Students Performance and Attendance sends to Parents Mobile Phone

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Abstract- In the rapidly evolving digital era, the education sector is undergoing a transformative shift, with a growing emphasis on leveraging technology to improve communication and efficiency. The Mobile-Based Student Progress Report Card System represents a significant advancement in this direction, providing an innovative solution to enhance the way educational institutions manage and share student performance data. Sending student progress reports via Short Messaging Service from a computer to parents or guardians is an efficient and convenient way to keep them informed about their child's academic performance. In this research paper, we introduce a cutting-edge methodology for the creation of a terminal mode mobile short message service system. Our approach connections establishing a robust linkage between a personal computer and a mobile device, achieved through either a serial port. Utilizing the versatile potential of VB 6.0 as our development platform, We extensively explore the domain of Windows-based serial communication, Protocol Data Unit mode manipulation, and sophisticated database programming. With this system in place, we can efficiently transmit students' performance means attendance, class test marks, note etc. reports to their parents' mobile phones.

Index Terms - Students Attendance, Performance, SMS, Mobile Phone

1. Introduction

The Authors [1] investigates several approaches to serial port communication and presents an implementation utilizing the Mscomm widget within the Visual C++ 6.0 development environment. Authors [2] introduces the design of a distributed supervisor system for a heat supply network, utilizing a GSM platform as its foundation. The system effectively blends the ease of PC-based SMS composition and management with the practicality of SMS communication, aligning the SMS communication format with their requirements [3]. Authors [4] primary objective is to accomplish serial data communication through VB programming. Furthermore, it comprehensively elaborates on the fundamentals of serial data communication, including both the reception and transmission of serial data. Authors [5] introduces a distributed and multi-layer SMS information system designed for value-added services, featuring adaptability to data and robust alarm capabilities. During its developmental phase, this system incorporates Siemens API for specialized purposes [6-7]. In the article provides a concise overview of the primary modules within the SMS platform [8]. The authors conducted research to explore contemporary methods of managing short messages. Subsequently, they designed a system for managing short message services on mobile devices [9]. Authors [10] are developed a terminal-based Short Message Service (SMS) system, utilizing serial communication, ADO (ActiveX Data Objects) smart pointers, and multithreading. Authors [11] explained in the details the method for sending and receiving text messages. Authors [12] designed, developed, and tested an affordable mobile patient monitoring system that leverages the Short Messaging Service (SMS). To enhance the efficiency and real-time performance of SMS transmission, Authors [13] introduces a thread-based real-time parallel sending algorithm for

short messages. Authors [14] introduced a novel approach to enhance the security of SMS messages against Man-In-The-Middle (MITM) attacks. Authors [15] presents the design, construction, and testing of a wireless system for monitoring both the patient's electrocardiogram and phonocardiogram. Authors [16] introduced a mobile solution for continuous intra-vaginal temperature monitoring, utilizing a standard Symbian OS mobile device. Authors [17] examines SMS traffic within a nationwide cellular network. Authors [18] developed and implemented mobile phone management software that utilizes serial communication, component technology, and other relevant technologies. This software can be used as a standalone desktop application. Authors [19] introduced the Short Message Command Interface (SMCI) prototype system, enabling mobile users to access remote machines and their associated services. Furthermore, we extended this prototype system to access emerging information appliances, laying the foundation for a Home Network Service Centre framework. Authors [20] designed and constructed an SMS system platform dedicated to teaching management. Authors [21] introduced significant importance for both lecturers and parents. The system facilitates lecturers in monitoring students' attendance by inputting data for absent students. When absenteeism surpasses the acceptable threshold, lecturers can issue warning letters to students. Additionally, parents can receive notifications about their children's status via SMS alerts. Authors [22] introduced a web-based application designed for daily student attendance tracking within university departments. Authors [23] explored the application of biometric technology, particularly fingerprint recognition, for monitoring student and staff attendance in educational institutions. Authors [24] the web-based application described in this context facilitates student-lecturer appointment scheduling. Researchers must exercise caution when handling biometric data to ensure its security and privacy are safeguarded against potential cyber threats [25]. Utilizing information gathered from an Australian institution, this study develops various classification models for forecasting student performance [26]. A systematic method based on the Gini index and p-value is suggested by the authors [27] to choose an appropriate ensemble learner from a combination of six possible machine learning algorithms. The field of technology controls specifically created for children has not yet been developed, according to the authors' [28] results. Authors [29] proposed face detection algorithms that are highly compatible with face recognition can significantly enhance system accuracy, leading to optimal results.

