

AUTOMATIC MARKS SENDING SYSTEM TO STUDENTS THROUGH SMS

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Abstract -

In the evolving landscape of educational technology, automation has emerged as a pivotal element in enhancing communication, reducing manual effort, and ensuring timely dissemination of academic information. One such critical area where automation can play a transformative role is in the communication of student academic performance. The conventional process of communicating marks to students and parents often involves manual data entry, report card generation, and physical distribution, which can be time-consuming, error-prone, and inefficient. This research paper presents the design and implementation of a low-cost, microcontroller-based system titled "Automatic Marks Sending System to Students Through SMS," aimed at automating the process of marks delivery using RFID and GSM technologies.

The hardware implementation is centered around an RFID module (MFRC522), which is used to read unique identification numbers (UIDs) from RFID tags assigned to individual students. Each UID corresponds to a particular student whose marks are stored in the system. When a student scans their RFID card, the system reads the UID, verifies it against stored values, and matches it with the student's data. Upon successful identification, the microcontroller triggers the SIM900 GSM module, which then sends an SMS containing the student's subject-wise marks to a specified mobile number.

The software architecture is developed using the Arduino IDE, with efficient logic implemented to handle UID comparison, LED indication, and AT command communication with the GSM module. The system features two pre-configured RFID tags, each representing a different student. When a tag is scanned, the system activates corresponding LED indicators for visual feedback and sends an SMS with that student's academic record. This operation is executed using AT commands via software serial communication between the Arduino and SIM900.

One of the key advantages of this system is its simplicity and cost-effectiveness. The use of basic components like RFID tags, Arduino UNO, LEDs, and GSM module makes it suitable for small to medium-sized educational institutions, especially those in rural or under-

resourced areas, where advanced digital infrastructure might not be readily available. Furthermore, the use of SMS as a communication medium ensures accessibility, as it does not rely on internet connectivity or smartphone usage.

Keywords: Automatic Marks Sending System, SMS Notification, GSM Module (SIM900), RFID Technology, Student Information System, Real-Time Communication, Arduino, Embedded Systems

1. INTRODUCTION

In the modern era of digitization, technology continues to revolutionize every aspect of life, including the education sector. Educational institutions are increasingly integrating automation and communication technologies to streamline administrative processes, enhance student engagement, and improve academic performance reporting. Among various administrative responsibilities, the process of recording, managing, and disseminating students' academic marks remains one of the most critical. Traditionally, marks are communicated through printed report cards, verbal announcements, or manual record-keeping systems, all of which are susceptible to inefficiencies such as delays, miscommunication, loss of records, and human error. In this context, the development of an Automatic Marks Sending System to Students Through SMS emerges as an innovative and efficient solution aimed at enhancing the accuracy and speed of academic information delivery.

This system is particularly significant in educational environments where direct communication between schools and parents is limited, either due to geographical challenges or infrastructural constraints. In many rural and semi-urban areas, parents often lack timely access to their child's academic performance due to the absence of regular reporting mechanisms or digital infrastructure. While internet-based platforms and mobile apps are increasingly popular in urban areas, they are not always feasible in remote regions with limited connectivity or low smartphone penetration. On the contrary, SMS (Short Message Service) is a ubiquitous communication medium that is accessible on even the most basic mobile phones and does not require an internet

connection. Leveraging this medium can bridge the digital divide and ensure inclusive access to academic information.

The Automatic Marks Sending System introduced in this project combines RFID (Radio Frequency Identification) and GSM (Global System for Mobile Communication) technologies to automate the process of identifying students and sending their marks via SMS to registered mobile numbers. The system is implemented using a microcontroller-based platform—specifically the Arduino UNO—which serves as the core controller for RFID data acquisition and GSM communication. Upon scanning an RFID card that uniquely identifies a student, the system sends a pre-defined SMS containing the student's subject-wise marks to the assigned mobile number using the SIM900 GSM module.

