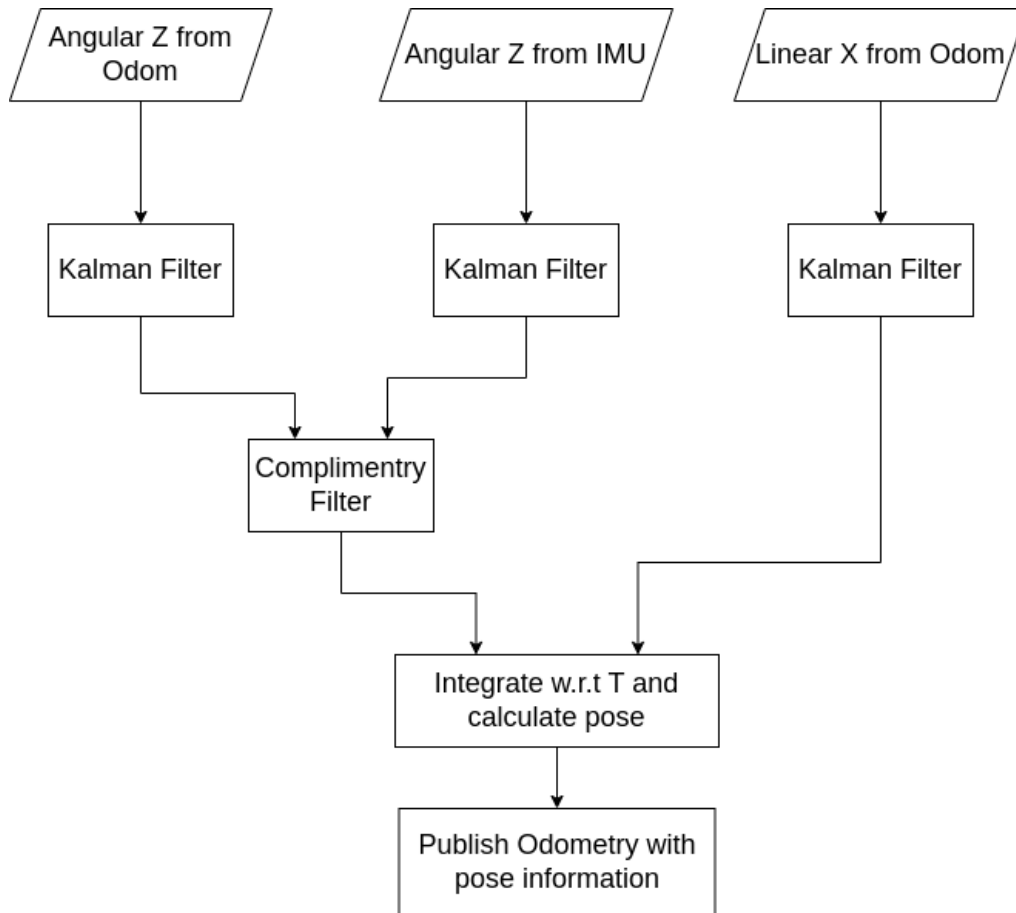


## Fusing IMU and Odom twist velocities to estimate the pose (x,y,theta)



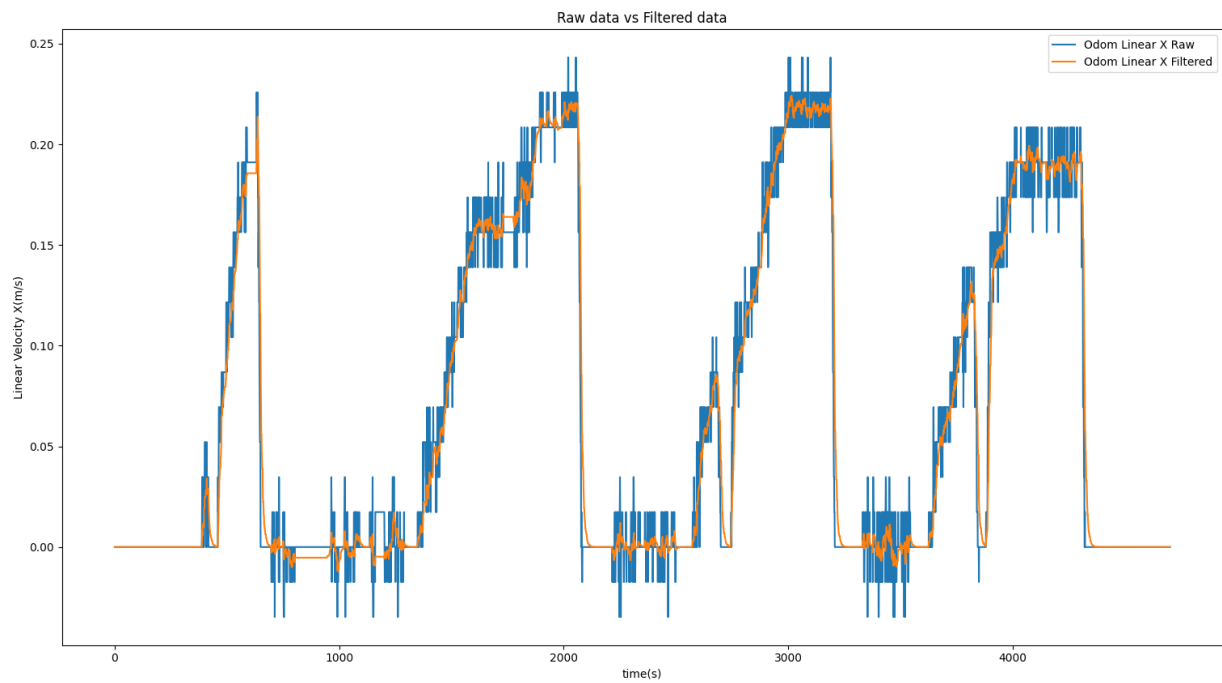
The angular velocities around the z-axis are obtained from both sources. Initially, a Kalman filter is employed to mitigate noise, followed by the fusion of these filtered values using a complementary filter. The linear velocity in the x-direction is