

# SMART HOME AUTOMATED CONTROL AND AUTOMATIC DOORBELL ALERT USING ANDROID(GOOGLE ASSISTANT APP) AND ARDUINO

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**Abstract** – A fully autonomous home is going to be the future. Everyone wants that the complete control such as switching on/off the lights, fans, televisions and other appliances through one device. Google application (Dialog-Flow) has been used as voice recognition and process the voice input from the smart phone. It can be automated from anywhere through internet. Home automation is becoming a viable option for older adults and physically challenged people. Another part of this project is going to be the intruder alert through mail. Intruder Alert will be detected using the following components Ultrasonic sensor. Thus in our project we are going to control the home appliances from anywhere and provide the alert whenever there is a chance of intruder entering the door.

**KEY WORDS:** home automation, speech recognition, intruder alert.

## 1. INTRODUCTION

Home automation is completely based on "The Internet of Things"...The devices and appliances in our home will be networked together to provide us with a effortless control over all aspects of our home. With home automation, you configure how a device should react, when it should react, and why it should react. At any time, you can grab your iPhone, Android device or other remote control and change the settings in your home as desired. Home automation is becoming a viable option for older adults and physically challenged people. Though such technology is quite complex, it remains completely flexible and user friendly.

Lots of smart gadgets are compatible with one another, and you can set different triggers between devices to automate regular home processes.

### 1.1 EXISTING SYSTEM

The existing work related to the home automation have some implementation of speech recognition which can be controlled by voice as well as through SMS technology which Requires the involvement of computers or laptop which is a major drawback. We also have other such works which existed where it includes speech recognition control system uses human-computer interaction to realize multiple menu choose function. The major disadvantage of this system is it

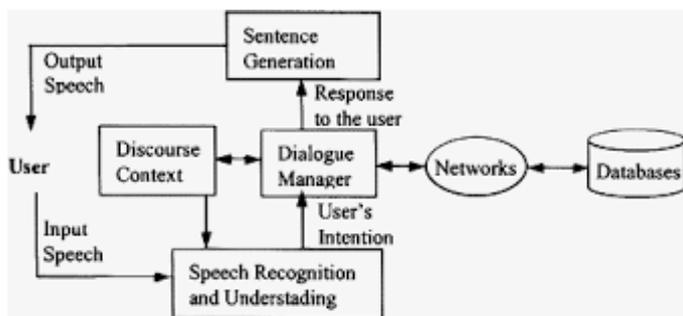
involves the usage of computer which may not be efficient for elderly people to interact. Another previously existed system implements Automatic speech Recognition engines through Microsoft speech APIs, where only 79.8% of these commands were recognised correctly. We had an existing system where we describe the design and development of a remote household appliance control system using ATmega328 microcontroller and android mobile through GSM technology. They had several advantages like paper low cost, secure, ubiquitously accessible, auto configurable, remotely controlled solution for automation of homes has been introduced. But the drawback is that the cost of microcontroller is very high. Another technology uses a wireless sensing element network to observe physical parameters (like light-weight and temperature) additionally because the presence of users reception and in every of its rooms, but it consumes more of the electrical energy. Another system involved Arduino and Raspberry Pi based Smart Communication and Control of Home Appliance System which Provides the control of the home devices as well as a secure and intelligent interaction between personnel inside and outside of the room. Major drawback is captures the image of an individual with date and time, which may lead to malfunctions. Voice Control for Smart Home Automation: Evaluation of Approaches and Possible Architectures is the another technology existed which has some advantages like offline voice recognition tools are used. The drawback here is real-time processing of human speech is a demanding task, requires significant processing power, and increases the cost of the gateway.

### 1.2 PROBLEM STATEMENT

Home automation refers to control the home appliances by using computer technology. Electricity is central to all the activities of the modern society, a system that saves electricity is of great use. Home automation provides security, energy efficiency and ease of use hence, it is adopted more. The existing system did not provide to incorporate the features when connected over different networks. Home automation is becoming a viable option for older adults and physically challenged people. In order to overcome the obstacles in existing system, we have made use of cloud sever to store and retrieve data.

### 1.3 ARCHITECTURAL DESIGN

We have different modules like Speech Recognition, Database Creation, Google Cloud, Function Control Appliances, Intruder Alert Mail. GOOGLE ASSISTANT is capable of responding only to general information (for eg: weather report, live scores etc). Whereas it cannot respond to user specific commands (eg: switch lights on). In order to configure it according to our needs we use DIALOG-FLOW (an end-to-end development suite). DIALOG-FLOW is a Google-owned developer of human-computer interaction technologies based on natural language conversations. Once the google assistant receives command from the user through voice it converts into statement and sends the request to the database which is the cloud. Once a request is done with the response the google assistant waits for another request and the process repeats. Similarly for intruder alert and gas alert sensors are placed where we receive notification through mail which has been registered with.

