Monitoring Unusual Activity Using Remote-Controlled Computer and Android Based Application

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Abstract

Monitoring activities using remote controlled computer, is an application that can control the computer's functionality remotely from an android based application. The system consisted of the software using Eclipse to generate an automated number to add the computer onto the android application. Users can add computer through this software where the added computer will be linked and the android based application will be able to identify how many PC's are connected. The second part is an Android based application using Android Studio to develop and follow up action. The integration between these two programs using Firebase to "Push" the information, to "Get" the information and to "Set" the information from one program to the other. The system can control different application of the computer upon linked to the android application, there is no need of other hardware, having a good connection of internet will be sufficient to carry out this application function. The system is suitable for cyber cafe and clients who want to monitor user's activity remotely.

Keywords

Remote controlled computer, Remote access, Remote PC, Firebase.

Introduction

The study and analysis on current issue regarding computer monitoring activities Computers have become a daily life necessity in today's era [Larsson, P. O., 2019; Magana, E.,et al., 2019; Potter, W. B., 2019]. Computers are used in an everyday bases for numerous tasks where machines can think and act just like humans has fascinated humanity for millennia [Kozma, R., 2019]. The impact of computers effects many people with the increasing rate of technological usage, and computers being a prime platform and the increasingly large sum of people being reliant on computers, there arises an issue of security within the computers. Understanding computers: Today and tomorrow, comprehensive. Cengage Learning [Morley, D., & Parker, C. S. ,2014; Castelluccio, M., 2019]. This

is mainly due to the fact that computers are a place where a large variety of information is stored. There have been many measures taken by reputed companies to decrease the misuse of computers and to strengthen the security system of the computers. The reason why computers are such a necessity in today's day and age is due to the fact that these complex gadgets offer a lot of benefit to people for personal and business use. It has almost become mandatory to monitor complex gadgets such as complex computers for the sake of personal safety. Due to the fact that sanctuary information is withheld in the complex computing systems. It is remotely possible to successfully monitor computers using the aid of android devices [Jadhav, A. et. al, 2012; Inamdar, A. et. al, 2013].

The advantage of using such android devices in the field of computer science is vital this is as it provides the authority figure with the opportunity to remotely monitor any activity that occurs in the computers. This activity can be scrutinized using android devices, the activity that is observed can be authorized activity or unauthorized, it could also notify businesses or certain clients about any unusual or usual on goings that take place on the computer. These can be effecting personal or business information. A research carried out by Wallen. J., 2014 states that, "There are times when you simply have to remote into a machine while you're on the go That's all fine and good when you have a laptop available, but when all you have at your disposal is a smartphone or tablet, the tools you choose can really make your day much easier". The author clearly suggests that life can be dependent on the gadgets around mankind. This is as an easy access to any information required. It also help suggesting that computers and laptops are a great necessity but in situations when laptops and computers are not convenient it would be greatly beneficial to make use of portable devices like smartphones.

Application program interface also known as API [Johnson, A., 2019] is an important aspect of this project regarding the information surfacing in the computers and the android applications. It is a complex structure made of functions and procedures which allows accessing data of operating systems or applications. API is acknowkledged to have a key role in the project this is as the main function for this system is to receive and send information held between the computer and the android application. This is due to the fact that the project is integrated together hence why the API targets the recieving and sending information. This reputable application developed by a renowned company named google named chrome is an application that can be easily accessed using a technological gadget. The purpose of this application is to remotely connect laptop or computer to the android device that an individual owns. With this key feature of this application it is easier to access the application without having to carry a computer as it is much more convenient to carry a portable device. The connection that google chrome can form between the computer and the android device allows the individual to view any sort of information held in the computer on the portable device-being phones or tablets. This application is only accessible if chrome browser is available on the computer.

Methodology

This study on the implementation of this system, two methods were carried out. The first method using questionnaire where a form of feedback were gathered from various user of a particular field of interest. This questionnaire is a feedback from a group of people to analysis the results. The results is presented into chart which can help the author to analysis large number or responses into a single

table form. Secondly, interview was conducted between the system analyst and users to collect the data and information. It helps to gather the information and data from the interviewee which allows to improve the proposed system depends on the user requirements.

The system architecture for Remote-Controlled Computer and Android Based Application is shown in figure 1. The architecture consists of Java programme, android application and real time database using firebase network.

Figure 1. System Architecture

Firebase is an online platform offered by Google for the developers to develop mobile application. The firebase helps the developer to create a database and a server in a real time scenario. The developer uses firebase as a server because the basic firebase is free of cost and the user just need a google account to login to the firebase website and connect the android device with the firebase. The firebase is used to send real-time information from the android device to the java software, firebase helps to store the user email and password on the database. The database of the android application can be connected by using only 3 line code in the Android application. The code is available on the firebase website and is very easy to understand.

Android studio is an open source platform, The purpose of this application is to develop software related to mobile phones and wearable devices. Android studio is derived by the collaboration of google and is the main maintainer of android studio. Many of the companies uses this software in their everyday life to develop application for android devices and wearable devices. Android can be easily customized according to the developer's requirement and needs. Therefore, the android studio is used as platform to develop the proposed project.

