V. Adithya, Motion and Posture Tracking for Assisted Living, M. Tech. Thesis, Department of Biosciences and Bioengineering, Indian Institute of Technology Bombay, June 2012.

Supervisor(s): Prof. P. C. Pandey

***Abstract*:** An inertial measurement system is developed for motion and posture monitoring. The sensing module consists of a triaxial accelerometer, a triaxial gyroscope, a microcontroller, and an on-board serial flash memory, for continuously acquiring and storing the acceleration and angular velocity information for later transfer to a PC. The functioning of the sensors and signal acquisition and storage has been tested using a lab setup.

A software is developed for orientation estimation by fusion of the sensor outputs using offline signal processing. It is implemented using MATLAB and involves an extended Kalman filter for fusing the quaternions computed from the accelerometer outputs and the complementary information provided by the angular velocity measurements. The relative RMS error of the filter output was found to be 6.5%.