180DB User Guide (Team 3)

Aeroplay

Group Members

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Hardware Requirements

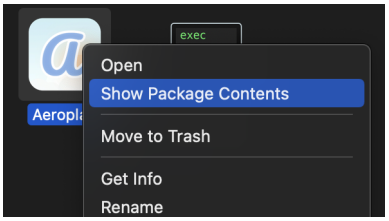
1. A computer or laptop to run the game. The game supports Windows 10 and MacOS.
2. (Optional but recommended) RaspberryPi Zero + BerryIMU + controller shell
    a. Needed to play using a real life controller but keyboard/mouse controls are supported too
    b. Controller shell is not necessary but its pretty cool to have
3. (Optional) Webcam
    a. Needed if you want to be able to use gesture controls
4. (Optional) Microphone
    a. Needed if you want to be able to use speech controls
    b. This also requires an internet connection

Game Build

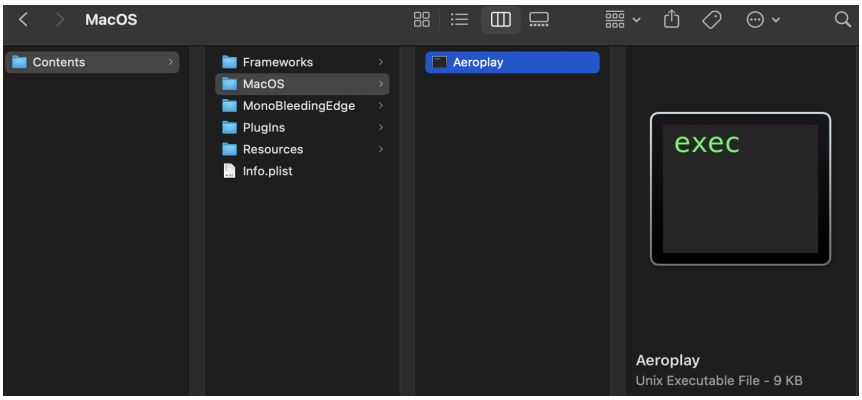
Windows

1. Download zip from website, unzip
2. Windows, run aeroplay.exe alongside dependent files

Mac



1. Download zip from website, unzip
2. Right click on app, show Package Contents,
3. Go to contents/MacOS, open Aeroplay.exec with ctrl+click



*The reason this is done is to prompt the microphone to engage in the game. Unfortunately, we don't have the Apple Developer Program ($99) to sign the app which enables us to do this. So a hacky-way is to launch it through the terminal. Donations are welcome (:

Hand Gesture Recognition

Windows

1. Download zip from website, unzip (if you haven't)
2. Open hgr.py (run as administrator)

Mac

1. Download zip from website, unzip (if you haven't)
2. Ctrl+Click hgr.py (to allow permissions)

If the executable does not work, you can run the code from the git repository:

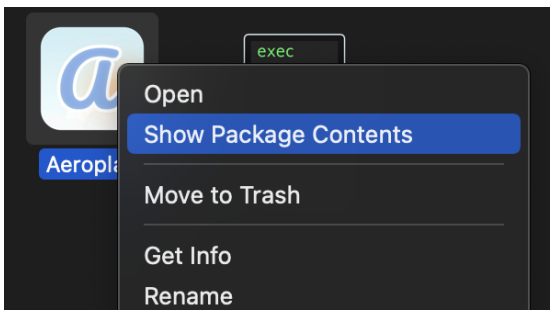
1. **Install the prerequisites:**
   pip3 install opencv-python
   pip3 install mediapipe
   pip3 install --upgrade tensorflow
2. **Clone the github repository:**
   git clone https://github.com/180D-FW-2021/Team3.git
3. **Go to the Hand Gesture Directory:**
   cd Hand_Gesture_Recognition/HandGesture
4. **Run hgr.py:**
   python3 hgr.py

