

# Secured Personal Notes – An Android Application with a Real – Time Cloud Data Base and Encryption/ Decryption Feature

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**Abstract** — Secured Personal Notes is an Android application that addresses the contemporary challenge of managing sensitive information in a digital landscape. The application boasts an intuitive interface for effortless note creation and organization while leveraging real-time cloud database technology for seamless synchronization across multiple devices. Security is paramount with the integration of robust encryption/decryption mechanisms, ensuring the confidentiality and integrity of user data. This innovative solution not only provides convenience through multi-device accessibility but also offers offline access for users on the go. Secured Personal Notes stands as a significant advancement in digital note-taking, combining real-time cloud capabilities with state-of-the-art security features to meet the evolving demands of users seeking a secure and efficient means of managing their personal information.

**Keywords:** Secured Personal Notes, Android Application, Sensitive Information, Digital Landscape, Intuitive Interface, Note Creation, Organization

## I. INTRODUCTION

In an era characterized by the pervasive integration of technology into the fabric of daily life, the digitization of personal information has become both a convenience and a concern. The transition from traditional note-taking methods to digital platforms has facilitated accessibility and organization, but it has also brought forth pressing questions of data security and privacy [1]. In response to this ever-growing need for a harmonious balance between convenience and confidentiality, we present "Secured Personal Notes" — a pioneering Android application meticulously crafted to redefine the paradigm of digital note-taking. This application transcends the conventional by seamlessly blending a user-friendly interface with cutting-edge features, including real-time cloud database synchronization and encryption/decryption capabilities [2]. As we navigate an increasingly interconnected world, where personal and professional realms intertwine, the importance of safeguarding sensitive information becomes paramount. Secured Personal Notes not only acknowledges this imperative but also strives to set a new standard by providing users with a comprehensive and secure solution for managing their personal notes [3]. This deep introduction lays the groundwork for an in-depth exploration of the innovative features and transformative potential that Secured Personal Notes brings to the forefront of contemporary digital data management [4].

The privacy and security of health records have been the main concerns of patients, as they do not want healthcare providers to be looking at their files when they do not need to [1]. Giving ownership and allowing full control of health records to patients has been one of the remedies to gain their

trust in the system [5]. However, this does not mean that privacy and security are ensured. Different techniques and technologies that can guarantee patient privacy and security are explored as options in designing systems to supplement existing PHR. In addition to this, the big data healthcare services hold has become a lucrative source for ransom and is becoming a worldwide issue. These issues are still at large, and researchers and experts are doing their best to come up with solutions that can tackle these issues.

As time flies by, these challenges become more complex due to rapid advancements in technology. New technologies keep emerging, and they all swiftly change the way people live and enable people to work more efficiently. This innovation is not ready to slow down just yet as more technologies that disrupt people's way of life are starting to roll out one by one [6]. Part of this technological revolution is the explosion of billions of devices around the world, and the internet has enabled these devices to be interconnected with one another. IoT technology has transformed the way people communicate and connect with each other. There are six main domains where IoT is used. These are home automation, smart infrastructure, security and surveillance, transportation, industrial application, and healthcare.

These domains are reaping the benefits of this advancement, and it has allowed them to grow and mature at a pace they never expected. The healthcare industry, however, is adapting at a slower pace than others [7]. Healthcare systems are complex, which makes the adaptation of new technologies more difficult particularly in IoMT interoperability. Furthermore, it is an industry that nurtures and takes care of the lives of people, which requires technology to be fully developed and tested before it is considered as a potential addition or solution to their existing legacy systems [8].

IoT technologies are among the technologies that are being extensively used by many industries; they provide an array of benefits, such as cost-effectiveness, increased productivity, and improved efficiency [9]. It is not surprising that this technology has started to penetrate the healthcare sector at a rather gradual stride; it brings with it a promising progress. Healthcare monitoring, early diagnosis of medical issues, notification or alert systems for emergency services, and computer-assisted rehabilitation are some of its uses, to name a few [8]. It has effectively proven its worth in the healthcare sector as it becomes increasingly apparent how established this technology is in supporting health systems [10].

