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"DAVID" A VIRTUAL ASSISTANT USING ARTIFICIAL INTELLIGENCE

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Abstract— **An intelligent virtual assistant (IVA) or intelligent personal assistant (IPA) may be a software agent which will performtasks or services for a private supported commands or questions. Sometimes the term "chatbot" is employed to ask virtual assistants generally or specifically accessed by online chat. In some cases, online chat programs are exclusively for entertainment purposes. Some virtual assistants are ready to interpret human speech and respond via synthesized voices. Users can ask their assistants questions, control home automation devices and media playback via voice, and manage other basic tasks like email, to- do lists, and calendars with verbal commands.**

Keywords- **VPA, NLP, Speech to text, Text Analyzing, Artificial Intelligence.**

I. INTRODUCTION

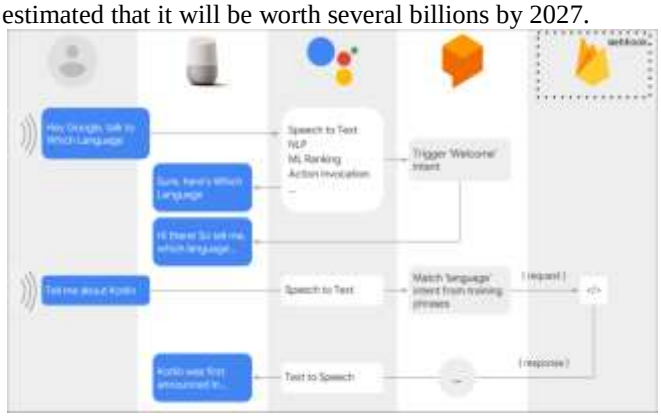
Gone are the days when humans depended on other humans for help or services. The digitalization of the world made sure that humans no need to contact anyone else to seek help, they could depend on a far more efficient and reliable device which can take care of their everyday needs. The computers, mobiles, laptops, etc., became a part of us and our daily life, It could carry out simple calculations to complex programs to reduce monotonous work and waste of manpower.

Virtual Personal Assistant has almost become a basic necessity in all electronic devices so as to execute the required problems easily. More than just being a bot , VPA can make life easier for the user in various ways. Speech recognition is one of the relatively new integration into the VPA. But, though its moderately efficient , it is not very helpful and are not used by the user due to its high amount of error. Though the error percentage of the upcoming VPAs is around 5 percent, it still is not quite up to the mark to where it becomes a basic part of the users life. Thus the projects aim is to build a VPA with speech recognition which has a very minimal error percentage.

Voice recognition is a complex process using advanced concepts like neural networks and machine learning. The auditory input is processed and a neural network with vectors for each letter and syllable is created. This is called the data set

. When a person speaks the device compares it to this vector and the different syllables are pulled out with which it has the highest correspondence.

Another market driver for the electronic assistant is that the automobile has become a mobile office, making safety an increasingly important issue. Using voice commands instead of touch-tones is not only a convenience, it is being perceived by consumers as a safety necessity. The global market for unified messaging services is expected to be a considerable share of the telecomm applications. It is estimated that it will be worth several billions by 2027.

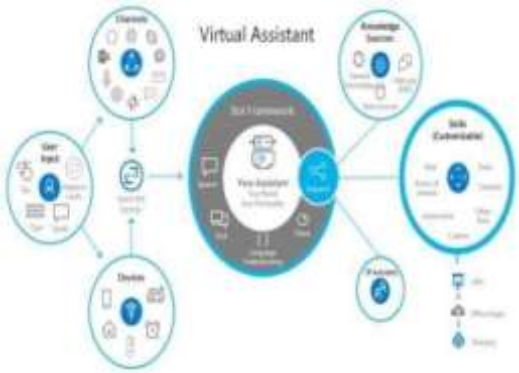


While indirect revenues for the carriers will be several folds. A few companies has started offering converging products in the VPA direction, e.g. Conita, WildFire, VoxSurf, VoiceGeneie, and VoiceTel, and Mitel Networks, though one or two provide solutions for mobile carrier environment.

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In summary, VPA promises to provide hands-free, eyes-free access to the web anywhere, anytime, from any phone.