In today's era of expanding cellular networks, the Short Message Service (SMS) stands as the Current champion of data services. Mobile value-added applications built upon SMS have witnessed widespread adoption. Nonetheless, the act of sending and receiving SMS messages through mobile phones is not without its shortcomings: limited storage capacity, modest processing power, and slow speed, absence of robust data backup and cumbersome operation, among others. Enter the personal computer (PC) as the prospective control hub for future smart home devices. The PC showcases unparalleled information handling competence, ample storage capabilities, and lightning-fast speeds that surpass those of mobile phones. Broadly three methods exist for transmitting and receiving SMS messages through a computer or PC:

a) Create a linkage between your personal computer (PC) and a GSM communication terminal, such as a mobile phone or GSM/GPRS modem. Utilize the PC's capabilities and AT commands to instruct the mobile device in the transmission and reception of SMS messages.
b) Set up a connection between the PC and the Short Message Service Centre (SMSC) or SMS gateway of a wireless carrier or SMS service provider. Utilize a protocol or interface supported by the SMSC or SMS gateway to effortlessly send and receive SMS messages from your PC.
c) Establish a direct connection between your PC and the SMS gateway of an SMS service provider. Subsequently, efficiently dispatch and receive SMS messages using a protocol or interface supported by the SMS gateway.

Actually, all previous state of art authors proposes only send the students attendance but our aim is to send other information like a class test marks, any extracurricular event organization or participation information etc. The following is an outline of the paper's remaining sections. The related work is covered in Part 2, the recommended system is discussed in Part 3, the recommended system is developed in Part 4, the recommended system is implemented in Part 5, and the conclusion is covered in Part 6.

2. Related Work

This section delves into a review of pertinent studies concerning student attendance within educational institutions, encompassing schools, colleges, and universities. Within this context, we will examine three key research works. Table 1, presented below, facilitates a comparative analysis of these prior investigations, aiding in the acquisition of a more comprehensive understanding of this subject matter.

Table 1: Comparative Analysis of Relevant Research.

Authors	Method
[22]	Web Based
[23]	Fingerprint
[24]	Web Based
Our Proposed	Machine-Mobile Interfacing

Authors [22] introduced a web-based application designed for daily student attendance tracking within university departments. This research also elucidated the use of a web-based system capable of generating attendance reports and assessing student eligibility for attendance, leading to improved operational efficiency and resource conservation. Furthermore, [23] explored the application of biometric technology, particularly fingerprint recognition, for monitoring student and staff attendance in educational institutions. This approach is gaining popularity due to its simplicity and accuracy in time verification. Additionally, [24] highlighted the use of SMS applications to send notifications to groups of students in educational institutions. Furthermore, the web-based application described in this context facilitates student-lecturer appointment scheduling. All previous authors presented system is used for the only for the students attendance. Remaining students' progress like class test, assignments, school/ colleges main examination results, extracurricular activities updates not covered. In our proposed method, The T610 mobile handset is one such device that used the DRS-11 cable for data transfer and interfacing.

3. Recommended System

Recommended system is shown in the figure 1, first a connection is established between the PC and a mobile device (such as a smartphone). This connection can be established through a physical link, like a DB 9 Serial cable.

