SafeHands: Futuristic Personal Database with Hand Recognition

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I. INTRODUCTION

In todays Internet environment, insecurity ratio is getting higher day by day. People are struggles to trust the mobile applications and softwares. The numbers of the credentials stealing malwares were rapidly increased in the last decade. Different kind of trojans created to make an easier environment for the attackers. Malware infections mainly divided into 5 categories. Stealer trojan, keyloggers, banking trojans,stealer modules and targeted malware. Stealer trojan is a malware that mainly used for getting the logon information’s from the victim. Also, these approaches are improving and producing day by day. In todays insecurity internet environment, the prevention from the malwares become too hard. Illegal activies can easily hide from the victims. In order to prevent these attacks, developers implemented Safehand to create users a safe environment which they can store their credential informations, images and private folders. This application uses Hand recognition technology to give access to users who scans their hand with smartphone.

II. ARCHITECTURE

Safehands architecture generally consists of socket(java) relations between personal smart phone and computer in order to achieve data transaction. Main goal is that user wants to be able to connect to his/her data in his/her computer with user-password and his/her hand picture. And these information will keep his/her private data safe and provide easy access method to data.

General scenario starts with Signup process, in order to keep your data you will need to create an account by providing unique username, password, and hand image to be a base for later image processing parts. After creation of account, the server computer should create a new folder for that specific person and adds this person’s username-password combination to user list. Also server receives image from phone camera and saves this image in account’s folder. After creating the account now user will be able to access his/her folder through Login process and this process takes user’s username and password, and after asks user to take a picture of his/her hand. User takes picture and click confirm button in order to send the image and start the comparison between Signup image and Image taken from Login process. When comparison is completed server will send a permission depending on the comparison process. If permission is granted user will be taken to the next window which has their personal data.

The other scenario is that if someone else tries to enter through your credentials, application will deny because of the comparison failure upon comparison process.

All these data transfers is done via socket data transferring which starts with each action. This feature helps the program to react to commands faster when the connection is not needed.

III. APK APPLICATION

Our application is developed with android studio in order to provide compatibility with every android device and consists of 3 activity pages which are Login, Signup, and Contents but besides these activities there are couple of threads that works in the background in order to provide connection without interfering with main activities. These threads are created and used upon request. Login, Signup, and Comparison are connection threads and they are activated with button clicks. These click stops the application in current state and starts data transfers back and fort between server and phone. When the activated thread is done functioning then application’s state will start to continue.
These threads will directly connect to server through personal hot-spot and the server side is not connected to internet.

We did not want to create a complicated application because our main idea is simple, and that idea requires simplicity in order to work in daily life.

IV. SOCKET PROGRAMMING

We started this project with python socket programming but python created compatibility problems and slowed down our application drastically, also if we were to use python for socket programming we would need to use command lines and this would slow down server machine. We want server machine to continue daily work and still provide service to our application. In order to provide this feature we switch to java socket programming and this helped with speed and the compatibility of the two ends.

After changing coding environment we created the server and server accepts 3 types of connection requests. After request, clients sends the mode of the request and server acts depending to this mode. Modes are `Login`, `Signup`, and `Comparison`.

Signup mode sets itself and then receives username which is selected by user upon Signup activity. After receiving username, server check user list and sees if the username is unique. If its unique it send ‘Yes’ answer to clients and then creates a folder with username. Then server receives the image user sent and saves this image to the folder created.

Login Mode receives username-password pair and check userlist. If username and password pair is correct server then receives image and saves it to folder which is named after username. Then server refreshes itself to be able to listen Comparison mode.

In Comparison mode, Whole new connection is establishes between server and client. Then server compare two images taken before and send a permission string to client. If the permission is ‘granted’ then application will gain access to 3rd activity which is contents activity. If the permission is ‘denied’, 3rd activity will never show up.

V. SOFTWARE

Mobile application is done in Java in Android Studio. For database process, developers used File Explorer. Hotspot is done in Windows Hotspot Manager. Developers used RGB method for image processing and Java language is used.

VI. HAND RECOGNITION SYSTEM

The hand recognition system is the most crucial part of the Safehand project. The system provides users a safe environment with the hand recognition
system. The system uses RGB method. The efficiency of the program satisfies the developer so we implemented a code with the RGB method. In the algorithm, 6 different coordinates taken from the user’s hand instead of using just one point to increase the accuracy. Total sum of the RGB values of the each point is stored. System have majority method. If the sum of the RGB values different is less than 10 pixels, the counter is increased. If the number of the counter is higher than the %50 percentage which means higher than the 3 out of 6, the system executes the eye blink detection.

VII. CONCLUSION

In todays business world, frailty proportion is getting higher step by step. Individuals are battles to confide in the versatile applications and programming projects. The quantities of the qualifications taking malwares were quickly expanded in the most recent decade. For this reason, we mainly focused on security problems. So, we developed Safehand Application to make persons’s life more secure. Also, confidential datas are stored in persons’ local computers, that is why noone can see other’s personal datas.