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Multipurpose Virtual Assistant UsingMachine Learning

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Abstract— Virtual assistant is a software agent who will perform a different task or work for personally supported Questions or commands called a Virtual Assistant with the intelligence of a human. In some phenomena, virtual assistants can interpret human speech, and sign language responds via synthesized voices and moves to convert voice to text. Clients can interrogate with their virtual assistants to control home automation devices manage their tasks like email, to-do lists, and media playback, check weather updates interact with help of sign language with verbal command and response. Several research papers regarding multipurpose virtual assistant were reviewed and an appropriate solution to address this problem was concluded. You Only Look Once Natural Language Processing and Convolutional Neural Network (CNN) algorithms assist to perform operations with voice and text commands. By using this approach, the final result is expected to have an accuracy score of over 96%.
Keywords*:* Virtual Assistant, Multipurpose Activities, Voice to text, Natural Language Processing, CNN, Machine Learning, Verbal Commands, Response.

I. Introduction

Nowadays almost all tasks are executed with the help of technology, for example, we have smartphones in our hands it is nothing less than having the world at your hand, in nowadays we aren't even using our fingers to execute tasks we just speak up the task and it's done. This is the way virtual assistants work for my project the voice-based intelligence assistant needs to invoke words or wake up words to activate the program. We have so many virtual assistants such as Siri, Alexa, and Cortana. We designed a system that efficiently works on a desktop. A virtual assistant is a program that improves the productivity of users by arranging routine tasks and by providing information from different sources and also reduces the productivity cost of input devices such as a mouse, keyboard, pen, etc.

A Voice searches have dominant over text searches so in current times virtual assistants are turning out to be smarter than ever this project stated on the premises of openly available sufficient amount of information on the web that can be utilized to develop an AI-based virtual assistant that is capable of making intelligent decision of user activities.

In today's digital world, virtual assistants have become an indispensable tool for everyday tasks and information management. However, people with disabilities, particularly those who are deaf, dumb, or blind, often face barriers in accessing and using virtual assistants due to lack of accessibility features. To address this challenge, this research project aims to develop a virtual assistant that is specifically designed to assist people with disabilities. The virtual assistant will have the capability to perform normal operations such as opening applications and providing the current time and date, as well as special features to support users with disabilities, such as speech-to-text and text-to-speech conversion, and gesture recognition. By doing so, the project intends to empower people with disabilities and enable them to access and utilize virtual assistant technology in an inclusive and user-friendly manner.

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II. Literature Survey

Human-computer interaction aspects of virtual assistants, including user experience, interface design, and accessibility issues. [1][3][4] Natural language processing techniques for virtual assistants, such as sentiment analysis, entity recognition, and dialogue management.

Integration of virtual assistants with other technologies, such as voice recognition, Sign language detection and object detection. User privacy and security concerns with virtual assistants, including data protection and access control.[2][5][6]

Economic and commercial aspects of virtual assistants, including market trends, revenue models, and potential future developments.[10]

Barriers and challenges faced by people with disabilities in using virtual assistants, such as lack of accessibility, low usability, and low speech recognition accuracy.[7][8]

Case studies and real-world examples of virtual assistants for people with disabilities, including success stories and lessons learned. Ethical and legal implications of developing virtual assistants for people with disabilities, including issues related to data privacy and intellectual property. It is important to consult credible and recent sources (e.g. academic journals, conference proceedings, and reputable websites) in the fields of accessibility engineering, human-computer interaction, and assistive technology.[4][9]

III. Methodology

Virtual Assistant Interface

1) Taking the input in the voice or textual form 2) The query sent to the Natural Language Processing (NLP) 3) Analyse the keywords from the query 4) The response was given to the user

Multipurpose Activities

Sign language interaction via assistant for disabled (dumb) people and object detection through voice commands for disabled blind people.