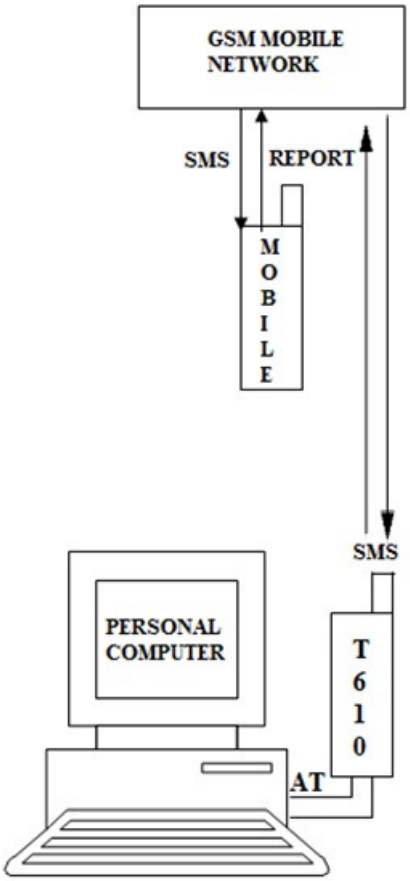


Fig. 1. Recommended System

Using specialized software or applications installed on the PC, the user can compose the SMS message. This software typically provides a user-friendly interface for typing out the message, adding recipients, and attaching files if needed. The software on the PC encodes the message into a format that can be understood by the mobile device and the GSM network. This often involves converting the message into a PDU (Protocol Data Unit) format, which is a standard format for SMS messages. Once the message is encoded, it is sent to the connected mobile device using the established interface (USB, Bluetooth, Wi-Fi, etc.). The mobile device acts as a bridge between the PC and the GSM network. The mobile device receives the encoded message from the PC and uses AT commands or other communication protocols to interact with the GSM network. It forwards the SMS message to the network for delivery to the recipient's mobile phone.

The GSM network processes the SMS message and routes it to the recipient's mobile phone based on the recipient's phone number. The message is delivered to the recipient's device, appearing just like any other SMS they might receive. In essence, the PC serves as the initiator and controller of the SMS message, while the connected mobile device acts as a conduit between the PC and the GSM network, facilitating the message's journey from sender to recipient. This approach is particularly useful when you need to manage and send SMS messages in bulk, automate messaging tasks, or leverage the PC's capabilities for efficient communication.

4. System Development

4.1 Short Message Service (SMS) methods:

Sending and receiving short message service (SMS) messages can be done in two different ways: text mode and PDU mode (Protocol Description Unit) mode, each with its own characteristics and use cases.

- Text Mode: In Text Mode, SMS messages are represented as plain text. You compose and read messages in a human-readable format, similar to typing and reading text messages on your phone's screen.
- PDU Mode: PDU Mode represents SMS messages in a binary format. It is a more compact and machine-readable way of encoding messages.

Text Mode is the standard and user-friendly way of sending and receiving SMS messages on most mobile devices, while PDU Mode is a more technical and versatile mode that allows for greater control over SMS message parameters and is commonly used in programming and network-level SMS handling.

4.2 Mobile Phone Selection:

The choice between these modes depends on the specific requirements of the application and user familiarity with the SMS protocol. The new mobile phone have not supported the PDU and Text mode. It leverages older technology with the intent of being economical and sustainable by repurposing older mobile phones. We selected T610 mobile phone shown in the figure 2 because it support to the PDU as well as Text mode.. The DRS-11 data cable shown in the figure 3 serves as an enhanced RS-232 connector, linking phone system connector to PC serial port. Through GSM and TDMA devices, this link provides access to data, fax, and modem features. The DRS-11 also enables the phone connection of the cable to be connected to a charger. The DRS-11 cable is compatible with various handset models, including Sony Ericsson T630, T230, T610, T310, T300, T200, T68i, T68, S700i, P910i, Z1010, K700, T200, T300, A2618, A2628, R310, R320, R380, R380s, R520m, R600, T20e, and T20s.

Fig. 2. Sony Ericsson T610 Mobile Handset

Fig. 3. Photograph of DRS-11 Cable

4.3 AT Command

AT commands are standardized control tools derived from GSM for establishing communication with mobile GSM phones or modems. This command set comprises strings conforming to specific syntax rules, facilitating the exchange of serial data between the mobile and the laptop or PC at the server, as well as the mobile handset at the client end. For example, the command "AT+CMGS=140" is used to send an SMS message. In this command, "AT" serves as the prefix for all commands, "CMGS" specifies the type of task to be executed, and "140" indicates the message length.

4.4 Modules:

The following modules will be used for the operation of the system

4.4.1 GUI Module

A GUI (Graphical User Interface) module typically refers to a software component or library that provides the tools and functionality for creating graphical interfaces for applications. GUI modules are commonly used in software development to design and build user-friendly interfaces that allow users to interact with the application through visual elements like windows, buttons, menus, and forms.

4.4.2 SMS Module

When working with SMS modules, typically need to understand how to send and receive SMS messages using the module's commands or APIs, configure network settings, manage SIM cards, and handle various error scenarios. First, it will search the database for a particular student and then construct an SMS in string format. It will then send that SMS to the parent's mobile using different APIs. This module also provides an interface for broadcasting SMS to all parents' mobile numbers.

