Smart Cloud Storage using Home Automation Support

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ABSTRACT
Utilization of Android is being extensively approved in operations beyond just tablets or Smart Phones because of its flexibility, open sources, and features it provides. The design and effectuation at a cheap cost, yet compressed and safe Android smartphone based home automation system that the paper demonstrates. The design is the favored ARM 11 hardware board where all of the electrical appliances and sensors are connecting the input/output ports on the commission. With a view to the system responsiveness as a result of making it more dynamic, such as integrating a well-liked and stable LINUX OS. The integration of Google's voice recognition features an additional add-on admitted which recognizes users' voice commands to control applications.

Keywords
ARM 11 Board, Relay Driver Circuit, JDK 1.6, Android SDK 2.2 and SQL Database.

1. INTRODUCTION

1.1. The Journey towards Smarter Home Automation

With the continuous growth of movable devices in its popularity and functionality, requirements for advanced pervasive mobile applications in people's daily lives is continually rising. Exercising services on the web are the free and practical way of offering distant service access or facilitating applications to connect with each other. The alluring merchandise is for circulation of home mechanization, representing an active household and singulars with substantial limitations.

Prior, glancing at an aspect of the forthcoming era of individually discussed robotic devices, which could do everything at the urging of a supervisor, but present-day it is a phenomenon. In addition, motorized gadgets can restore the favorable load of an individual functioning force. Mortals are highly procumbent to flaws and in comprehensive circumstances, the contingency of failure gains, because, a computerized appliance can perform with alertness, adaptability, and relatively nil errors. Approach to home automation can be pragmatic and can fabulously advance the lives of the handicapped.

An automation system of home that are available, feasible inside both categories: narrowly disciplined systems and outlying disciplined systems. Narrowly disciplined systems are the schemes that service an in-house supervisor to accomplish an ideology of home automation. Over said system, the patron can govern their household appliances around the house over a stagnant or cellular interface. Internet connection is using the structures of an Outlying disciplined system. These schemes governed by individual computer and locomotive gadgets.

The complication of mechanizing schemes of home using, Bluetooth, General Packet Radio Service, and Radio Frequency Identification demands a sovereign software and hardware setting inaugurated in every house. In addition, such schemes contribute the customer with definite entry as an approach field is confined only to a definite spectrum. Mobile devices and cloud network eradicates an urgency to initiate and scuttle applications on the client's personal computer, clarifying support and sustenance.

Here, project consolidates the remotely and locally disciplined schemes over a Cloud Network service. Computing on cloud affords admissions in committal to online resources, which is smoothly gratifying and lacks an inferior management exertion. The home mechanization scheme is recommending a perspective that comprises of household devices and gadgets that are reserved and cultivated by central administration. Its primary assignment is to upgrade accomplishment. Bestowing, it into three calibers embroiling discerning unit for auditing the applications of convoluting level. A micro - controller and a transmission caliber that uses a Global Packet Radio Service, or mobile phones over a sequential port RS-232 are refining unit. The Short Message Services are in the condition broadcasting equivalent of power breakdown. The feasible resolutions hatched over assorted network mechanization. Also, Cloud system is exhibited in it.

1.2. Basic Concepts

Here the idea is to demonstrate a small expenditure, agile house scheme, pliable standalone that is in contact with the Android application broadcasting among the mini netting server furnishing higher rate affecting substituteThe Municipalities and Eradication of the less productiveness of the data processing machine is preserving the cost of the total system to a mere. Substituting responsibilities are fusing into the voice acknowledgment.

An amalgamation of the manifold junction portable gadgets, cellular dissemination, potential channel transmission and Cloud hobnobs, contributing a client using distant authority on several instruments, equipments and devices in the home. It practices a coagulation in approachable WIFI seclusion; mainframe positioned schedule and mobile phone application to grant an aid from client interface to the purchaser.

A scheme of house mechanization system diverges from alternative plans by conceding a purchaser in engaging an arrangement outside the addiction for an Internet connection or mobile carrier by means of surrounded house WIFI isolation. It is drafting a cheap expenditure and comprehensive granting a diversity of instruments governed.