derived from the "odom\_velocities" message, and this, too, undergoes filtration using a Kalman filter.

Upon integrating these velocities, the resultant values provide the displacement along the x-axis and the angle along the z axis. From these derived values, the poses can be computed.

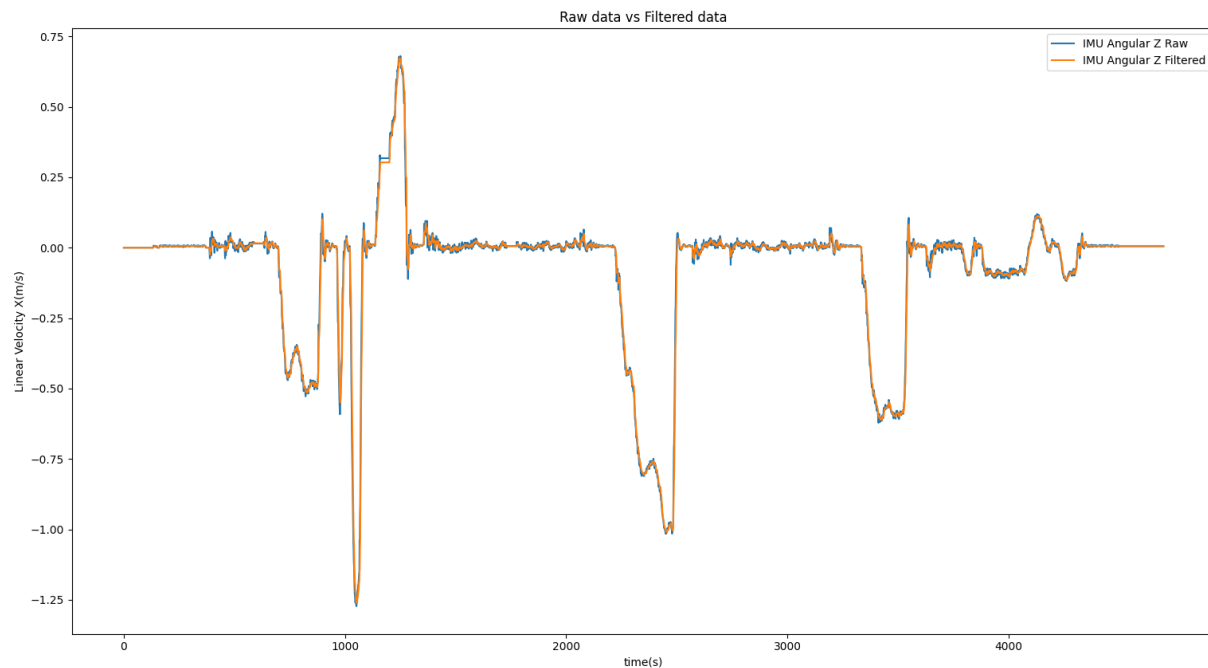
Below figures show angular velocities before and after applying kalman filter:



