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<u>Week 4 Assignment</u>
Using APA format, give short answers to each of the following:

1.What are the additive colors? What are the subtractive colors? What types of I/O devices use each kind of color?

The additive colors are Red, Green, and Blue (RGB). Adding combinations of these three colors produces other colors. The subtractive colors are Cyan, Magenta, and Yellow. They are named such for the absence of color each represents, CMY is the inverse of RGB.

Printed media use CMYK and digital media work in RGB. This is due to the nature of the two medium. A white piece of paper is reflecting all the colors in the spectrum; therefore, colors added to the paper are thought of as blocking out the colors in white we don't want displayed. Monitors, on the other hand, are generating color from a black screen, which is the absence of color; therefore, colors must be added to the nothingness (Waldman, 2004).

Waldman, Harry, *RGB vs. CMYK*, Printbuyers ONLINE, Jun 14, 2004. Retrieved Feb 8. 2009 from harrywaldman.com at:
http://www.harrywaldman.com/June%2014%2004%20Pbol.html

2. Describe the process of automated speech recognition. What types of interpretation errors are inherent to this process?

Speech recognition involves the detection of phonemes, individual sounds, and translating them into combinations of letters in the alphabet. Sound is captured by the computer and translated into digital patterns, which are translated into words. Real time speech recognition is very CPU-intensive. There is also the issue of similar sounds representing different letters, such as "dumb" and "sum." Additionally, different people speak differently; therefore, speech recognition software must learn to adapt to the dialect of the current user. Currently, developers are working on software that will attempt to predict what we are saying and attempt to finish our sentences (Marks, 2009).

Marks, Paul, *Innovation: Speech Prediction Software*, New Scientists Magazine, Feb 3 2009. Retrieved Feb 8, 2009 from newscientist.com at:
http://www.newscientist.com/article/dn16528-innovation-speech-prediction-software.html?DCMP=OTC-rss&nsref=online-news

3. Describe the components and functions of a typical sound card. How is sound input captured? How is speech output generated? How is musical output generated?

Sound cards include an amplifier, microphone, and speaker/headphone jacks. Depending how elaborate the card is, it may also include stereo converters, MIDI synthesizer, and

more powerful amplifiers. Speech is generated by using a collection of word / phoneme samples that are put together to form words. With MIDI, music is generated with sound samples played in synthesizer fashion, the same sound sample played at different frequencies and pitch to generate different notes.

4. Describe the various types of optical input devices. For what type of input is each device intended?

Mark Sensors and Bar-Code Scanners read patterns in bar codes, that translate into digital information. Optical scanners generate bitmap representations of printed images, while Optical character recognition technology uses optical scans with software to read printed words in paper into ASCII or Unicode formats. Digital cameras perform the tasks of video and picture cameras, capturing images directly into digital format.

5. What is JPEG encoding? What is MPEG encoding?

JPEG encoding is a type of bitmap compression used for images that are too complex for vector lists. JPEG is best used for compressing digital photos rather than pictures with text. JPEG offers a various levels of lossiness depending on the amount of compression desired (Lane, 1999).

MPEG stands for Moving Picture Experts Group, and represents another standard in audio and video compression. This is a lossy compression as well.

Lane, Tom, *JPEG image compression FAQ*, FAQ Archives, Mar 14 1999. Retrieved Feb 8 2009 from faqs.org at: http://www.faqs.org/faqs/jpeg-faq/part1/

MPEG, *The MPEG Home Page*, Retrieved Feb 8, 2009 from chiariglione.org at: http://www.chiariglione.org/mpeg/

2.Describe the process of automated speech recognition. What types of interpretation errors are inherent to this process?
Answer: Speech recognition requires the conversion of sound waves into a digital representation, the recognition of primitive speech components, and the recognition of higher level speech components. While the first process is relatively straightforward, the latter two are relatively difficult problems in pattern recognition.

3.Describe the components and functions of a typical sound card. How is sound input captured? How is speech output generated? How is musical output generated?
Answer: A typical sound card accepts analog microphone input and converts it a stream of digital audio data. It also accepts MIDI or digital audio from other computer system components and generates sound output by digital to analog conversion and/or sound synthesis. A sound card may also include an audio amplifier to generate a signal usable

by headphones or speakers. Speech output is generated by converting a digital audio stream produced or retrieved by software) into an analog sound wave. Musical output may be produced by digital to audio conversion of digital audio data or by generating audio data based on MIDI control input.

4.Describe the various types of optical input devices. For what type of input is each device intended?
Answer: Mark sensors scan a page for darks marks at predetermined locations. They are generally used for surveys and tests where each question has multiple answers and each question and answer is assigned a unique mark location. A bar code scanner shines a scanning laser on a surface an looks for variations in reflected light as the laser moves across a pattern of dark and light bars of alternating size (height or width). Different bar sizes correspond to different numeric inputs. Bar codes may also be two dimension patterns of dark dots or blocks. Bar codes are primarily used for tracking inventory items and goods in transit. An optical scanner shines white light on a page or other surface, detects the reflected light with a matrix of photodetectors, and generates a bit map representation of the scanned image. Optical scanners are the core technology of input devices such as fax machines, copy machines, scanners, and still and motion digital cameras. All are used to convert still or moving images into appropriate digital representations. Optical character recognition (OCR) devices combine an optical scanner with software or firmware that interprets patterns within the scanned images and text. OCR devices are used to convert printed textual into an equivalent digital form.