Biomedical Robotics – Assignment 3

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Cursor movement using Motion data

The Aim of this Assignment is to move the cursor with the motion Sensor Data

Experimental Setup :-

In MATLAB First step is to Install " Simulink Support Package for Android device ". As a part of another step we should Install " Android studio SDK" which need to be configured with the MATLAB. After successfully configured we need to follow some Basic Steps

1. Developer mode should be Enabled in your phone
2. Need to Install supported Driver which computer can detect your phone
3. After doing 2nd step we need to connect the phone with the USB cable
4. The MATLAB support package will detect your phone . After these we need to run the Test app and It will Install an package in your phone and After Verification we need to Perform Simulink Model

Issues :-

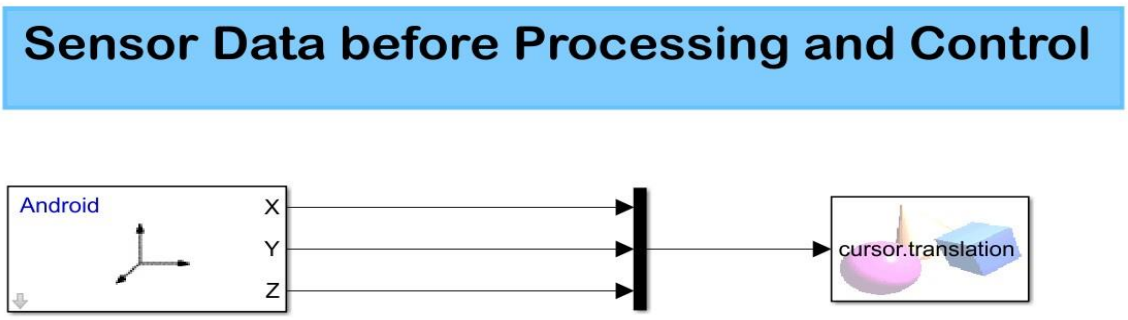
1. While collaborating Simulink Package with Android Studio due to versions . You can’t run test app

2. SDK Tools if it will be up to date while Running the test app it will show no file are detected

3.During Installation if anything not shown we need to uninstall Everything, and these files are too Bulky

Simulink Model :-

The Program is coded in MATLAB Simulink. The program has Simulink model (medical3.slx) . Initially A VR sinc Model box was connected with Mux and it was synchronized with 8_palline_color(3D Model) and Android Accelerometer was connected as shown in the figure



In these Model If we perform It is too difficult to control the motion of the sensor . Because there are many issues by Too much Noise , and no control mechanism of the signal . so the movement can be controlled so to control the movement of cursor control mechanism designed.