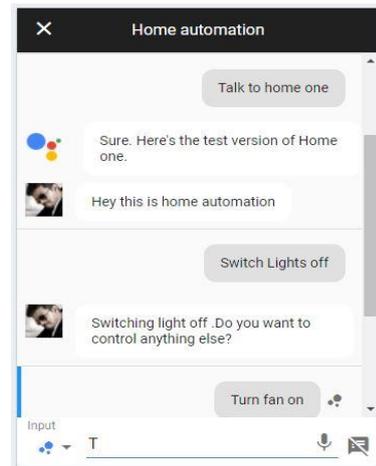


### 1.4 OBJECTIVES

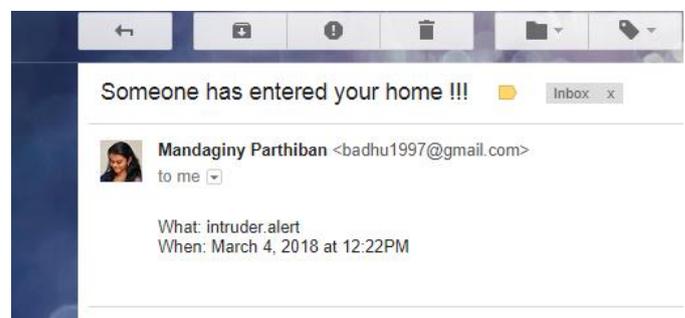
The main objective of our project is to make benefit for the elderly and physically challenged people who can control their home appliances from where they are. Not only that in our project we have added two other features where if anyone enters the room an alert will be received through mail and an ultrasonic sensor is placed to detect the gas leakage and notify immediately through mail. Most of the existed systems are of heavy cost and speech recognition is only around a limited range which is a major drawback and we have overcome this in our project. To control home appliances using google assistant, a speech recognition application which is an open source and this application can be controlled via internet

## 2 WORKING MODULE

In voice recognition we give voice commands which is converted to a statement and the request is done and furthermore requests are also displayed to the user. The following figure gives a clear idea



Similarly for intruder alert the sensors detect the happening and provide the notification through mail to the user.



### 2.1 PRACTICAL ISSUES

The speech recognition technology has advanced rapidly—particularly in the past 10 to 15 years—and is becoming commonplace in the bedroom, kitchen, and the rest of your house. It is light-years beyond its first iterations in the 1990s, when one of the earliest commercial products was Dragon Dictate, a typing software released in 1990 that was error prone and cost \$9,000. (Google alone has reduced its speech-recognition error rate by 30 percent since 2012.) Both Google and Amazon have jumped into the market with gusto, with Google Home and Amazon Echo now accounting for the two largest market shares in the industry. Microsoft also recently released its own smart speaker featuring an AI assistant named Cortana, and unsurprisingly, Apple supposedly has a similar device in the works. All in all, the value of the virtual assistant market, and the speech recognition it necessitates, is expected to exceed \$3 billion by 2020. What once may have been seen as a neat gadget is no longer. Companies are investing in a future where VUIs are commonplace, and that has implications for both consumers and companies. Amazon's Echo (you might know her as "Alexa") is perhaps the best example of the far-reaching effects of VUIs and helps illuminate the far-reaching implications of the proliferation of this tech. As a result of this sort of product recognition and prioritization (or lack thereof), Amazon Basic batteries account for a third of all battery sales online. In doing so, Amazon is able to undercut brands that have spent millions to build their images and

brand recognition. Amazon is already working to undercut prices in a number of industries, decimating the retail industry in the process, moving into groceries, and becoming an inescapable platform for sellers and consumers. Many companies have to participate in the Amazon Market because of the number of people they're able to reach through Amazon's platform. Consumers participate because things are cheaper and all it takes is a click to order something or, going forward, merely a voice command through your Echo. There's also the risk from hackers, who aren't governed by the same regulations as intelligence agencies or law enforcement and are often able to access anything connected to the internet—whether it's your voice-controlled thermostat or your smart speaker. As *Wired* reported in August 2017, a hacker was able to install malware on an Amazon Echo that turned the mic into a wiretap that could constantly listen in on conversations.

