block Diagram of Electronic Protection For Exam Paper Leakage

The microcontroller will compare this number with predefined number of the card. If it is matched, the lock is opened through motor mechanism. The microcontroller output is very low voltage (5v) which is not sufficient to drive the motor. So, 12V transistor based relay is used to run the motor. The output of microcontroller at port0.4 is 5v, which is applied to the base of the transistor, and then the transistor goes into saturation. The output of transistor is 4.5V applied to relay, which is run with 12V. Then the relay is energized and switched ON. Then the motor runs unidirectionally. Initially, tamper switch is low. If anyone tries to open the box before rfid predefined time. Then the tamper switch becomes high and high pulse (5v) send to

microcontroller. Then the buzzer ON. Simultaneously, GSM sends sms to board that “some one tamper ur box please check”.



CIRCUIT DESCRIPTION:

For this system we have used PIC controller for Much Flash memory for transmission, The RISC (Reduced Instructions Set Computer) microcontroller is a powerful tool that provides a highly flexible and cost-effective solutions to many embedded monitoring and diagnostic systems. The central unit has been made around of an PIC microcontroller with proposed architecture which will be used for GSM and Exam paper leakage protection system, also Easy to program it and writing or burning devices are available it also have inbuilt analog to digital convertor of i c module it is directly connected to controller pin and matrix keyboard and internal timer used for showing time and SMS sending we used LCD 16*2 and we used RFID redder module that is ID of project. Regulated power supply is used and step down transformer for this. The diagram for the Exam paper leakage protection system is shown in fig.1. Vibration sensor is connected to the port pin of Microcontroller. GSM Module is connected to the port pin of transmitter pin of microcontroller and receiver pin is connected to RFID reader module. Matrix key board connected to complete eight bit port. When did it gets vibrations before time then it will be connected to ground i. e. active low. And into controller programming we read the data from inbuilt. mob. No. and sent it to SMS sending i.e. at command format. Circuit of DC motor developed by H-bridge motor driver for forward and reveres direction this circuit made using four power transistors that is shown in dia. As S1,S2,S3 and S4

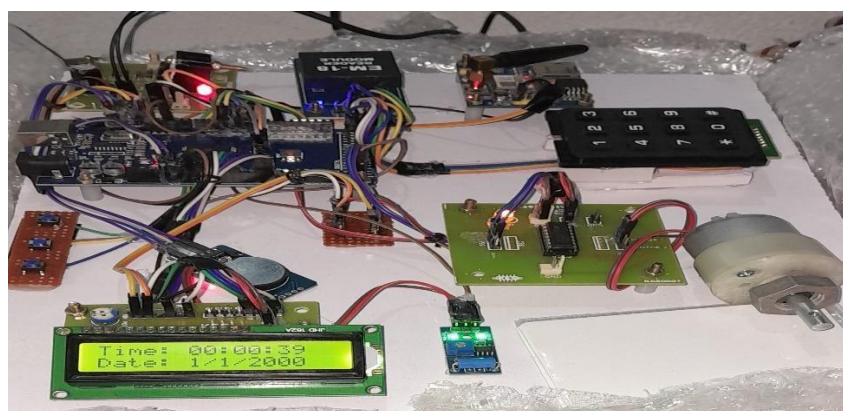
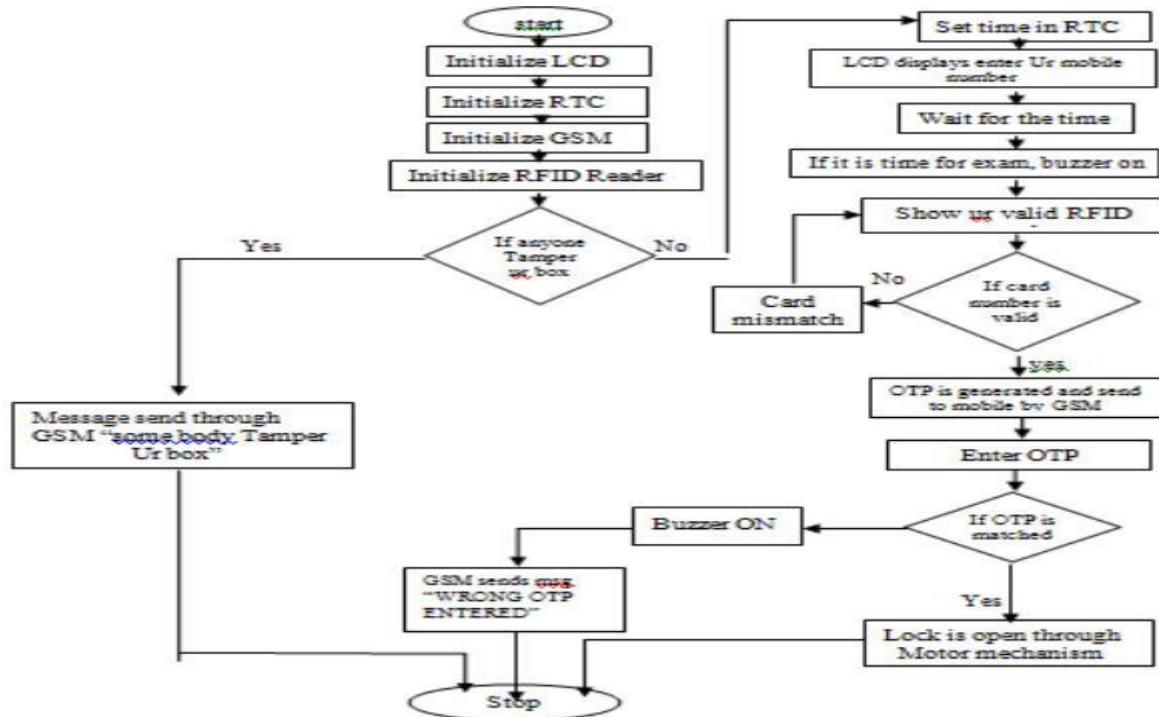


