ABSTRACT

Some methods of analyzing human footwork with the addition of optics and IMU sensors to analyze the kinematic abnormalities of the knee tend to be expensive and require special space and time for their application. The method has not been tested on the movement up and down the stairs. A solution designed to solve the problem by building an IMU sensor board (inertial measurement unit) to monitor gait (knee) based on additional filters. In the development of this system there is an Arduino Pro Mini microcontroller as a sensor controller, 1 MPU6050 module in which the module contains accelerometer and Gyroscope sensors are useful for capturing data in the form of signals from human footwork with units of g (Gravity Force), this system also supports serial communication contained in the microcontroller and uses the help of Arduino IDE software for sending and receiving data. The results of data retrieval are then processed with the Complementary Filter method to reduce noise. From the results of visualization using excel, it was found that using a complementary filter data from the accelerometer sensor and gyroscope was easier to read than before using the filter. The results obtained on the left and right legs were the highest accelerometers of 22.54 g and 18.16 g, respectively. While on the highest gyroscope it is 33.35 g and -1.58 g. The implementation of the system is focused on the analysis of gait using acceleration, angular velocity and running cycles. The results of this study can then be used as preliminary research to analyze the gait cycle so that it is hoped that in the future it will be able to overcome problems in gait.

Keywords: Arduino Pro Mini, MPU6050, IMU, Complementary Filter, Gait Cycle, Accelerometer, Gyroscope