Algorithms and Techniques

Speech Recognition:

Speech Recognition is a library for achieving speech recognition with hold-up for several engines and APIs, online and offline. It assists APIs like Google Cloud Speech API, IBM speech-to-text, Microsoft Bing Voice Recognition, etc.

Pyttsx3:

Pyttxsx3 stands for python Text to Speech. It is a multiplatform Python cover for text-to - Natural sound audio synthesis. It is a python collection supporting common text-to-speech engines on Mac OS 10, Windows, and Linux. It exertion for both Python2.x and 3.x versions. Its main superiority is that it works offline.

Quepy:

it is a python framework to transform natural language questions to queries in database.it can easily manage to different kinds of queries Natural language and database queries with less code you can build your own system for natural language access to our database

OpenCV:

OpenCV (Open Source Computer Vision Library) is a library of programming purposes mainly aimed at real-time computer vision.[1] Originally developed by Intel, it was later supported by Willow Garage and then Itseez (which was later acquired by Intel[2]). The library is multiplatform and free for use under the open-source BSD license. OpenCV's application zone include: 2D and 3D feature toolkits, a Facial recognition system, Gesture recognition, and Motion understanding. Segmentation and recognition. Image processing is

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the analysis and subterfuges of a digitized image, especially in order to improve its quality. Image processing is a method to perform some functioning on an image, in order to get an improved image and or to extract some useful information from it.

Tensorflow:

TensorFlow is a freed and open-source software library for dataflow and differentiable programming across a range of tasks. It is a figurative math library, and is also used for machine learning applications such as neural networks. It is nearly new for both research and production at Google.

SQLite:

SQLite is a suitable library, providing an in-process relational database for efficient storage of small-to-medium- sized data sets. It assist most of the common features of SQL.

Convolutional neural network:

Classification Technique: It is a kind of network architecture for deep learning algorithms and is specifically used for image recognition and classification.

Natural Language Processing:

"Natural Language Processing (NLP) is a subfield of artificial intelligence and computer science that focuses on the interaction between computers and human languages. The goal of NLP is to enable computers to understand, interpret, and generate human language in a way that is both natural and useful.

NLP techniques are used to process and analyze large amounts of textual data, including speech, text, and social media, to extract meaningful information and insights. NLP techniques range from simple text cleaning and tokenization to complex semantic and syntactic analysis, and deep learning models.

NLP has a wide range of applications, including machine translation, text classification, sentiment analysis, and question answering, and has a significant impact on many industries, such as customer service, healthcare, and education

IV. Proposed Impementation

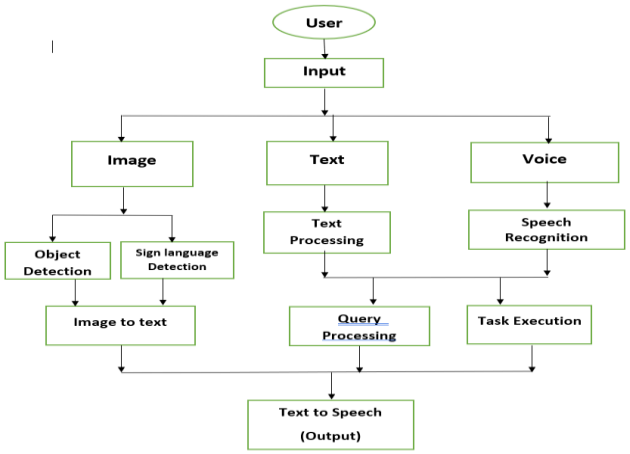

Fig1. The architecture of the System

The focus of this study is to create a Multipurpose virtual assistant system. Fig.1 shows an overview of the architecture. This proposed system will be developed as a desktop application. The input for the application is in three forms Image, text, and voice. These

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inputs are recorded in real-time which can further process depending upon the form of input if the input is in voice format then the natural language processing algorithm is used for speech recognition then it is used to process queries or tasks. The text form of input is given to NLTK to perform a particular task.

