

MEEN_689 Robot Perception Project Proposal

Zihui Lang, Bin Wu, Yinsu Zhang, Zilong Zhang

Accelerometers and Gyroscopes are two be the most commonly used sensors in motion detections. In fact, the most popular solution usually combines the two using sensor fusion to improve overall motion detection performance. One of the accelerometer sensor behavior is large noise because it is sensitive to unwanted vibrations; On the other hand, the gyroscope often introduces a drift in measuring because the output is integrated in order to get the orientation angle, and the bias error gets integrated together, causing the linear draft over time.

For the purposes of this project, we aim to utilize sensor fusion strategies learned in class to combine data from an accelerometers and a gyroscopes of a smart phone in order to obtain accurate motion data.

Accelerometers and gyroscopes are wildly used in inertial pose estimation. An accelerometer is a sensor responsible for measuring inertial acceleration with problem like noisy measurements and unreliable in short run due to motion and noise. Gyroscope is a type of sensor that measure angular rate which will exhibit very high frequency noise that is caused by thermomechanical events. Based on above situation, in order to get a more reliable pose estimation, fusing these two types of sensors can always get a better result.

As a good start of exploration for robotics perception, we will firstly try different sensor fusion algorithm to fuse these two types of inertial sensors data to improve pose estimation result. We will present our comparison in the final project presentation.