Deliverable D - Conceptual Design

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**Objective**

The smart glasses will provide a clear view of the work field to the senior employee, while the junior employee will receive visual cues and annotations through the lens. The video feed between the two must be reliable and in real-time.

**Design Criteria**

**Clear feed between users:**

The feed between the video source and the receiving end must be seamless to ensure real-time communication and avoid timing-based errors. For precision, the display should be clear with high-resolution.

**Battery efficient:**

The design must be able to support a longer battery-life, so the glasses can be used on a long workday and are reliable in times of emergency.

**Visual cues and annotations:**

Alongside audio help, the glasses will allow the mentor to give the junior employee visual aids, such as annotations, gestures, or pertinent data/images.

**Unique experience through use of an API:**

The design will use Shabodi’s API’s and will demonstrate their capabilities to give the user a unique experience that allows them to best complete their job.

**Conceptual Design (Visuals)**

**Smart glasses with visual cues and annotations seen through the lens**

**Description:**

A small camera on the frame of the glasses (one - centered, or two - each end) shares video feed to a remote senior employee. Junior employees will receive both audio and visual cues.

**Benefits:**

* A clear lens allows a straight view to the work field for the junior employee, allowing for more precise hands on work.
* Annotations and visual cues allow the mentor to communicate and guide the junior employee more efficiently (Augmented Reality)
* The video feed transmitting only to one other (the senior mentor), will require less power and prolong the battery life.

**Drawbacks:**

* Limited surface area on the lens will limit the amount of annotations or visual cues the senior employee can send back to the junior employee.
* Due to limited size of lens, annotations may block the view

**Augmented reality goggles (AR)**

**Description:**

These goggles/glasses take a video feed from a camera on the outside frame and transform it with pertinent visual information, guidance from a mentor, or any other relevant data. The feed is shared to both the goggles and the senior mentor. Provides more surface area for the video feed, and offers space for features such as a live image of the senior mentor (allows for visual gestures, face to face contact), annotations of audio feed, and more possibilities.

**Benefits:**

* The senior and junior employee see the same video feed at the same time for precise real-time connection.
* Annotations of the visual feed allow the junior employee to read (and re-read if needed) the directions received from the senior employee. Beneficial if there are audio constraints due outside noise or if the senior employee is unable to communicate verbally at that moment, text can be sent to the junior employee’s screen.
* Senior employee can upload feed to the junior’s screen and share documents, images and more (similar to screen-sharing)
* A larger degree of awareness is possible, and can notify the user of nearby workers or workplace hazards.

**Drawbacks:**

* Bulkier than traditional glasses.
* A direct view (through a clear lens) may be preferred by certain users doing hands-on work. A survey could be done to determine this.
* The video feed will be sent to the AR screen as well as the senior employee. This will require more power and will diminish the battery life.

**Smart glasses with layered information display**

**Description:**

This design would provide a simple view for the worker that puts priority information in the front view of the lens. Only necessary items will be displayed unless set up to be otherwise. Less pertinent information can be layered background, or only shown upon command by the user.

**Benefits:**

* Displaying only the most necessary information (annotations and cues from the mentor) allows the user to focus most on exactly what is at hand.
* Most clear view of the field of work
* Less battery energy consumed

**Drawbacks:**

* Less help is readily available
* Will rely mainly on audio cues from the mentor

**Evaluation chart:**

**Rating in terms of compliance with criteria, 3 being most and 1 being least.**

| **Design criteria** | **Smart glasses with extensive visual aid** | **Smart goggles that utilize AR** | **Simple smart glasses with layered information display** |
| --- | --- | --- | --- |
| **Visual aids** | **2** | **3** | **1** |
| **Reduced battery consumption** | **2** | **1** | **3** |
| **Size** | **3** | **1** | **3** |
| **Unique experience** | **2** | **3** | **1** |
| **View of work field** | **3** | **2** | **3** |

**Conclusion**

The design developed must connect workers in real-time while providing them with a unique experience to enhance their working conditions. This will be accomplished by developing smart glasses that allow the junior employee to receive visual cues, such as gestures or demonstrations of the task at hand. The amount of aids in the field of view as well as the visual design of the glasses can be determined by the user’s needs, and can be altered when their needs change through a work day.

Sources

<https://televu.ca/>

<https://ohanaone.one/tech/#backpack-emr>

<https://www.vuzix.com/en-ca/pages/vuzix-ultralite-oem-platform>

<https://www.vuzix.com/en-ca/pages/smart-glasses>

Important note: we don’t want glasses fogging up, so if they could be tight to the face this would be ideal