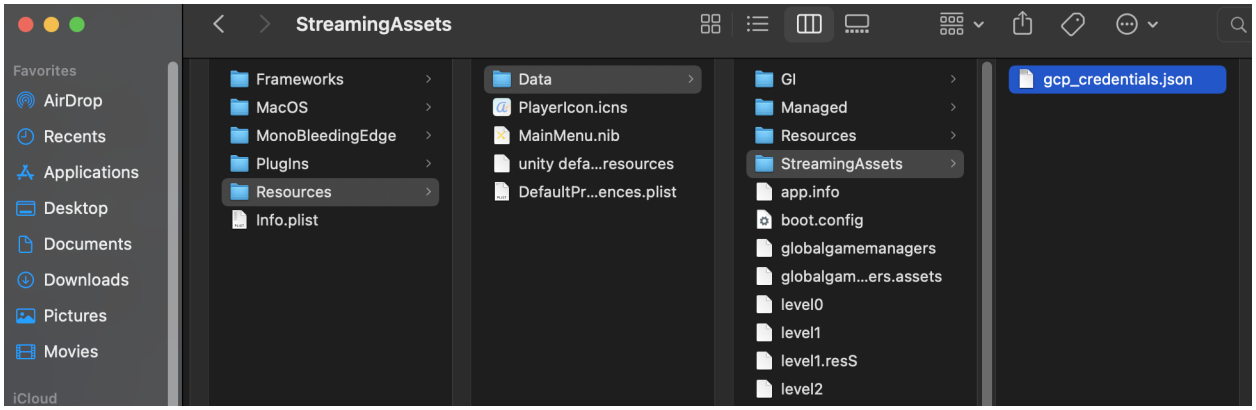
Speech Recognition

By default, we do include a GCP credentials file for convenience for those who just want to try out the game. Please don't abuse it as it's in the free tier and there is a limit on how much speech it can transcribe.

However, for hardcore gamers, please setup a GCP Account and retrieve the API key as follows:

1. Follow step 1 of Google's Cloud Speech-To-Text Quickstart Guide
   a. Setup a GCP Console Project
   b. Enable the Speech-To-Text API for your project
   c. Create a service account
   d. Download your service account's private key as a JSON file
2. Rename your private key JSON file to *gcp_credentials.json*
3. Right click on the Aeroplay app -> Show Package Contents
4. Navigate to Resources/Data/Streaming Assets and replace the *gcp_credentials.json* there with your newly created one





Available Voice Commands

Menu Scene

1. **Start/Begin/Play** = Starts the game when in Menu Scene
2. **Leaderboard** = Opens leaderboard
3. **Setting/Option** = Opens Settings Scene
4. **Quit/Exit** = Exits the game
5. **Change Map/ Switch Map** = Changes Current Map Setting
6. **Realistic** = Selects realistic map
7. **Low poly** = Selects low-poly map

Realistic/Low-poly Scene (In-game)

1. **Keyboard** = Enable keyboard mode
2. **Pause/Stop** = Pauses game
3. **Resume/Continue** = Resumes game
4. **Main Menu** = Exits to main menu
5. **Quit/Exit** = Exits the game

End Scene

1. **Start** = Restarts the game
2. **Leaderboard** = Loads leaderboard in browser
3. **Main Menu** = Exits to main menu
4. **Quit/Exit** = Exits the game

Settings Scene

1. **Music Volume Down/Decrease Music Volume** = decrease music volume
2. **Music Volume up/Increase music volume** = increase music volume
3. **Music Volume off =** turns music off
4. **Music volume (low | normal | high)** = set music volume to a pre-specified level
5. **Engine Volume Down/Decrease Music Volume** = decrease engine volume
6. **Engine Volume up/Increase music volume** = increase engine volume
7. **Engine Volume off =** turns engine sound off
8. **Engine volume (low | normal | high)** = set engine volume to a pre-specified level
9. **Minimap (on | off)** = turns the minimap on or off (to save processing power)

10. **Retro camera (on | off)** = turns the retro camera on or off for low-poly map
11. **Sunset** = Sets time of day in low-poly map to sunset
12. **Dusk =** Sets time of day in low-poly map to dusk
13. **Dawn =** Sets time of day in low-poly map to dawn
14. **Default Settings** = resets all to default settings
15. **Main Menu** = Exits to main menu with current settings