An important challenge that the recognition system had to meet for field use, was the use of a handheld computer as the hardware platform. While this platform has the benefit of a long battery life, that would allow autonomous use in the field for extended periods of time, its drawbacks are the lack of hardware floating point computation, slower speed, and more limited memory than standard PCs. While for previous simpler phrase translation systems [11] the DynaSpeak™ engine proved appropriate, the task of limited-domain spontaneous speech-to-speech translation required additional features.

One of the difficulty in gas leakage is "How many detectors do I need?" and "Where should I locate them?" are two of the most common questions about installing gas detectors, and probably two of the most difficult to answer. Unlike other types of safety-related detectors, such as smoke detectors, the location and quantity of detectors required in different applications may not be clearly defined.

### 3. OUTCOME

#### 3.1 APPROACH

We need a smart phone containing the google assistant app and a desktop with PROCESSOR :Intel Core i3, RAM:4 GB DDR2 RAM, MONITOR:15" COLOR, HARD DISK :100 GB. Another hardware involved is NodeMCU is an open source IoT platform. It includes firmware which run on the ESP8266WiFi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. Another sensor for intruder alert is Ultrasonic Sensor HC-SR04. An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It detects a person who enters the door and notify through mail. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. For gas leakage we use the sensor

### OVERALL APPROACH

In our project the first module is about the User provides commands in the form of speech/text to GOOGLE ASSISTANT app. GOOGLE ASSISTANT is capable of responding only to general information (for eg: weather report, live scores etc). Whereas it cannot respond to user specific commands (eg: switch lights on). In order to configure it according to our needs we use DIALOG-FLOW (an end-to-end development suite). DIALOG-FLOW is a Google-owned developer of human-computer interaction technologies based on natural language conversations. The Voice Message given by the user is converted into text by GOOGLE ASSISTANT and the respective text is sent to the DIALOG-FLOW. It identifies the required entities from the text. The next process is regarding database creation. The status of the device is stored in the cloud database, so that it can be accessed anywhere from the world. We use FIREBASE (a realtime cloud database) to store the device status. Only the admin can provide access rights to the user. The Firebase Realtime Database is a cloud-hosted database. Data is stored as JSON and synchronized in realtime to every connected client. Then comes the performance of Google Cloud Function is used to store the data extracted from the dialogflow in the database. Cloud Functions is a serverless environment that lets you build and connect cloud services at the level of a single function, rather than at the level of entire applications, containers, or VMs. The function will be called when the respective http URL is requested. This is called as webhook. A WebHook is an HTTP callback: an HTTP POST that occurs when something happens. The function is written in nodeJS. The Cloud Function acquires the device and its status from the webhook and converts it into Boolean form and updates in the database. Since it is a realtime database, the updated value will be reflected to the connected devices. The Home Automation System will read the data and controls the appliances accordingly. The last module of this project is regarding Intrude Alert/Gas Leak which will be detected using the following component

#### Ultrasonic sensor

An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. Gas sensor is used to detect gas leakage. If This Then That, also known as IFTTT, is a free web-based service to create chains of simple conditional statements, called applets. A new Applet is created as "If maker Event "intruder.alert", then send me an email at "\*\*\*\*\*@gmail.com" A webhook will be created for that applet. A Https request is made from the nodeMCU and the Mail will be sent.

### 4 ADVANTAGES

The benefits of home automation typically fall into a few categories, including savings, safety, convenience, and

control. Additionally, some consumers purchase home automation for comfort and peace of mind.

1. **Savings:** Smart thermostats and smart lightbulbs save energy, cutting utility costs over time.
2. **Safety:** Security cameras offer benefits through either remote monitoring of package deliveries or real-time video of home inhabitants or unwanted visitors.
3. **Convenience:** Because home automation technology performs rote tasks automatically, end users experience great convenience.
4. **Control:** Consumers also choose smart home devices to better control functions within the home. With home automation technology, you can know what's happening inside your home at all times.
5. **Comfort:** Some people use smart technology to record shows or to play music throughout the home. Connected devices can also help create a comfortable atmosphere—they provide intelligent and adaptive lighting, sound, and temperature, which can all help create an inviting environment.

## 5 CONCLUSION

Most of the existing automation systems have a specific range of commands in order to interact with their home appliances. These commands distance the users away from the technology. To overcome all of the existing issues and address the solution our project proposes voice commands to interact with home appliances using Arduino and a mobile device. These voice commands which are processed by Natural language processing helps the users to build a better connection with the technology. We make use of internet to control the home appliances from any part of the world.

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