4.4.3 Database Module

This module will manage the student database. Administrators can easily add, delete, and modify student data. It will also maintain reports of sent SMS messages. The database module's functionalities allow teachers to create, display, and search for records on a wide range of topics. These entries can include practically any format or structure, including photos, files, URLs, numbers, text, and more.

4.4.4 Security Module

A security module refers to a system that is designed to enhance the security of a computer, network, software application. This module handles user authentication, ensuring that only authorized individuals can access a system. It may involve username/password verification, or multi-factor authentication (MFA) methods

5. System Implementation

The primary components of an ERD for a student's progress card, the connections between these components, and the characteristics of each component are presented in figure 4

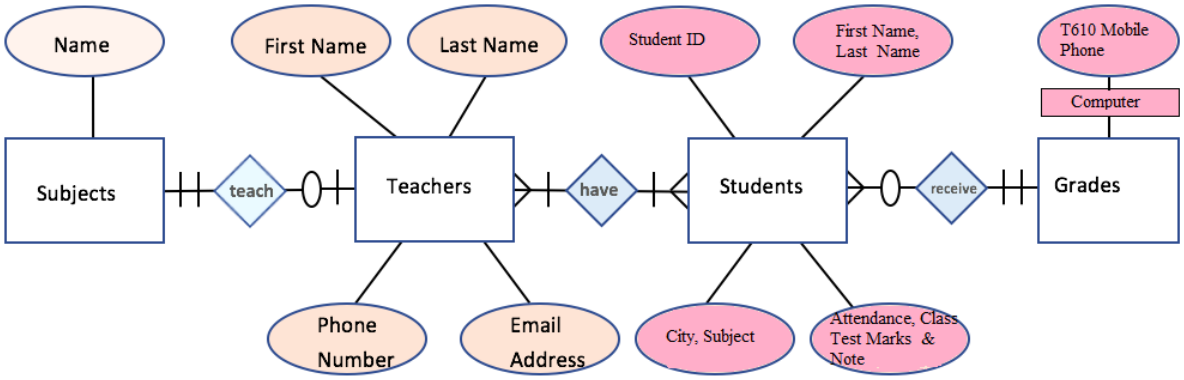


Fig. 4. Entity-Relationship Diagram (ERD)

5.1 Administrative credentials:

Administrative credentials typically refer to the username and password combination that grants access to administrative privileges on a computer or system. These privileges allow the user to perform tasks. In the figure 5 mentioned administrative credentials

Conflicts of Interest

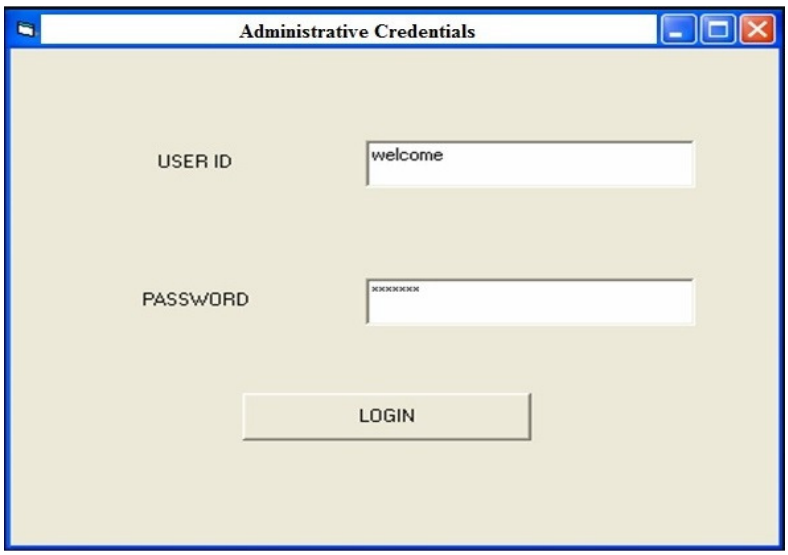


Fig. 5. Login Window

5.2 Creating database tables:

Creating a database using Microsoft Access is a straightforward process. Microsoft Access is a relational database management system (RDBMS) that allows you to create, manage, and manipulate databases. Creating database tables is a fundamental part of database design. The structure of tables, including the columns, data types, constraints, and indexes, should align with application's data requirements. In the below figure 6 mentioned total tables created with names.

