Mini Project 2

Camera application for visually impaired individuals

Deadlines

- September 16: Project announced.
- September 18: Work on project day (no class).
- October 14: Project demo day.

Background

- When we think of cameras and photography, we falsely believe that only visually able individuals should be able to take photographs. In HCI we talk about making interfaces that are accessible to all users.
- Companies have recognized this issue and released tools for visually impaired users, for example Google released Guided Frame that uses voice commands and haptic feedback to help visually impaired users take photos.

Your Task

- You will create a desktop applications that enable visually impaired users to take selfie images using only speech-based commands.
- The applications can be created using any programming language.

Workflow

- The display should be divided into 4 quadrants and a center section, hereby named top-left, top-right, bottom-left, bottom-right, and center.
- The user will specify the position where they want their face using commands such as: “top left”, “top right”, “bottom left”, “bottom right”, and “center”. The commands will be provided as speech inputs only.

Workflow

- Your application should guide the user to move their face to the desired location using only speech-based commands.
- Once the user’s face has appeared in the desired location; your application should take an image and store it.

Workflow

- Your application must check for what percentage of the face is in the desired location before taking the image.
- Your application should also make sure the face is facing the camera and not at an off-angle position.

Helpful Links

- Face detection: https://ai.google.dev/edge/mediapipe/solutions/vision/face_detector
- Text2Speech: https://huggingface.co/tasks/text-to-speech
- Face Detection Example: Face Detection with Python using OpenCV Tutorial | DataCamp

Test Cases for Demo Day

- Test case 1: I will specify center as the position where I want my image to be, however, my face will be in a randomly selected position of either top-left, top-right, bottom-left, or bottom-right.
- Test case 2: I will specify center as the position where I want my face, however, my face will be off screen outside of the view of the camera in randomly selected location of top-left, top-right, bottom-left, or bottom-right.

Grading Criteria

- How intrusive the voice commands are, points will be lost if the voice commands are too frequent or not frequent at all. There is no quantitative criteria for what too frequent or not frequent is.
- How quickly does the application navigate the user from their starting location to the desired location. Points will be lost if the time taken for each test case exceeds 30-seconds.

Grading Criteria

- Whether the face is facing the camera. Points will be lost is the face is rotated too far when the image is taken.
- What percentage of the face was used to determine if the location was reached. Points will be lost if only a small part of the face is used and the chosen location and final image location do match.