2. HARDWARE REQUIREMENTS

- 1) Arduino UNO (Microcontroller Board)
- 2) MFRC522 RFID Reader Module
- 3) RFID Tags (RFID Cards or Key Fobs)
- 4) SIM900 GSM Module
- 5) SIM Card (Activated)
- 6) LEDs (2 Nos.)
- 7) Resistors (220Ω – 330Ω)
- 8) Jumper Wires (Male-to-Male, Male-to-Female)
- 9) Breadboard (Optional, for Prototyping)

3. Implementation

The implementation of the “Automatic Marks Sending System to Students Through SMS” is structured around three core operations: student identification via RFID, marks processing using Arduino, and SMS transmission through a GSM module. The project integrates hardware components with embedded software logic to automate the process of delivering academic performance information to parents in real-time.

3.1 Hardware Integration

1. Arduino UNO – The Central Control Unit

- The Arduino UNO serves as the brain of the system. It collects inputs from the RFID reader, processes the student's UID, and sends commands to the GSM module to transmit SMS. It also controls the status LEDs to give feedback on system activity.
- Role: Central processor and communication controller
- Communication Interfaces Used:
 - SPI (for RFID)
 - Software Serial (for GSM SIM900)

- **MFRC522 RFID Reader Module** – Student Identification
- The MFRC522 RFID reader is connected to the Arduino using the SPI interface. When a student scans their RFID card, the module reads the UID (Unique Identifier) and sends it to the Arduino for comparison.
- Power Supply: 3.3V (provided by Arduino)
- Interface: SPI
- Connections:
 - SDA → Pin 9 (SS)
 - SCK → Pin 13
 - MOSI → Pin 11
 - MISO → Pin 12
 - RST → Pin 10
 - VCC → 3.3V
 - GND → GND

3. SIM900 GSM Module – SMS Transmission

- The SIM900 GSM module is used to send SMS alerts to the parent's mobile number. It is connected to the Arduino through software serial communication on digital pins 2 and 3.
- Power Supply: Requires 12V/1A to 2A external power source (not powered via Arduino)
- Interface: UART (SoftwareSerial)
- Connections:
 - SIM900 TX → Arduino RX (Pin 2)
 - SIM900 RX → Arduino TX (Pin 3)
 - GND → Common GND with Arduino
- Important Note: The GSM module must be powered using a dedicated 12V adapter with at least 1A current output to ensure stable operation.

4. LEDs – Visual Feedback Mechanism

- Two LEDs are used to indicate the detection of student cards and the initiation of SMS sending.
- LED1 (Pin 5) – Indicates that Tag 1 (e.g., S. Raju) has been detected
- LED2 (Pin 6) – Indicates that Tag 2 (e.g., P. Suresh) has been detected
- Each LED is connected in series with a 220-ohm resistor to limit current and prevent damage.

5. Power Supply and Grounding

- Arduino UNO can be powered via USB or external 9V adapter.
- SIM900 GSM Module requires a 12V DC power adapter (1A to 2A recommended).
- All components share a common ground to ensure stable operation and signal reference.