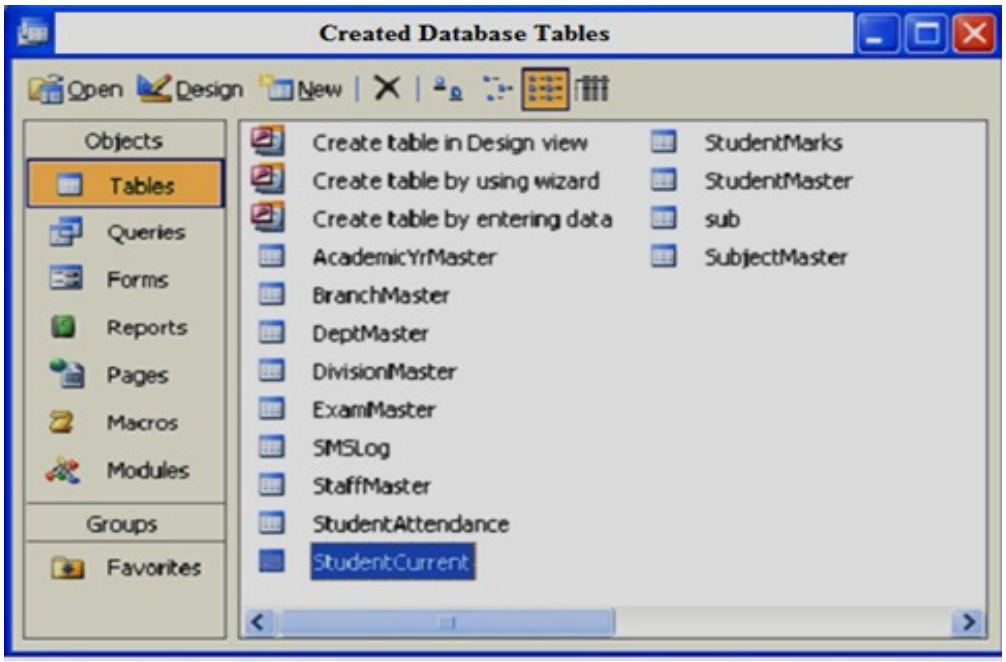


Fig.6. Tables Created for Data Entry

Table name Student Current is mentioned in the figure 7 with fields names. In the same manner database of all the tables are created