Java is a general computer programming language that is class based, object-oriented and concurrent, specifically designed to have as few implementation dependencies as possible. It is intended to let application developers "write once, run anywhere" which means that the compiled java code can run on all platforms which support it. It was developed by James Gosling and was

released in 1995 as a core component. The language derives much of its syntax from C and C++ but has low-level facilities than either of them. The original Java compilers, virtual machines were released by Sun Microsystems under proprietary licenses. The latest version is Java 11 which was released in September 2018 which was only in six months after Java 10. Java 8 is still being supported but no further updates are going to be taking place in Java 9. Versions which were earlier than Java 8 are supported by companies on commercial basis e.g. the Oracle back to Java 6(while they still highly recommend to uninstall it). It was originally designed for interactive television but ended up being too advanced for digital cable at that time.

Results and Discussion

Based on the feedback of questionnaire and interview, a large number of users are aware of the proposed system and wanted to have a remotely connection between their laptop/pc from an android device. Besides that, interviewer were excited to know that the system having the notification if there is someone breaking into the laptop/pc. Users can immediately access the camera to look who is using it. As security is concern, the system is focusing on it.

The completion of the system allows several testing to be done. Unit testing is a level of software testing where individual units or components of a software are tested. The purpose is to validate that each unit of the software performs as designed. These are the function that was tested on the proposed system such as sign in, sign up, add Computer, shutdown, restart, log off, access computer, screen shot, edit, delete and logout. The table 1 and 2 shows the sample of test conducted.

Table 1: Sign in test case

Case test number	1	Case test name	Sign in (Mobile App)
Purpose of testing	To test Sign in functionality.		
Pre-condition.	Have to Sign Up first.		

#	Description	Test Data (Input / Action)	Expected Results	Outcome (Actual Result)
1	Login with correct Email and password and press Sign in	Correct Email and Password Email: test@gmail.com Password: 123456	- Sign In successful - No Error Message - Directed to home screen	Passed / Meet the expected result The Sign in is successful, no error message appeared and directed to home screen.
2	Login with incorrect Email and password	Incorrect: Email Incorrect: Password	- Sign in unsuccessful - Error Message - Forgot password text show up. - Stay at login page	Passed / Meet the expected result The Sign in is unsuccessful and there are pop up error message.
3	Login with correct Email and incorrect password	Correct Email Incorrect Password	- Sign in unsuccessful - Error Message - between 4 and 10 alphanumeric show up. - Stay at Sign in page	Passed / Meet the expected result The Login is unsuccessful and there are pop up error message.
4	Login with incorrect Email and correct password	Incorrect Email Correct Password	- Sign in unsuccessful - Error Message - Enter a valid email address show up.	Passed / Meet the expected result The Sign in is unsuccessful and there are pop up error message.

Table 2: Add computer test case

Case test number	2	Case test name		Add Computer (Mobile App)
Purpose of testing	System to be connected with internet.			
Pre-condition.	Have to Sign Up first.			
#	Description	Test Data (Input / Action)	Expected Results	Outcome (Actual Result)
1	Enter Computer name, IP Address and Port.	Correct computer name, correct IP address and correct Port.	- Sign In successful - No Error Message - Directed to home screen.	Passed / Meet the expected result The Add Computer is successful, no error message appeared and directed to home screen.
2	Login with incorrect IP address and Port	Incorrect: IP address Incorrect: Port	- Add Computer unsuccessful - Error Message - Invalid IP address or Port. - Go to home screen	Passed / Meet the expected result The Add Computer is unsuccessful and there are pop up error message.
3	Login with correct IP address and incorrect Port	Correct IP address Incorrect Port	- Sign in unsuccessful - Error Message - between 4 and 10 alphanumeric show up.	Passed / Meet the expected result The Login is unsuccessful and there are pop up error message.
4	Login with incorrect IP address and correct port	Incorrect IP address Correct Port	- Sign in unsuccessful - Error Message - Enter a valid IP address.	Passed / Meet the expected result The Add Computer is unsuccessful and there are pop up error message.

The system was implemented using NetsBeans and Android Studio. Android studio is a well known development tool with new and fascinating android applications. The function of the above user interface design in figure 2 is to add the computer on the android device. The above user interface is the proposed system mobile design, the purpose of this particular design is to register the computer that user connect to android device. User can add the computer name and the set a specific IP address for each Laptop and PC. This IP address will be manually added into the android device which consume lesser time and better connection. Figure 3 shows the profile of the admin page shows on how to control the setting and profile on the android device. All the personal details of the admin are available under this interface. The admin can update, logout or authorize other user to operate the device.

Figure 2: Add Computer

Figure 3 Admin page

The user interface enable a quick response. As soon as the user gets the notification from the system if there is unusual login attempt, the user can quickly response to that scenario by simply choosing one of 3 response Shutdown, Restart and Log off as shown in figure 4. For further function, figure 5 shows option to access camera to access the computer and take a screen shot. Access computer gives the full control of the connected laptop/pc the user can control the function of the device from the connected android device and similar to screenshot the users gets a copy of the screen display currently live when the user request for a screenshot. The edit function enable user to change the IP address. The implementation was designed well and tested accordingly.

Figure 4 User Interface

Figure 5 User interface

Conclusions

Remote controlled computer is an application to control the computer's functionality remotely from an android based application. The proposed system have two important parts which are software and android based application. The software used to generate an automated number that would be used

to add the computer onto the android application. Users can add computer through this software where the added computer will be linked and the android based application will be able to identify how many PC's are connected. The Android based application is using Android Studio to develop and follow up action done from this application. Integration between these two programs are using Firebase. The main work of the Firebase would be to "Push" the information, to "Get" the information and to "Set" the information from one program to the other. The system purpose is to control different application of the computer after linked to the android application, there is no need of other hardware, having a good connection of internet will be sufficient to carry out the function of this application. The system is suitable for cyber cafe and clients who want to monitor user's activity remotely.

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