II. FEATURES OF VPA

A. Tasks

A task is a personal or work-related assignment you want to track through completion. A task can occur once or repeat (a recurring task). A recurring task can repeat at regular intervals or repeat based on the date you mark the task complete. For example, you might want to send a status report to your manager on the last Friday of every month, and get a haircut when one month has passed since your last haircut. Recurring tasks are added one at a time to the task list. When you mark one occurrence of the task complete, the next occurrence appears in the list.

Users can also create Task Requests. A task request enables the user to assign tasks to the other people, and to receive task requests from others. When someone assigns a task, that person gives up ownership of the task (unless the task is declined). Anyone who assigns a task can keep an updated copy in their task list and receive status reports for the task.

Associated with task requests is a task list. A list that includes the name of the person who originally sent the task request plus the names of everyone who also received the task request, reassigned the task to someone else, and chose to keep an updated copy of the task in their task lists. VPA provides VUI to the MS Outlook task manager.

B. Internet Applications

The VPA allows personnel to access, customize, and engage the internet to help them source information ranging from weather, directions and schedules, to stock performance, competitive data and news. All using simple, conversational voice commands, e.g. trip management, airline reservation and hotel reservations.

The convergence of the richness of the internet and the accessibility and mobility of the phone is now forming a vast new network - a Voice Web - where Internet content can be accessed from any phone, anywhere, using human voice. A voice portal can be defined as "speech-enabled access to Web- based information." In other words, a voice portal provides telephone users with a natural-language interface to access and retrieve Web content. An Internet browser can provide Web access from a computer but not from a telephone. A voice portal is a way to do that.

The emerging Voice Web (or voice portals) is all about distributed voice-enabled content known as voice sites that can be accessed from any telephone using a standard voice browser. This emerging technology creates a new model for business applications known as V-Commerce.

III. SYSTEM ARCHITECTURE

The system architecture of this projects shows the flow of the control through the system. It also shows the hardware and the software required for the execution of the program. The architecture diagram is as follows :

IV. HARDWARE AND SOFTWARE REQUIREMENTS

Hardware:

- A phone with a touch screen interface.
- Phone Ram should be of a minimum 512 MB.
- Internet connectivity.
- The phone should have USB debugging mode for development and testing purposes.

Software:

- Operating system should be android 4.1/win 8.1/IOS 6 or higher.
- The kernel version should be 3.0.16 or higher.
- Support of other basic applications like maps, calendar, camera, web connection etc.

V. EXISTING AND PROPOSED SYSTEM

Existing Model

Most of the existing projects have only used speech recognition using neural networks. Though their systems have a moderate accuracy, they are not for practical usage nor efficient to be of any real use .There are a few rudimentary techniques used by them:

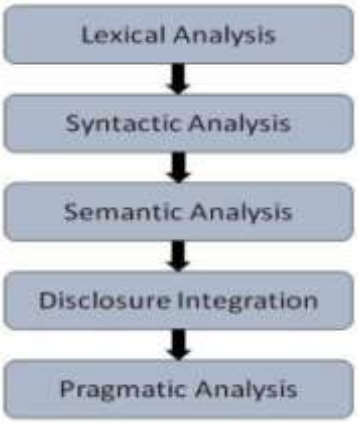
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1. Context-aware computing:

Context-aware computing is a class of systems that have the ability to sense their physical environment and adapt themselves to it accordingly. These can be used for recognizing words spoken by people with varying accents. It can also deduce words that may have been misspoken.

2. MFCC:

MFCC refers to the Mel-Frequency Cepstral Coefficients. MFC (Mel-Frequency Cepstrum) is a collection of these coefficients. It amounts to the short-term power spectrum of a sound. These can be used to sense variations in sound so as to recognize the various variables required for voice recognition.



3. NLP:

Natural Language Programming is a branch of Artificial Intelligence that deals with the interactions of computer and human languages. It mainly focuses on how to program the computers so that they can process the large lume of data on natural languages. This concept is used to familiarize the computer with the various words in a particular language and also to recognize them when spoken.

Proposed Model

Speech to text:

- A Piece of software used that converts audio to text. It doesn't understand just anything you might say.

Text Analyzing:

- Converted text is just letters for computer.
- A piece of software converts text to something that is understandable for computer.
- Computer understands the command, so Virtual Assistant like siri convert this text to computer command.
- VPAs maps the words to functions and parameters to create a command that computer can understand.