Fig2 Circuit Connection

FLOW CHART FOR EXAM PAPER LEAKAGE:**Fig 3. Block Diagram for Exam Paper Leakage LITERATURE REVIEW:**

First the question paper comes to the college from university in an electronic sealed box which is called Electronic Control Box. The Electronic Control Box is an embedded system that was designed using ARM processor, which has inbuilt RTC to monitor the Electronic Control Box. If anyone tries to open that box before and after the RFID swipe time duration, the system communicates to the university authorities by sending an SMS (Short Message Service) through GSM (Global System for Mobile communication) that "some malfunctioning has taken place with the Electronic Control Box". **EXISTING SYSTEM:**

In previous investigation for exam paper leakage protection system. Firstly, the university will send the exam paper to the college in "an electronic sealed box" that will be termed as "sealed cover paper" **Drawbacks:**

- Not accurate
- Less security system
- RFID was not interfaced for swiping purpose to get into the password

PROPOSED SYSTEM:

In order to overcome this problem here we are in. Here firstly question paper goes to the college from university in electronic fixed box which is an embedded system planned with Arduino uno. A password will be given to the college authorities and password will be sent to college before 10minutes of test. By entering the password with proper password, lock of electronic fixed box is open. By utilizing this there will be more control on leakage by providing with this security system. By using that the mems sensor is used to theft alerted means broken and RFID access and Keypad access. If in case unauthorized message sent to user and buzzer alert.

METHODOLOGY:

This project focuses on developing a robust electronic protection system to secure exam papers, addressing vulnerabilities inherent in the current manual handling processes. The system employs an Arduino Uno-based electronic fixed box, which serves as a secure repository for exam papers. Access control is a key feature, with unique passwords sent to authorized college authorities 10 minutes before the exam to unlock the box. This ensures that only designated personnel can access the contents. To enhance security, the system integrates MEMS sensors that detect any tampering attempts. If unauthorized access is detected, the sensors trigger immediate alerts. Additionally, the system incorporates RFID and keypad authentication, providing a dual-

layer security mechanism to ensure that only authorized individuals can unlock and access the box. Real-time monitoring capabilities are a crucial component of the system, enabling continuous surveillance and immediate detection of any security breaches. Automated alert mechanisms are in place to notify authorities promptly in the event of unauthorized access, ensuring a swift response to potential threats. The multi-layered security approach of this project significantly reduces the risk of exam paper leakage, thereby preserving the integrity and confidentiality of the examination process. By addressing the shortcomings of the existing manual system, this electronic protection system offers a comprehensive solution for safeguarding exam papers. Through this implementation, the project aims to provide a more secure and reliable method of handling and storing exam materials, ensuring the trustworthiness of the examination process.



