**CPU, Memory, And I/O Devices**

**I/O And The Working Principle: The Voice System**

**By Odiscious Dozier**

**Trident University**

INTRODUCTION

This is a discussion of the function of input and output devices and an analysis of the working principle (how efficient or what improvements have been made) of voice input and output systems with their present state of technology.

The essential parts of a computer are the Control unit and the Arithmetic and Logic unit (ALU), which are part of the central processing unit (CPU), and the primary memory (RAM). All non-essential parts of a computer are considered input and output devices or peripheral devices.

Devices like, keyboards, the mouse, printers, and monitors, are commonly known and used peripheral devices. Other devices that fall under the term, peripheral device, are the, I/0 port, programmable peripheral interface, programmable interrupt controller, DMA controller, communication interface, counter/interval timer, CRT controller, memory controller, floppy disk controller, and hard disk controller (Rom, 2007).

INPUT DEVICES

Input devices are a type of a peripheral device that are used to insert data or instructions into a computer. A keyboard, for example, is an input device that will translate or convert the user’s input into binary values that the computer can understand.

Pointing devices are input devices that have the specific job of empowering a user to select something on the computer’s screen. Various types of pointing devices are the, mouse, track ball, light pen, touch screen, graphic tablet, and joystick (Rom, 2007).

Voice input systems like the microphone take in audio and can be recognized, via software, to perform preprogrammed tasks or to serve as a means to conduct search. Google, for example, has voice recognition software that will allow you to speak into the microphone on your machine to utilize their search engine; as opposed to, inserting text with the keyboard.

OUTPUT DEVICES

Output devices are a type of peripheral device that are used to translate or convert data, instructions into usable material that can be digested by the user; for example, a printer will print words on paper after converting data from the computer. In some cases, an output device’s data, instructions will be converted into a form that can be used as input to another device or piece of equipment or machine.

There are certain devices that have the ability to act as input and output devices. Touch screen monitors, tablets, and smart phones are all devices that allow its surface to, take in data from the user, perform some calculation, and return converted data into user digestible information.

WORKING PRINCIPLE ANALYSIS

INPUT SYSTEMS

One of Microsoft’s core business lines is its Office Suite of products. Microsoft Word is a part of this sweet and Microsoft continually, adds, modifies, and upgrades, this product. Their goal is to make it easier for the user to not only use the product, but to become so familiar with it that it is used as a standard business practice across the globe.

One of the many focuses Microsoft has had with their Word product is with helping the user accomplish their goals of typing faster. Auto word correct is a feature that identifies words as their being typed in and if there’s an error detected, Word will automatically fix it with some grammatical considerations.

It’s not perfect, but it’s a tool that certainly does help improve the average person’s typing speeds. Apart from increasing one’s own skills at typing, the only other way to increase speed with Human Computer Interaction (HCI) is to eliminate the keyboard all together and simply talk into the machine(s).

In 1982, Dragon systems was founded by Drs. Jim and Janet Baker. By 1995, Dragon systems released discrete word dictation-level speech recognition software – the first company to do so. Over the years it has become a well-known company, in the tech industry, for its speech recognition software and by fiscal year (FY) 2014 non generally accepted accounting principles (non-GAAP) revenue was approximately $2.0 billion (Nuance Fast Facts, n.d.).

In today’s market, there are several different voice recognition software to choose from. This section analyzes the top 8 offerings from various companies, based on the data, *see Table 1*, retrieved from http://voice-recognition-software review.toptenreviews.com/.

Table 1: Analysis Criterion for top 8 Voice Recognition Software Products

|  |  |  |  |
| --- | --- | --- | --- |
| **Dictation** | **Features** | **Commands** | **Help & Support** |
| Accuracy Score  Select Text  Correct Text  Format Text  Move Cursor  Punctuation | Customizable Commands  Web Search  Voice Profile  Displays Spoken Text  Mute or Microphone Off  Microphone Status Icon  Voice Training  Additional Training  Accent Support  Headset and Microphone included  Compatible with Bluetooth Headsets  Voice Transcription  Section 508 Certified | Open and Close Programs  Navigate Programs and Folders  Switch or Minimize Windows  Change Settings | Frequently Asked Questions  Online Chat  Telephone Support  Email Support  Tutorials or Demos  User Manual or Guide |

In the following, these offerings are listed in order from the top of the top best to the least of the top best:

With a Dictation accuracy score of 95%, Dragon Professional leads all other voice recognition software. It also offers each of the criterion from *Table 1*.

