ABSTRACT

Falls are the main accidents that often occur in the elderly. Factors causing falls consist of intrinsic factors related to health conditions and extrinsic factors related to environmental conditions. A fall accident must be followed up immediately so that someone who has a fall accident can be saved. The condition of the fall will affect how much impact the victim will receive whether it falls forward, backward or sideways.

In this study, a classification will be carried out consisting of 8 indications, namely normal standing, normal sitting, normal sleep, climbing stairs, descending stairs, falling forward, falling backwards and falling sideways. The control center is an Arduino and the MPU-6050 sensor as an accelerometer and gyroscope. The data that has been obtained will be classified using Orange Data Mining which consists of 2 stages, namely the data will be trained and the data will be predicted. The classification method used is the Adaptive Boosting Algorithm (AdaBoost). AdaBoost is an ensemble learning with a boosting method that is able to balance the class by giving weight to the level of classification error that can change the distribution of the data. Then the data will be classified in 5 conditions of ratio comparison between training data and testing data, namely 10%: 90%, 20%: 80%, 30%: 70%, 40%: 60% and 50%: 50%.

The results of the classification are in the form of parameter performance analysis which will be compared with 2 other tree-based ensemble method classification algorithms, namely Random Forest (RF) and Gradient Boosting (GB). The results of the ratio comparison analysis using AdaBoost obtained the best performance accuracy of 100% at a ratio of 50%:50% and from the results of the comparison of 3 classifications between AdaBoost, RF and GB, it was found that Adaboost was the best model with the highest accuracy performance value in 4 ratio ratios, namely 97.5% at a ratio of 20%:80%, 98.7% at a ratio of 30%:70%, 99.3% at a ratio of 40%:60% and 100% at a ratio of 50%:50%.

Keywords: *Fall detection, MPU-6050, Classification, Machine Learning, Orange Data Mining, AdaBoost*