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SECURE FILE STORAGE ANDROID APP USING CRYPTOGRAPHY

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ABSTRACT

"Someone hacked my phone" or "Someone hacked my social media accounts" these statements drastically changes the lives of people as now we all keep our details in our phone including our bank details nowadays most of the bank provides an app in which all our transactions are shown and how much amount we have in our account. This problem has increased in pandemic as in pandemic many mentors provided free courses on different subjects and after learning from their courses they are taking wrong advantage of it. Our approach ensures for and keep their private data safe as nowadays data security and privacy are the issues that are increasing and are affecting badly on small scale business. We are associated with various issues but we focus mainly on data security and methods of providing encryption.

Keywords: Data Security, Cryptography, Cloud Storage, Kotlin, Android.

I. INTRODUCTION

Our android based application is a platform through which user can upload their files on cloud in an encrypted form. First the user needs to register with their login credentials and then they can access the app. After uploading the file user can rename the file if they want. The user can download the uploaded file. The main objective of application is to provide data security to users.

- **Cryptography:**

Cryptography is a means of using codes to protect information and communications so that only those who are supposed to read and process it may do so. It also refers to secure information and communication techniques called algorithms, to transform messages. These algorithms are used for cryptographics key generation, verification to protect data privacy, web browsing on internet and many more Cryptography mainly focuses on following four objectives:

Fig 1: Cryptography

- **Confidentiality:** The information cannot be understood by anyone for whom it was unintended.
- **Integrity:** The information cannot be transmitted between the sender and the intended receiver without being discovered in storage or transit.
- **Non-repudiation:** The sender of information cannot afterwards dispute their involvement in the creation or delivery of the data.
- **Authentication:** The sender of information cannot afterwards dispute their involvement in the creation or delivery of the data.

- **Cloud Storage:**

Cloud storage is a way for users to save data securely online so that it can be easily shared with those who are granted permission. This gives you agility with "anytime anywhere" data access.

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Fig 2: Cloud Storage

Benefits of cloud storage:

- **Total cost of ownership:** There is no hardware to purchase, storage to provision and only pay for storage that you actually use.
- **Multiple users:** More than one use can be connected with the same cloud environment. Multiple people can collaborate on a single file using cloud storage. For example, you can grant several users access to your files so that they can view and change them. Your file can be accessed in real-time by an authorised individual from anywhere in the globe.
- **Scalable:** Cloud storage is a scalable and adaptable solution. If your current storage plan is insufficient, you can improve your service plan. You also won't have to relocate any data from one area to another because the extra storage capacity will be added to your storage environment along with some additional capabilities.

- **Android:**

On many mobile platforms around the world, the Android operating system is the most widely utilised. By the end of 2020, it will have occupied almost 75% of the global market. The initial Android was created by a firm called Open Handset Alliance, which used a customised version of the Linux kernel as well as other open-source software. Google supported the initiative in its early stages, and ultimately eventually acquired the entire company in 2005. The first Android smartphone was released in September 2008, and it quickly became the market leader due to characteristics like as user friendliness, community support, customization, and large-scale production of Android devices. As a result, the market assesses the need for knowledgeable developers to create Android-compatible gadgets. So, the Android operating system became a complete set of operating systems for different devices like wearables, mobiles, notebooks, smart TVs, tablets, set-top boxes, etc. As a result, the Android operating system has evolved into a comprehensive set of operating systems for a variety of devices, including wearables, mobile phones, notebook computers, smart TVs, tablets, set-top boxes, and more.

- **Features:**

- User Login
- Encrypt/Decrypt
- Upload/Download
- Rename
- Sort

- **Requirements:**

- Android OS
- Continual Internet Connection
- 32GB Storage
- Minimum 3GB RAM

II. LITERATURE SURVEY

Flash drives, hard discs, and other types of physical storage devices are gradually becoming outdated. The reason for this is because, in the business world, worldwide expansion necessitates data sharing among personnel in order to collaborate. Many people nowadays have numerous devices for personal use, such as one or more mobile/cell phones, tablets, laptops, and desktop PCs. As a result, cloud storage allows users to access their personal data from any of their own devices. As a result, an increasing number of consumers are opting for the more convenient alternative of keeping their data in the cloud.

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Cloud storage has an advantage over other storage choices since it can be accessed from anywhere with a stable internet connection. Users' confidential files are stored on storage servers, and users have the ability to view their files from anywhere. Tablets, laptops, mobile phones, desktop PCs, and other electronic gadgets can all be used to store and access content stored in the cloud. Businesses can profit from cloud storage by significantly increasing productivity. Thus, lugging physical storage devices is no longer necessary.

