

Abstract

The purpose of this research was to develop a system to determine the angle of a specific joint, changing over time, using Inertial Measurement Units (IMUs). The type of sensor being taken into consideration was BNO055, from Bosch.

IMUs are used to capture necessary navigation information, in the form of quaternion. Then the quaternions were sent to Cypress PSoC 4BLE Board. Joint angles were calculated in real-time movements and displayed on hyper terminal software. The results were then compared with joint angles' outcome from optical encoder. It was a device used specifically in linear or circular position detection applications. Data were sent also via Bluetooth Low Energy (BLE) and can be captured by cell phone with Bluetooth Apps.

The main programming language which was used in this project is C. Besides the traditional C functions, firmware configurations were assisted by using built-in libraries from Cypress.