Voice Recognition Systems in the Cloud Networks: Has It Reached Its Full Potential?

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ABSTRACT

Voice recognition software enables computer users to use keyboards instead of only entering text using their voices. The medical and legal communities have both reported some success with speech recognition technology, even though the library literature is relatively mute on voice recognition technology. Voice-recognition technology can take over typing for someone who cannot do so due to a physical disability. Voice recognition may still be in its infancy, but it is advancing quickly and becoming more accurate, and it is well worth the investment of money, time, and effort required to learn it. Speech recognition artificial intelligence apps have seen a significant increase in numbers in recent years. Businesses increasingly rely on digital assistance and automated support to rationalize their offerings. Voice assistants, intelligent home appliances, search portals, and similar technologies are only a few instances of the widespread use of voice recognition. The research investigates the theory that one of the primary benefits of using a speech recognition system is th.at it enables the user to continue working on other tasks simultaneously. The user can direct their attention to observation and manual activities while maintaining control of the device using voice input commands. In addition, the study's findings indicate that voice recognition is an additional type of speech recognition in which a source sound is identified and matched to an individual's voice. For instance, Apple's Siri and Google's Alexa use AI-mechanized voice recognition to provide speech or text back support. On the other hand, voice-to-text programs such as Google Dictation translate words that are dictated to them as text.

Key Words: Voice Recognition, Speech Recognition, Speaker Efficiency, Cloud Networks, Artificial Intelligence

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INTRODUCTION

Voice recognition software enables computer users to use keyboards instead of only entering text using their voices (Zumalt, 2005). The medical and legal communities have both reported some success with speech recognition technology, despite the library literature being relatively mute on voice recognition technology. Within the confines of an agribusiness library at the University of Illinois, voice recognition software was put through its paces regarding dictation accuracy and usability. It was found that the voice recognition in Dragon NaturallySpeaking 8.0 was more accurate than the speech recognition in Microsoft Office 2003. In addition, there are links to informative websites and some background information regarding this ground-breaking technology (Douglas & Gibbins, 1983).

Since the Perm State University Library was one of the first to categorize its complete collection on the typewriter in 1902-03, typing, or keyboarding, as it is known now, is a more significant occupation than it was one hundred years ago. Interacting with a computer is essential to the practice of librarianship, just like it is to a large number of other white-collar jobs. The necessity for keyboarding has increased significantly due to the proliferation of online activities such as blogging, online chat, discussion lists, and email. On the other hand, an expanding number of additional data input techniques are accessible. For example, in addition to typing on a keyboard and speaking into a microphone, users now have different options for interacting with their computers: handwriting and voice recognition.

It seems inevitable that almost everyone will use their voice to interact with computers in the future; the only question that remains is how soon this will happen (Mandapuram & Hosen, 2018). In the science fiction television series Star Trek, the characters communicated with their computers almost entirely by speech. This gives us a glimpse into the potential of human communication in the future. In a funny scene from the film Star Trek IV: The Voyage Home, the character of Lieutenant Commander Montgomery Scott (Scotty), who lives in the twenty-fourth century, is forced to communicate with a computer that was developed in the twentieth century. After unsuccessfully attempting to use his mouse as a microphone, another character advised him to use the keyboard instead. After that, Scotty proceeds to type out an intricate set of equations for "transparent aluminum" at a rate of almost two hundred words per minute, even though he has never used a keyboard before.

Voice recognition systems, often known as VRS, have more than once been hailed as the "killer application" of the future (Bland, 2000). Despite this, many people have experimented with this technology but have since abandoned it to use it again once it has been improved. Therefore, it is easy to comprehend why only a few people have adopted this technological advancement. Although VRS has gained widespread acceptance among people who have disabilities that prevent or restrict them from typing, the vast majority of people who can type continue to rely on their keyboarding skills. The ability to type on a keyboard honed over years or decades is considered sufficient or superior to VRS. Because VRS applications call for gear not required of other software, such as a solid sound card and a microphone, in addition to additional software and some initial training, most users will only attempt it if there are compelling reasons. The primary software developers and suppliers are experiencing financial restraints, which is one of the other challenges. As a result, many customers are waiting to see what Microsoft will do. Even if there has been some reluctance to adopt this technology, the consistent increase in processing power has unquestionably contributed to the movement of VRS toward more acceptability (Williams, 2003).

