

# SYNOPSIS

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## 1 Group Id

Group ID.-3

## 2 Project Title

Voice Controlled Personal Assistant and Connecting IOT Devices

## 3 Project Option

Internal Project

## 4 Internal Guide

Prof. Nitin R. Talhar

## 5 Technical Keywords (As per ACM Keywords)

### Technical Key Words:

- Special-Purpose and Application-Based System
- Online Information Services
- Natural Language Processing
- Input/Output and Data Communication
- Artificial Intelligence
- Distributed System
- Personal Computing

## 6 Problem Statement

To develop a hardware system which takes the input through voice commands and perform the various actions and keeps learning the context of these commands to further improvise the responses in future and help humans with day-to-day workforce.

## 7 Abstract

In the Modern Era of fast moving Technology we can do things which we never thought we could do before. But to achieve the accomplish these thought theres a need for a platform which can automate all our task with easy and comfort.

So there is a need to develop a voice controlled personal AI having brilliant powers of deduction and the ability to interact with our surroundings just by one of the materialistic form of human interaction, our VOICE. The Hardware device captures the

# SYNOPSIS

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personals audio request through microphone and processes the request so that the device can respond to the individual using in-built speaker module. For Example, if you ask the device 'what's the weather?' or 'how's traffic?' using its built-in skills, it looks up the weather and returns the response to the customer through connected speaker.

The platform is open to all and connect all IOT devices in the vicinity to perform the assigned task on go. This feature makes it distinctive from already existing personal AIs and separates it from the flock. It uses open source software to process natural language, to determine the intent of the query and to perform the action. The platform features include : Turn on the lights, do the mathematics, play your favorite song or ask anything which comes to your mind. Just speak naturally and the platform is there to do your bidding.

The Platform also extends an Android Application in which you can add To-Do-list or set a reminder or alarm through the app, push notifications and personalize according to your needs. The device has a lot of native skills and abilities baked in it and more can be added to extend its capabilities.

There is still a lot of ground to be covered up in the world of automation but the skills the device we are building possesses, it can help to build a new generation of voice controlled devices and bring a new sustaining change in the field of automation.

## 8 Goals and Objectives

- The main objective of this device is to ease the burden of your work by providing any information you want and help you with daily work.
- To expedite you from the pressure of remembering things like meeting, play music on go, solve your queries.
- To develop a platform which can interact seamlessly and can have a friendly conversation with you.
- To control IOT devices of the surroundings of the device using simple commands.

## 9 Relevant mathematics associated with the Project

System Description:

- **Input:**
  - Vocal Commands in Natural Language
  - Creating and Updating To-Do List using Android Application
  - Taking Picture using Android Application
- **Output:**
  - Vocal Reply of respective services to the query provided as Input.

# SYNOPSIS

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- Reminder according to To-Do list.
- Picture Description of the Image Provided as Input.

- **Mathematical Formulation:**

Let the  $M$  be the universal states which contains,

$$M = \{Q, S, F, Q1, Qf\}$$

where,

$Q$  = No. of states  $\{Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8\}$

$X$  = No. of states  $\{X1, X2, X3, X4\}$

$Q1$  = Initial State.

$S$  = Success state.

$F$  = Failure state.

where,

$Q1$  = Start.

$Q2$  = Initialize assistant by calling "ARCKIN".

$Q3$  = Once initialized, give input in the speech format.

$Q4$  = Processing of speech into text.

$Q5$  = Text is compared with commands.

$Q6$  = Perform action according to command.

$Q7$  = Convert the action into speech.

$Q8$  = Give output in the speech format.

$X1$  = Connect "ARCKIN" to mobile application.

$X2$  = Update To-Do list, Calender, Alarm, reminder, etc.

$X3$  = Updated data is sent to cloud server.

$X4$  = According to the data sent, "ARCKIN" will take action.

- **Failure Conditions:**  $F = \{F1, F2, F3, S\}$

- $F1$  = Failure if the device is not initialised due to noisy background.
- $F2$  = Connection with android app failed.
- $F3$  = Server down failure or cannot retrieve data from server.

