IMU-based Orientation Estimation and Trajectory Optimization

Jiaqi Li
Department of Electrical and Computer Engineering
University of California, San Diego
La Jolla, U.S.A.
jil547@ucsd.edu

Nikolay Atanasov
Department of Electrical and Computer Engineering
University of California, San Diego
La Jolla, U.S.A.
natanasov@ucsd.edu

Abstract **- This project focuses on tracking the orientation of the camera system built. In this project, angular velocities and accelerations captured by the IMU were first converted to quaternions representing the object's pose, estimating the pose in the next timestamp, and finally use gradient descent algorithm to minimize the difference of its estimations with the data gathered by the VICON camera. The optimized quaternion data was then used in generating panorama pictures to represent the rotations of the camera.**

Index Terms **- Orientation tracking, Projected gradient descent, Inertial Measurement Unit**