The major milestone that this project tries to achieve is that it tries it increase the accuracy of the speech to text software. Meaning the software will theoretically be able to convert any speech with slight modulations or different accents into text with high level of accuracy and precision needed for day to day usability of the VPA. The software essentially combines voice recognition using neural networks and lip movement detection using machine learning to increase the precision of the word spoken.

For people with different accents, just voice recognition will be useless because the words they speak will be vastly different from the actual word by the computer's point of view because the vectors or the values stored for that particular word would have been gotten only based on the word being spoken in a particular accent. So here is where lip movement recognition comes into play.

For most words, though in a different accent, the movement of the lips remains similar enough to deduce the word. Thus, lip movement recognition helps cutting down the various other words which would have had the same likeliness as per the voice recognition software.

VI. WORKING PRINCIPLES

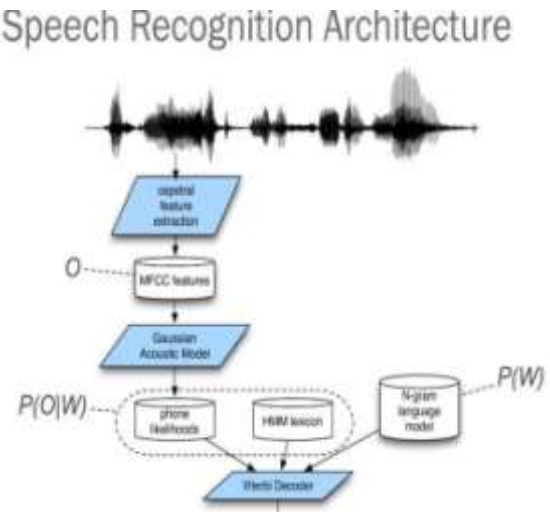
The working of Virtual Assistant uses following principles:

- Natural Language Processing : Natural Language Processing (NLP) refers to AI method of communicating with an intelligent systems using a natural language such as English.

Processing of Natural Language is required when you want an intelligent system like robot to perform as per your instructions, when you want to hear decision from a dialogue based clinical expert system, etc.

Five Steps in Natural Language Processing are:

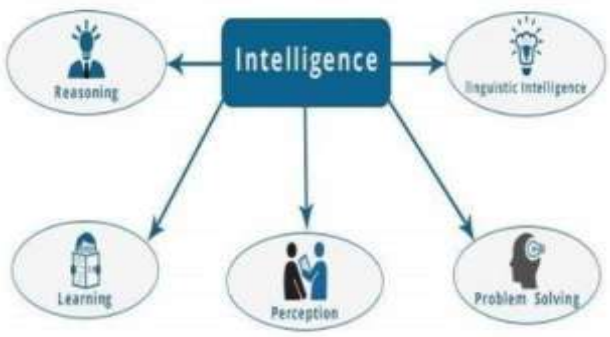
- Automatic Speech Recognition: To understand command according to user's input.



- Artificial Intelligence: To learn things from user and to store all information about behaviour and relations of user.

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The ability of a system to calculate, reason, perceive relationships and analogies, learn from experience, store and retrieve information from memory, solve problems, comprehend complex ideas, use natural language fluently, classify, generalize, and adapt new situations.



- Inter Process Communication: To get important information from other software applications.

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VII. CONCLUSION

The paper describes a new emerging service for mobile user. The Virtual Personal Assistance provides an intelligent computer secretarial service for mobile professionals. The new service is based on convergence of internet, speech recognition technology and mobile technologies.

The VPA minimizes the interruption of the user, improves the utilization of his time, and provides a single point of communication for all his messages, contacts, schedule, and source of information. The paper proposes as well a decision structure for call screening, as well as handling requests for meetings and appointment. The system initially targets lawyers, doctors, sales personnel, small offices, maintenance crews, etc. However, it is expected to become a standard feature for millions of other users.

It overcomes many of the drawbacks in the existing solutions. It is mainly built to make a much more efficient VPA o that they can be brought into much more practical day to day uses. But the system has its own limitation. Though the efficiency is high the time consumption for each task to complete maybe higher than the other VPAs and also the complexity of the algorithms and the concepts would make it very tough to tweak it if needed in the future.

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