How It Works: KINECT-IMU Calibrator Beta1

Subtasks

- Connecting to a Bluetooth device
    - When the application loads it will scan for all devices that are nearby. If your device isn't there, press <Find Bluetooth Devices>
    - Once connected, one will see the data at the bottom of the screen
- Logging Data that is being collected
    - Connect the Bluetooth devices and connect the KINECT if desired.
    - Browse for the folder location that the data should be saved to
    - After looking at the graphs, numbers, etc. Press <Strat Data Logging>
    - To complete, press <Stop Data Logging>
    - (If you exist the program, the logs are stopped and saved.)

- Binding a Bluetooth device to the *Kinect Default Coordinate System. (This is only for displaying the correct orientation of the IMU cube)*
    - Connect a Bluetooth device.
    - When the device is in the correct orientation, press <Bind To Kinect Default Cord>

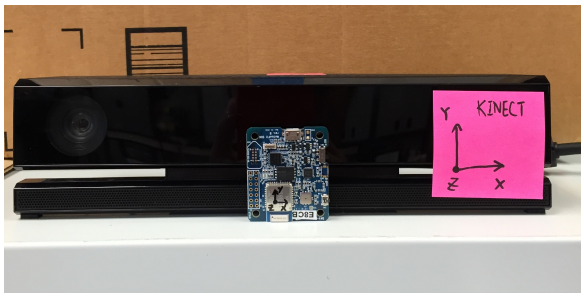
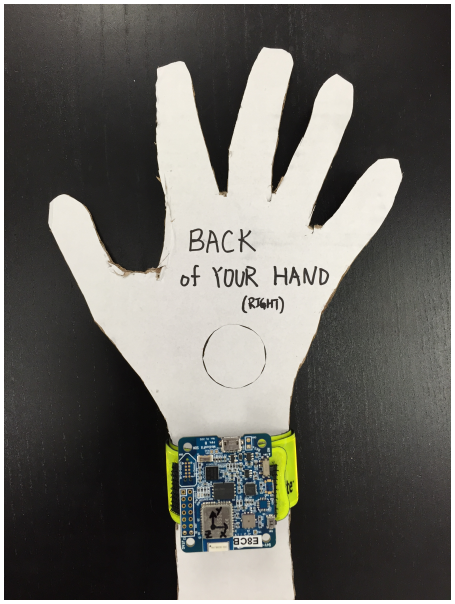


Figure1. Correct Orientation of Kinect Default Cord Binding

- Binding a Bluetooth device to the *Right Arm Quaternion as Read by KINECT*
    - Connect a Bluetooth device
    - Strap device to right wrist
    - Put the wrist in the identity orientation (Right hand pointed to the ceiling, hand open, thumb away from Kinect)
    - When the device is in the correct orientation, press <Bind To Right Forearm>



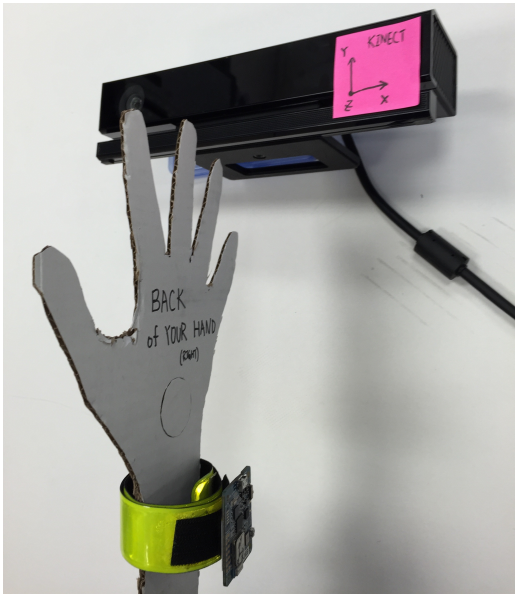


Figure 2&3. Correct Orientation of Right Arm Binding

- Create/View Kinect Virtual Sensor
    - Connect a Bluetooth device.
    - Once the Bluetooth device appears in the box at the bottom, click the drop down list under the *Sensor Location* column and select the correct joint (usually right forearm)
    - 2 more graphs will pop up, as well as 2 more devices at the bottom boxes. These graphs and rows can be used to understand how the Kinect is seeing the joint.

Two main tasks

- **Task 1: Attempt a linier and rotational calibration (Find the angles and displacement)**
    - Connect to a Bluetooth device.
    - Put device on the right forearm (not necessary to be the correct orientation)
    - At the box in the bottom, under the column *Sensor Location* locate the connected Bluetooth device and select *Forearm right*
    - Get into the view of the Kinect, ensure that oneself can be seen with either of a Kinect visualizers. Once in the frame, press Setup Calibrator.
    - Once the bar goes green, press calibrate after one feels there is 10 seconds of good data.
    - (Just because the bar is green doesn't mean that the data is good)

- **Task 2: Seeing the difference between the Kinect and Inertial Sensor of the quaternion**
    - Connect to a Bluetooth device
    - Put device on the right forearm
    - Once the Bluetooth device appears in the box at the bottom, click the drop down list under the *Sensor Location* column and select the correct joint (usually right forearm)
    - Put the wrist in the identity orientation (Right hand pointed to the ceiling, hand open, thumb away from Kinect)
    - When the device is in the correct orientation, press <Bind To Right Forearm>
    - At this point you are free to move to any other orientation.
    - Once in another *good* orientation, press *calibrate like frames*.
    - After 5 second of data reads, the correction will be out put
    - NOTE: you must stay in the frame during the calibration.
    - NOTE: the results should be <5% error, if they are greater you didn't bind to the Right Forearm while in the identity position.
    - NOTE: This test can only check the difference between the Kinect's quaternion calculations vs. the sensors.