Journal Entry #2 (Week 09/13 – 09/26)

Preliminary Research on cameras with OCR as a reference:

Example #1: Onyx OCR

Reference: https://store.freedomscientific.com/products/onyx-ocr


- Comprises of two different cameras
- Fixed OCR camera on the left
- Magnifier camera attached to top of monitor

Example #2: Joyusing V500 Document Camera

Reference: https://www.amazon.com/JOYUSING-Document-Auto-Focus-Capturing-Flexible/dp/B07D58LBKV

- OCR Function: ABBYY OCR Technology
- 8.0 Megapixel camera, 100x digital zoom function
- Autofocus lens

Conclusion: The main cameras that were on the market that incorporated OCR were document cameras. These cameras will not be ideal since the camera we want to reference has to be mobile and not in a fixed position.

B50R001 OCR Readers

- Resolution: 736 × 480 Pixel
- Working Range: ≥ 20 mm
- Service Life: 100,000 hours
- Working Distance: 20 mm, 100 mm, 200 mm

NOTE: The working range for this OCR readers will be a problem, so it will not be ideal along with its working distance.

NOTE: Project shifted to Keyboard

Internal Structure of a Keyboard

Reference: https://computer.howstuffworks.com/keyboard1.htm

- Keycaps: A plastic covering on top of each key switch that identifies the letter or symbol input into the computer.

- Key matrix: The key matrix is a grid of circuits underneath the keys.

The key matrix

- In all keyboards, each circuit is broken at a point below each key

- Pressing a key will press a switch, completing the circuit and allowing a small amount of current to pass through
- The mechanical action of the switch causes some vibration, called bounce, which the processor filters out
- The processor in the keyboard analyzes the key matrix and determines what characters to send to the computer
- When the processor finds a circuit that is closed, it compares the location of that circuit on the key matrix to the character map in its read-only memory (ROM).
- A character map tells the processor the position of each key in the matrix and what each keystroke or combination of keystrokes represents.

Keyboard Switches:

- Keyboards use different switch technologies that are mechanical or capacitive
- Mechanical key switches: rubber dome, membrane, metal contact, foam element
- Rubber dome switches are common, membrane keyboards do not have a good tactile response
- Foam element and metal contact are less common

Keyboard Connections to Computer:

- Many keyboards connect to the computer through a cable with a PS/2 or USB connector
- Wireless keyboards connect to the computer through infrared (IR), radio frequency (RF) or Bluetooth connections.
- Wireless keyboards require a receiver, either built in or plugged in to the USB port, to communicate with the computer.
- Wireless keyboards have an AC power connection or use batteries for power
- The signal from the keyboard is monitored by the computer's keyboard controller regardless if wireless or wired

Capacitive Keyboard

Reference:

https://www.mechkeybs.com/learn/capacitive-keyboard/

- Uses a change of capacitance on a keyboard's capacitor pad to detect a pressed key
- It is made up of a capacitor membrane which, when pressed, triggers an electrical response.
- Uses the electric impulse on the capacitor membrane to receive and register the keystroke.

Capacitive Switches:

Reference: https://www.nelson-miller.com/pros-and-cons-of-capacitive-switches/

- Non-mechanical
- Current flows through all parts of the key matrix
- No problems with bounce since the two surfaces never come into contact
- Longer lifespan when compared with mechanical switches

- Require direct contact with a conductive object to operate
- Touch-controlled electrical switch that operates by measuring change in capacitance
- Operates in a similar manner of a capacitive touched phone
- When a person's finger touches a switch, a small electrical charge is transferred from your body to the switch
- The human body is the conductor as it is transferring energy
- Touching a button with a bare finger will draw some of this electrostatic field to a person's body, thus changing the capacitance.
- This causes a change in capacitance as the charge that is transferred changes the capacitive switch's electrostatic field
- This change allows the switch to identify where the change occurred

Pros of Capacitive Switches:

- Able to withstand harsh environments
- Supports integration of LED backlights
- Easy to use

Cons of Capacitive Switches:

- Expensive
- May not work with gloves

NOTE: Capacitive switches will be used due to the fact they are easy to use and long lasting despite the cost. Capacitive switches will replace the keycaps and