Control Setup

Setup Without Premade Controller

1. **SSH into Raspberry Pi that will be used as a controller:**
   ssh pi@raspberrypi.local
2. **Install package to only clone a specific folder in the repo:**
   sudo apt-get install subversion
3. **Clone the controls section of the github repository using svn (subversion)**
   svn checkout https://github.com/180D-FW-2021/Team3/trunk/Controls
4. **Go to Controls Directory:**
   cd Controls
5. **Locate the ourIMU.py file:**
   ls
   locate file named ourIMU.py
6. **Proceed to the "*How to Connect the Controller*" section**

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1. **SSH into Raspberry Pi that will be used as a controller:**
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Precaution

Make sure the Unity game is running before going through the process of connecting the controller with the game. Wait for the screen to say "Connect Controller" to connect the controller to use to move around the ingame plane. Another option available is keyboard which can be enabled with a simple press of keyboard key 'k' which will enable the user to control the ingame plane using keyboard inputs of WASD for directional inputs instead of the specialized controller.

How to Connect the Controller

1. **Find local IP address of the device that will run the Unity game:**
   ipconfig getifaddr en0

2. **Press Start in the main menu of the Unity game**
3. **Wait for the Unity game to display Connect Controller Screen**
4. **Run the controller using ourIMU.py file and the IP address from previous step as argument:**
   python3 ourIMU.py 'IP_Address'
   This command must be run on Raspberry Pi/Controller

How To Play

Plane Controls

Hold the controller in whatever way feels most comfortable in your right hand, you can choose to move using your wrist, your elbow, or your arm depending on what is most ergonomic for you. The position of the controller will mirror the movement of the in-game plane, so tilting the nose of the plane upwards or downwards will change the pitch of the plane. The plane will turn left or right depending on whether the plane is rolled to the left or to the right.
To activate a speed boost, quickly thrust the controller in the forward direction, away from you. These speed boosts can only be done once every 10 seconds.

Hand Gesture Controls (Requires WebCam)

When in game you may use your left hand for hand gesture controls. Please make sure the hand gesture executable is running and displaying the webcam in the background and your left hand is fully visible on the webcam.

(✋) A laser can be shot in game by gesturing with an open hand, with your palm facing the camera. The laser will hit objects covered by the crosshair in the middle of the screen.

(👍) A friendly thumbs up can be used to gradually increase the throttle of the plane.

(👎) A thumbs down can be used to gradually decrease the throttle of the plane.

Keyboard Controls

If you wish to play using a keyboard and mouse instead of the plane controller + hand gestures, you may press ‘K’ on your keyboard when prompted to connect the controller before the game starts. To use these controls, place your fingers over the “WASD” keys on the keyboard and press and hold these keys to move.

You may pitch upwards using the ‘W’ key and pitch downwards using the ‘S’ key. Inputting ‘A’ will allow the plane to turn to the left and inputting ‘D’ will allow the plane to turn to the right.

Pressing ‘space’ will provide you with a short speed boost which can be done once every 10 seconds.

To fire a laser, press/click the left mouse button. The laser will hit objects covered by the crosshair in the middle of the screen.

Pressing or holding ‘Q’ on the keyboard can gradually increase the throttle of the plane.

Pressing or holding ‘E’ on the keyboard can gradually decrease the throttle of the plane.

Game Objective

The main objective of the game is to score as many points as possible in the given amount of time; you can get points by shooting or colliding with the balloons on the map. Each game will start with 3 minutes on the clock.

Balloons

Balloons come in different sizes, each with their own point values.

- Orange balloons are the largest and most common. They move the slowest and are worth 1 point each.
- Red balloons are smaller and less common than orange balloons. They also move faster and are worth 2 points each.
- Purple balloons are smaller and less common than red balloons. They also move faster and are worth 3 points each.
- Lilac balloons are smaller and less common than purple balloons. They also move faster and are worth 5 points each.
- Blue balloons are the smallest and the rarest. They move the fastest and are worth 10 points each.

Balloons will move in accordance with randomly generated wind and will also bob up and down. Smaller balloons move faster which make them more challenging to hit and hence, are worth more points.