4. Real Time Implementation

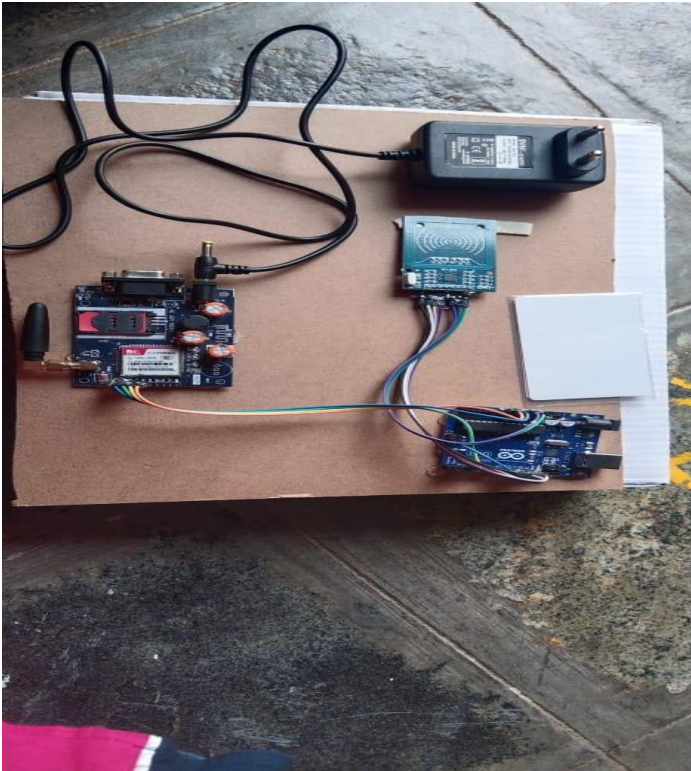


Fig -1: Hardware Implementation

5. Simulations

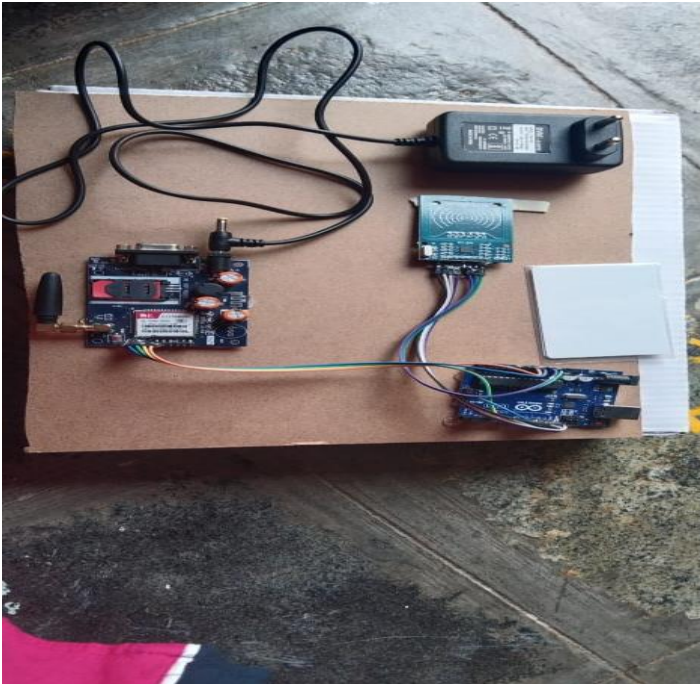


Fig -3: Result

6. Advantages

1. Instant Communication

- The system allows for real-time transmission of students' marks directly to their registered mobile numbers via SMS.
- Parents and students receive timely updates without any delays or manual interventions.

2. No Internet Required

- Operates entirely over GSM networks using SMS, eliminating the dependency on internet access.
- Particularly beneficial in rural or low-connectivity areas where traditional online result systems are ineffective.

3. Time-Saving and Efficient

- Automates the entire process of result distribution, saving time for teachers and administrative staff.
- Reduces workload during examination result processing and reporting.

4. User-Friendly System

- Simple hardware setup using RFID and SIM900 GSM module.
- Easy to operate and does not require specialized training for school staff.

5. Cost-Effective Solution

- Uses low-cost components like Arduino, RFID module, and GSM SIM900.
- Requires no complex infrastructure, making it affordable for schools with limited budgets.

6. Enhanced Parent-Teacher Communication

- Keeps parents informed about their child's academic performance in real-time.
- Promotes transparency and builds trust between the school and the parents.

7. Secure and Personalized Information Delivery

- Each RFID tag is unique to a student, ensuring that marks are sent to the correct person.
- Reduces the chances of errors or miscommunication during result declaration.

7. CONCLUSION

In the digital era, the need for instant communication between educational institutions, students, and parents has become increasingly important. Traditional methods of result distribution—such as printed report cards or manual announcements—are time-consuming, prone to human error, and often result in delayed communication. The **Automatic Marks Sending System to Students Through SMS** addresses these challenges by offering a smart, efficient, and accessible solution that leverages **RFID** and **GSM technologies** for real-time academic communication.

This project demonstrates how automation can be effectively integrated into the education sector to streamline administrative tasks and enhance transparency. By using an **RFID module (MFRC522)** to uniquely identify students and a **SIM900 GSM module** to transmit marks via SMS, the system ensures that academic results reach the intended recipients accurately and instantly. As soon as a student scans their RFID tag, the microcontroller identifies the card and sends a predefined message containing the student's marks to a registered mobile number.

Especially in low-income or geographically isolated communities.

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