ARTIFICIAL INTELLIGENCE AND VOICE RECOGNITION

Artificial intelligence and machine training can alter people's voices, accents, pronunciation, connotations, situations, and other aspects. Voice recognition is a rapidly developing technology that quickly encourages the threat of destitute recording equipment and buzz disintegration. This also involves a threat to the human state of mind and the various aspects of human languages, such as colloquialisms, acronyms, etc. In comparison to more conventional models of voice recognition, the technology can now deliver an accuracy of up to 95%, which is on par with everyday interactions between humans.

In addition, it is now considered a respectable mode of communication because numerous significant businesses have begun to adopt voice recognition as a standard practice in their day-to-day operations. Therefore, it is anticipated that most search engines will support voice-based systems as a critical component of their investigation framework in the future.

Artificial intelligence (AI) refers to the behavior of a machine that, if a human being did it, would be referred to as brilliance (Migowa et al., 2018). This makes artificial intelligence more adaptable, practical, and cost-effective than natural intelligence. The use of artificial intelligence (AI) in the recognition of voices requires two distinct fundamental notions. To begin, this involves researching the mental processes unique to humans Seco specifying edifies those processes using machines (such as desktops, cobots, and other similar devices).

This is now possible thanks to developments in artificial intelligence (AI) and machine learning (ML), which can process enormous datasets and implement better levels of efficiency through self-learning and mending in response to environmental changes (Mandapuram et al., 2018). For example, machines may be "taught" to "listen" to different accents, dialects, situations, and emotions. They can also be trained to handle complex and arbitrary data readily available for data mining and machine learning.

CLOUD-BASED SPEECH RECOGNITION

The purpose of the utility model is to deliver a voice recognition system based on cloud computing consisting of a cloud computing terminal, a decision maker, a communication network, a local speech recognizer, and a voice recognition terminal.

Over the past few years, speech recognition technology has been increasingly incorporated into every industry. People can only control electronic devices with their voices because of technology known as speech recognition. For instance, it can make phone calls and perform computer operations using only its voice.

Traditional speech recognition technology, on the other hand, relies on installing locally-based voice identification software to carry out speech recognition; as a result, the terminal needs to have a more powerful central processing unit and contain a vocabulary that is as broad as is practically possible with enough storage space to spare. And because the technology behind voice-collecting terminal producers is constantly evolving, companies that create new speech recognition software are forced to upgrade the software and hardware of voice recognition terminals continuously. This has severely hampered the development of speech recognition applications.

A speech recognition system that is based on cloud computing, by voice recognition terminal, decision-making device, communication network, cloud computing end, and local voice recognizer form, it is characterized in that: after the voice recognition terminal carries out analog to digital conversion to the sound bite that collects, being sent to decision-

making device makes a strategic decision, and if decision value is less than the threshold value of regulation, decision-making deactivates. If the decision value is greater than the threshold value of the code, decision-making activate

SHORT HISTORY OF VRS SOFTWARE

Over many years, IBM has actively participated in the VRS industry. One of the pioneers in this field was James K. Baker, a researcher at IBM who, in the late 1970s, penned several studies on this technology. Dragon Systems was established when he and a few others decided to found their own privately held corporation. In the early 1990s, the company released a software package called Dragon Dictate, a discrete-speech package, which meant that a distinct pause needed to be inserted between each word uttered. Even though most users found the required respite to be bothersome, the software managed to win over a dedicated following, many of whom continue to use various versions of the program even to this day (Memon et al., 2018). 1997 marked the end of development for Dragon Dictate, while the same year saw the release of Dragon Narratively Speaking (often abbreviated as DNS), a new product from Dragon Systems.

Dragon NaturallySpeaking was, in fact, a component of a series of various products that Dragon Systems manufactured. These products were designed specifically for the medical and legal communities. It was the first continuous-speech package (you could speak at an average speed, apparently at up to 160 words per minute), and you could reportedly talk at that speed with it. Before the owners of Dragon Systems sold their company to a European company called Lernout and Hauspie, the product Dragon NaturallySpeaking was upgraded around five times. Lernout and Hauspie had an effect that competed with Dragon NaturallySpeaking called VoiceXpress. Lernout and Hauspie encountered various financial difficulties almost immediately after arriving in Asia, ultimately leading to insolvency. In 2001, a technological company called ScanSoft, which had previously been a spin-off of Xerox, purchased the remaining assets of VoiceXpress and Dragon NaturallySpeaking.

