OSP Demo - Gesture Detection Using IMUs

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Introduction

The Open Speech Platform hardware mainly consists the Processing and Communication Device (PCD). It features 3 IMUs: one in the PCD, one in the left ear-piece, one in the right ear-piece.

To show IMU functionality, the PCD can recognize a “flip” detection to toggle beamforming on/off.

Requirements

1. **Your PCD, with OSP software already successfully installed.** Installation steps are covered in greater detail in the “OSP Hardware - PCD Setup” guides (for macOS/Linux, for Windows).
2. **A browser-enabled device that can launch OSP software’s graphical user interface, the Embedded Web Server (EWS).**

It is also recommended that you refer to the “Beamforming” Section of the OSP Software Manual.

Part 1 - Enabling Gesture Detection

1. Have the device switched on.
2. Open a terminal and navigate to the directory of the PCD release using the following commands in order.
    a. For macOS/Linux:
        i. `cd [PATH_TO_“pcd-[date]”_FOLDER]`
        ii. `./pcdtool conn`
    b. For Windows:
        i. `cd [PATH_TO_“pcd-windows-[date]”_FOLDER]`
        ii. `.\pcdtool.exe conn`
3. Enter the `print_mode` command, to find the assigned IP address number

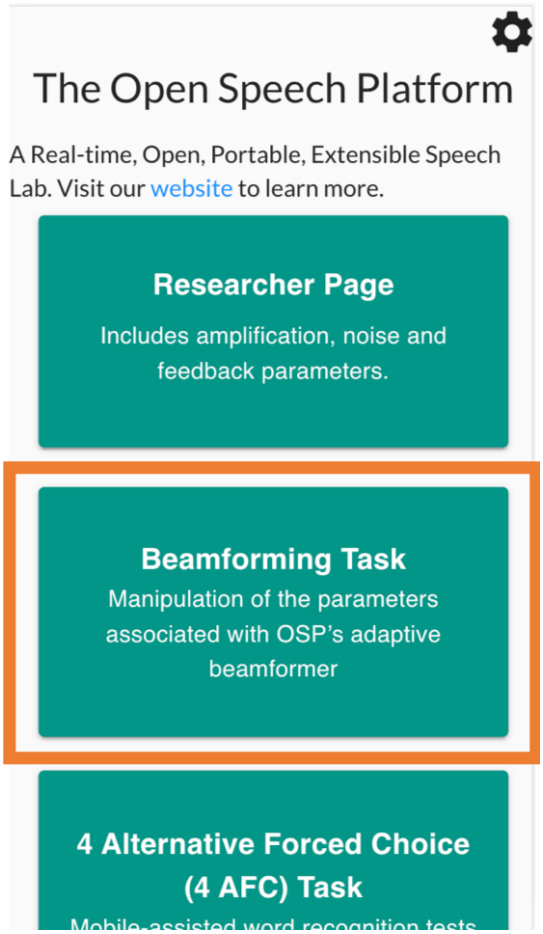
   a. If the PCD is in Hotspot mode, the IP address should be “192.168.8.1”.
   b. If the PCD is in Hotspot mode, the IP address will be based on the wifi network that you have connected to. This address should appear to the right of "inet" after the **`print_mode`** command.

4. Finally, open your browser and enter the following into the search bar: **`http://[YOUR_IP_ADDRESS]:5000`**

   For example, if your IP address is “192.168.8.1”, you would enter “**`http://192.168.8.1:5000`**”

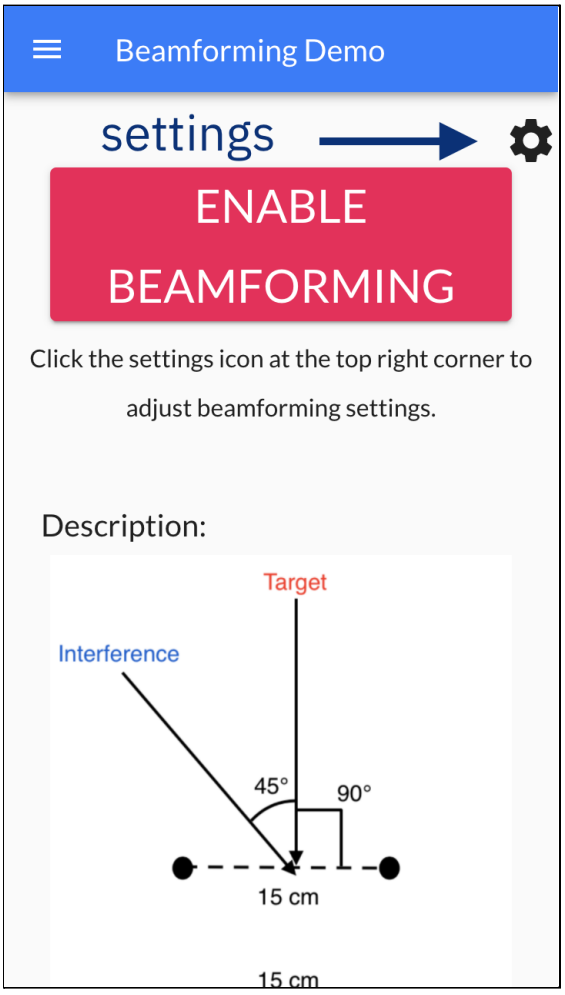
   The browser search bar should say “http://[YOUR_IP_ADDRESS]:5000”.

