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Holographic Virtual Personal Assistant

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Abstract- *In our project we are trying to give the artificial intelligence more control on the hardware. We all are aware about the virtual personal assistant which can talk back if we talk to it. And does some task which we give in the form of commands. Talking to virtual assistant from your computer screen or phone is nice and all, but what if you could speak to that assistant as hologram. Thus, we included the Holographic technology with virtual assistant so that user can actually see his virtual personal assistant. Including of holographic makes the assistant closer to the human. As user can see the assistant, it is more comfortable to talk with it. In this work, we are using a speaker, mic, personal computer, extended display and holographic projection setup. There are two main parts of this project: Software which produce desired output and Hardware which illuminate the output in 3D holographic form.*

Keywords*—Speech Recognition, Holographic Projection, Text Analysis.*

I. Introduction

As digitalization has booming all over the world, human computer communication has growing as well. This leads the research towards the Artificial Intelligence. The new generation of independent technology aspires to make computer interface more user friendly. Now a day's people are using more and more virtual tools. It leads the virtual reality to become a part of life.

One of the most used tools of the virtual is an artificial intelligence. An artificial intelligence is the science of making an intelligent machine, or a controlled robot, or a software think intelligently, in the similar manner the intelligent human think [1]. Artificial Intelligence has various field such asreasoning, learning, problem solving, natural language processing and so on. Using these fields, a virtual assistant had created which can perform natural language processing. The first tool enabled to perform digital speech recognition was the IBM Shoebox, presented to the public during the 1962 Seattle World's Fair after its initial market launch in 1961. The first modern digital virtual assistant installed on a smartphone was Siri, which was introduced as a feature of the iPhone 4S on October 4, 2011 [2]. Nowadays, every smartphone has virtual assistant through we can access various services by just giving command via verbal communication.

Holographic projection is the new wave of technology that will change how we view things in the new era. To understand how a holographic projector works we need to know what a hologram is. Holography is the method we used to record patterns of light. These patterns are reproduced as a three- dimensional image called a hologram. 3-dimensional holographic projection technology is loosely based on an illusionary technique called Peppers Ghost [3].

Holographic virtual assistant is the combination of above two techniques i.e. Artificial Intelligence in the form of virtual assistant and Holographic projection. This holographic projection has done using a glass arranged inclined in such a way that the image looks as 3d as real in real world.

A. OBJECTIVE

Since, in major countries, isolation of human being become major problem. Our Goal is to develop a user-friendly application that automatically responds to the human voice and commands, and to make a 3-dimensional visual human interface that interacts and communicate like human. It helps to resolve the isolation problem.

II. Literature Survey

Yunakov, Oleg, "Personal Virtual Assistant" (2005). Honors College Theses. Paper 3.
http://digitalcommons.pace.edu/honorscollege_theses/3

In 2004, Yunakov researched on the Personal Virtual Assistant. He said, "The Personal Virtual Assistant (PVA) is an innovative, inexpensive, and reliable virtual secretary. This user-friendly system will perform many of the tasks commonly performed by a traditional secretary". He made the personal virtual assistant which can interpreted the command and can perform several tasks include easy access to the supervisor's schedule with the option of adding or deleting a meeting using an easy and friendly user interface. Another important task that PVA includes is based on videoconference module. If the supervisor is out of the office, but is available for a videoconference meeting, such arrangements can be made through the PVA. Limitation for this PVA was that it could not talk and could not understand human language. It takes command directly from the user from textual inputs such as keyboard or touch panel display.

Knote, R.; Janson, A.; Eigenbrod, L. & Söllner, M. (2018): The What and How of Smart Personal Assistants: Principles and Application Domains for IS Reserach. In: Multikonferenz Wirtschaftsinformatik (MKWI). Lüneburg, Germany.

Knote, R.; Janson, A.; Eigenbrod, L. & Söllner, M. proposed article on What and How Smart Personal Assistants can do. They had idea that Digitization brings new possibilities to ease our daily life activities by the means of assistive technology. They knew that SPA research is highly fragmented among different disciplines, such as computer science, human- computer-interaction and information systems, which leads to 'reinventing the wheel approaches' and thus impede progress and conceptual clarity. So, they researched and identified five functional principles and three research domains which appear promising for future research, especially in the information systems field.