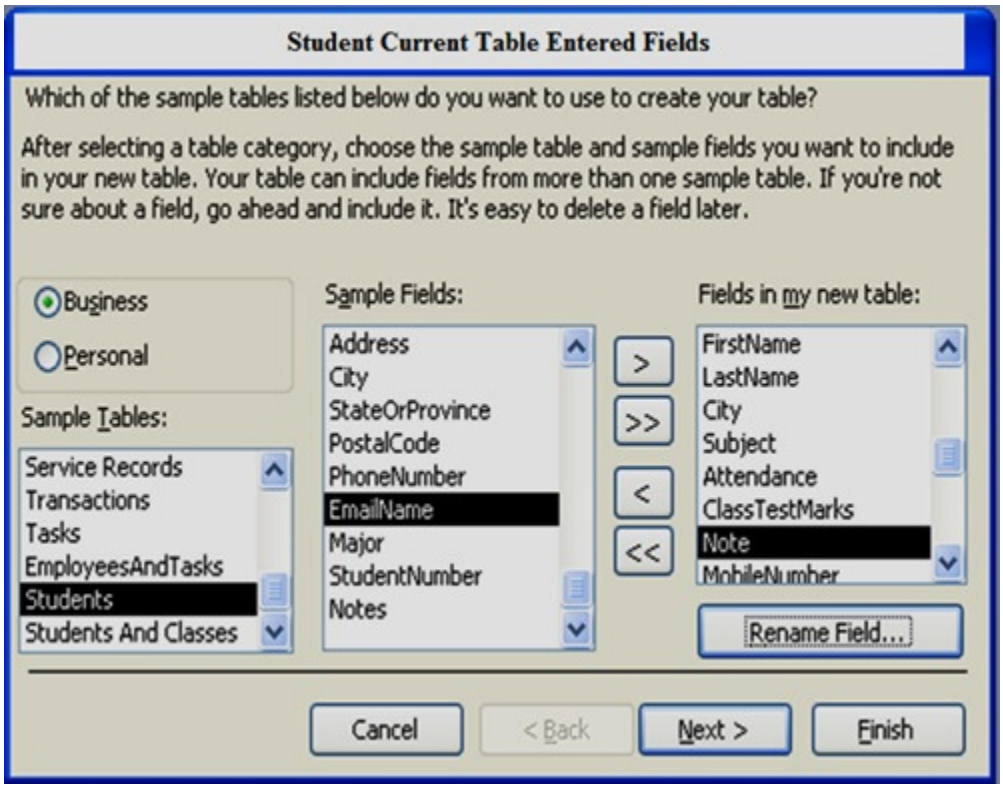
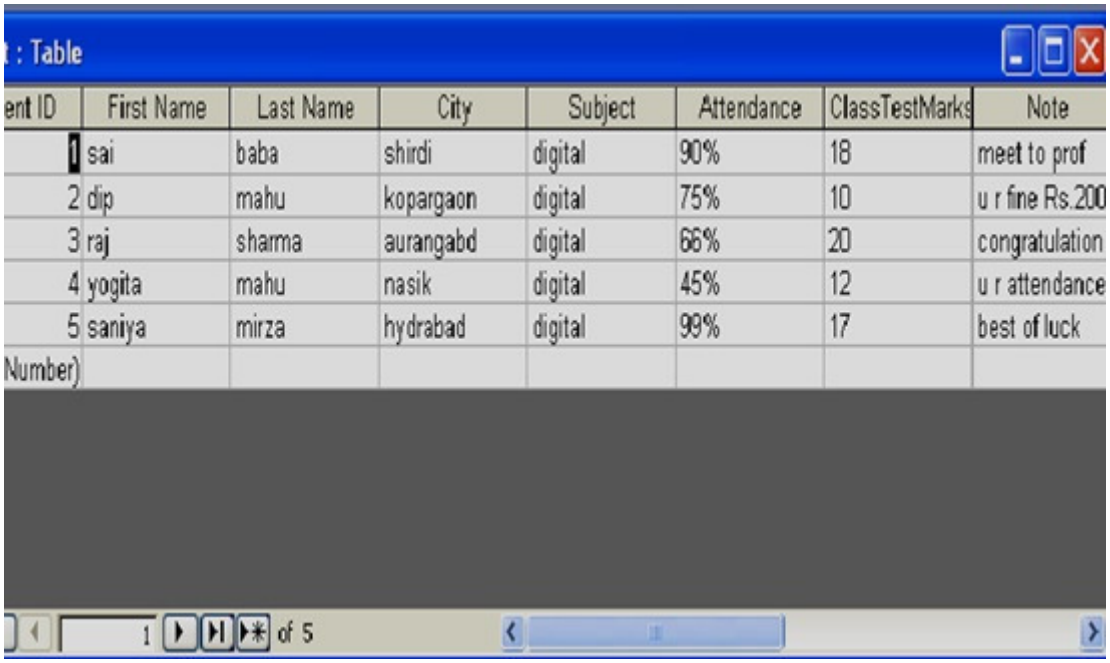


Fig.7. Student Current Tables Created for Data Entry

Whatever the information want to send on the parents mobile, is called as students database. and it is shown in the figure 8.



: Table

ent ID	First Name	Last Name	City	Subject	Attendance	ClassTestMarks	Note
1	sai	baba	shirdi	digital	90%	18	meet to prof
2	dip	mahu	kopargaon	digital	75%	10	u r fine Rs.200
3	raj	sharma	aurangabd	digital	66%	20	congratulation
4	yogita	mahu	nasik	digital	45%	12	u r attendance
5	saniya	mirza	hydrabad	digital	99%	17	best of luck
Number)							

1 of 5

Fig.8. Generated Data Base

5.3 Design the Graphical User Interface (GUI):

VB6 allowed developers to create Windows applications with a graphical user interface. You could design forms by dragging and dropping controls onto a design surface, making it accessible for developers without extensive coding experience. Created GUI is shown in the figure 9. Mobile handset (T610) connected to the computer. Click the "Send" button within the specially crafted GUI (Graphical User Interface) environment. This action initiates the transmission of student progress updates to the mobile phones of parents. Once all messages have been successfully dispatched, a comprehensive report detailing the delivery status of each message is automatically generated