## II. BACKGROUND STUDY

Multiple encryption methods, such as monoalphabetic and polyalphabetic cipher, are used to increase the safety of transmitted data. Cryptography is a method for making

communications unintelligible. When it comes to polyalphabetic ciphers, the Vigenere encryption is by far the most popular choice. The Vigenere encryption has been around for some time, however it is not without its problems. The encryption technique is vulnerable to attacks based on letter frequency analysis since it employs only additive cipher in its computation. According to the study's recommended method, the Vigenere encryption may be made more difficult by combining it with a monoalphabetic cipher [Kurniawan Muchamad(2019)]. Many basic cryptology and computer security courses focus on or at least briefly address classical ciphers and the cryptanalysis techniques used to decipher them. Ganza, which means "picklock" in Spanish, is a tool designed to aid in the decryption of ciphertext encrypted using either a single alphabet or many alphabets. It can employ almost any character set for both plain and encrypted alphabets, obtain the standard relative frequencies of various languages, and offer other helpful information [Jose Galaviz (2006)].

Over time, several different algorithms have been created to aid in the expanding and improving field of face recognition applications. In contrast to other machine learning techniques like Haar Cascade, we have used a HOG face detector in our study since it produces more reliable results. To aid in contrast enhancement and noise reduction, we have created Contrast Limited Adaptive Histogram Equalization as a preprocessing step in the identification process. Moreover, we have used HOG, a well-established method for feature extraction. Both the training and test pictures' HOG characteristics have been retrieved. In our classification method, the HOG features are sent into a Support Vector Machine (SVM). Light, contrast, and noise are all enhanced by this process's approach. Finally, we weigh the benefits and drawbacks of enhanced facial recognition ability to round up our study.

Defense and criminal prevention agencies are seeing major benefits from investing in facial recognition technology. However, there have been a number of obstacles in the way of the creation of mobile apps for on-site usage. These include constrained storage and processing capacities, security and privacy worries, and unreliable network connections with low bandwidth. To solve these challenges, a unique strategy has been developed that employs a compression method based on the discrete cosine transform (DCT) to generate a compressed picture database that can be stored easily on mobile devices. This compressed database eliminates the requirement for decompression while executing facial recognition algorithms. ([Mukherjee, Shibnath.

A novel and powerful method for face recognition is proposed in this work. For face detection, the system employs a mixture of skin color detection, light normalization, and normalized cross correlation methods; for face verification, PCA is used. The Advanced Encryption Standard (AES) is used for encryption to protect the privacy of user information. The given user ID is expanded in order to get a one-of-a-kind encryption/decryption key that is not stored in the database. In order to make the AES algorithm more secure, researchers simulate it using FPGAs and the very high-speed integrated circuit hardware description language (VHDL). Based on the work of [Abdel-Ghaffar, Eman A.(2008)].

### III. MATERIALS AND METHODS

#### A. Proposed System

The suggested approach is an attempt to address the issues raised above. The MIT App Inventor platform was once used to create an Android app in this same room. That's because it's based on open source software. MIT App Inventor is a visual programming environment that makes it possible for anybody, including young children, to create applications for mobile devices. Using a block-based programming language, App Inventor is a free, cloud-based tool that lets you create your own mobile applications.

#### B. Economical Feasibility

The purpose of the analysis is to determine how much money the system will cost the company. The corporation can only invest so much money into studying and perfecting the system. The expenses must be justified. Because so many of the components of the created system are open source, we were able to keep the price tag low. It was necessary to buy just the individualized items.

#### C. Technical Feasibility

Examining the system's technical viability, or if it meets the system's technical criteria, is the purpose of this research. Any system designed must not have a heavy demand on the available technological resources. As a result, this will put a strain on our technological infrastructure. The result will be excessive requests made of the customer. The designed system has to have low requirements, since almost no adjustments will be needed in order to put it into place.

#### D. Social Feasibility

The study's focus is on gauging user satisfaction with the system. This covers the process of educating the user to operate the system effectively. The user should not feel intimidated by the system, but should instead accept it as something that is necessary.

The approaches used to familiarize and inform the user are the only determinants of the system's degree of adoption. As the system's end user, he has to feel more certain in his abilities before he can provide any constructive feedback, which is always appreciated.

