Gesture Controlled Drone
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For our final project, we propose a gesture controlled UAV. At minimum, the project will contain two parts: gesture recognition and an interface with the UAV controller.

We currently have two possible input routes that we could take for the gesture recognition component. The first input route includes a Microsoft Kinect and the second is composed of a VGA camera that would capture colored hands. Whichever input we choose will be fed into the FPGA that would classify it as one of several predetermined gestures. The complexity and number of gestures will be determined by memory limits on the FPGA and the input source (the Kinect will afford us more complex gestures).

We will control the UAV by interfacing with the existing controller that comes with the UAV. At minimum, we want to be able to turn on the UAV, and allow it to levitate. Possible additions that we're considering are adding sensors to the UAV so it will be able to avoid walls and also a graphic display for the user. This may require purchasing an additional FPGA to place on the UAV that takes in sensor data and applies control signals to the UAV. We are unsure of exactly what type of UAV we will use, but we plan on meeting with the MIT UAV team for suggestions.

Interfacing with the Kinect provides many challenges, and since it has not been done before in a 6.111 project, we are unsure how difficult it will be. Our initial system design consists of adding a Raspberry Pi computer as a link between the Kinect and the FPGA, with a Kinect USB driver loaded onto it that receives data from the Kinect and drives data via USB onto the FPGA. Our current plan allows us to take several different paths toward achieving the complexity required in a 6.111 final project. If we fail to incorporate the Kinect, we will focus more on the onboard UAV sensors and the graphical user interface.