Peter Imire, University of Portsmouth and Peter Bednar, Lund University. Publication at: https://www.researchgate.net/publication/264001644

Peter Imire, University of Portsmouth and Peter Bednar, Lund University proposed a report that discusses ways in which new technology could be harnessed to create an intelligent Virtual Personal Assistant (VPA) with a focus on user-based data. It will look at examples of intelligent programs with natural language processing that are currently available, with different categories of support, and examine the potential usefulness of one specific piece of software as a VPA. This engages the ability to communicate socially through natural language processing, holding and analyzing data within the context of the user.Sheetal Reehal, University of Mumbai, India. International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 5, Issue 6, June 2016

We also searched some applications of virtual personal assistant such as siri. Sheetal Reehal made a research paper on How siri works and what can siri do. She found that Siri has three layers: voice processing, grammar analysis-context learning engine and services. Also, her research paper gave knowledge about other applications such as Google now, Cortana, Facebook Arrives, etc.

III. Proposed System

The goal of virtual environment (VE) is to provide natural, efficient, powerful, and flexible interaction. Our proposed system "Holographic Virtual Personal Assistant" (HVPA) is an input modality can help meet these requirements because, human languages are natural and flexible, and may be efficient and powerful, especially as compared with alternative interaction modes. The traditional two-dimensional, keyboard and mouse oriented graphical user interface is not well suited for virtual environment. Synthetic environments provide the opportunity to utilize several sensing modalities and technologies and to integrate them into the user experience. Device which looks like human, listens like human and talk back like human can be used to mediate communication between the human and the environment.

Some major countries, like Japan and USA, are facing the major problem of isolation. Peoples of such countries are always feeling alone since no one of their families lives around them. At the like these, a virtual assistant is very help fool. Our goal is to make such assistant which makes the lonely people to feel someone with them all the time. Virtual Assistant can make notes, phone calls, whether forecasting and many other things. Clearly the voice recognition and respond to it would be useful, as well as features that are derived from those measurements.

IV. Basic Technology

This system will have made of basic three concepts,

1. Automatic Speech Recognition
2. Natural Language Processing
3. Holographic Projection

A. Automatic Speech Recognition

Automatic Speech Recognition (ASR) is computer hardware and software-based techniques which is used to identify and process human voice. ASR is primarily used to convert spoken words into computer text. It can also be used to authenticate the identity of the person speaking into the system. Automatic Speech Recognition is also called as Automatic Voice Recognition (AVR) or simply Speech Recognition.

The basic sequence of events that makes any Automatic Speech Recognition software, regardless of its sophisticated, pick up and break down your words for analysis and response goes as follows:

- You speak to the software via an audio feed
- The wave file is cleaned by removing background noise and normalizing volume
- The resulting filtered waveform is then broken down into what are called phonemes.
- Each phoneme is like a chain link and by analyzing them in sequence, starting from the phoneme, the ASR software uses statistical probability analysis to deduce whole words and then from there, complete sentences
- Your ASR, now having "understood" your words, can respond to you in a meaningful way. [4]

B. Natural Language Processing

Natural-language processing (NLP) is an area of computer science and artificial intelligence concerned with the interactions between computers and human (natural) languages, in particular how to program computers to fruitfully process large amounts of natural language data. Natural language processing (NLP) is the ability of a computer program to understand human language as it is spoken [5].

C. Holographic Projection

The hologram pyramid is a simple device that can be made by manipulating a sheet of plastic into the shape of a pyramid with its top cut off. The device creates a 3D-like illusion for the viewer and makes an image or video appear as if it were in midair. It works on the principle of Pepper's Ghost.

Four symmetrically opposite variations of the same image are projected onto the four faces of the pyramid. By principle, each side projects the image falling on it to the center of the pyramid. These projections work in unison to form a whole figure, which creates a 3D illusion.

V. Working Model

The virtual assistant basically consists of three working layers,

1. Speech to text conversion
2. Text Analysis
3. Interpret Commands

A. Speech to conversion

Speech to text conversion is a technique of converting natural language words in the text format in computer. In this technique, NLP and ASR is used to translate the speech into text. Python supports many speech recognition engines and APIs, including Google Speech Engine, Google Cloud Speech API, Microsoft Bing Voice Recognition and IBM Speech to Text. In this project, we are using google speech engine for converting speech in to text.

Google speech engine takes input from microphone and provide text format output. For using microphone, PyAudio package must be installed in the system. PyAudio package allows user to access the microphone in python. The text is forwarded to the text analyzer.