Another benefit of cloud storage is that it allows users to save any type of information, including text documents, photos, spreadsheets, videos, PDFs, and so on. Different cloud storage companies offer different types of functionality. In addition, cloud storage has a backup option. Data on one's local storage can be permanently lost if it is unintentionally deleted or if the actual storage device, such as a hard drive, is lost. Physical storage devices also have a predetermined storage capacity, and the higher the storage capacity, the more expensive it is. Physical storage devices may have challenges with compatibility or detection. Another risk is that a virus that has infected one's PC can spread to the flash drive and infect its digital data, or that data loss can occur due to server outages, human errors, or natural disasters. In terms of infrastructure, the cost of purchasing new servers, deploying them, and maintaining them is far more than the cost of cloud storage. Purchasing, installing, and maintaining new servers. This also aids in lowering one's energy bill and becoming more environmentally conscious. Cloud storage also allows for instantaneous data interchange, allowing numerous persons to view the same information. As a result, this solution is ideal for both remote and in-house work. As a result, internet cloud storage is advantageous to all types of enterprises. Cloud storage is a less expensive platform that does not require a large investment and can be used to actively connect and collaborate with clients and employees. As a result, an increasing number of users are turning to cloud storage, making it a popular alternative to traditional storage.

Cryptography is a method of ensuring message confidentiality. In Greek, the phrase has a special meaning: "hidden writing." Nowadays, however, individuals and organisations' privacy is protected by high-level cryptography, which ensures that information delivered is secure and only the authorised receiver has access to it. Cryptography, with its historical roots, might be considered an old technique that is currently being explored. The earliest examples are from 2000 B.C., when the ancient Egyptians utilised "secret" hieroglyphics, as well as other evidence such as ancient Greece's hidden writings or the famed Caesar cypher of ancient Rome Hundreds of millions of people use cryptography on a regular basis to protect data and information, while the majority are unaware of it. Cryptographic systems, in addition to being immensely helpful, are also extremely brittle, as a single programming or specification error might compromise them.

The basic premise of a cryptographic system is to encrypt information or data in such a way that an unauthorised person cannot deduce its meaning. Cryptography is commonly used to send data via an unsecured channel, such as the internet, or to ensure that unauthorised persons do not comprehend what they are looking at in a case where they have accessed the information. In cryptography, the obfuscated data is known as "plaintext," and the act of concealing it is known as "encryption"; the encrypted plaintext is known as "ciphertext." This is accomplished by a set of principles known as "encryption algorithms." Typically, the encryption process uses a "encryption key," which is passed to the encryption algorithm together with the data as input. The receiving side can extract the information using a "decryption algorithm" and the associated decryption key.

Cloud storage systems are secured using the hybrid cryptography concept. The distinction between less secure and more secure systems is demonstrated using two alternative ways. The first method employs the RSA and AES algorithms, with RSA serving as a key encryption algorithm and AES serving as a text or data encryption algorithm. AES and Blowfish algorithms are employed in the second, or more secure, approach. These two algorithms provide double encryption over data and key in this approach, providing significantly higher security than the first.

III. SYSTEM SETUP

For this project, KOTLIN and XML languages are used. For the database, we have used Firebase. Short descriptions of the platforms required are mentioned below:

- **Kotlin:** Kotlin is a statically typed, open-source programming language that may be used for both object-oriented and functional programming. Similar syntax and features from other languages, such as C#, Java,

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and Scala, are available in Kotlin. Kotlin doesn't try to be original; instead, it takes cues from decades of language evolution. It is available in JVM (Kotlin/JVM), JavaScript (Kotlin/JS), and native code (Kotlin/Native) forms.

- **XML :** eXtensible Markup Language, or XML, is used to create Android layouts. XML is a markup language, similar to HTML (or HyperText Markup Language). It was developed as a standard for data encoding in web-based applications. Unlike HTML, however, XML is case-sensitive, requires that each tag be properly closed, and retains whitespace.
- **Firebase:** Google's Firebase app development platform allows developers to create apps for iOS, Android, and the web. Firebase offers analytics tracking, reporting, and app issue resolution, as well as marketing and product testing.

Sr. No.	Hardware and Software Requirements	
	Name of Equipment	**Specification**
1	Computer System	4GB RAM or more, 20GB of available disk space
2	Windows	Windows 8 or higher
3	Android Studio	Version 4.1 or above
4	Java Toolkit	JDK 1.8 or above
5	Android Emulator	Android 6.0 or above

IV. WORKING

A. PROJECT ARCHITECTURAL ALGORITHM:

Step1: First the the app will ask the user if he/she has an account if the users does not have an account the app will tell the users to make and account and then only the app will start functioning.

Step2: After creating an account the user will have to login in the app by using their unique login credentials.

Step3: After login the app will ask user to upload a file of any format i.e .jpg,.pdf,.txt etc.

Step4: After uploading the file the file will be encrypted and stored in the firebase and an text message will be shown to user that the file has been uploaded and encrypted.

Step5: The file that has been uploaded and all the previous files that the user has uploaded and the users can download the files by decrypting it.

