

# 6.811 Principles and Practices of Assistive Technology

## Electronic Access Lab (Part 1)

### Station A: Head Tracker/Eye Tracker

Head tracking allows the user to control a mouse cursor by repositioning the head. Our devices track head location by detecting a small reflective dot affixed to a pair of glasses. Our eye tracker is a camera that detects the locations of your eyes and (after a short round of calibration) estimates your gaze direction and its intersection with the display.

In this activity, you will use combinations of tracking hardware and software. We have two head trackers and one eye tracker connected to the laptops. The head tracker computers each have a different software package for configuring the behavior of the camera.

### This Lab

There are only a few laptops with tracking hardware set up. Whenever a laptop comes free, you should do the corresponding section, use “Camera Mouse,” “Eye Tracking” or “NaturalPoint Head Tracking.”

When none of the laptops with tracking hardware is available, follow the instructions in the “Chatting in IRC” section on your own laptop or one of the provided laptops. The idea is to have conversation happening in the IRC channel at all times that students are using the tracking hardware.

### A. Camera Mouse

Camera Mouse is a free program that enables you to control the mouse pointer on your computer screen just by moving your head. You can also try downloading this onto your computer if you wish to.

Read instructions here: <http://cameramouse.org/downloads/CameraMouse2014Manual.pdf>

1. Click on a location on your face to start tracking. We recommend eyes or center of glasses (something pretty distinct).
2. Make sure that Point-N-Click is open and then press Ctl + F9 to start the Camera Mouse.

### Explore

1. **Experiment with Point-N-Click.** There are a lot of buttons in the Point-N-Click toolbar. Experiment with them to see which you find most useful.
2. **Try some regular desktop actions.** Move windows around and drag icons around on the desktop.
3. **Follow the instructions in the “Chatting in IRC” section below.**

### B. NaturalPoint Head Tracking

1. **Make your head trackable.** Either put on the provided, lense-less glasses that have the reflective head-tracking stick on them, or put one of the provided stickers on your glasses or face.
2. **Ensure that the NaturalPoint head tracker is connected to the laptop via USB.**

3. **Launch SmartNAV from the Start menu.** The green light on top of the head tracker should light up when your reflective sticker is in its field of view. The mouse cursor should start moving as you move your head.
4. **From here on, try to use only the head tracker!** You can left-click by pressing the left Windows key on the keyboard, and right-click by pressing the Context Menu key on the right half of the keyboard (to the left of the control key).
5. **Launch Dasher from the Start menu, then type some text.** Click once in the Dasher window to start, then move the mouse to steer the Dasher cursor into the sequence of letters you wish to type. Click again to stop typing. The letters will automatically be typed into the last window you had focused.

## Explore

1. **Try “Relative” and “Absolute” cursor positioning.** Open the SmartNAV window. Try changing the "Cursor Positioning" setting back and forth between "Relative" and "Absolute" and observe the effect.
2. **Try some regular desktop actions.** Move windows around and drag icons around on the desktop.
3. **Follow the instructions in the “Chatting in IRC” section below.**

## Chatting in IRC

Follow these instructions when no laptop with tracking hardware is free.

1. **Open Chrome and visit <http://lightirc.com/start/>** (If the Internet isn't working today, go to the Backup Text section below and do that instead.)
2. **When it connects, type “/join #ppat”** and press enter to join our chat room.
3. **Chat!** Send messages by pressing enter or clicking the send button that’s just to the right of the input box, whichever is easier. Talk about things that interest you:
  - Your favorite classes
  - Your most dreaded finals
  - Hobbies
  - The weather

Keep the conversation going so that people using the tracking hardware have a chance to participate.

## Alternative Instructions

1. **Launch Notepad from the Start menu.**
2. **Type the following passage:**

Some say the world end in fire,  
Some say in ice.  
From what I’ve tasted of desire  
I hold with those who favor fire.

## Topics to think about:

- What usability issues did you encounter with each of the tracking devices? What was easy to do and what was more difficult?
- How does using a head/eye tracker affect your experience in the chat room?
- Are there ways in which app UIs could be better suited for use with head/eye trackers?
- How comfortable did you feel using each device by the time you were done?

## B. Eye Tracking (Currently Does NOT work)

Follow these instructions when the eye tracking laptop is free. The eye tracker looks like a Kinect and rests on the keyboard looking up at the user's eyes.

1. **Ensure that the eye tracker is connected to AC power.**
2. **Launch QuickACCESS from the Start Menu** (Start > QuickACCESS Beta). This is the software for enabling eye-tracking-friendly control of the operating system.
3. **Ensure that the eye tracker is connected to the laptop via Firewire.**
4. **Place the eye tracker on the keyboard and direct it up toward your eyes.** Both green lights beneath the lens will light up when your eyes are in view and the camera is the proper distance away.
5. **Start calibration.** Moving the mouse to the blue haze on the left corner of the screen, then click the first icon in the column that has an "eye" at the top. Then follow the moving target with your eyes. (*When you need to recalibrate, click the second icon in that column that looks like a mouse pointer pointing at one of the calibration targets.*)
6. **Start the on-screen keyboard.** Aim the cursor at the blue haze (you may need to look past the edge of the screen) and click the keyboard icon by closing your eyes for about a second. Resize the keyboard to fit the screen. (You may find this difficult, and may need to use a mouse to start the keyboard.)

**From here on, try to use only the eye tracker!**

## Explore

1. **Practice clicking.** Depending on the current setting, you click by closing your eyes for about a second, or holding the cursor at the same screen position for a second or two.
2. **Explore the settings.** Activate the blue haze and click the gears icon in the third column. Change any setting you're curious about, but please change it back when you're done.
3. **Try hiding the mouse cursor.** Click the fourth icon in the fourth column of the blue haze menu. It looks like a "No Mouse Cursor" sign. (Be sure to turn it back on afterward.)
4. **Try some regular desktop actions.** Move windows around and drag icons around on the desktop. Go to the desktop by clicking the fourth icon in the third column that looks like a desk top. Then use the dragging actions in the first column of the blue haze menu.
5. **Follow the instructions in the "Chatting in IRC" section below.**

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