5. Select “Beamforming Task”.

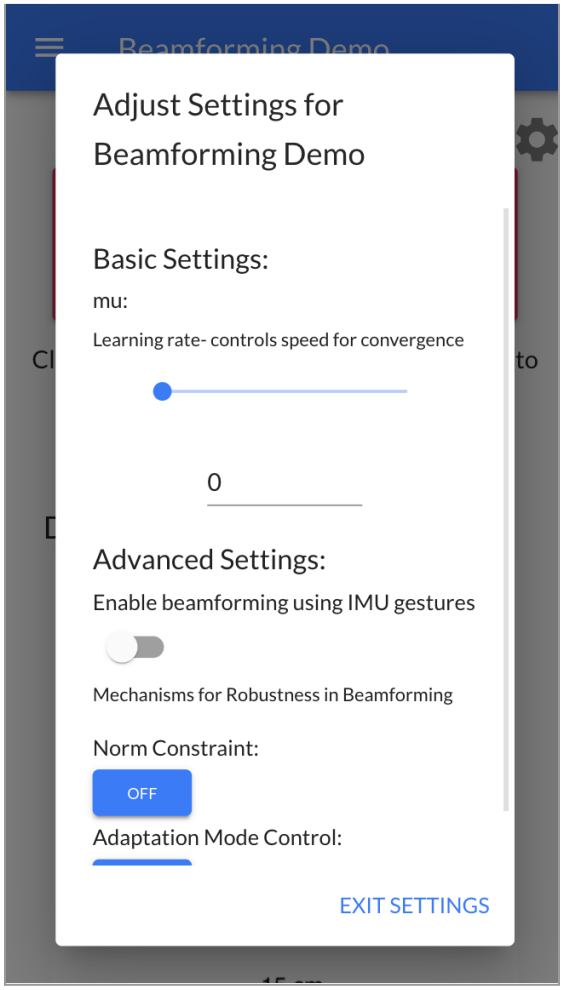

The Open Speech Platform
A Real-time, Open, Portable, Extensible Speech Lab. Visit our website to learn more.
Researcher Page
Includes amplification, noise and feedback parameters.
Beamforming Task
Manipulation of the parameters associated with OSP's adaptive beamformer
4 Alternative Forced Choice (4 AFC) Task

6. Once on the Beamforming page, you should see a button labeled “Enable Beamforming”.

   Click on the settings icon on the top-right corner (it looks like a gear, see left image).

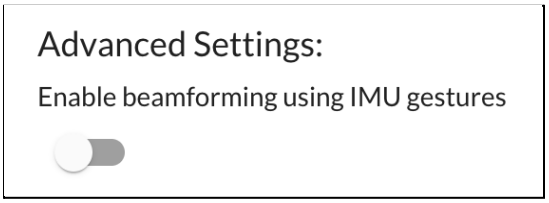


7. You should see the settings interface appear (see right image).

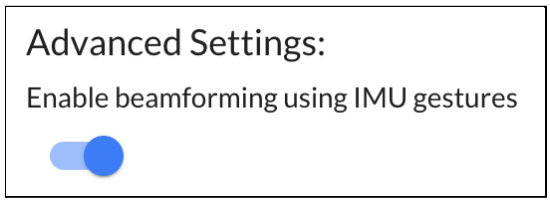


8. Directly under “Advanced Settings”, select the toggle to the right of “Enable beamforming using IMU gestures”.

   To confirm that this option is “on”, the toggle icon should move to the right and change color.



Setting is turned off.



Setting is turned on.