1.3. Problem Definition

The idea of home automation system is a perspective that includes devices and gadgets like light, fan and bulbs are controlled means On/Off device and maintained for home management by using the cloud network. Home Automation is utilizing a system of the cloud network that uses mobile devices or computer to authorize essential features and home functions inevitably over the Internet worldwide.

A computerized home is sometimes called a smart home. The primary task is to improve performance. In addition, by using the cloud, anyone can share all images within that cloud network. Suppose a user took a picture and store in the cloud than other Android users can see that picture.

2. LITERATURE SURVEY

2.1. Overview

The home mechanization scheme allows the client an exhaustive authority on a personal computer, telephone or via mobile devices from the system to the jobholder of their house safety.

Numerous controversies convoluted while picturing system of home mechanization. It should yield a foolproof merging into owner superficially to keep appliances comfortably set up, governed, and monitored. In addition, the entire conformity is hastily adequate for consummating the actual potential of cellular robotics.

Ultimately, the organization is price-efficient about justifying its function in the system of house mechanization. Reduction of drawbacks of individual scheme, abolishing the draft arguments formerly cited.

The research proposal assimilates provincially, and outlying governed projects are adopting data on cloud grid. It grants an entity, acting independently of a portable jobholder. It enables pattern, using it for diverse cell phone stages. Also, it permits the pattern of responding narrowly during the unavailability of phone and computer admittance. From the internet, using statistics framework and cloud circulation all the originals can control, audit as well as manage every private statistic mark. Pachube is the feasible utility amongst all. The stimulation of innovation, demanding a steady mutation is an era of health protection business.

The lingering malady, developing society census-taking and upgrading in therapeutic machineries are crucial Furnishers for intensifying prices. Each stakeholder expects greater profit from their capital. In addition, disease victims are inaugurating to perform a leading appearance in admonishing their concern. The beckoning of a compelling alteration in fitness concerned institutions promotes, and challenge over the generations beforehand is galvanizing through arising attention, employment exemplary, and finances arranged next to contented state and individual beliefs. IBM revealed contemporary investigation that demonstrated that just 34 percent of healthcare providers, CEOs focus to administer complexity more efficiently. Similar organizations are ready for the impending complexity, accepting only 55 percent of healthcare payer CEOs.

However, an up-to-date surroundings functioning is principally sanctioned. An unknown tight IT alignment with business goals, economic benefits, and rapid economic development is offered by cloud computing two stages that is an inactive information technology access. The cloud computing is promising in fitness concerned industries and builds concrete endorsements on catching leverage of the scientific know-how by fitness relevant industries, which the research report inspects. In wellness program, the complexity, in delivering high-quality along with the pace of change, is increasing.

Physicians and hospitals, studying blueprints in enhancing professional resilience manifesting preeminent health care expense. The remodeling separation of the foundation focused, statistics-lacking plans to unhealthy-focused, scientific-prospered fitness programs require for completion. The fitness concern institutions back fresh financial strategies and coherent long-suffering knowledge.

Looming personal interest shipment and practical mechanism drives business dealing dimensions as well as complicating logically compelling assignments to brand original stages never anticipated by fitness concerning organizations. Burgeoning IT intricacy menaces to hold organizations back, these drivers desire a humungous IT footprint to empower contemporary effectiveness.

2.2.Existing System

Home automation is an old notion, but the spectrum of home automation still has many rooms available for improvement. The methodology and technology used by each of these living systems are unique. The method has assorted the existing systems, according to the method recycled; for exemplification, the medium for communication between the user and home.

For schemes that employ a similar methodology as the system is going into the depth of studying the technologies. The categorization is on the basis of controlling mechanism controlling through remote controllers. These devices crave the user to be within the premises in order to operate the equipments. Applications such as Bluetooth, Radio, and other devices are coming in the vicinity or spectrum.