Additionally, IBM was involved in research about speech recognition and marketed a product line known as Via Voice. At present, ScanSoft is also the distributor of IBM's Via Voice and provides support for it. Additionally, Microsoft has been working on VRS for some years, and Bill Gates has highlighted the promising future of VRS in some lectures and books. However, they did not launch this feature until the Office XP package, which coincided with the introduction of Word 2002 (Gutlapalli, 2017a).

There are now some specialized companies operating in the sector. Speaking Solutions is a company that has worked with several other businesses in this industry, including Plantronics, the manufacturer of microphones, and sells training manuals and tip sheets for all of the different limited-edition packages. Speaking Solutions also sells limited-edition packages. In addition, they provide a sizeable quantity of instruction at various locations dispersed across the nation. As a result, many educational institutions focusing on business have begun educating students on using VRS software. A video instructional series for the NaturallySpeaking line of products has been developed by a smaller company and distributed on CD-ROM. The Unofficial NaturallySpeaking Public Forum is hosted by a firm known as KnowBrainer. This forum is a fantastic resource for information regarding technical issues. They have also recently started constructing laptops and desktop PCs with components designed to provide the highest possible level of performance for VRS.

NATURAL LANGUAGE PROCESSING (NLP)

Artificial intelligence, known as natural language processing, involves analyzing data derived from natural language and converting it into a syntax that machines can understand. Voice recognition and artificial intelligence shed light on fundamental facets of natural language processing models, improving human language recognition's accuracy and scope (Saady et al., 2014).

Voice recognition has developed into an essential part of our lives, from intelligent home appliances that can be programmed to follow commands and be turned on and off from a remote location to digital assistants that can set reminders, schedule appointments, to recognize a music file playing in a motel, and to search engines that answer with relevant search outcomes to user questions (Schwind, 1988).

Phone recognition and natural language processing enable businesses to transcribe phone calls and appointments and even interpret incoming calls. Apple, Google, Facebook, Microsoft, and Amazon are the digital giants that continue to take advantage of AI-backed speech recognition applications to create an exceptional user experience (Gutlapalli, 2017b). These applications allow companies to understand their customers' needs better.

HOW DOES VOICE RECOGNITION WORK?

Voice recognition is the process by which a computer can hear the words spoken by a person and then convert those words into a format that a machine can comprehend. After that, it is translated into text, voice, or another required configuration, depending on the ultimate purpose (Sackeim & Gur, 1985). The process of converting voice signals into data a machine can read is called speech recognition.

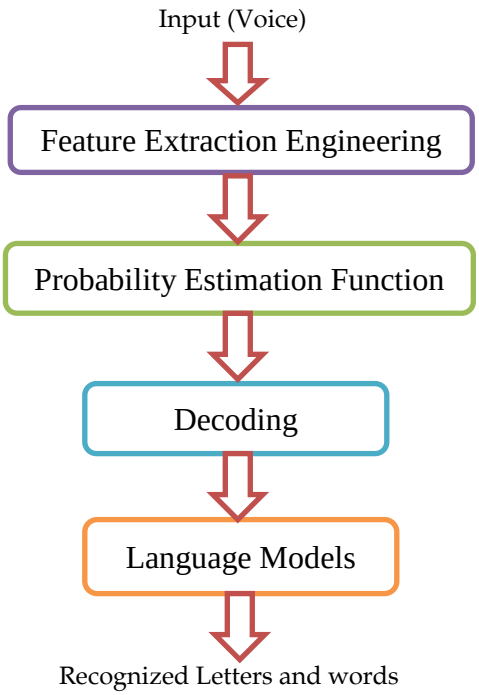

Figure 1: Flow chart illustrating how voice-to-letter and word recognition works

This can be accomplished by using either traditional rule-based methods or by implementing machine learning strategies. Since the 1960s, computer speech recognition software has typically relied on rule-based approaches. They are initially trained by hand, and maintaining that training over time requires much hard effort. The models in the machine learning technologies have been automated using a predefined collection of training data and require minimal upkeep as time passes. Although initial training is frequently expensive, they are more cost-effective due to their increased efficiency.

