

# VOICE COMMAND SYSTEM

Kajal Gupta<sup>1</sup>, Sushil Kumar<sup>1</sup>, Ravi Kant Rai<sup>1</sup>, Payal Dubey<sup>1</sup>

1. B.Tech Student, Krishna Engineering College, Ghaziabad

## 1. Abstract

This project is based on Android application development and provide personal assistant using voice recognition or text mode operation. This program includes the functions and services of: calling services, text message transformation, mail exchange, alarm, event handler, location services, music player service, checking weather, Google searching engine, Wikipedia searching engine, robot chat, camera, Bing translator, Bluetooth headset support, help menu.

As it integrates most of the mobile phone services for daily use, it could be useful for getting a more convenient life and it will be helpful for those people who have disabilities for manual operations.

## 2. Aim and Purpose

The purpose of the project is to develop an Android application that provides an intelligent voice assistant with the functionalities as calling services, message transformation, mail exchange, alarm, event handler, location services, music play service, checking weather, searching engine (Google, Wikipedia), camera, Bing translator, Bluetooth headset support, help menu and Windows azure cloud computing.

Many years ago, software programs were developed and run on the computer. Nowadays, smart phones are widely used by all people. About 35 percent of the Americans have some sort of Smartphone. This shows that the market is increasing fast and there are also more capabilities for Smartphone because of this wide use.

Therefore, the software development on the Smartphone is very promising. The operation modes on the Smartphone are by working with gestures and through the keyboard. It is not a convenient way for users with completely manually input. The common way of communication used by people in daily life is through the speech. If the mobile phone can listen to the user for the request or handle the daily affairs, then give the right response, it will be much easier for users to communicate with their phone, and the mobile phone will be much “Smarter” as a human assistant.

This project is focusing on the Android development over the voice control (recognition, generate and analyze corresponding commands, intelligent responses automatically), Google products and relevant APIs (Google map, Google weather, Google search and etc), Wikipedia API and mobile device references ranging from Speech-To-Text, Text-To-Speech technology, Bluetooth headset support and camera; advanced techniques of Cloud computing, Multi-threading, Adobe Photoshop image editing skills. As all those functionalities and services for the project have been explained, the main structure and construction of the project has been basically illustrated with its goals.

### 3. VCS Methodology

**Calling Service:** If the user wants to consume the calling service, he or she must have a command contains a valid name the calling keyword like “call”, ”make a phone”, then the call will be made if the person is found in the contacts. There are different ways to make a phone call, the list below shows the correct command to use the calling service.

“**Call Tom**”, make a phone call to tom. The program will first capture the key words “call”, and then the program will continue to capture the person’s name “Tom” after the word “call”, then get all the contacts on the mobile and compare them one by one, if “Tom” is equal to the name that the user is give in the command, the phone call will be made to “Tom”.

“**I want to give a call to Lucy**”, make a phone call to Lucy. The program will capture the command keyword “call” and the name “Lucy” and make a phone call to Lucy.

**Text Message Transfer:** If the user wants to use the application to send the text message, he or she must have a command with the SMS message keyword and a valid name, then the message will be send if the person is found in the contacts. They are different forms to send the message; the list below shows the correct command can do the message sending.

“**Send a message to LiLei Let's dinner together**”, send a message to LiLei with the content “Let’s dinner together”, the program will capture the keyword “message” and the content “let’s dinner together”, then the program will check the mobile contacts and get the first phone number corresponding to “LiLei” and send the message to LiLei.

“**SMS Hui Nihao**”, send a message to Hui with the content “Nihao”.

**Mail exchange:** The user can send an email to the person in his contacts and with person’s email address. He or she must have a command with the email keyword like “Mail”, “Post” and a valid name; the email will be send if the person is found in the contacts. They are different forms to send the message; the list below shows the correct command can do the email sending.

“**Mail Bellis it will rain today**”, send an email to Bellis the content “it will rain today”, the program will capture the keyword “Mail” and the content “it will rain today”, and then the program will check the mobile contacts and get the email address corresponding to “Bellis” and send the message to “Bellis”.

“**Post Mimy a boy is waiting for you**” send an email to “Mimy” with the content “a boy is waiting for you”

**Alarm:** The user can use the set alarm command to set an alarm at the corresponding time. When the time is up, the alarm will be activated and play the sound; meanwhile, an alert will be presented for the user to stop the alarm.

“**Set alarm to 10**” the alarm will be set at 10 o’clock. The program will capture the setting command “Set alarm” and get the time command “10” and then the alarm will be active at 10AM.

“**Make time to 11:50**” the alarm will be set at 11:50. The program will capture the command “Make time” and the time “11:50”, the alarm will be wake up at 11:50.

### Locate position

“Where am I” / “Show my current location”, the program will present the current location of the user on the map.