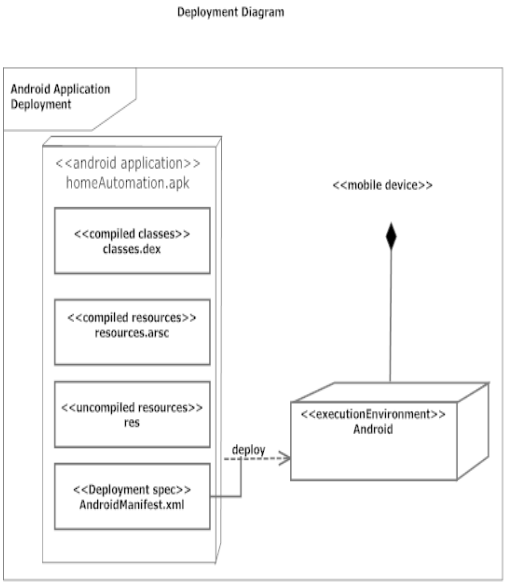

Fig.1 The diagram of deployment 1

Table 1. Testing scenario

Test case id	Test cases	Input	Output	Pass/Fail
1	Login	Enter User name and Password.	Login successful	Pass
2	Accept text Format	Text	Text can be Witten in a block	Pass
3	Validate	User Name and Password/ Random sequence generator	Check if the user is authorized.	Pass

Different types of controllers utilized and following controllers are more prevailing in most of the applications such as Bluetooth, Radio Frequency (RF), and Frequency (RF) and Infrared (IR). The significant limitations inherent in these systems are immobility and inconvenience to the user requires a computer and the Internet in order to control the equipment. Most of the existing systems are exorbitant and interspersed and doesn't demand re-electrifying in the previously built house. Flexibility and usability are significant arguments for abounding regimes. However, dispatching in the arrangement by providing the elimination of each component of an organization as well as pliable results are allowing the customer accumulation. Level Distinctive users have unique security claims, and their allocations may differ according to the of the economy. Most of the enduring systems are not economical for most of the customers and some of the systems of the economy. Most of the enduring systems are not economical for most of the customers.

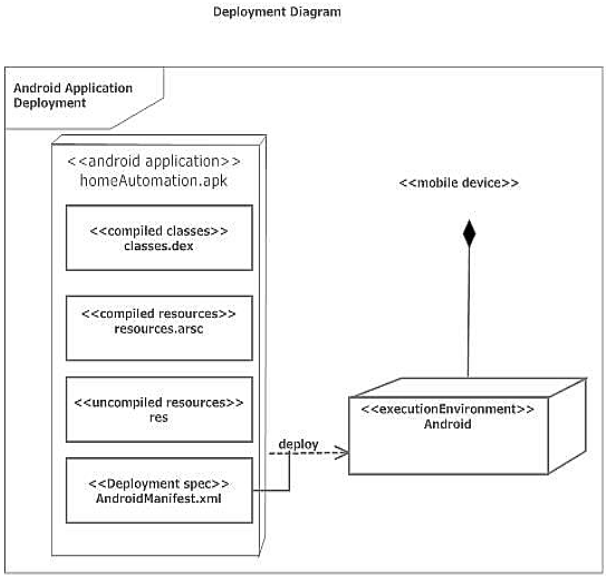

Fig.2 The diagram of deployment 3

3. SOFTWARE REQUIREMENTS

3.1. Project Scope and Operating Environment

The user of the product/system is any person who has android phone and wants to control home appliances. Software has two considerable components; one is the mobile application and second is the server. The server needs a minimum One gigabyte random access memory and hundred gigabyte hard disk to Windows XP/Vista/7 machine. The cellular Ad-hoc communication is in constructing because of WIFI gadgets, which are demanded by the server. The purchaser is conventional to have Android Mobile phones and should be able to conduct with Android handset.

3.2. Organizational aspects

3.2.1. Aspect I (Functional Requirement)

In Client side, Mobile backs [1] Android handset. [2] It permits users catching images, show pictures; devices. [3] Allow to turn on and off the device. [4] And to select multiple devices simultaneously. As well as, computer also should be able to perform similar activities like mobile.

3.2.2. Aspect II (Functional Requirement)

On Server side, the system should [1] Prove web based access (HTTP support). [2] Able to store images. [3] Allow users to see pictures. [4] Allow users to see all the device list is on/off. [5] Allow users to turn On/Off device.