SYSTEM INTERFACE

The size and adaptability of the speech engine were the primary areas that caught our attention (Suvalsky & Boelman, 2012). We wanted to ensure we were not trapped in a speech engine that could not be updated as technology advanced, so we checked to ensure this was not the case. It was also vital to train the speech engine for a specific user, mainly if that user spoke a language that was not English. In addition, we needed to ensure that the speaker could be identified even if there were variations in the quality of their voice, such as what would occur when a radiologist had a cold.

Our primary focus was minimizing this change's effect on the users. We wanted to make sure that the new approach would be an overall enhancement to the methods currently being used so that we could limit the number of adjustments necessary for everyone due to switching from an analog dictation system.

As a result, we gave particular consideration to the following processes: the sign-on procedure, the editing procedure, the distribution procedure to referring physicians, the capability for our radiologists to interact with the system off-site, the adaptability of the system to accommodate residents, and the efficiencies gained from the enhanced microphone capabilities.

Again, we sought to acquire a system that could be interfaced with the PACS and information system already in place to lessen the degree to which our users would be affected by the impending shift. Because we use the IDX RIS, the company is providing our speech recognition software needed previous experience working with an IDX interface. We were searching for the capacity to link between the speech engine and IDXRad in a one-way and two-way way. Because of this, our radiologists would be able to get lists of examinations that had been finished in the RIS through the speaker system, and if necessary, they would be able to alter or sign the results in the RIS. We wanted to ensure that the voice product could be interfaced with the Radworks PACS system because we use it. We had high hopes that the speech engine could kick off the process of retrieving an image and that the microphone used for dictation could drive most of the image alteration activities that the radiologist needed.

ADVANCES IN VOICE RECOGNITION

People with disabilities now have access to a far more comprehensive range of options because of advancements in voice-recognition technology. We have always considered it hilarious when there are typographical errors, but the typos in our new software take the cake. Our dictation is being recorded into a microphone positioned directly in front of our lips and protruding from a headset with only one headphone. The microphone's sensitivity is such that it will interpret even a deep sigh as either a, of, the, or what. The computer types "aha" after being prompted by our husband's loud sneeze (achoo) from another nearby room. However, if I keep our breathing under control, pay attention to where our husband,

who suffers from allergies, is at all times, and enunciate each word carefully, the computer will usually understand everything we say correctly on the second try. Despite this, its initial readings bring back fond memories from our youth, when we frequently prayed to our kind Father before meals, asking him to bless the food for its intended purpose. According to our interpretation of the prayer, its meaning was as follows: "Gracious Father, please bless this food for its tender juices." Our personal computer interprets our voice in the same manner that a little child would. So training the machine to understand our terminology and pronunciation will take significant time and patience.

Due to the effects of multiple sclerosis (MS), we have been battling for the past 25 years, and our hands cannot type a whole document. To keep writing, we have started utilizing technology that recognizes our voice and categorizes our sentences. The voice-recognition technology that is now available is in its infancy, and as a result, it has given me both some humorous and aggravating opportunities. It can be challenging to find a voice that is familiar to readers. Finding an agent that a machine can recognize is considerably more difficult.

The dictation and command modes are the two operation modes available in voice-recognition software (Thodupunori & Gutlapalli, 2018). When speaking into a microphone, the most common way individuals utilize it is to dictate manner. However, to make changes in a text, such as changing the spelling or capitalization of a word, it is frequently required to access command mode. The usage of a cue word comes first in the process of entering command mode. Regarding our software, the term "computer" is the signal that tells the machine to put me into command mode. This signal was pre-programmed into the device by our team. We don't need to do anything more than say, "Computer move right (or left) one word," "Computer capitalize this," or "Computer select right (or left) one word" for the software to go into command mode and then immediately switch back into dictate mode. If we say, "Computer begin the spell," we will have successfully entered command mode for spelling, and the computer will now be ready to spell. After we are done, we say "computer return," and the program will immediately transition back into the dictation mode. The new technology can read our mind because it recognizes that some words, like to, too, and two, can be spelled in more than one way and offers me several alternatives in the correction box at the side of the text. Simply selecting the word with the correct spelling will trigger the technology to insert it into the paper automatically (Mandapuram, 2017b).

Voice-recognition software requires patience, word training, and trial and error. We can only create simple papers until we learn them, which will aid me greatly. MS drives me to write other than just typing. Voice-recognition technology lets me communicate as long as we can converse.