B. Text Analysis

Text analysis is the process of analyzing the digital text obtained by converting human speech into text. Here, Text analyzer, analysis the text and compares it with its own data to produce desired output. For example, if the text contains "Hello" word then it searches for the "hello" word in the database. If the database contains "Hi" in reply column then it produces "Hi" as output.

Text Analyzer simply contains if else statements. If the text contains any type of command then it is forwarded to command interpreter.

C. Interpret Command

Whichever command given by the user, is executes in command interpreter. Command interpreter is a part of a computer system that understands and executes commands that enter interactively by a human being or from program. In this layer, mapped command goes to server as well as evaluated locally simultaneously. Local recognizer communicates with server to use whether command will be best handle locally or not.

After these three layers of processing, desired output is shown on the holographic display setup which shows 3d

image of virtual assistant.

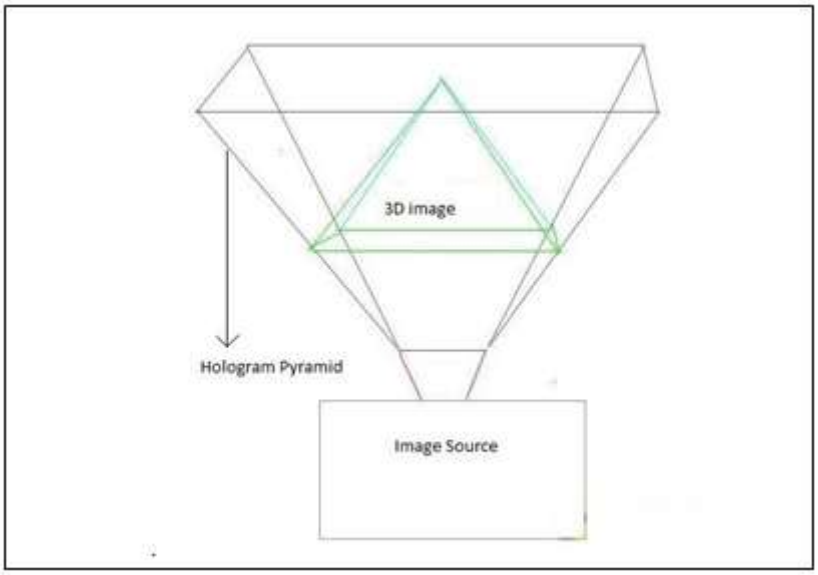

Fig. 1. Holographic projection using glass pyramid.

VI. Advantages

Some major advantages are mentioned below,

a. Virtual personal assistant is capable to perform many tasks with less interference of human being. User can add remainder for their works, and sends email without physical contact with the computer.

- Since, we are using holographic projection, it does not require any special glasses to view the image in 3-dimensional view and it can be viewed from any angle.
- HVPA can talk with human and act as a virtual friend. It helps in resolving the Isolation problem.
- Due to isolation, a person feels very loneliness and depression which can be resolved using a virtual friend.
- Like in-person personal assistant, virtual assistant does not require any room and desk for their work. It is cost effective solution to make and to hire.

VII. Future Scope

Holographic virtual assistant is acts as good friend. But at the same time, it requires considerable space to set up the hardware. Next step will be stripping back the physical hardware as far as possible so that user feels that virtual assistant is in real world. With the intelligence of the VA existing in the cloud, pushing it into our lives on multiple devices in office, vehicles, and homes. Due to this, our Virtual Assistant remains with us all the time and it doesn't affect wherever we go. Your VA will continually be prompting the suggestions and taking instruction. It grows with you that means it understands the situation and can suggest the best way to solve any problem.

HVPA may become your good friend which will knows about you even than perhaps you do yourself. It may know your little by little things. And as we know it stores all data in its storage device, it never forgets anything about you. Due to holographic effect, it may possible to create a copy image of any person, so that a user can have their own people around him.

VIII. Conclusion

Virtual Personal Assistant are very effective way to organize your schedule and daily activities. In addition of holographic images, VPA comes one step closer to the humans. VPAs are also reliable than Human Personal Assistant because, VPAs can have lots of information than human. They also connected to the internet, so it knows the activity from the birth of the internet. Since, in mega countries, social isolation is major problem. This VPAs becomes there friend so that they never feel lonely. It becomes good friend, a good advisor, a good assistant and lots more.

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