EEE102 Project Proposal:
Finger Tracking Ring

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Introduction:

In my project, I will design a ring that tracks finger movements and allows you to interact with electronic devices (i.e., a PC or a smart tv) with your finger. This device possibly can be used as a mouse input to a PC.

Design Specifications:

Part List: Basys 3, 9-dof IMU board, some cables for connecting the output and IMU.

The design will be based on a Basys3 and a 9 degrees of freedom (dof) inertial measurement unit (IMU) consisting of accelerometer, gyroscope and magnetometer. The IMU board will be glued on a ring and will be parallel to user's finger when put on. First, Basys 3 will read data from the IMU via SPI protocol. Then, the data will be processed and compared to an initial state (will be set by the user by a button press). The change in direction (thus the direction of the user's finger) is determined using the IMU data. Finally, I am planning to either implement PS/2 protocol on Basys3 to interface it with a PC or use the VGA output of Basys 3 to demonstrate the project. In the end, my aim is to make the cursor follow the movements of user's finger.

Demos:

Progress Demo:

In the progress demo, Basys 3 will be able to communicate with the IMU and get the data from it. The data will be displayed on the 7-segment display for demonstration.

Final Demo:

In the final demo, Basys 3 will be able to process the IMU data and track the movements of IMU. The demonstration either will be connecting basys3 to a PC and seeing the cursor movements according to the direction of the IMU or displaying an imitated cursor on a VGA monitor.