### Navigation

“How can I go to Lund” / “Navigation to Lund”, the program will present the routes to “London” on the map with the highlighted route from the current location to London.

**Music player service**, the user can use this application to play songs, his or her command must contain keyword “play”. If the user wants to play the specific song, he or she should also say the name of the song after “play”, and the song should be exist in the SD-card memory. Or if the user wants to play a random song, he or she just needs to say “a song” instead of the song’s name. During the playing, the user can pause or stop the song by giving the command “pause” or “stop”.

### Play

“Play Canon”, the program will play the song “Canon”

“Play a song for me”, the program will randomly pick a song from the library and play it.

### Pause

“Pause playing music”, the song will be paused immediately.

### Stop

“Stop music player”, the song will be stopped immediately.

**Checking weather:** the user can use the application to check the weather for recent days in local place or specific location. He or she should say the keyword “weather”, then the user should notify the date that should be presented as “today/tomorrow/the day after tomorrow” if he or she wants to get the information about the other days otherwise the application will default set the date as today, and the user can also can choose to tell about the place name “in Malmo”, the application will check the weather belong to that place, otherwise the place will be set as locally. Weather check today:

“What's the weather for today”, the current weather condition for local place will be show. “What's the weather in Malmo”, the current weather condition for Malmo will be show. Weather check other days:

“What's the weather next few days”, the forecast in next 4 days will be show.

“What's the weather next few days in Malmo”, the forecast for Malmo in next 4 days will be show.

**Google searching engine**, the Google search engine is activated by the user commands which contain ‘Google’ or ‘Search’. By detecting the search keyword and search request, the Google search engine will returns the search result displayed on the browser on the mobile phone.

“**Google China**”, the keyword ‘Google’ is detected and the result will be presented on the web browser by searching ‘China’ on Google.

“**Try to Google Java API**”, the user can have the keyword Google in the middle of a request and the result of searching ‘Java API’ on Google will be displayed on the web browser.

“**Search for apple**”, the user can also use the keyword ‘search’ to do the Google search, this command will have the result of searching ‘apple’ on Google.

**Wikipedia searching engine**, whenever the user wants to search any content in Wikipedia, it is possible to do in this program by having a command contain the keyword ‘define’. If ‘define’ is detected by the program, the program will automatically give the result by search the content after ‘define’ in Wikipedia.

“**Define Android**”, the keyword ‘define’ is detected, and the program will return the result by searching ‘Android’ on Wikipedia.

“**Define true love**”, the keyword ‘define’ is detected, and the program will return the result by search the content after ‘define’, which is ‘true love’ on Wikipedia.

**Robot chat**, the robot chat will work only after the chat mode is enabled which can be done with a command that contains keyword ‘chat’. After the chat mode is enabled, a response will be given every time when the user gives a request. The chat can be finished by the user commands contain the keywords of ‘finish/ disable/ end/ complete chat’.

“**Enable chat**”, the keyword ‘chat’ will be detected and the chat mode will be enabled. Now the user can enjoy the chat by inputting any text he /she wants.

“**Let’s chat**”, the keyword ‘chat’ will be detected and the chat mode will be enabled. Now the user can enjoy the chat by inputting any text he /she wants.

“**Finish chat**”, the keyword ‘finish chat’ is detected and the chat mode will be disabled. When the user exits the chat mode, the program gets back the normal mode to receive and analyze the commands, and give correct response.

**Camera**, the camera is started while the keyword ‘camera’ is detected. Therefore, the user who wants to operate with the camera will have to give a command with camera inside. After camera is started by the correct command, the camera itself will guide the user how to take photograph.

“**Open the camera**”, as the keyword ‘camera’ is detected, the camera is started. And the user can work with the camera by clicking the different selection on the mobile phone.

“**Start the camera**”, as the keyword ‘camera’ is detected, the camera is started. And the user can work with the camera by clicking the different selection on the mobile phone.

“**I want to use the camera**”, as the keyword ‘camera’ is detected, the camera is started. And the user can work with the camera by clicking the different selection on the mobile phone.

Bing translator, the user should have the keyword ‘translate’ / ‘how to say’ as the keywords to define this is a translate request, and ‘in’ as keyword to indicate the objective language.

As the user have the command contains these keywords, the translator will return the result with the text in the objective language.



“[Translate I love you in Chinese](#)”, as ‘translate’ and ‘in’ are detected by the program, the program will call the translator with ‘I love you’ as the original text and Chinese as the objective language, the result will be the Chinese words of ‘I love you’.

“[How to say hello in Swedish](#)”, as ‘how to say’ and ‘in’ are detected by the program, the program will activate the translator with ‘hello’ as the original text and Swedish as the objective language, the result will be the Swedish text of ‘hello’.