3.3.External Interface Requirements

In User Interfaces, Client side includes [1] Welcome page. [2] Window for showing the devices controlling (ex-light, light, fan, bulb). [3] Window to display monitors (ex-Light). [4] Message's window to display device data (Ex light is off). [5] Showing image window.All of the Mobile application is installing in movable equipment in the hardware interface. The connection to the server is possible if portable gadgets are supported by WIFI appliance. [1] ARM 11 Board. [2] Relay Driver Circuit. [3] WIFI Module. [4] External Hard Drive [5] Electrical Appliance. In Software interfaces, it includes [1] JDK 1.6 [2] Android SDK 2.2 [3] Eclipse Editor. [4] SQL Database. [4] Android 2.2 supported mobile handset [5] Operating System: Windows. In addition, in Communication Interfaces, there is existence of building communication protocol using WIFI grid. Through, software, data dispatching in server is possible, mostly if it supports encryption logic of BASE64. A server backs the web-based approach Hyper Text Transfer Protocol.

3.4. Non-Utilitarian Prerequisites

3.4.1. Administration Prerequisites

With the application, as per criteria higher rate of random access memory and server development is due to tuning of the server. Portable applications are using many RAMs. The Kernel-based Virtual Machine tuning is for providing extra address space for the application.

3.4.2. Safety Prerequisites

The entire client's statistical data is stored on the server of the cloud grid as the software is hosting the server of cloud grid. The capability, of protecting and maintaining the privacy of client's data is an initial requirement for the commodity. The customer's desk is accessing over the accreditations of the buyer, and freezing several alternative clients from accessing the purchaser confidential data. The clients are prohibited from client's rights because the consummation is in the gadgets of the cloud chain.

3.4.3. Security Prerequisites

The permission to the client is on the basis of approaching his desk and prohibiting it to approach an alternative desk on the cloud. The project plan is using both decryption and encryption channels, making a provision for a client to employ and decode the complete statistical data.

3.4.4. Software Quality Attributes

[1] Information overflows prevention and storage. [2] Periodical active sensor if necessary (alarm functions not obligatory).

4. THE APPROACH

4.1.Hardware Use

Fig.3 Snapshot of Raspberry Pi used in the project

The Raspberry Pi Foundation of United Kingdom made a continuous effort of research, establishing a board known as Raspberry-Pi. It is the sole board of meager magnitude. The primary objective is to provide advanced teachings to all technical schools. It is assembling in triplet panel compositions over the accredited fabricating a contract beside Newark 14, Egoman, and RS Components. The raspberry-pi is under the process of auctioning on networking platforms by these associations. The countries like China along with Taiwan, a unique version is always under circulation by the Egoman. The FCC/CE stamps and red coloring is lacking in the alternative Pis. Every corporation is equivalent to the hardware. The Broadcom BCM2835 System Onchip includes VideoCore IV GPU, ARM1176JZF-S 700 MHz processor, shipping alongside random memory access of 256 megabytes. It is excluding from a solid-state drive or built-in hard disk. The Raspberry Pi has a clone CPU (Central Processing Unit), Random-Access Memory Access Memory) or Graphics Processing Unit. Alternately, they are all pinched into sole component called a System onChip or SoC group. It is substantially the unified machine on a single chip. The Raspberry Pi utilizes an ARM1176JZF-S 700MHz CPU, installing in a broad range of mobile phones; handheld games console and readers. The CPU is the single core. However, it does have a coprocessor to act floating point calculations. Plenty of estimations needed by a program include whole numbers. These are effortless for the central processing unit to control. Integer calculations yield authentic conclusions. Real numbers or floating-point have a fractional part, e.g. 1.5.

