ML Based Virtual Personal Assistant

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Abstract – Smart and Intelligent assistance is the need of the hour in the quest for technologically ahead society. In such a motive, our Virtual Personal Assistant (VPA) system is proposed. The basic idea is to ensure security of personal information of users and provide accurate support for various daily aspects of living through a simple but powerful system. Such a system uses classification and regression Machine Learning Algorithms to garner results and basic chatterbot system to act as a perfect companion for humans. The system targets providing assistance for travel, sports and statistical analytics, basic knowledge from web. The raspberry pi is used for minimal processing and powerful computing systems are suggested for improvisation of our vision. The system differs from existing VPAs as it ensures complete security for personal likes and dislike amidst other crucial details like account credentials. Our system uses minimum resources meaning perfect-fit for cost-effective usage. Also, with incremental learning to be deployed, accuracy and services are almost certain to improve manifolds. This gives users a sense of security as system is under their complete control.

Keywords— machine learning, regression, incremental learning.

I. INTRODUCTION

Although the capability to instruct devices to perform tasks via voice commands has been available since the 1950s [1], it is only in the last few years that the proliferation of smartphones made voice interfaces accessible to users worldwide. In comparison with earlier implementations, nowadays, voice technology is more robust to noise [2] and dialect variations [3], while voice search is reportedly three times faster than typing on a mobile device [4]. Currently, virtual personal assistants (VPAs) are freely available on mobile devices (e.g. Microsoft Cortana, Google Assistant, Apple Siri), home appliances (e.g. Amazon Echo, Google Home), and as part of car systems (e.g. Nuance-developed Systems). According to recent surveys [5, 6], the availability of virtual assistants and consequently their aggregate usage has been increasing. However, despite their widespread availability, robustness and speed, the number of people who use VPAs on a regular basis remains relatively low. Another recent survey [5], found that 70% of iPhone users consider their usage of Siri to be sporadic and limited to basic tasks.

A virtual assistant or intelligent personal assistant is a software agent that can perform tasks or services for an individual based on verbal commands. Sometimes the term chatbot is used to refer to virtual assistants generally or specifically accessed by online chat (or in some cases online chat programs that are exclusively for entertainment purposes). Some virtual assistants are able 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 such as email, to-do lists, and calendars with verbal commands. To design a device that acts as a digital organizer to provide variety of services to its master. It will look at examples of programs and 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.

II. LITERATURE REVIEW

Irrespective of the fact one is planning to start out or looking to expand or becoming organized & efficient, delegating usual administrative tasks always remains a typical issue. Time is valuable and every second counts. For instance, if you spend $100 an hour and invest your time looking after small tasks that are repetitive in nature, you are losing money. Well, you need to spend time on accomplishing important tasks that are important to take your business towards expansion. The fact that our calendars are always open, and online services make us regularly available for interactions may have made life more convenient, but it also made them more complicated. We are all being bombarded by assignments and tasks, trying to keep up. Each day has limited working hours, which need to be spent upon doing productive tasks. Less productive work like following up mails and scheduling meetings, if delegated, help in saving approximately one-fifth of productive time per day. In other words, you save one full working day in a week.

Isn't it beneficial to use that time connecting with more people and making more sales? Or you attend important meeting and conferences to take your company in the successive direction. Quite often, there comes times when it is required to hire a professional to work. To find the right person, there goes a series of cycle to perform such as recruiting, hiring and training until the right professional is hired. Now, this eats up time and funds. When you have a virtual assistant, there's no need to worry about payroll costs or providing benefits. Also, there's no involvement of having office space or equipment. Last but not the least, you get all the benefits of the needed help without going through hassles.

Despite significant improvements in automatic speech recognition and spoken language understanding - human interaction with Virtual Personal Assistants (VPAs) through speech remains irregular and sporadic. According to recent studies, currently the usage of VPAs is constrained to basic tasks such as checking facts, playing music, and obtaining weather updates. In this paper, we present results of a survey (N = 118) that analyses usage of VPAs by frequent and infrequent users. We investigate how usage experience, performance expectations, and privacy concerns differ between these two groups. The results indicate that, compared with infrequent users, frequent users of VPAs are more satisfied with their assistants, more eager to use them in a variety of settings, yet equally concerned about their privacy.

