

**ACCEPTABILITY OF ANDROID DEVICE CONTROL SYSTEM**

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**ABSTRACT**

This study focuses on the development of Android Device Control System (ADCS) and assesses its acceptability in the institution. The ADCS contains a description of an advanced control mechanism with the use of an Android device application. It is integrated with an online server and domain allowing a remote access on the devices and appliances in the different offices. Automation integration, in particular for some business establishments had been one of the means of the enterprise to achieve success, imposing high level of control. It does not only mean adding manpower but maximizing the resources and facilities of the company to ultimately obtain its vision. The study used the developmental-evaluative research design. The sample size for this research study comprised of fifteen (15) department heads from various offices in SDSSU Cantilan. As the respondent used the Android Device Control System, they found it more reliable, high-tech and easy access to control compared to the manual procedure of control on the different devices/appliances on the office. With its systems capability and performance, the system is fully accepted by the institution.

**Keywords:** Acceptability, Android System, Control System

**INTRODUCTION**

Automation in the field of technology has evolved in the passing of years. People were trying to develop a more modern technology that goes deeper into one's personal life. If people see things clearly, automation covers a massive aspect in the world of technology today, (Kovatsch et al, 2010). This study aims to formulate a combination of Android Mobile Technology and On-line Control System.

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The Android application should be present and installed on an Android device to be able to view and control devices remotely. The user of the system can view status and control via Android application. The Android application is linked through the on-line control system where the device control circuit is connected. An individual device that is connected to the circuit can now be turned on and off by the user depending on its command from the Android application.

The concept of a control system for Android application has been a trending issue in today's technological advancement. Today, there are a lot of published studies utilizing the present technology. The conception of the Android platform is attracting more and more programmers in mobile computing fields. It carries package of software for mobile devices, including an operating system, middleware, and core applications. The interconnection of Android and SDK provides powerful tools and APIs necessary to develop applications on the Android platform using the Java programming language (Shu, et al., 2009).

The significant advancement of Android platform had been studied by (Kumar, 2014) over the last couple of years which has created a new dimension in the world of information and communication technologies. The advancement is leading to anyone, anytime, anywhere (AAA) connectivity for things with the expectation being that this extend and create an entirely advanced dynamic network of IoTs. The IoTs technology can be used for creating new concepts and vast development space when it comes to Android development.

The innovation of many Android based systems had been originated in understanding how the Android platform system rapidly changes the world of technology today. The advantage of Android technology is proven by those stated studies that use the Android system. The possibility of utilizing such technology capabilities enables the researcher to delve into a system development using Android. Through the extensive understanding of its components, there might be greater chances of discovery in system development and automation with the help of these technologies particularly on control systems.

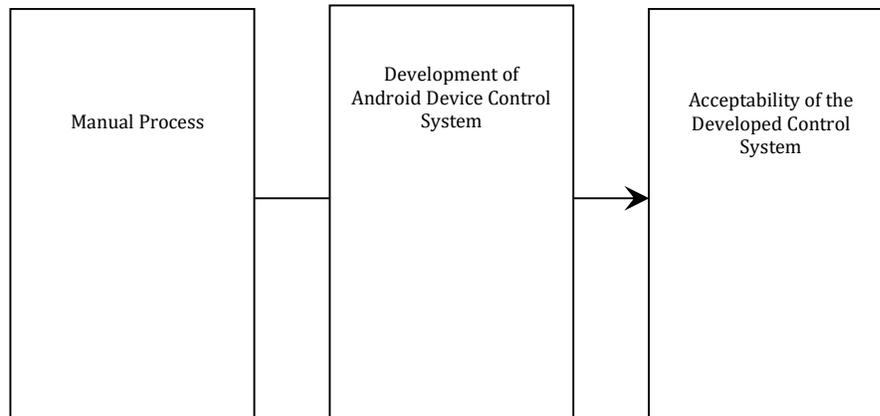
The different android innovation and automation studies mentioned gives the researcher the idea of developing the study. It is obvious that in the stated studies, automation in Android platform must take a consideration of the innovative supports and all dimensional aspect, especially in communication of the system. The study attempt to integrate the online communication in relation to automation in the field of Android development. To keep abreast with the emerging trend, the researcher has come up with the idea of developing a control system using Android. The Android tool and SDK combination gives the researcher a concept of possibilities in integrating such software in our technology of today. Such system

provides the capability of controlling full range devices by utilizing the best communication resources today, which is the World Wide Web.