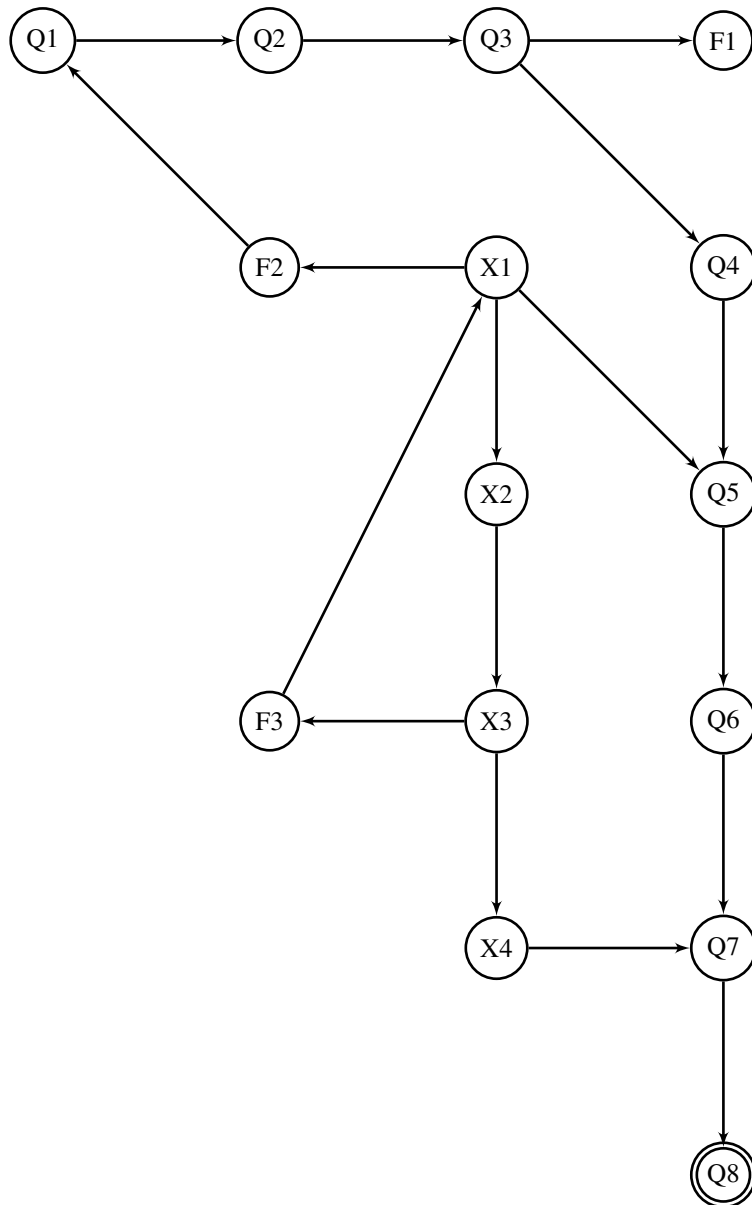
- **Success Conditions:**

## SYNOPSIS

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- S1 = Success after the data is assimilated and output is produced accordingly.

### 9.1 Activity Diagram



## 10 Names of Conferences / Journals where papers can be published

- International Conference on Human-Computer Interaction INTERACT 2017

# SYNOPSIS

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- ICCE 2016 Sub-Conference on Artificial Intelligence in Education/Intelligent Tutoring Systems (AIED/ITS)
- ICHCIAI 2016 International Conference Human Computer Interaction and Artificial Intelligence
- Open Journal of Internet Of Things (OJIOT)
- IEEE Intelligent Systems

## 11 Review of Conference/Journal Papers supporting Project idea

### 1. **Interacting With Computers by Voice: Automatic Speech Recognition and Synthesis – DOUGLAS OSHAUGHNESS**

This paper has examined the basic aspects of humancomputer interactions via voice. The basic approaches and methods of ASR and synthesis have been discussed. Microprocessors can easily handle the computation speeds needed for many synthesizers, and many function entirely in software. However, the memory requirements of modern waveform concatenation systems strain the capacities of some practical systems.

### 2. **Analysis of Machine Translation and Speech Synthesis Speech-To-Speech Trnaslation System – KEI HASHIMOTO, JUNICHI YAMAGISHI, WILLIAM BYRNE, SIMON KING, KEIICHI TOKUDA**

This paper has provided an analysis of the impacts of machine translation and speech synthesis on speech-to-speech translation. We have shown that the naturalness and intelligibility of the synthesized speech are strongly affected by the fluency of the translated sentences. The intelligibility of synthesized speech is improved as the translated sentence become more uent.

### 3. **On the track of Artificial Intelligence: Learning with Intelligent Personal Assistants – NIL GOKSEL-CANBEK, MEHMET EMIN MUTLU**

The paths of this study regarding IPAs is intended to reveal an overview on how and to what extent these devices might be used in human-computer interaction and learning. In this connection, the working systems of the IPAs namely Apples Siri, Google Now and Microsoft Cortana are revised within the context of AI. Although there have been several works related to IPAs in education. The potential use of IPAs for second language learning within Natural Language Processing (NLP) should be focused particularly.

### 4. **Chatbot-Assiting: SIRI – HARSHITA PHATNANI, Mr. JYOTIPRAKASH PATRA, ANKIT SHARMA**

Siri's first Apple iteration opens minds and speaks loudly to Siri's potential. What struck us is that even with this initial release one can readily imagine a sea change in the way humans interact with mobile. My voice application business

# SYNOPSIS

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allowed us to see the potential of truly great natural language voice technologies. The few great applications we found left us believing that someday, voice will handle large numbers of everyday tasks and, where appropriate, even more complex things.