Our online survey1 consisted of a mixture of open and closed questions. The welcome page of the survey informed respondents about the purpose of the study; the estimated completion 1https://tinyurl.com/voice-technology-and explained the voluntary nature of the survey. Before commencing, the respondents were asked to provide consent for their replies to be stored and analyzed. In total, there were 29 questions for respondents who reported to have used a virtual assistant at least once in the past (VPA users) and 12 questions for those who did not (VPA non-users). In this paper, we only report the results for VPA users.

The survey responses were collected between June 2017 and November 2017. At the beginning, the respondents were asked when they started to use their VPA and how frequently they used it for. The goal of these questions was to provide background information regarding device usage and to distinguish between different groups based on frequency of VPA usage.

The initial analysis of data revealed 2 major groups i.e. 'frequent users' and 'infrequent users'. For the comparative purposes, based on usage behavior, we defined respondents who reported to use VPA at least once a week as 'frequent users' (FU) and respondents who reported to use their VPA less than once a week as 'infrequent users' (IU). We are aware that this cut-off point is somewhat arbitrary; however, we chose it to provide enough data to facilitate comparison between these two user groups. The rest of the survey was divided into 3 main parts, i.e. 'usage experience', 'performance expectations', and 'privacy concerns and social acceptability'.

A virtual assistant, also called AI assistant or digital assistant is an application program that understands natural language voice commands and completes tasks for the user. Such tasks, historically performed by a personal assistant or secretary, include taking dictation, reading text or email messages aloud, looking up phone numbers, scheduling, placing phone calls and reminding the end user about appointments. Popular virtual assistants currently include Amazon Alexa, Apple's Siri, Google Now and Microsoft's Cortana -- the digital assistant built into Windows Phone 8.1 and Windows 10.

Virtual assistants can also be contrasted with another type of consumer-facing AI programming, called smart advisers. Smart adviser programs are subject-oriented, while virtual assistants are task-oriented. Virtual assistants are typically cloud-based programs that require internet-connected devices and/or applications to work. Virtual assistants typically perform simple jobs for end users, such as adding tasks to a calendar; providing information that would normally be searched in a web browser; or controlling and checking the status of smart home devices, including lights, cameras and thermostats. Users also task virtual assistants to make and receive phone calls, create text messages, get directions, hear news and weather reports, find hotels or restaurants, check flight reservations, hear music, or play games. In this paper, we present results of the survey on usage of VPAs. We focus on respondents experience with virtual assistants and compare differences in behavior between frequent and infrequent users. There are three main factors of investigation, namely, (1) usage experience, (2) performance expectations, and (3) privacy concerns.

Intelligent Personal Assistants were originally developed to make the interaction with computer systems more human-like, enabling people to use natural language to manage their schedules, and access a variety of tasks and services. The present generation of such assistants (e.g. Cortana, Siri, etc.), often referred to as Voice Powered Assistants (VPAs) is the focus of our study. The growing popularity of VPAs and their improved accessibility can be attributed to the latest advances in speech technology.

In recent years, the introduction of deep neural networks (DNN) for acoustic and language modelling has made automatic speech recognition (ASR) systems more robust, while the implementation of the knowledge graph enhanced the spoken language understanding (SLU) capabilities of question answering systems. Recent studies in the area addressed usage patterns of virtual assistants and problems with their adoption. The evaluation of VPAs focused on different aspects that affect their continued use, such as usage experience, performance expectations, privacy concerns and social acceptability.

EXISTING SYSTEM:

The term virtual assistant, or virtual personal assistant, is also commonly used to describe contract workers who work from home doing administrative tasks typically performed by executive assistants or secretaries. Virtual assistants are typically cloud-based programs that require internet-connected devices and/or applications to work. Three such applications are Siri on Apple devices, Cortana on Microsoft Devices and Google Assistant on Android devices. There are also devices dedicated to providing virtual assistance. The most popular ones are available from Amazon, Google and Microsoft. To use the Amazon Echo virtual assistant, called Alexa, users call out the wake word, "Alexa." A light on the device signals to the user it is ready to receive a command, which typically involves simple language requests, such as "what is the weather today," or "play pop music." Those requests are processed and stored in Amazon's cloud. The technologies that power virtual assistants require massive amounts of data, which feeds artificial intelligence (AI) platforms, including machine learning, natural language processing and speech recognition platforms. As the end user interacts with a virtual assistant, the AI programming uses sophisticated algorithms to learn from data input and become better at predicting the end user's needs.