## **THEORETICAL BACKGROUND**

Android technology is one of the leading technology today. Its distinct characteristic gives it unique features attracting more and more users. The existence of Android devices in the global market opens the window of many different programmers. The Android technology has been utilized around the world making it one of the top technologies in the 21<sup>st</sup> century, (Sullivan, 2008). GSM, Global system of Mobile, is a popular Mobile communication system provided by Cellular service providers or GSM Operators in most countries internationally. It is used in most mobile handsets used by us. GSM Mobile communication system can be intelligently used by electronic devices that can collect some data and send it to the central place using SMS or GSM data call. GSM is required in Vehicle tracking systems because GPS system can typically receive location information from satellites but cannot communicate back with them. Hence, there is a need for some other communication system like GSM to send this location information to central control room. Other technologies can also be used, but they are more costly,(Ramani,et al., 2013). Automation is used to execute a sequence of actions without any human interference. It is also described as testing a system with different data sets again and again without human intervention. Automated testing is automating the manual efforts of testing process currently being used. It is the use of tools and sequence that tries to reduce the need for manual, human efforts, interaction in repetitive tasks. It includes detailed test cases creation- including expected results that have been created from Business Specific point of view and by looking Design Documents of application. A stand-alone Test Environment encompasses a Test Database that is restorable to a known constant. Such test cases can repeat each time there are modifications made to the application(Nagowah, et al., 2010) Wireless Sensor Network is an intelligent and efficient alternative for various problems. It can be an agglomeration of different application problems such that multiple applications can be processed, and their relevant information can be sensed by a single Sensor Node termed as Multipurpose Nodes. This Heterogeneous network may contain information of different importance that includes regular updates and critical data triggered by any event. In this paper,the researcher proposes that dynamically allocates the priorities to the packets based on their importance of information. It can also controls congestion in the network by adjusting the rate of the traffic generated by a simulation of multiple applications inside the node. Detailed analysis and results are shown along with the

description of our protocol to validate its effectiveness in wireless sensor networks(Sharma, et al.,2014). The researcher is following the most modern model in developing a system the Waterfall Model. This type of model motivates the researcher due to its concept that it is very simple to understand and use. In a waterfall model, each phase must be completed fully before the next stage can begin. In this design, the testing starts once the development is completed.



**Fig.1.** Conceptual Framework of the Study

Figure 1 shows the overall flow of the study, from the manual system to the development of the proposed system and the testing of its acceptability in the SDSSU system. The manual process in the diagram illustrates the present mode of controlling the devices and appliances in the institution. This process is necessary so that the researcher would know that there is a need for the development of such design. It is where the system would base its scope of development. The second stage is now the development of the Android Device Control System (ADCS).

This stage of the diagram illustrates the development of different software and hardware that would work together to form the ADCS. It is at this stage that the data gathered from the manual process are being integrated allowing the innovation of the new control system.

The system must be fully functional to be able to attain the third stage of the diagram that is the testing of acceptability on the developed control system. This step determines the overall performance of the system, and it is the determinants of this study. The acceptability of ADCS relies on its system performance and how it will be conducted in the identified offices of the institution.

## **STATEMENT OF THE PROBLEM**

The primary objective of this study is to design and develop an android application program.

Specifically it sought to answer the following questions:

1. What method of controlling different devices and appliances are utilized in the institution?
2. What software and hardware design can be developed to control the devices and appliances?
3. What is the level of acceptability of the developed Android device control system?

## **SCOPE AND LIMITATION**

This study is focused on developing a device control system using Android. The system will be implemented and test the acceptability on the identified offices in the institution. The study is limited only within SDSSU Cantilan Campus. The respondents of the study are the heads of the different offices/bureaus where the system is to be installed for testing. The system Android application runs on different version of Android operating system and limits only in Android devices.

## **DESIGN AND METHOD**

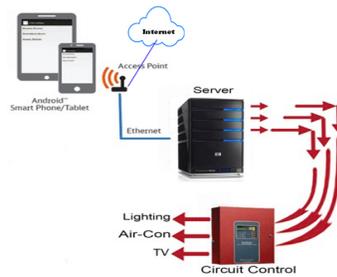
The primary objective of this paper is to design and develop a device control system using Android and assess its acceptability in the institution. Developmental-evaluative is the method that is being employed in this study. The research took its first step in evaluating the present mode of controlling the devices and appliances in the institution. The researcher assessed the data and came up with the development of an Android device control system. After the development, the researcher determined the performance of the system therefore; it must be implemented.

The researcher formulated the questionnaires, and it was validated by technology specialists. The researcher conducted the survey evaluation regarding the present status of control; then conducted the implementation. To test its acceptability, the researcher evaluated the respondent with the use of a questionnaire.

## **TECHNICAL ASPECTS OF THE SYSTEM**

This section suggests the software tools and component diagram needed to design develop and implement the Android device control system. The researcher's first approach is to plan,

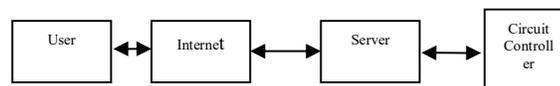
identify and analyze the best possible solution based on the stated problem that would come up with a real time system that is significant to all users.



**Fig.2.** Components Diagram

Figure 2 above illustrates the components needed in the system. The system requires a server that is constantly on-line where the system server application is being installed. The other side of the server is the control circuit, capable of controlling the devices and appliances. In order for the Android device to gain full control to the devices and tools the android devices must be connected to the internet for it to be able to communicate with the server. A wireless access point (WAP) is needed so that the devices can connect remotely to the server. The WAP must be connected on-line so that the system can connect to the World Wide Web. Proper configuration of the server, the control circuit and the Android device allows the full functionality of the system.