Fig 4. GPS Receiver **Fig 5. GPS Receiver Module**

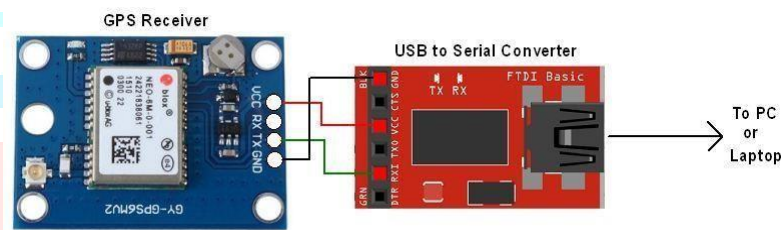


Fig 6. GPS Serial Interface

GPS Receiver Module:

A GPS Receiver Module is a device that receives signals from Global Positioning System (GPS) satellites to determine precise location, speed, and time. It is widely used in navigation systems, tracking applications, and geolocation services. Key Components of a GPS Receiver:

Microcontroller/Processor – Processes the received data.

Power Supply – Provides necessary voltage (e.g., 3.3V or 5V).

Communication Interface – Connects to external devices via UART, I2C, or SPI.

External Storage (optional) – Stores GPS data logs.

GPS Serial Interface:

The GPS Serial Interface allows communication between the GPS module and external devices, such as microcontrollers or computers. The most commonly used protocol is UART (Universal Asynchronous Receiver-Transmitter), which transmits GPS data in NMEA (National Marine Electronics Association) format.

Common Communication Protocols:

- UART (TX, RX Pins) – Serial data transmission.
- I2C (Inter-Integrated Circuit) – Multi-device communication.
- SPI (Serial Peripheral Interface) – High-speed data transfer.

NMEA sentences provide essential details like latitude, longitude, altitude, speed, and time for various applications. **GPS Receiver:**

A GPS Receiver is a device that receives signals from Global Positioning System (GPS) satellites to determine precise location, speed, and time. It is widely used in navigation, tracking, surveying, and geolocation applications.

Antenna – Captures signals from GPS satellites.

Processor – Converts signals into readable location data.

Power Supply – Provides necessary voltage (usually 3.3V or 5V).

Communication Interface – Sends data via UART, I2C, or SPI to external devices like microcontrollers or computers.

ResultsAnd Discussion:

Results:

This prototype consists of ARM controller, RFID Reader and RFID Tag, Real Time Clock, DC Motor, Motor Driver, 3*4 Key Matrix and GSM module, MEMS Sensor ,16*2 Lcd display and Buzzer.



Fig 7. Model Circuit

When an RFID tag is placed near the RFID reader, the reader emits a signal that the tag picks up and responds to. The tag sends a return signal back to the reader, which then converts this signal into a digital format and sends it to the microcontroller. A 12V DC motor is used to open the lock of the embedded system. Since the microcontroller's output voltage is too low to drive the motor, a motor driver is utilized to provide the necessary power. MEMS Sensor GSM is used to send the message and Buzzer is on to the board whenever anybody try to open the box.

The LCD displays the following output during the startup of the embedded kit:

After turning on the experiment kit, the LCD display should show the message "Electronic Protection for exam paper Leakage."



Fig 8. LCD display

LCD displaying the output during controller asks for show Ur RFID card as shown below:

Step 1: When it is time for the exam, the LCD on the controller will display the message "Show Your RFID Card."



Fig 9. After RFID card shown

LCD displaying the output during controller to the Display Enter password Authorized person as shown below if Authorized person also Enter the password is In Correct the GSM System is Sending a Message entered wrong password and Buzzer is on.

After Enter the password The LCD displays a message indicating the transmission of an OTP to the authorized individual through GSM, facilitated by the logic code within the controller.

The OTP received by the authorized person is inputted into the microcontroller through a 3x4 keypad matrix.

If the entered OTP is valid, the lock will be opened via a motor mechanism. Otherwise, the GSM module will send a notification to the authorized person indicating that an incorrect OTP was entered.

Step 2: When the Un Authorized Person to scan the card the GSM system is send to message alert to Authorized Person and Buzzer is on

The Message will be sent on registered mobile number.

CONCLUSION AND FUTURE SCOPE:

Conclusion

An Effective system is proposed here which uses RFID, GSM and Real Time Synchronized clock. Examination section of university can deliver the question papers to the examination centers by password protected electronic security system. All these question papers will have next level security using RFID. Using GSM each activity involving opening and closing the box can be monitored in real time by university examination center.

Future Scope

- This project can be extended by including biometric of the college authorities.
- This project can be extended by placing gas sensor, which is used to detect the gas whenever anybody want to cut the box by using cutter.
- This project also can be extended by placing vibration sensor in the box, which detects vibrations, whenever, anybody want to break the box with hammer.

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