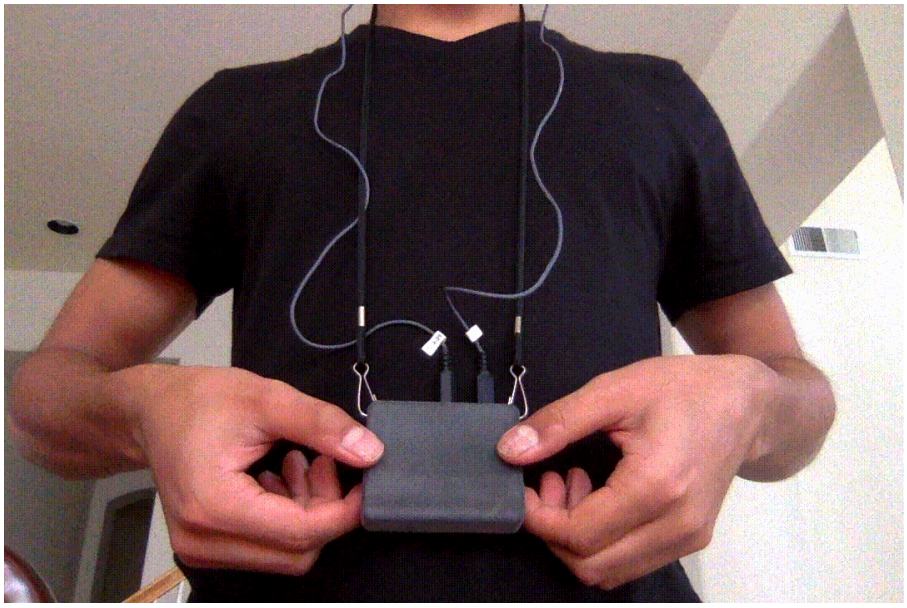
Proceed to part 2.

Part 2 - Performing the Gesture

1. Wear the PCD lanyard around your neck.

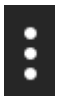
   When looking down at the PCD, you should see labels “Left” and “Right” (see image)