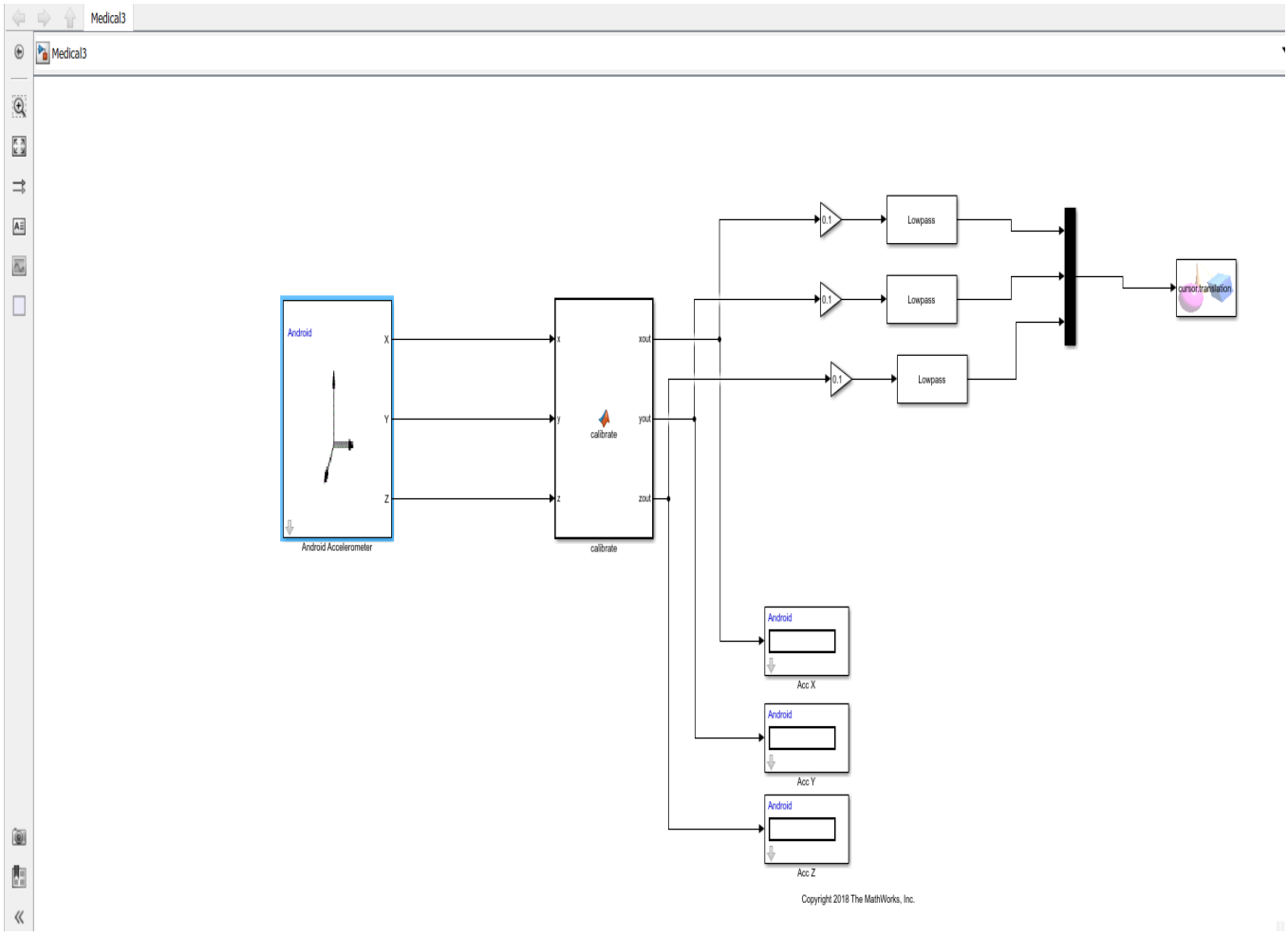
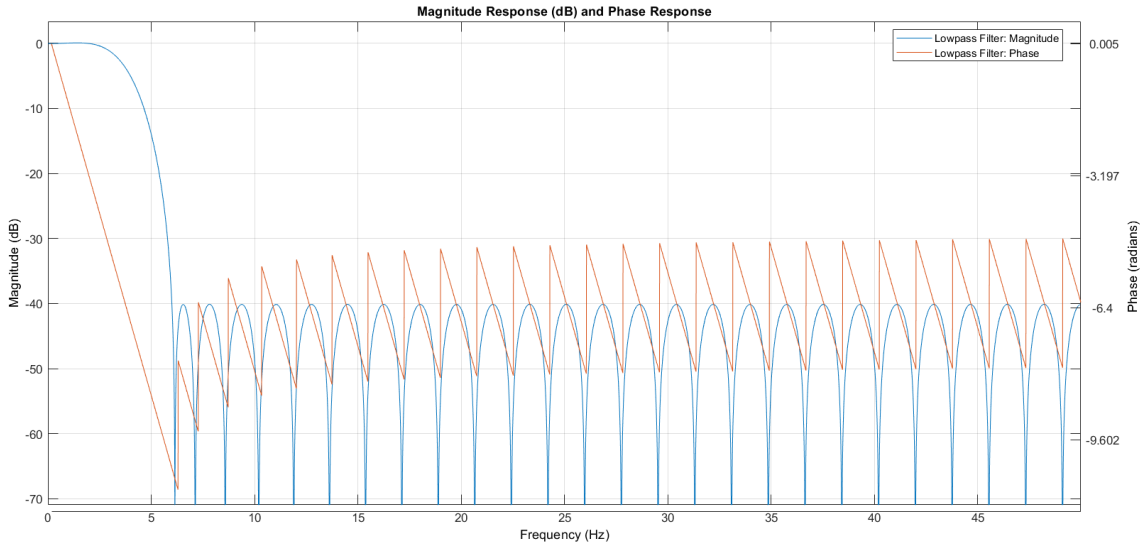


fig :- control Mechanism for cursor movement using motion data

The Android Accelerometer Provides us three values X , Y , Z and It was badly affected by the noises so to Regulate the signal we need to multiply with the calibration Matrix. For Calibration "slexHARAndroidCalibrationMatrix.mat" is used After Multiplying with these the sensor automatically readjusts the accelerometer. After the sensor calibration the next step is process the signals and properly map the signals to VR sinc Block. For these we used the gain value and the low pass filter .The optimal value has be taken as 0.1 for the gain value by these it will easily collaborated with matrix and it will increase the sensitivity of the signal. The low pass filter has be tuned as shown in the below diagram



The low pass filter was designed in such a way that it should match sample time with the accelerometer sensor

Result :-

After Simulation we have reached the target all target points were reached by moving the Android phone