**Bluetooth headset support**, the Bluetooth headset support will be enabled when the program is loaded. The user should firstly turn on the Bluetooth in the setting of the mobile phone, and the Bluetooth icon will be valid in the program after executing the program. The user will be required to plug in the Bluetooth headset and turn on /off it manually by clicking on the Bluetooth icon.

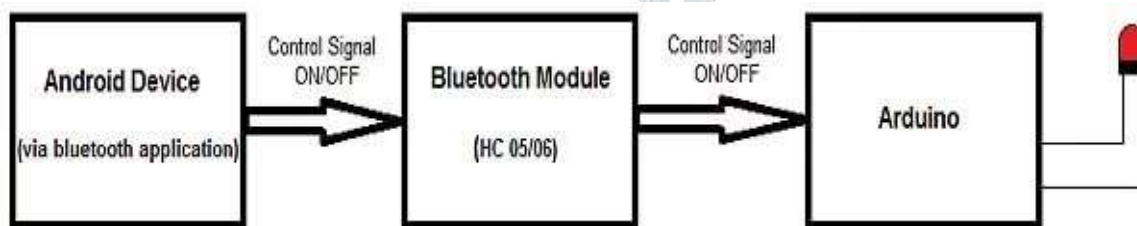
**Help menu**, the help menu can be activated by manually select on the option menu or through the command. The commands should have ‘help’ as the keyword contained, then the help menu will be activated and the help menu provides the list of all functions with their explanation and examples to use it.

“[I want to check the help menu](#)”, if the users have the keyword ‘help’ contained in the command, it will be detected as a keyword and the help menu will be returned with a list of the functions, the functions are presented in two pages and user can scroll the pages by slipping the touch pad of the mobile phone; by selecting on each of the functions, the user can enjoy the details of the explanation and the examples of each function.

## Interface an Android smartphone with an Arduino via Bluetooth to control an LED from your phone.

### How Does It Work?

There are three main parts to this project. An Android smartphone, a Bluetooth transceiver, and an Arduino.



HC 05/06 works on serial communication. The Android app is designed to send serial data to the Arduino Bluetooth module when a button is pressed on the app. The Arduino Bluetooth module at the other end receives the data and sends it to the Arduino through the TX pin of the Bluetooth module (connected to RX pin of Arduino). The code uploaded to the Arduino checks the received data and compares it. If the

received data is 1, the LED turns ON. The LED turns OFF when the received data is 0. You can open the serial monitor and watch the received data while connecting.

## Connecting the Arduino Bluetooth Hardware

This circuit is simple and small. There are only four connections to be made between the Arduino and Bluetooth module.