2. Flip the PCD upward such that the bottom is now facing the roof (see GIF below).

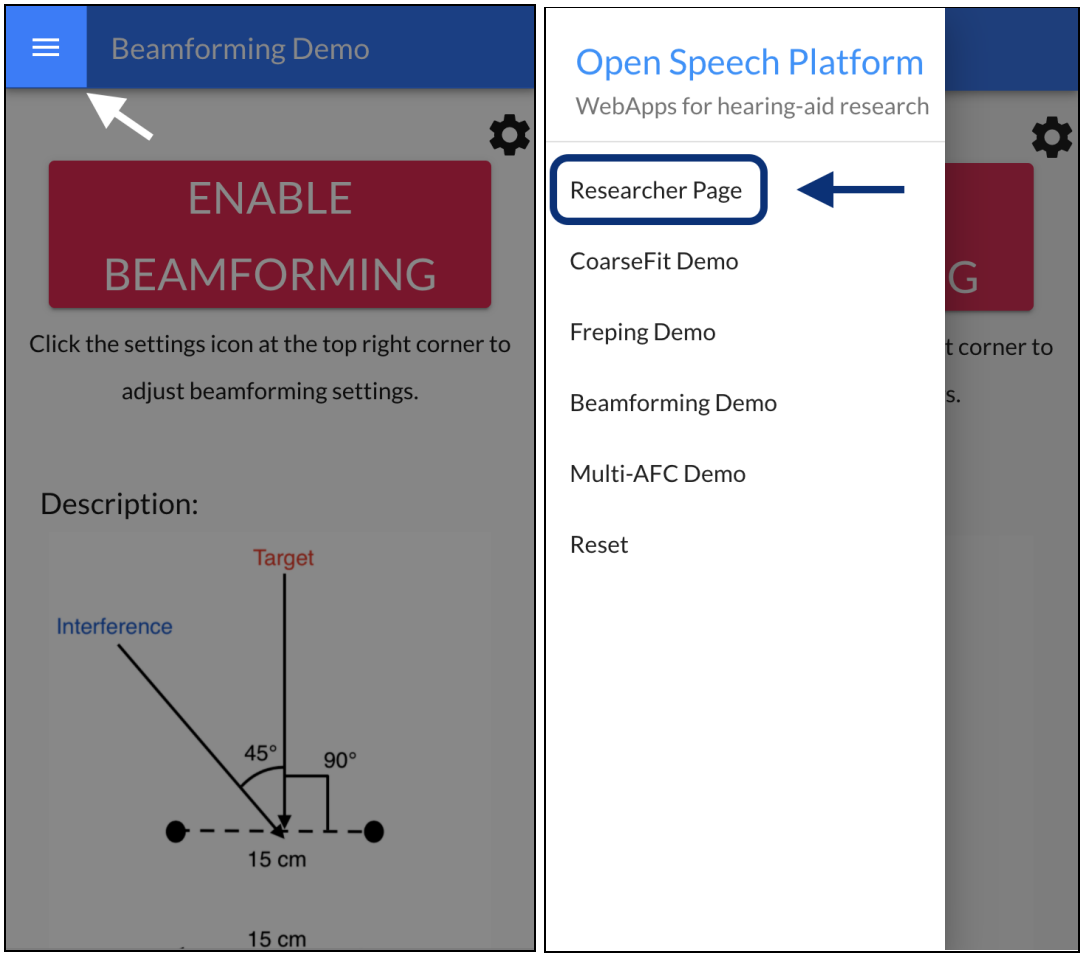


Part 3 - Confirming the Gesture

You should hear an audible sound once you have flipped the device. **To confirm, you need to do one of the following**:

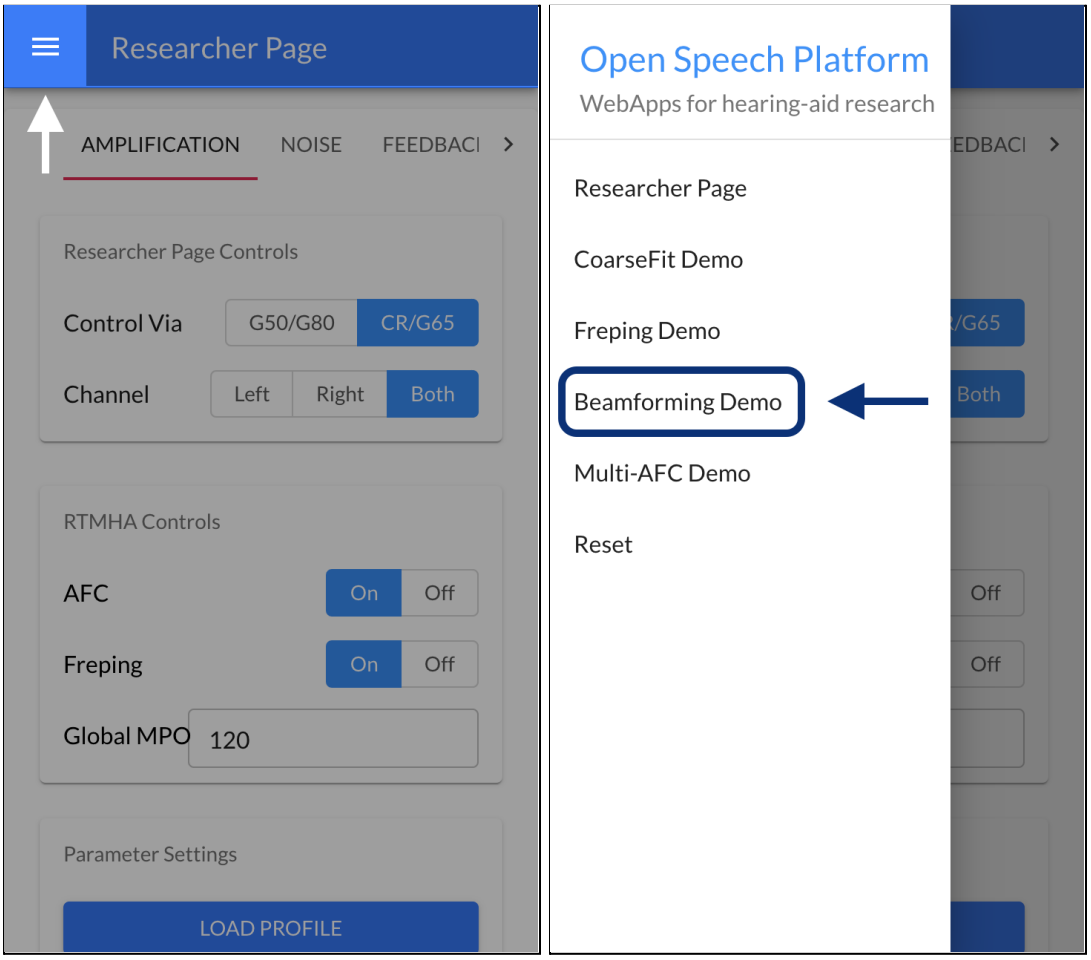
1. In beamforming, refresh the browser page.
    a. On Chrome, you may need to select the icon with the three vertical circles  , then select the icon with a circular arrow .
    b. On other browsers, you may only need to select .