Odom Angular Velocity in Z with Kalman filter



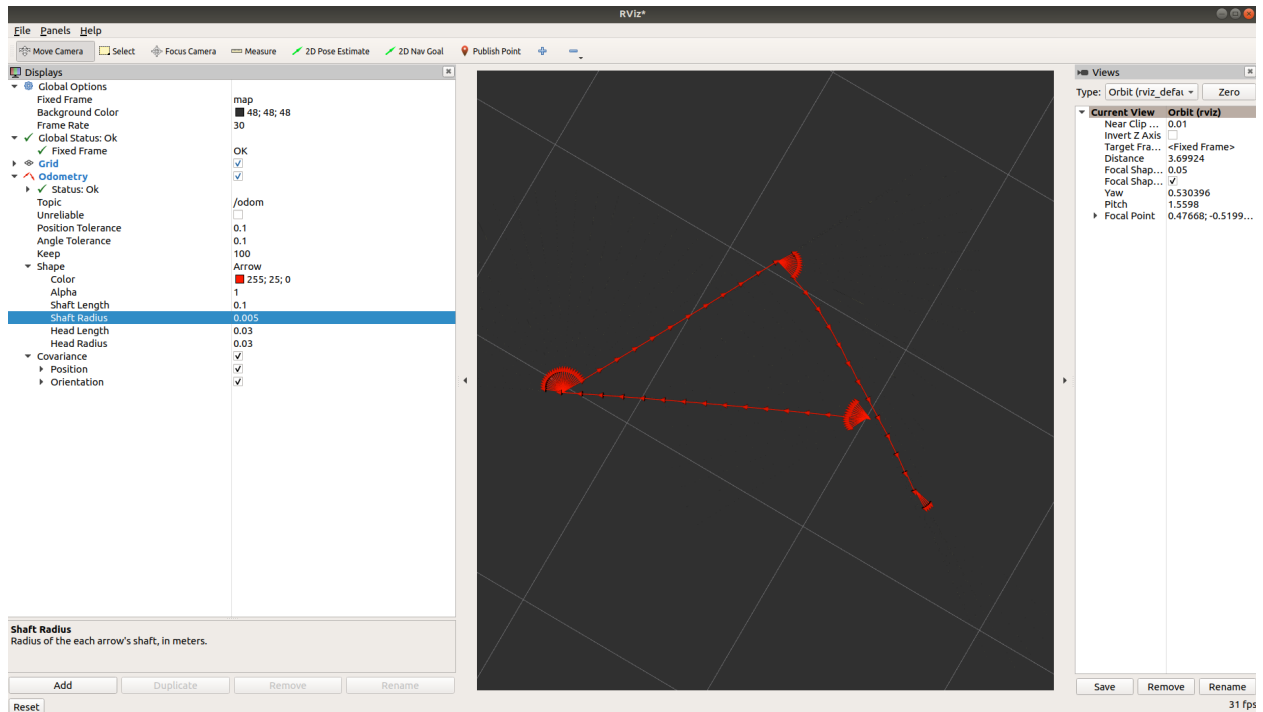
Odom Linear Velocity in X with Kalman Filter



IMU Angular Velocity in Z with Kalman Filter



Fused Data vs Raw data (Angular Velocity Z)



Path visualized in RViz

## Challenges Faced:

First time I worked with ROS2, till now I was using ROS Melodic. So installation was giving some errors and I had to go through the documentation and tutorials for ROS2.