With a Dictation accuracy score of 90%, Dragon Premium falls into 2nd place. Apart from the Section 508 Certified criterion, this software fulfills all the same criterion Dragon Professional does.

With a Dictation accuracy score of 88%, Dragon Dictate falls into 3rd place. It also offers all the same criterion as Dragon Professional apart from the Section 508 Certified criterion.

With a Dictation accuracy score of 86%, Dragon Home falls into 4th place. This software offers all, but three criterion; which are, Compatible with Bluetooth Headsets, Voice Transcription, and Section 508 Certified.

With a Dictation accuracy score of 76%, Voice Finger falls into 5th place. It has all the Features in the criterion except the following: Headset and Microphone Included, Compatible with Bluetooth Headsets, Voice Transcription, and Section 508 Certified. Email Support is the only criterion offered under Help and Support. All other criterion are met/offered.

With a Dictation accuracy score of 64%, ViaTalk falls into 6th place. Under the Dictation criterion, ViaTalk does not offer Select Text and Format Text. The Features it comes with are, Web Search, Voice Profile, Displays Spoken Text, Mute or Microphone Off, Microphone Status, Headset and Microphone Included, and Voice Transcription. Under the Command criterion all are offered, except the ability to Navigate Programs and Folders option is only available on PCs. Under the Help and Support criterion, Online Chat, Tutorials, and User Manual or Guide, are not available. All other criterion are met/offered.

With a Dictation accuracy score of 60%, e-Speaking falls into 7th place. Under the Dictation criterion, e-Speaking does not offer, Select Text, Format Text, and Punctuation. The Features it comes with are, Customizable Commands, Web Search, Voice Profile, Displays Spoken Text, Mute or Microphone Off, and Voice Training. Under the Help and Support criterion, there is not an option for Online Chat. All other criterion are met/offered.

With a Dictation accuracy score of 72%, Tazti falls into 8th place. Under the Dictation criterion, Tazti does not offer Select Text and Format Text. The Features offered are, Customizable Commands, Web Search, and Mute or Microphone Off. Under the Help and Support criterion offerings included are, FAQs, Email Support, and User Manual or Guide. All other criterion are met/offered.

OUTPUT SYSTEMS

Augmentative and alternative communication was born in the1950s. It was a response stimulated from the need of patients that had lost their ability to speak after surgery (Zangari et al, 1994).

Speech generating devices (SGDs) or voice-output communication aids (VOCA) are electronic devices that enable a user to select messages they wish to have read aloud by the device (Speech Generating Devices (SGD), 2010). Voice Amplifiers, TextSpeak Speech Generating Keyboards, and Talk Tablets are just a few of the devices that are currently available to the general public. Their prices vary greatly based on features and capabilities.

Based on the information found at, <http://assistivetechnology.about.com/od/AugmentativeCommunication/tp/Top-10-Alternative-And-Augmentative-Communication-Aac-Apps.htm> the top 10 Applications for iPad vary in price and ability with a range starting at free and topping out at $189.99.

REFERENCES

Nuance Dragon Naturally Speaking, Medical Transcription, Voice Recognition Software. (n.d.). Retrieved August 20, 2015, from <http://www.dragon-medical-> transcription.com/history\_speech\_recognition\_timeline.html

Nuance Fast Facts. (n.d.). Retrieved August 20, 2015, from <http://www.nuance.com/company/company-> overview/fast-facts/index.htm

Reynolds, C. and P. Tymann Schaum’s Outline of Principles of Computer Science

(Schaum’s Outline Series). (New York: McGraw-Hill, 2008)

[ISBN 9780071460514].

Rom, B. (2007). Chapter 7: I/O Devices, Microcontrollers, I/O Processors and Arithmetic Processors. Computer Fundamentals, Architecture and Organization. New Age International, New Delhi

Speech Generating Devices (SGD). (2010, January 7). Retrieved August 24, 2015, from https://www.bridgeschool.org/transition/multimodal/sgd.php

The Best voice recognition software of 2015 | Top Ten Reviews. (2015). Retrieved August 21, 2015, from <http://voice-recognition-software-review.toptenreviews.com/>

Zangari, C.; Lloyd, L.; Vicker, B. (1994). "Augmentative and alternative communication: An historic perspective". Augmentative and Alternative Communication 10 (1): 27–59.