2. Open the sidebar, navigate to “Researcher Page”



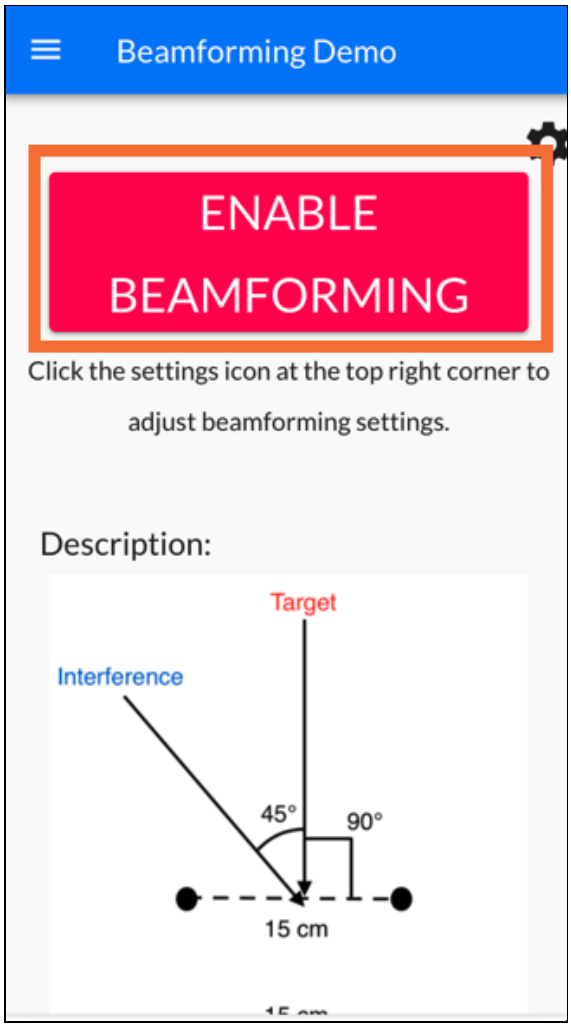
Then, open the sidebar again and navigate back to “Beamforming

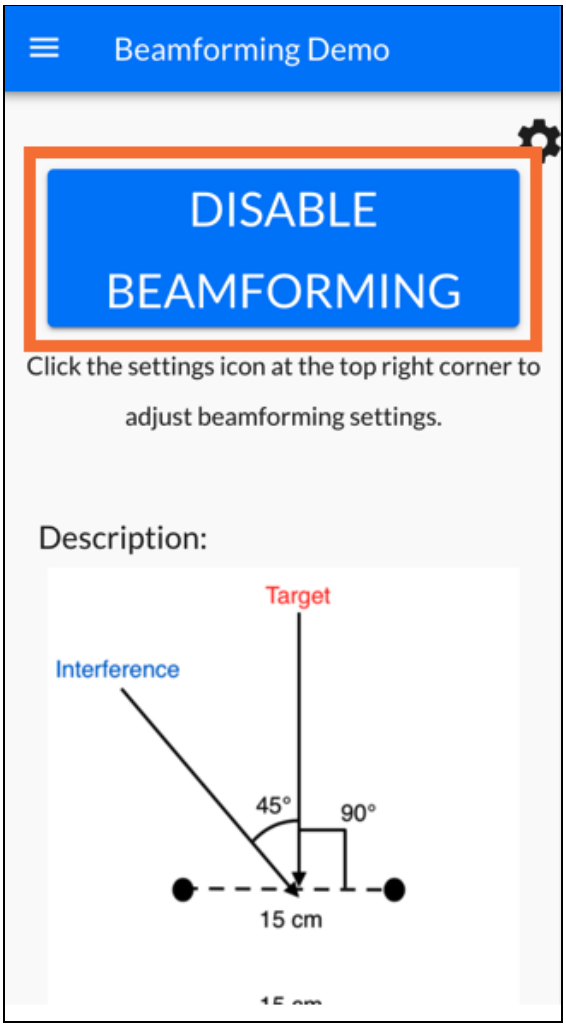
Demo.



If the gesture recognition worked, the Beamforming button should be toggled (ie. “ENABLE BEAMFORMING” <> “DISABLE BEAMFORMING”). If gesture recognition did not work the first time, try the following:

a. repeat steps from Part 2 & 3
b. refresh the browser page a few times
c. do the flipping of the device more quickly/slowly (from Part 2, step #2)


Beamforming Demo
ENABLE BEAMFORMING
Click the settings icon at the top right corner to adjust beamforming settings.
Description:
Target
Interference
45°
90°
15 cm


Beamforming Demo
DISABLE BEAMFORMING
Click the settings icon at the top right corner to adjust beamforming settings.
Description:
Target
Interference
45°
90°
15 cm