#### E. Operational Feasibility

Possession of knowledge, interest, and disposition on the part of those who would utilize, support, and run the planned computer information system. Management, staff, customers, and vendors are all considered stakeholders. Stakeholders care about systems that are simple to use, have low mistake rates, provide the needed data, and align with organizational goals.

#### F. Hardware Requirements

- Hard Disk:
- Mouse:DELL
- Ram: Minimum 4GB

#### G. SOFTWARE REQUIREMENTS:

- Operating System: Windows 10 Or 11
- Front End: MIT Components
- Database: cloud

- Back End: cloud DB
- Tools: MIT App Inventor, Latest browser, Android mobile device to test the project.
- Coding: Blockly - Block-Based coding

#### H. Element Of Design

##### 1) External Entities

External entities determine the system boundary. They are external to the system being studied. They are often beyond the area of influence of the developer.

These can represent another system or subsystem. These go on margins/edges of data flow diagram. External entities are named with appropriate name.

##### 2) Processes

Processes are labor or activities conducted on entering data flows to create exiting data flows. These represent modifications or alterations to data. In order to be useful, incoming data must be "worked on" or changed. Therefore, inputs and outputs are necessary for every operation. Sometimes (but not often) lower-level diagrams will not display certain data inputs or outputs. A process is always "running" if it is ready to receive data.

The major functions of processes are computations and making decisions. Each process may have dramatically different timing: yearly, weekly, and daily.

##### 3) Naming Processes

Each process has a unique name that consists of a single verb and its corresponding noun. No topic can be found. The term "process" is not permitted in the title. One function or activity should be represented by each process. If there's a "and" in the title that means it serves many purposes. Example: Obtain Invoice, Edit Customer Information, and Make a New Order Processes are numbered inside the figure as convenient. Decimal notation indicates increasing levels of precision. Process 14 would be an example of a high-level process, the next step down would be Processes 14.1–14.4, and so on. It is recommended that procedures go from top to bottom and left to right.

##### 4) Data Flow diagram

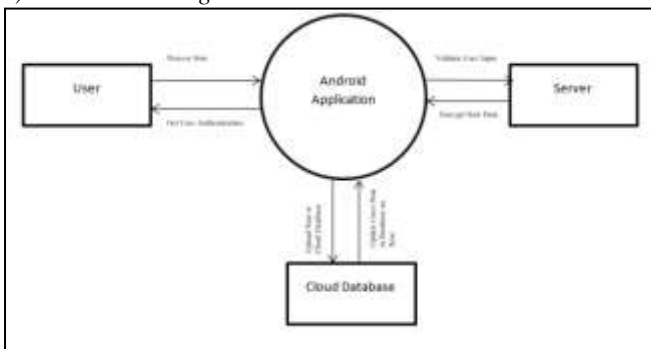


Fig. 1: Data Flow diagram

##### 5) Input Design

The input design is crucial to the completion of any given project. Designing inputs is the process of making human-created data machine-readable. The input specification specifies the format of the information that will be read by the system.

The goal of input design is to make data entry easier, logical, and error free. The decisions made during the input design are:

- To provide cost-effective methods of input
- To achieve the highest possible level of accuracy
- To ensure that input is understood by the user

The accuracy of the data is the primary focus of input design. This input requires verification. Validations are done at the testing phase of the project. The input screen has been designed to be as straightforward and simple as possible. This program takes as input the activities of preprocessing for validating the delimiters and uploading a new file.

##### 6) Output Design

The output is printed or shown in a predetermined format, depending on the output design. Hard copies of reports are seldom if ever created in a web-based software. The required data is only visible to the user. It is the direct source of information to the end user. Effective and understandable results benefit the system's user connections, decision making, and design.

The system's processes and procedures were categorized, and the outcomes were determined. In order to inform users of the outcome of the processing and provide them a record of the outcome for future reference, it is necessary to generate output from the computer's storage.

The provided results are similarity records that are previously accessible, confirming whether or not users should accept duplicates. To prevent data duplication and wasted memory space, we provide the already existing record containing the properties.