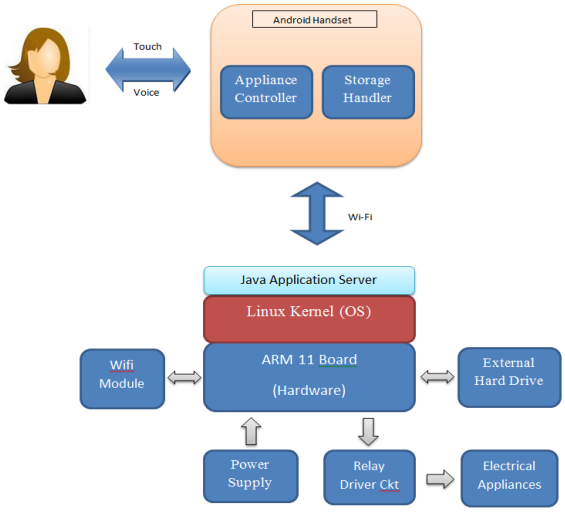

Fig.4 System architecture

4.2. UML diagrams

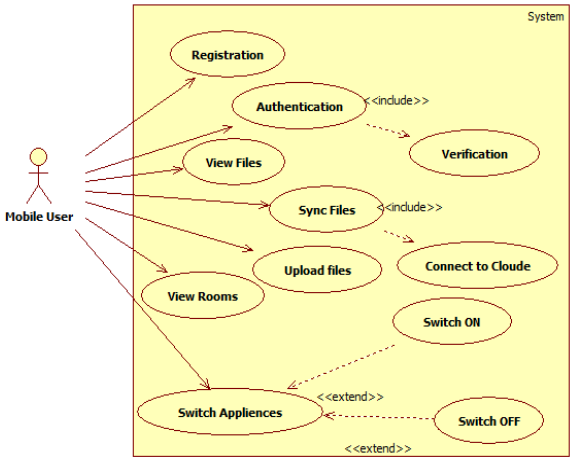

Fig.5 Use Case Diagram

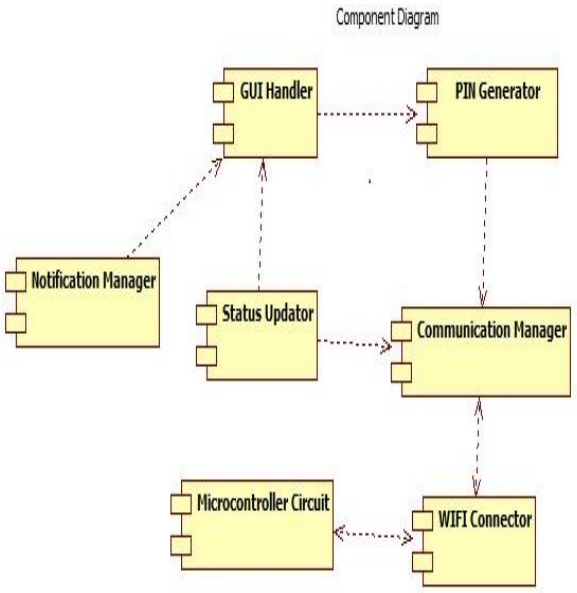

Fig.6 Component Diagram

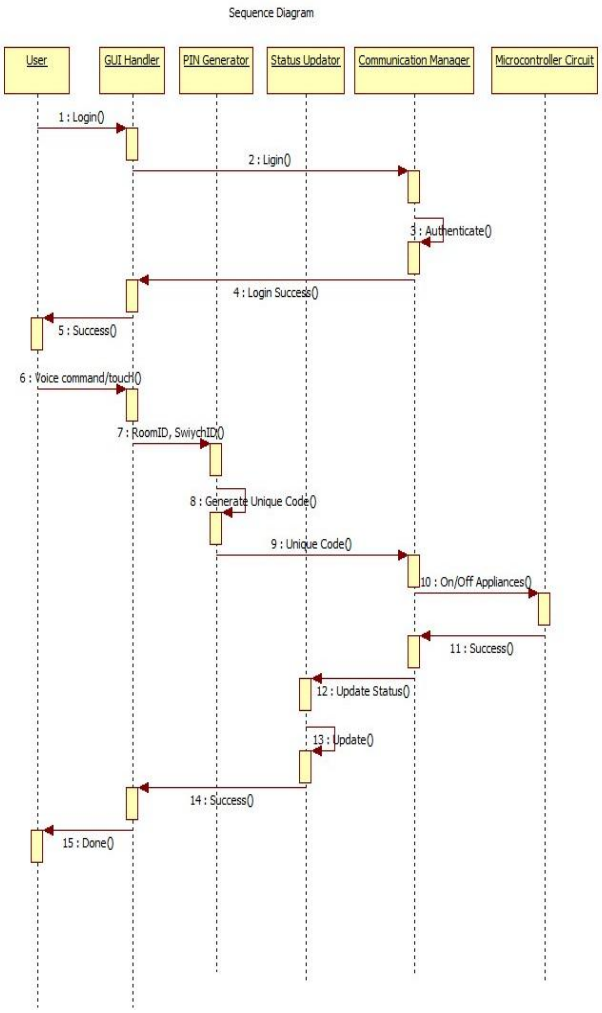

Fig.7 Sequence diagram

4.3. Analysis models

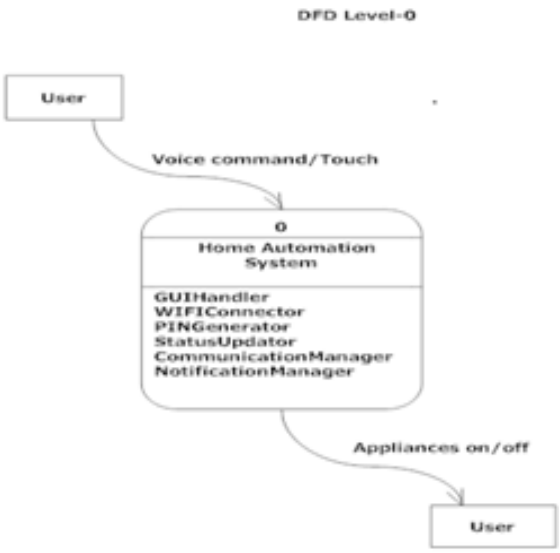

Fig.8 Data flow diagram 1

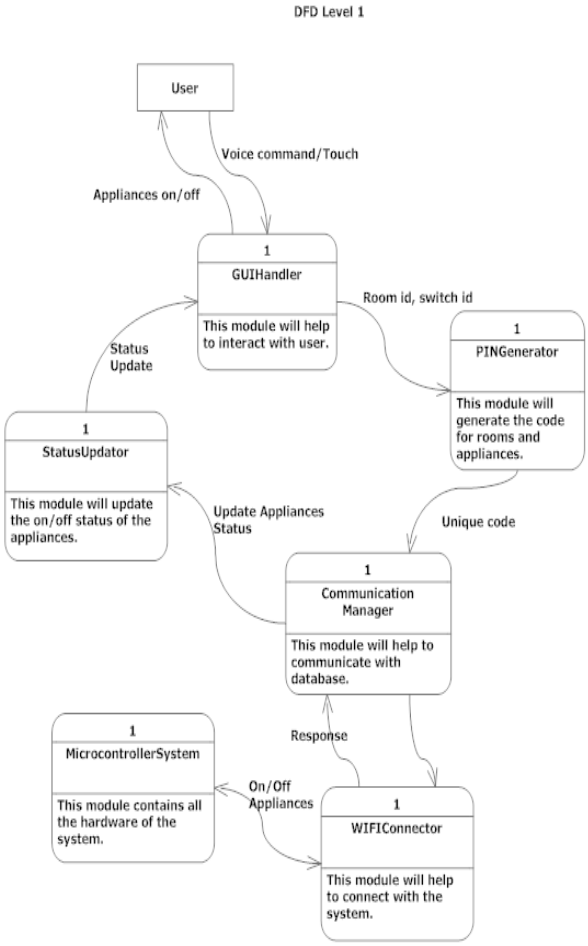

Fig.9 Data flow diagram 2

4.4. Activity diagrams

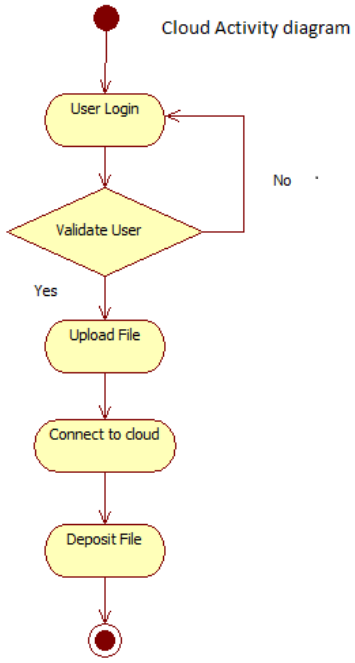

Fig.10 Cloud activity diagram

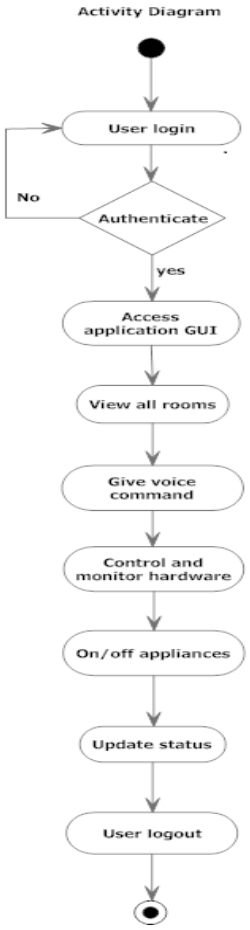

Fig.11 Activity diagram

5. SYSTEM DESIGN

5.1.System Architecture

The depository in the server of a cloud chain is pivotal. Systemization provides cloud maintenance jobholders outright authority on the renditions of the browser-based applications labored to clients, nullifying the demand of rendition improvement or certification authority of private customer estimating gadgets. The server in the cloud grid includes the server of glassfish and client's database. Glassfish is drafting the construction of the network benefits approachable in a competent as well as complacent method. The Glassfish is the distant customer, demanding mechanization of household equipment by utilizing both, Android device as well as buyers personal computer. Android is established using an operating system of Linux initially devised in consideration of tablets and smartphones utilizing ARM processors.

5.2.The Technology Used

5.2.1. Java Platform