IBM ViaVoice for Mac has enhanced our productivity tenfold. Thanks to this fantastic new technology, our word-processing program lets us finish a book. Voice recognition has improved our email, and we're just getting started. Half the world is disabled or helps disabled people. Voice recognition opens the world to disabled people like me. Our Hungarian husband types less as we learn our new program. With patience, voice-recognition technology, and our husba produce siting produce quality writing. Despite the adjustments we must make in a paper written using voice-recognition software and the technology's development, we find it magical, fantastic, and worth the effort to learn and adjust (Petta & Woloshyn, 2001).

The new voice-recognition technology fascinates us, so we want to learn as much as possible about it. We generate quality documents despite our MS. We think speech recognition will replace keyboarding in the computer business soon. It's the future, worth the software cost, time, and effort to learn. Voice recognition, hardware, and peripherals may increase with faster and larger main memory (Mandapuram, 2016). We currently require two headsets: one for the voice-recognition microphone and one for a gyroscope to operate the mouse with head motions. This is bulky, and we look forward to wearing one headset and doing all our work hands-free. To improve voice recognition, a monitor-mounted camera might capture our lip motions (Gutlapalli, 2016). That camera could record our eye movements and blink rate to assess our alertness and productivity.

DIRECTIONS FOR FUTURE RESEARCH

One of the significant difficulties associated with VRS is the issue of dealing with noise in shared spaces. This type of shared setting is quite typical in large workstations, such as most of those seen in cataloging and acquisition departments. One option for resolving this issue is using a device known as a Sylencer or Stenomask, a small mask that can be held in hand and contains a microphone inside. This attachment is often used in courtrooms and law offices to take transcripts and depositions. It is also a potential answer to the noise and privacy concerns generated while speaking out loud in a venue primarily open to the public. Dragon Naturally Speaking Professional, the most advanced edition of the program, enables users to connect to a network. It might be a practical pilot project to install this program in a large department with several workstations, such as a department that categorizes items. This feature makes using the same speech profile across different workstations possible. One of the challenges presented by earlier software versions was the requirement to perform voice training on each machine; however, this is now a manageable issue (Waldrup et al., 2000). The effects of the various hardware and peripherals may have been tested more comprehensively. Even though the devices used in the tests were modest, office-oriented computers with minimal peripherals, the tests showed that having superior computing equipment makes a difference in the accuracy of dictation (Freeh et al., 2001). Performance could be improved by installing a faster hard drive, a better sound card, and a better microphone. An improved processor, such as the recently introduced 64-bit AMD chip, would also be beneficial (Lange, 1990). When attempting to log in to the app, the home automation system can take a picture of whoever is trying to access it. This is one example of a home security feature that can be adapted to include various additional components. Voice-Based Systems (VBS) performance is being improved by researchers using the Internet to manage home appliances rather than a Bluetooth module. Using the Internet in voice-based systems will control devices remotely from anywhere (Mandapuram, 2017a).

CONCLUSION

The author gives a system that can actualize real-time contact between hard-of-hearing individuals and intelligent robots or toys, as well as a design and research proposal for a voice recognition system of a brilliant example based on speech recognition and sensors, as well as interpersonal communication. Speech recognition will fundamentally alter the way people conduct business on the Internet and will, in the long run, come to define what constitutes world-class e-commerce. The next generation of the web will be characterized by speech recognition and voice XML. The speaker recognition technique enables us to realize a wide variety of applications. People who cannot do their jobs due to physical limitations can receive adequate assistance from this system. They can make use of this technology without

having to touch any buttons. In today's world, this technology is also used by cops working in CID. Its purpose is to catch criminals in the act of doing illegal things.

When one is already happy with their typing speed, why should they go to the trouble of learning this software, which takes some additional hardware and software and some training time? Even though the technology behind dictation has yet to reach the level of accuracy typically depicted in popular science fiction, it is helpful in various situations. For instance, people who have disabilities may find that speech recognition enables them to communicate with the outside world in ways that were previously impossible for them. For example, a person who types slowly using the "hunt and peck" method may be able to make efficient use of this technology to complete most of the document creation process more quickly than by typing. Last, some quick typists may use it for simple documents such as email while conversing with pals over the Internet or while writing their blogs. This chronic difficulty in our white-collar profession may be somewhat helped by applying this technology.

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