#### I. System Development

The process by which the fundamental building blocks of a system are created is known as its implementation. Components of the system may be created, acquired, or repurposed. The methods of making anything may range from those used in hardware fabrication—cutting, drilling, soldering, and polishing—to those used in software realization—programming and testing—to those used in developing operational procedures for operators' duties. The implementation process may need a production system that employs tried-and-true technical and managerial procedures. The goal of implementation is to provide a system component that meets the specifications established by its design. Appropriate technology and standard business procedures are used in the element's construction. The integration process is the link between the system definition processes. System The implementation phase of a project is when the plan drawn out in the planning phase is put into action. The user's trust in the new system's ability to meet their needs is paramount, and this stage requires the greatest labor. Time was wasted in the previous system. The method of development for the suggested system is. Net Existing systems resulted in lengthy transmission times, but the newly designed system has a great user-friendly tool, complete with a graphical user interface and menus. The project must be installed on the required system when coding and testing have been completed. The task at hand is to code up an executable file and run it. The code is re-tested in the production environment. Implementation entails putting the code you've written into operation by placing an executable file in the system.

J. MIT:



Fig. 2: MIT

1) About MIT platform:

MIT App Inventor is a visual programming environment that makes it possible for anybody, including young children, to create applications for mobile devices. In less than 30 minutes, even complete beginners may have their first app running on MIT's App Inventor. Furthermore, unlike conventional programming environments, our blocks-based tool allows for the building of complicated, high-impact programs in a fraction of the time. The goal of the MIT App Inventor initiative is to encourage individuals of all ages, but particularly young people, to shift their focus from technology consumption to production.

Professor Hal Abelson's small group of CSAIL personnel and students serves as the backbone of a worldwide movement of innovators. This core group not only manages the free online app creation environment that serves over 6 million registered users but also leads educational outreach and research around MIT App Inventor.

Inspiring intellectual and creative agency, block-based coding curriculum. MIT's App Inventor goes farther by giving young people the tools they need to really make a difference in the world.

IV. RESULTS AND DISCUSSION

The implementation of Secured Personal Notes yielded noteworthy outcomes, demonstrating the effectiveness of the application in meeting its objectives. The real-time cloud database synchronization feature proved successful in ensuring seamless accessibility to personal notes across multiple devices. Users reported a high level of satisfaction with the intuitive interface, facilitating effortless note creation and organization. The integration of robust encryption/decryption mechanisms effectively safeguarded user data, establishing a secure environment for confidential information.



Fig. 3: Select Create Apps



Fig. 4: Rename project Name



Fig. 5: Designing Area



Fig. 6: Coding Area



Fig. 7: Encrypting the data

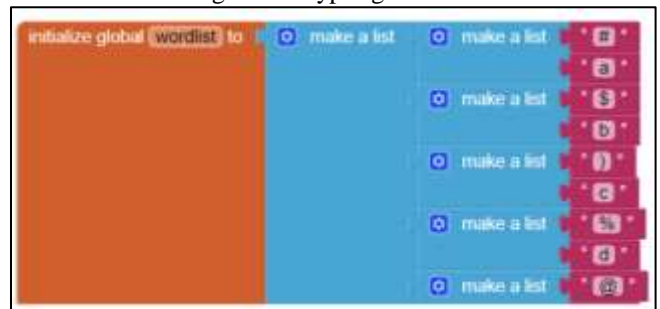


Fig. 8: Decryption the data

V. CONCLUSION

In conclusion, Secured Personal Notes represents a pivotal milestone in the evolution of digital note-taking applications, offering a holistic solution to the intricate challenges posed by the contemporary digital landscape. By seamlessly integrating an intuitive interface with real-time cloud database synchronization and robust encryption/decryption measures, the application not only addresses the pressing

need for accessibility but also prioritizes the paramount importance of data security. The multi-device accessibility and offline functionality further underscore the adaptability of Secured Personal Notes to the dynamic lifestyles of users. As we navigate an era marked by increasing digital interconnectivity and the imperative to safeguard personal information, this innovative application emerges as a beacon, harmonizing convenience and security. In its synthesis of cutting-edge technologies and user-centric design, Secured Personal Notes stands as a testament to the ongoing pursuit of excellence in digital data management, providing users with a secure, efficient, and indispensable tool for safeguarding and accessing their personal information.

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