### Arduino Pins | Bluetooth Pins

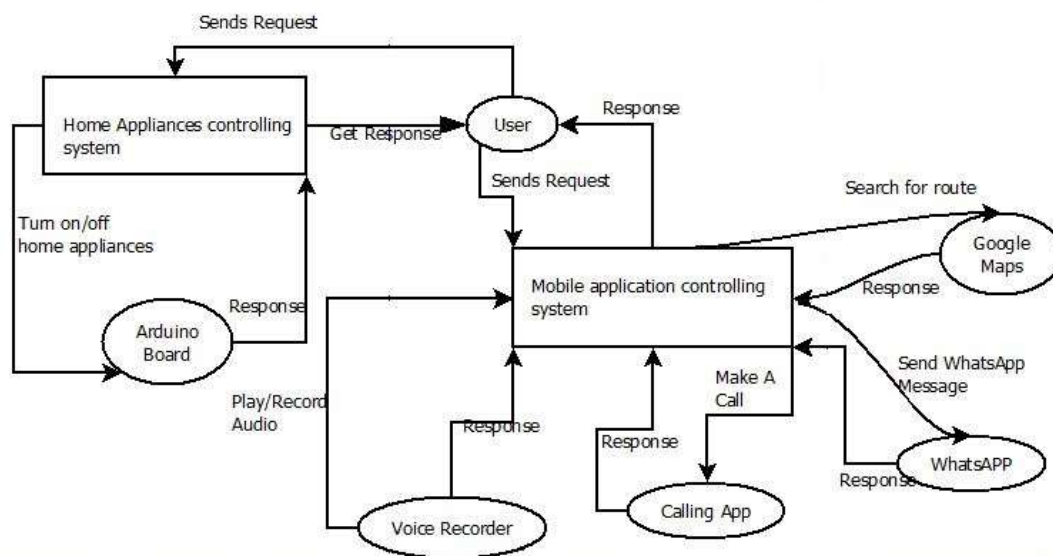
RX (Pin 0) ———> TX

TX (Pin 1) ———> RX

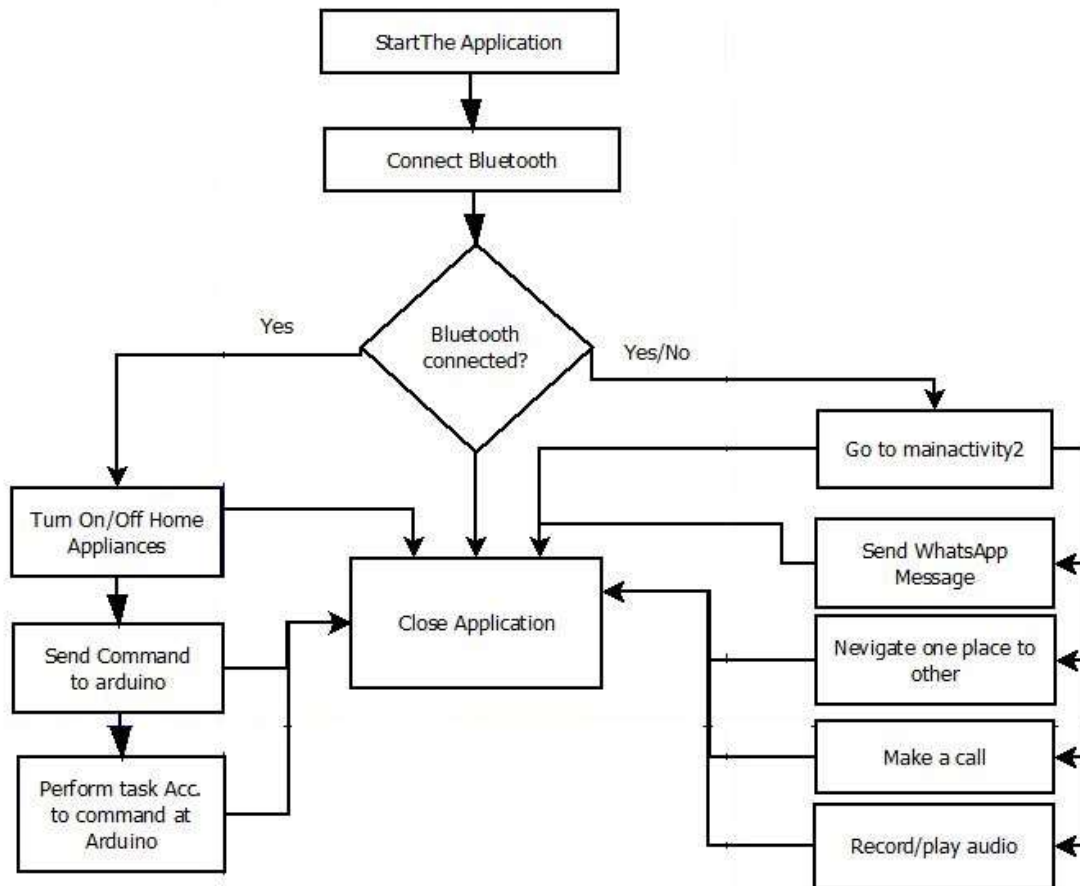
5V ———> VCC

GND ———> GND

### 3. DFD



## 4. Flowchart



## 5. Delimitations

- It is not a convenient way for users with completely manually input. The common way of communication used by people in daily life is through the speech. Therefore it helps operating the VCS through speech.
- This helps modern voice recognition software to increase independence for persons with disabilities.
- This system provides a system so that the blind and physically disabled population can easily control many functions of a smart phone via voice.
- As the world population is becoming older, the need to develop systems to assist elderly and disabled citizens is crucial.

## 6. Limitations

- Noise affects the voice recognition accuracy, response distance, and response speed.
- Wireless communication is limited by the effective communication distance of the transmitter and receiver, especially in the situation of a large house.

## 7. Conclusion

A smart phone based voice recognition system can be developed to operate an app with simple voice commands. This technology can be implemented into a user friendly and compact device. By creating online voice-controlled applications, people are free to choose which device better suits them. This paper

proposed the capability of modern voice recognition software to increase independence for persons with disabilities. Major purpose of this system was to provide a system so that the blind and physically disabled population can easily control many functions of a smart phone via voice. The system is very useful for the general population as well. Users command a mobile device to do something via voice such as directly controlling smart phones. These commands are then immediately executed.

As the world population is becoming older, the need to develop systems to assist elderly and disabled citizens is crucial. The project discussed in this paper suggests the development of a voice command system based on the Google Speech Recognition Engine. For that, it was developed a cell phone Android application working along with an Arduino Uno board.

The proposed system was tested and the findings suggest that the system works reasonably well, although some improvements shall be taken in regard with the voice command recognition tool. In some instances, the Google Speech Recognition was not able to recognize the speech. Therefore, that reveals that this tool is not fully reliable, and the uptake or development of a more reliable speech recognition tool may be considered.

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