**5. An Intelligent Voice Assistant Using Android Platform – *SUTAR SHEKHAR, POPHALI SAMEER, KAMAD NEHA, Prof. DEVKATE LAXMAN***

We have developed application in which user can easily send a message with their voice commands and also tried to use the most of the inbuilt application with voice command. But all these applications have adaptations for the English language. We are also surveying to use the mailing and calendar where user will be able to mail and also create their event using voice command.

**6. Home Automation Using IOT – *VINAY SAGAR, KUSUMA SM***

Home automation using IOT has been experimentally proven to work satisfactorily by connecting simple appliances to it & the application appliances were successfully controlled remotely through internet. The designed system not only monitors the sensor data like temperature, gas, light, motion sensors but also actuates a process according to the requirement. For instance, switching on the lights when it gets dark. It also stores the sensor parameters in the cloud in a timely manner. This will help user to analyze the condition of various parameters in the home anytime anywhere.

**7. RASPBERRY PI BASED ROBOT WITH CLOUD TECHNOLOGY – *Prof. GOKILAVANI R, NAVANEETHAN S***

The data monitored has been updated to the firebase cloud server with the help of wifi & the continuous access from anywhere is feasible. The proposed method contains the raspberry pi and the sensor devices. The output sensor data is updated to the cloud server; the updated sensor values can be viewed on its own smart phone. The commands can be sent to server by using wifi using the IP address of raspberry pi toolkit.

**8. Exploring IOT Application Using Raspberry Pi – *CHEAH WAI ZHAO, JAYANAND JEGATHEESAN, SON CHEE LOON***

Raspberry PI is useful for small application development because it can be used to integrate with many components such as speakers, LED lights, sensors, cameras and wireless communication units to develop smart applications. It is very important to protect the file in order to maintain data consistency and accuracy. File sharing is widely used ranging from small-medium sized company to big company. One of the reason is that, admin can easily manage the file and client can access the file efficiently.

## SYNOPSIS

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### 9. Natural Language Processing – *ABHIMANYU CHOPRA, ABHINAV PRASHAR, CHANDRESH SAIN*

The strength of the capabilities to use natural language for query specification and retrieval bags over the keyword, key-phrase approaches. We believe that the restricted use of natural language in captions for multimedia data abstraction is less cumbersome task than the full natural language fact abstraction and feel that can be judged and build upon not only for abstracting images but also the form so multimedia (audio, video, text, data etc) data as input sources.

### 10. A study of techniques for facial detection and expression classification – *G. HEMALATHA, C.P. SUMATHI*












Although human recognize facial expressions virtually without effort or delay, reliable expression recognition by machine is still a challenge, in achieving aptimal preprocessing, feature extraction or selection, and classification, particularly under conditions of input data variability. To attain successful recognition performance, most current expression recognition approaches require some control over the imaging conditions because many real-world applications requires operational flexibility.

## 12 Plan of Project Execution

ID	Task Name	Start	Finish	Duration	Complete
1	Requirement gathering	20/6/2016	1/7/2016	10.0 d.	100%
2	Buy hardware - Raspberry pi and Arduino	1/7/2016	7/7/2016	5.0 d.	100%
3	Configure Raspberry pi and Arduino	6/7/2016	8/7/2016	3.0 d.	100%
4	Install and configure Jasper on raspberry	8/7/2016	12/7/2016	3.0 d.	70%
5	Configure Neo-pixel and servo motor	12/7/2016	25/7/2016	10.0 d.	90%
7	Configure nRF24L01 Transceiver on arduino for data transmission	27/7/2016	3/8/2016	6.0 d.	80%
9	Develop Android application	3/8/2016	15/8/2016	9.0 d.	75%
10	Prepare Synopsis and report	12/9/2016	20/9/2016	7.0 d.	50%
12	Write Journal paper or white paper	26/9/2016	3/10/2016	6.0 d.	0%
13	Implementation	26/9/2016	3/2/2017	95.0 d.	0%
11	Testing	3/2/2017	20/2/2017	12.0 d.	0%
12	Deployment	24/2/2017	1/6/2017	70.0 d.	0%

# SYNOPSIS

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ID	Task Name	1/6/2016			1/1/2017	
		1/6/2016	1/9/2016	1/12/2016	1/3/2017	1/6/2017
1	Requirement gathering					
2	Buy hardware - Raspberry pi and Arduino					
3	Configure Raspberry pi and Arduino					
4	Install and configure Jasper on raspberry					
5	Configure Neo-pixel and servo motor					
7	Configure nRF24L01 Transceiver on arduino for data transmission					
9	Develop Android application					
10	Prepare Synopsis and report					
12	Write Journal paper or white paper					
13	Implementation					
11	Testing					
12	Deployment				