

Abstract

Gait analysis has been widely applied to study walking patterns of humans with knee kinematic abnormalities. This analysis is usually applied using Image Processing Technique that uses a camera to capture motion. But this technique has its drawbacks because it requires large costs, and its implementation is limited to specific time and space. To overcome this problem, this final project designed the Gait Analysis System based on IMU sensors (Inertia Measurement Unit). In this system there is an accelerometer and gyroscope sensor, and a mini Wemos D1 microcontroller. This system supports wifi networks using the MQTT (Message Queue Telemetry Transform) protocol for the process of sending and receiving data. This data will undergo signal preprocessing by using a complementary filter to reduce noise caused by external environmental factors (vibration and friction when walking). In patients with knee kinematic abnormalities, this system can measure gait orientation based on acceleration, angular velocity, and cycle when walking.

Keywords: Ggait analysis system, IMU, microcontroller, complementary filter