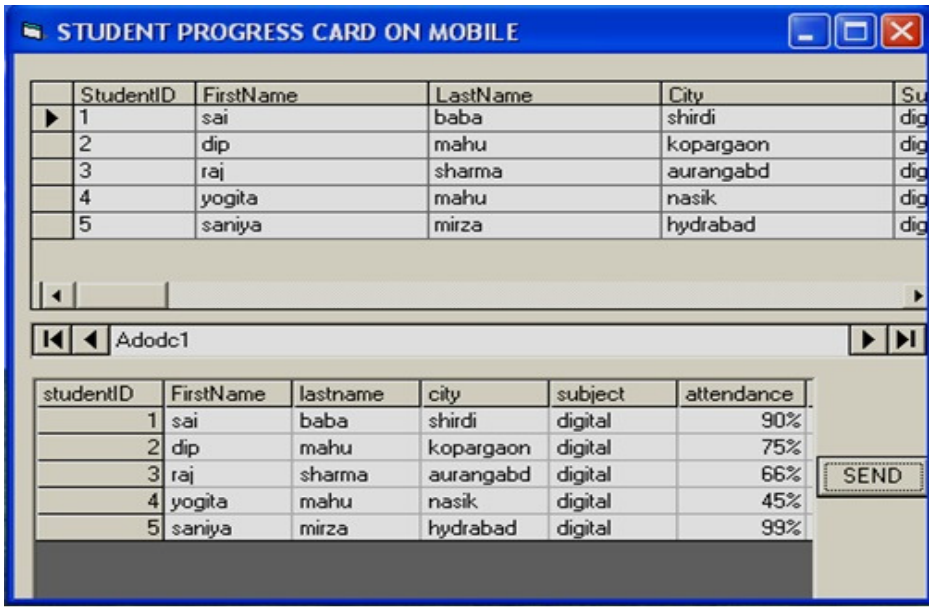


Fig.9. Main Project Window

Sample received message on the parents mobile phone shown in the figure 10.

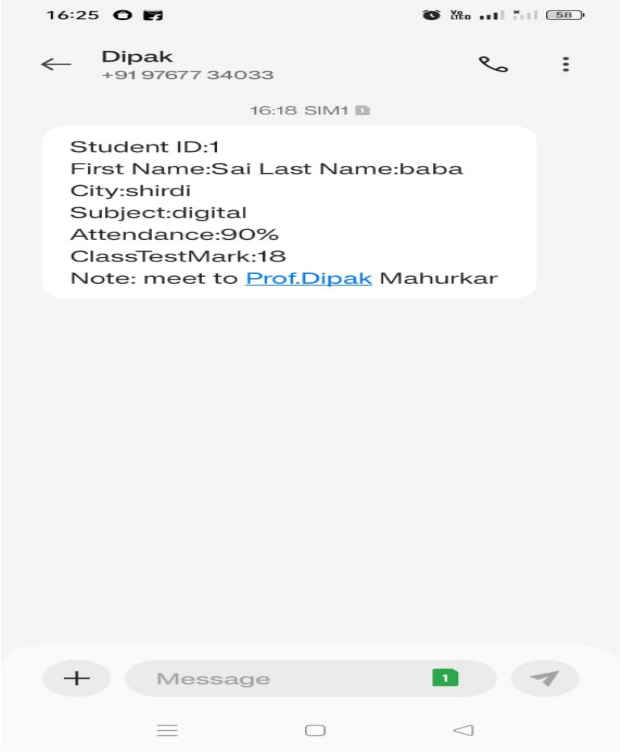


Fig.10. Main Project Window

The system is secured since it is password protected. Monitoring of CPU, memory, and network utilization to guarantee efficient resource allocation. Conducted polls of users to get their opinions on the system's usability, simplicity, and general contentment checked if there were big loads or unforeseen circumstances.

6. Conclusion:

A mobile phone-based Student Progress Card that functions as an user-friendly human-computer interface. The Student Progress Card on Mobile Phone stands out as an optimal choice for educational institutions aiming to maintain consistent communication with parents regarding student progress. Its efficient use of older mobile phones not only reduces operational costs but also promotes sustainability, making it a highly favourable and practical solution for modern educational settings. The progress card is simple for parents and students to use at any time and from any location to stay informed about academic progress. Parents and students can always be kept up to date on progress with mobile progress cards, which can offer real-time information on grades, assignments, and attendance etc. There may have been privacy issues with the use and sharing of private student information. It the preferred and practical choice for educational institutions seeking improved parent-teacher communication in today's educational environment.

Declarations of interest

The corresponding author declares that there are no competing interests on behalf of the other writers.

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