

Gesture Controlled AR Drone

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Objectives

- Control the Parrot AR Drone using hand gestures with the Leap Motion device, and EEG signals from the eMotiv EPOC.
- Use Kinects to detect and track the drone's position.
- Track and simulate the drone's movements in Unity3D.



AR Drone

Controlling the Drone

- The Leap Motion controller tracks hand movements and gestures, which correlate to drone movement.
- Hand Controls:
 - Curl right hand down – move forward
 - Curl right hand up – move backward
 - Point right hand right – move right
 - Point right hand left – move left
 - Turn finger clockwise – turn right
 - Turn finger counterclockwise – turn left
 - Show left hand – stop and hover
 - Curl left hand into a fist – land
- The eMotiv EPOC tracks brain signals and facial expressions, which help control the drone.
- EEG Controls:
 - Blinking
 - Jaw Clenching
 - Winking (left and right eyes)



Leap Motion controller



eMotiv EPOC

Detecting the Drone

- Microsoft Kinects use infrared light to generate a depth map of the area. We use that to track the drone in real time.
- Used two Kinects from different angles to more accurately and track positions. (And could potentially be used for multiple drones)
- Location of the drone is determined by the server, which then sends the information to Unity and the main program
- Main program can use determined position to set bounds, including altitude restrictions



Kinect

Unity3D Program

- The Unity3D engine was used to create a program to simulate the real world movements of the drone in a 3D environment.
- Receives position from server (Kinects) and displays drone's flight position in 3D
- Also receives video feed from drone to display in corner
- Could theoretically also be used to display environment of the drone, but that hasn't been implemented