Our Audio-based Navigation Glasses will provide the visually-impaired and blind with an inconspicuous way to stay informed of their surroundings, harnessing a camera and sensors to reliably detect nearby objects, relaying the most relevant information about signs and oncoming obstacles via positional audio cues.

**Ethics statement:** Our team respected all known copyright and licensing requirements in the design of our device.

(Some symbols in this poster © Twemoji project, used under license CC-BY 4.0)

---

**Functionality**

- **Spatially-aware captioning of pedestrian traffic signs**
  - **Flexible:** in a variety of situations, recognize common symbols and signs: stop, pedestrian crossing, no entry, railroad crossing, falling back to color/shape
  - **Practical:** accurately detect objects and obstacles within one second without requiring network connectivity
  - **Portable:** lightweight, comfortable to wear for long walks, and battery-operated with automatic low-power mode
  - **Unobtrusive:** enable user to hear environment while audio cues are played via bone conduction, compact and adaptable to any social environment, configurable importance threshold to limit interruptions

---

**Software**

**Handling Recognized Objects**

- **Object detection:** For each still image from the camera sensor, regions of interest are selected by computing saliency. Within these regions, SURF feature detection finds and describes keypoints (e.g., edges, corners), comparing to stored keypoint descriptors derived from an image collection of pedestrian signs.

- **Gesture control:**
  - **Look up:** Describe details of nearest object
  - **Tilt head:** Toggle verbosity of audio output: “All information”, “Important only”, “Silence”

---

**Hardware**

- **Camera**
- **Wire bridge (hidden if possible)**
- **Clear or tinted lenses, acts as regular glasses (possibly swappable)**
- **Area in front of eyes kept clear to not interfere with partially-sighted users**
- **Shielded, cloth-covered wire (for comfort)**
- **Wire junction**
- **Bone conduction speaker, right (inside edge)**
- **Left side**
- **Bone conduction speaker, left (inside edge)**
- **Right side**
- **Bone conduction speaker, left (outside edge)**
- **Bone conduction speaker, right (outside edge)**
- **Inertial Measurement Unit (gyroscope + accelerometer)**
- **Camera**
- **Short tether to processor/battery**
- **Additional camera**

---

**Conclusion**

Our Audio-based Navigation Glasses will provide the visually-impaired and blind with an inconspicuous way to stay informed of their surroundings, harnessing a camera and sensors to reliably detect nearby objects, relaying the most relevant information about signs and oncoming obstacles via positional audio cues.

**Ethics statement:** Our team respected all known copyright and licensing requirements in the design of our device.

(Some symbols in this poster © Twemoji project, used under license CC-BY 4.0)