You may also come across golden balloons; golden balloons have a beacon to show their location and will be shown on the minimap. These balloons cannot be popped by lasers and must be popped through collisions. Colliding with a gold balloon will add 15 points to your score and will also add an additional 15 seconds to the game clock. These balloons are hard to get, try to find the easiest approach!

Crashing Penalty

You may collide into balloons for points but avoid hitting terrain! Each collision will cost you 20 seconds on the clock and will respawn you from the starting point. If you're going for golden balloons, be sure to weigh the risk and reward.

There are also moving obstacles that you may want to watch out for!

Settings

From the main menu you can access the settings menu where settings can be changed by either clicking the arrow buttons or using voice controls.

The music volume and engine volume settings change the volume of the background music and the engine volume in game.

You can also choose to toggle whether or not to show the minimap from here. Turning off the minimap drastically increases the framerate of the game so it may be beneficial to turn it off if the game is lagging.

There are also a couple visual settings that can be adjusted that only affect the low-poly scene. The retro camera setting enables a fun visual effect that adds a pixelated look.

Changing the time setting will change the sky, lighting, and music of the low poly scene. Each one feels like a whole new map, try them all out!

Voice Controls (Requires Microphone)

If you don't want to use the keyboard and mouse to interact with the game and prefer yelling at your computer, voice controls are enabled for controlling the game state and navigating the menus. To use the voice controls, simply say the name of the button you wish to press or say a command. There are multiple phrases that can be said to execute a command so you can try guessing what to say or you may look up a valid phrase from below.

1. In-Game Speech Options

When playing the game you can simply say "Pause" or "Stop" to pause the game. From the pause screen, you are given a few options:

- Say "Resume" or "Continue" to unpause the game and continue playing
- Say "Main Menu" to return to the main menu
- Say "Quit" or "Exit" to rage quit the game

2. Main Menu Speech Options

- Say "Start", "Begin", or "Play" to start playing the game
- Say "Leaderboard" to be redirected to our online leaderboard and website
- Say "Settings" or "Options" to access the settings menu
- Say "Change Map" or "Switch Map" to toggle between the different maps in the game
    - You can directly say "Realistic" or "Low Poly" to set the map
- Say "Quit" or "Exit" to close the game application

3. Game End Menu Speech Options

- Say "Restart" or "Start" to replay the game
- Say "Leaderboard" to be redirected to our online leaderboard and website
- Say "Main Menu" to return to the main menu
- Say "Quit" or "Exit" to close the game application

4. Settings Menu Speech Options

- Say "Increase Music Volume" or "Decrease Music Volume" to fine-tune the music volume or use one of the presets below:
    - Say "Music Volume Off" to turn off background music
    - Say "Music Volume Low" to make the background music quiet
    - Say "Music Volume Normal" to play with the standard music volume
    - Say "Music Volume High" to play with louder music volume
- Say "Increase Engine Volume" or "Decrease Engine Volume" to fine-tune the engine volume or use one of the presets below:
    - Say "Engine Volume Off" to mute the engine noises in game
    - Say "Engine Volume Low" to make the engine noises quieter
    - Say "Engine Volume Normal" to play with the standard engine volume
    - Say "Engine Volume High" to play with louder engine volume
- Say "Toggle Minimap" to toggle whether or not the minimap will be shown in game

- Say “Toggle Retro Camera” to change the whether the retro camera is active or not in game
- Say “Sunset”, “Dusk”, “Dawn”, or “Day” to change the time of day in game to the respective option
    - Say “Change Time” to iterate through the different time options
- Say “Restore Default” to restore the settings back to their default values
- Say “Main Menu” to return to the main menu; settings changes are automatically applied

Leaderboard

We have a website! Visit https://aeroplay.online to check it out (feel free to click the “Aeroplay” logo). From here, you can access download links for the game package for MacOS and Windows.

Below this, you can find the most current leaderboard which is separated for each map and each control scheme. You can use the drop down menus to select the configuration that you want to search. Additionally, there is a search bar where you can enter a username and press the search icon to get the listings for a given player.

Important:

Have fun!