Java is established by Sun Microsystems. The primary goal of Java was providing an end user electronics a platform-autonomous language and operating system. The utilization of C plus plus is the pioneer determination. Nevertheless, the production started improving with a stable administration, pinpointing by planners regarding spawning of the language that is delivering the entire organization exceptionally. The First-Person Incorporation was an attempt for the end user electronics managed by the team of Java organization.The Time Warner Company is using a Video-on-demand consignment as a result of development of both hardware as well as software.

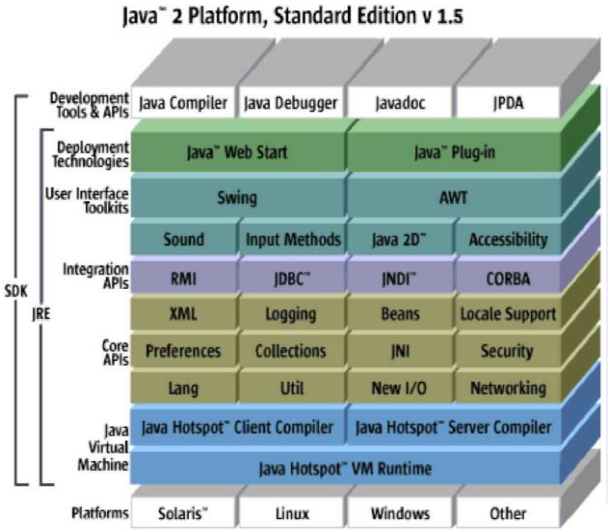

Fig.12 A Java 2 Platforms, Standard Edition

Lamentably the video on demand design, alongside silicon graphics is always preferable to the Time Warner group. The impediment casts aside the First-Person crew without any merchandise and the software with an influential chunk. Ultimately, an instinctive alliance are remarking terminology of the World Wide Web as well as the Java, and it initiated a merchandise. Currently, it is the pair of a habitat in consideration of flowing programs inscribing Java as well as the programming ideology. The Java compiler is the explanation of a runtime JVM, which decipher its source cipher into commands, differentiating it from conventional compilers. The Java terminology is always defining in simple terms. It is drafting in distinction to top-bottom level approach. The crux Application Peripheral Interface for Java encompasses of interfaces and classes that administer the homogeneous access to a differing set of network obligations. The Java is successful in sustaining the intonation after the emergence of the internet and network programming. The feasible preferences for the Java are bolstering due to the recent Application Peripheral Interfaces.

5.2.2. Android Platform

Android has been a recently developed operating system designed for mobile devices. It was developed by Google and uses a Linux based kernel, Java-compatible libraries along with the just-in-time compiler for development in the Java programming language. It supports many hardware components. Conventional equipment consists of cameras. It also includes WiFi communications chip, wireless commutation's chip, Bluetooth sender-receiver, and a color touch screen. The Android Application Program Interface (API) contains many functions and classes to control the cellular devices. The functionality is all available in a single device with at least a day worth battery life. For the project, H.263 is used in the development of the Android device and the initial Android API struts recording in H.263 with Android 3.0 introducing support for H.264. Android dispatches with a built-in RTP receiver with support for H.263 and H.264 decoding to display the video player audio. Android 3.1 adds RTP encoding support for transmitting audio over a network using the IETF standards. With the RTP, encoding integrative audio may be transmitted by using the operating system streaming class. Resolutions for the

encoders are limiting to the recording and playback capabilities of the camera, the processor speed, and the graphics card of the device.