## DESIGN



**Fig.3.** System Design

Figure 3 above shows the entire system design. The first box stands for the user of the user of the system. The user is the one who has the Android device where the application is being installed. The second box is the internet. The Android device must be connected to the internet for it to be able to communicate with the server. The third box illustrates the server PC. The server PC is connected on-line and to the control circuit. It is where the server application is installed and gives the gateways of communication between components of the system. Without the server PC, there will be no possibility of detecting either one of the components. The last part is the control circuit. It is here where the switching is going on. The circuit is made up of an array of relays allowing controls of the different devices and

appliances with a DC current. In this way the Android device can now control the various relays assigned on various devices in the institution.

## RESULTS AND DISCUSSION

Automation can be described best as an introduction of technology within a remote environment to provide convenience, comfort, security and energy efficiency to its users. With the existence of the internet, the world of automation had become more and more popular (Kovatsch, 2010). The emergence of Android technology opens new possibilities for innovation and research..

**Table 1.** Mode of controlling the devices and appliances

Mode	Frequency	Percentage
Manual	15	100
Partially Automated	0	0
Fully Automated	0	0
<b>Total</b>	<b>15</b>	<b>100</b>

Table 1 shows the mode of controlling the devices and appliances using the process of frequency counting. The table consists statements that relates to the problem statement and results of their rating. Result shows that the way the respondents control their devices and appliances in the institution are done manually. It further implies that that there is a need to automate the process of controlling such devices and appliances. With the volume of android devices that exists and has been used today, it will be a great help to design and develop a system like the Android Device Control System (ADCS). It further implies the advent of automation in utilizing present technology supported by the study of (Kovatsch, et al., 2010).

**Table 2. Level of Acceptability**

<b>Indicators</b>	<b>Mean</b>	<b>Adj. Rating</b>
1. The Android Device Control System (ADCS) is easier and faster to install.	4.00	FA
2. The ADCS provides easy installation procedure.	4.00	FA
3. The ADCS responded directly every time the user inputs command to the android application program.	4.00	FA
4. The ADCS offers direct status updates whenever the device is turned on/off.	4.00	FA
5. The ADCS supports multi standard voltages (110V, 220V, etc).	4.00	FA
6. The ADCS is capable to control any appliances.	4.00	FA
7. The ADCS is compatible to any version of android operating system.	4.00	FA
8. The ADCS offers wireless or wifi transmission of control.	4.00	FA

9. The ADCS server needs to be constantly online.	4.00	FA
10. The ADCS is very useful and cost effective.	4.00	FA
<b>Grand Mean</b>	<b>4.00</b>	<b>Fully Accepted</b>

Legend: 3.26 – 4.00 – Fully Accepted

1.76 – 2.5 – Partially Accepted

2.51 – 3.25 - Accepted

1.0 - 1.75 – Not Accepted

Table 2 shows the level of acceptability of the developed Android Device Control System. The table includes the questions derived from the statement of the problem and their prescribed rating. The respondents rated the system as entirely acceptable with a grand mean of 4.00. It means that the system shows an excellent performance. It is easy to install, provides easy installation procedure, responded directly to the command of the user, provide an accurate status updates whenever the device is turned on or off. The excellent system performance is a significant capability of a designed system that is best described by (Kovatsch, et al., 2010). According to them, to gain an excellent system performance, there must be a maximum utilization of the available system giving way to the user's appreciation and satisfaction. Moreover, the system supports multi-standard voltages, this means any appliance can be attached and can be directly controlled via Android.

Further, compatibility of ADCS to any version of Android operating is entirely acceptable. It implies that the system is designed to adapt to any version of android operating system. The compatibility of an Android application is very crucial especially in the mode of fragmentation (Hyung, et al., 2014). However, a system compatibility test is a good solution to address fragmentation and therefore, be compatible to be installed in any Android platform.

In the overall results, the respondents are very satisfied and amazed of the capacity of the system. They find it very useful and very necessary to be installed in the institution. The cost effective capacity of a designed system is paramount and thus provide a significant impact in the acceptability of the system. This is supported by the study of (Hoffer, et al., 2008) that one factor of an acceptable system is its cost-effectiveness. It means that in system formulation,

there must be an aspect of cost effective analysis concerning the system performance in collaboration with the user of the designed system

## FINDINGS

After the data were gathered, tabulated, analyzed and interpreted, the researcher obtains the following results. On the mode of controlling the devices and appliances, the whole respondents said that they manually control the devices and appliances in their respective offices. It implies that there is really a need of developing a control system. However, on the level of acceptability of the designed Android Device Control System, the designed Android Device Control System is very acceptable with a grand mean of 4.00. It denotes that the system is 100% acceptable in which the respondents wanted to have it installed immediately in their offices.

## CONCLUSION

After formulating the finding, the researcher comes up with the conclusion that the developed Android Device Control System is very useful and acceptable to be installed in the institution.

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