For disabled people, the input is taken in the form of an image then according to the type of disability the system is providing the output. The Blind disabled people are given the initial command to the system so that the Object detection algorithm is used to detect the particular object to help blind people by using a virtual assistant. The people who are not able to speak can give the command in the form of hand gestures or actions and these actions are given to Sign language processing and the output is displayed in the form of text and further processed to speech.

V. Expected Result

The suggested approach evaluates the user input depending on different forms. Fig2. Shows the user interface of the virtual assistant application. The application is initializing and provides 3 Choices such as input through voice, text, and disable. Fig.3 shows voice input for the query processing where the voice query given is “dogs”.Fig.4 illustrate that the input is given by Mute users through hand gestures (actions) and the Sign language detector process this actions to give the output in the form of text to speech.

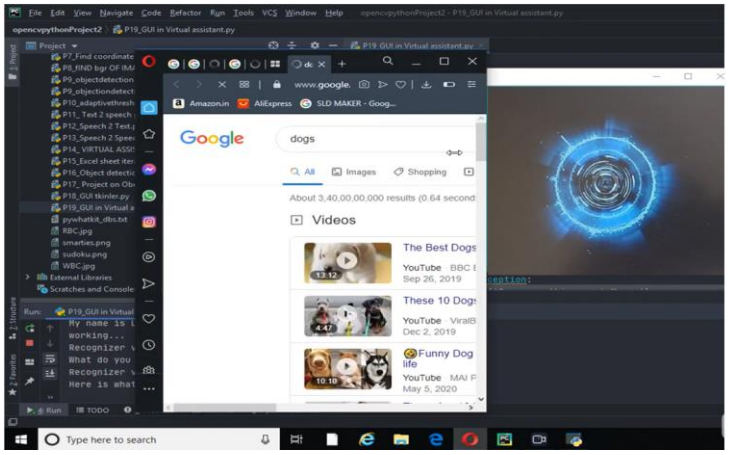

Fig 2. User Interface

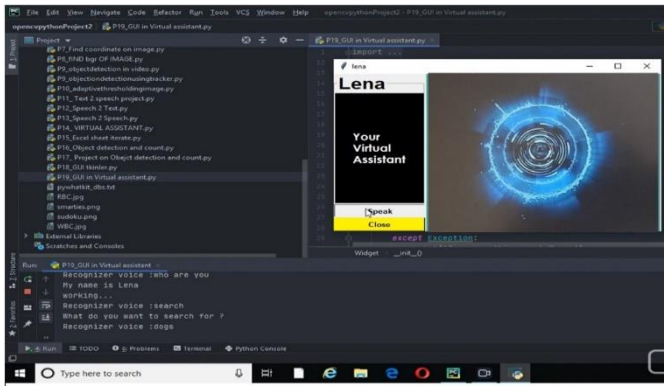

Fig 3. Query Processing for voice input

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Fig.4 Sign Language Detector for Action

VI. Future Scope

The virtual assistants which are currently available are fast and responsive but we still have to go a long way. The understanding and reliability of the current systems need to be improved a lot. Currently, virtual assistants are not always dependable in high-stakes situations.
However, advancements in Artificial Intelligence, Machine Learning, Neural Networks, and IoT integration have the potential to significantly enhance the capabilities of these assistants. The integration of these technologies will allow us to achieve new and greater heights in the future. The potential of virtual assistants is far beyond what we have seen so far Most of us have seen Jarvis, that is a virtual assistant developed by iron man which is although fictional but this has set new standards of what we can achieve using voice-activated virtual assistants.

VII. Conclusions

The proposed system will act as an intermediate-level of a virtual assistant. The system aims to automate a growing number of tasks, making them more convenient for the user. The ultimate goal is to alleviate the workload on the user and allow the system to handle more and more tasks independently in the future, we can take our system to next level and make it advanced-level of virtual personal assistant which can do almost all the operation which is done by the user.

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