6. MATHEMATICAL MODEL

6.1. Set Theory

1. Let 'S' be the "Home cloud with automation support."

   S= {S1, S2, S3….. Sn}

   Set S is dividing into seven modules

   S1= Request Handler (RH)

   S2= Request Validator (RV)

   S4= Configuration Manager (CM)

   S5= Response Generator (RG)

   S6= Database Manager (DM)

   S7= Device Handler (DH)

2. Identify the inputs as I.

   Inputs = {X1, X2, X3… Xn}

   X1= Files to upload

   X2= Device ON/OFF request

   Identify the output as O.

   Outputs = {Y1, Y2, Y3… Yn}

   Y1= Device Switching

   Y2= File storage

6.2.Venn Diagram

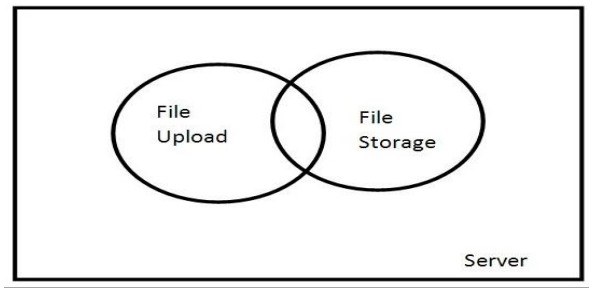

Fig.13 Venn diagram

7. APPLICATIONS

The applications of Smart cloud storage using home automation support are as follows:

- The home mechanization system has a comfortability of opening and closing of curtains.
- The auditing of the entire home is through the cameras.
- It administers the availability of entrance access gates for a WIFI spectrum.
- The system is conveniently upgrading by restoring the old gadgets such as a music player with a contemporary model and upgrading the authorizing software in a fraction of the time.
- It also provides the facility heating and cooling for sighting from the client's personal computer.
- The privacy is satisfactory by notifying when someone enters the home or in any guest room.
- The stopping of alarm will automatically start playing the cherishing tune.
- The devices in the house use cloud support for storing all the formats for compatible usage

8. FUTURE WORK

Viewing the prevailing position, successful in building cross stage scheme, expanding on the Android, but the primary focus is also the expansion of the project on iOS, Symbian as well as Windows. The development of mechanization over all the home gadgets assists in removing the drawbacks of managing particular gadgets. The target is to enhance the add-on of cloud storage more than the operational range of the home. In Safety plans, the inclusion of motion sensors along with biometric technology is the target for achieving the safe system. The focus is on the extension of home automation system beyond its spectrum.

9. CONCLUSION

The entire implementation of the academic research project is successful. The primary goal of the research is aiding for disabled as well as elderly people. The analysis report administers a fundamental belief of managing household gadgets and a provision of safety by utilization of the Android cell phone and tablet. The addition of cloud storage is the core innovation for home automation system. The outcome is successful in the accomplishment of innovative home mechanization, but the focus is to extend in office or public areas for the speedy revolution.

10. ACKNOWLEDGEMENT

Individually, take the convenience to praise counselor of the project Prof. Nilam Kadale and Dean of the Department Prof. Dr. Rajesh Prasad for their precious direction. Also, for administering all the fundamental expertness, which were vital for the culmination of the project report. Personally, everyone in the group is complacent to all the faculty representatives of the Division of Computer Engineering, NBN Sinhgad School of Engineering, Pune for their valuable moment, reinforcement, judgments, opinions, and cogency. Likewise, acquiesce the Institute to furnish with all the fundamental adroitness, the significant books, and an internet connection. In addition, sponsored by an electronics store Croma, whose financial support helped a lot to get configuration parts within a system. The approach was to create a home automation system in which it includes an add-on as cloud storage in only a minimum cost. The idea is highly appreciative of the teachers as well as the sponsor company that selflessly supported the project idea.

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