DISADVANTAGES OF EXISTING SYSTEM:

Virtual assistants have a variety of privacy concerns associated with them. Features such as activation by voice pose a threat; as such features require the device to always be listening. However, such features are important to make devices accessible for people who may otherwise have trouble. Modes of privacy such as the virtual security button have been proposed to create a multilayer authentication for virtual assistants.

Cortana, for example, works best by using data from a user's device, including emails and other communications, a user's contacts, location data, search history, and data from other Microsoft services and skills -- third-party

applications -- that users choose to connect with. Users can choose not to sign in and share this data with Cortana, and adjust permissions to prevent certain data from being collected, though these actions limit the virtual assistant's usefulness. These virtual assistants require large amounts of personal data and are always "listening" in order to respond to voice commands. Virtual assistants then retain voice interactions and personal information to improve the user experience. Virtual assistant providers also maintain privacy policies, which define how each company uses and shares personal information. In most cases, companies do not share customer-identifiable information without a customer's consent.

PROPOSED SYSTEM:

To design a device that acts as a digital organizer to provide variety of services to its master. 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. It continues to expand its digital abilities in organizing events, ordering food, playing music, guiding services for travelling, game prediction etc. It is suggested that new technologies may soon make the idea of virtual personal assistants a reality.

Experiments conducted on this system, combined with user testing, have provided evidence that a basic program with machine learning algorithms in the form of a digital personal assistant. Using machine learning algorithms to iteratively learn user's preference for each theme based on quality feedback given by the user. The concept of a virtual assistant which is a digital service looking after a range of our needs is fast becoming a reality. As artificial intelligence and machine learning progress at pace, digital assistants are set to become our gateway to the internet and know more about us than we do ourselves. Siri and Google now are just the beginning. The device accepts voice input processes it through various machine learning algorithms to provide desired output to user.

III. HELPFUL HINTS

A. Proposed Architecture
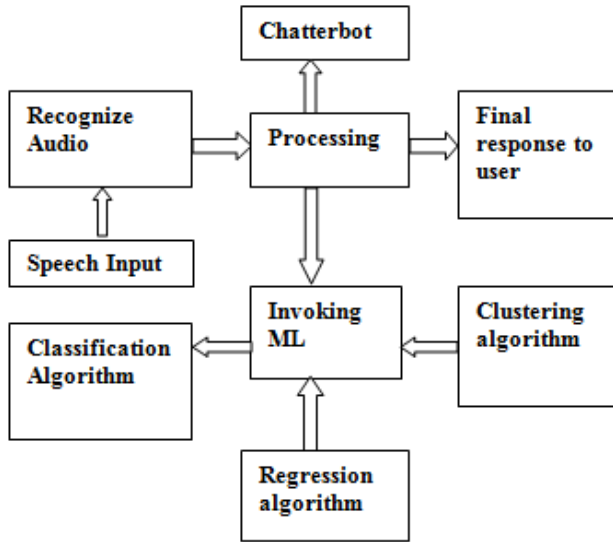
REGRESSION:

Regression is a method of modelling a target value based on independent predictors. This method is mostly used for forecasting and finding out cause and effect relationship between variables. Regression techniques mostly differ based on the number of independent variables and the type of relationship between the independent and dependent variables.

CLASSIFICATION:

Convolution neural networks algorithm is used for this classification purpose. The dataset of the plant leaf, various diseases, pests and soil images are trained in Mat lab tool and classified into various clusters which classifies various labels. Fuzzy C-means algorithm is used to identify the pest and disease present in the farm.

CLUSTERING:

Clustering is used for segmenting the image into clusters having pixels with similar characteristics. Clustering involves dividing the training data into X & Y axes where a   different feature gets classified into different classifications and corresponding labels

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