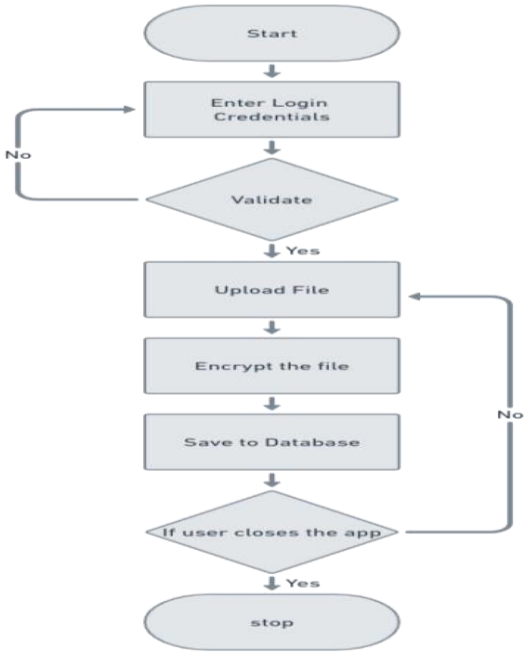

Fig 3: Project Architectural Flow

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B. MODELLING AND ANALYSIS:

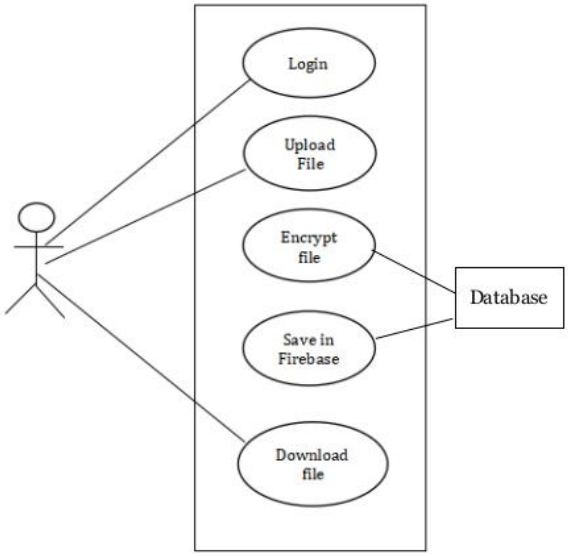
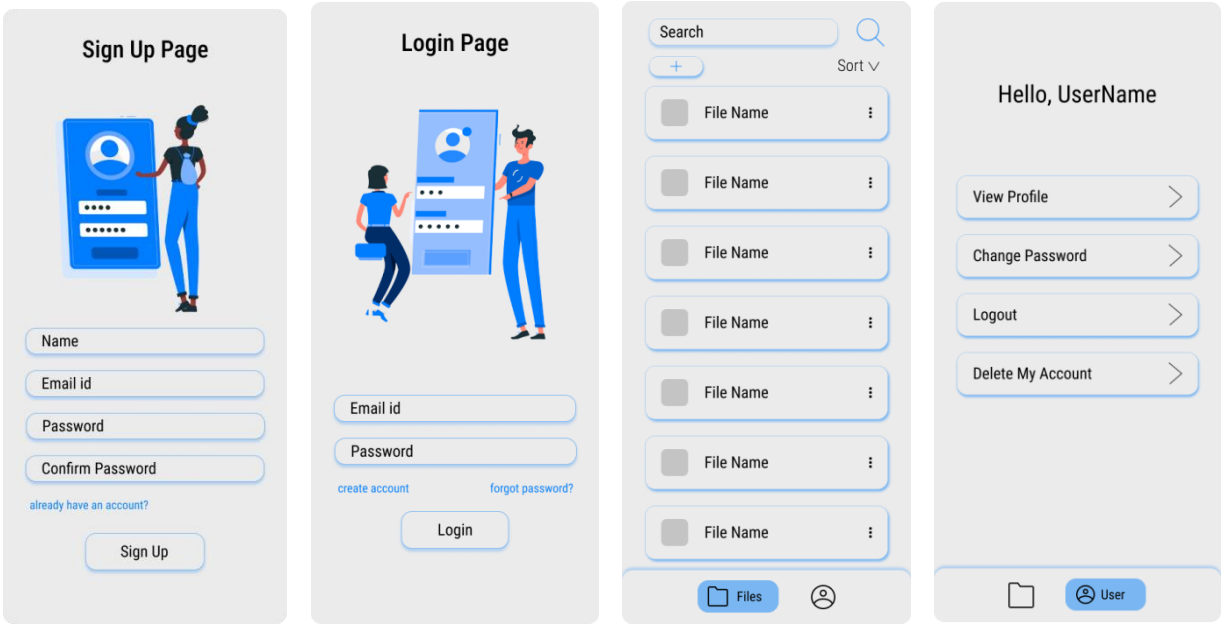


Fig 4: Use Case Diagram

- **User Interface Diagram:**



V. CONCLUSION

With a clear objective of providing data security to the users and it can be prevented as this is one of the solutions. The main aim is to securely store and retrieve data on the cloud that is only controlled by the owner of the data. Therefore, we see that this system can be an innovative step to be adapted in our daily usage.

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