ABSTRACT

The movement system of the human body will decrease due to damaged bone mass. The factors that make bone mass decrease are factors of age and disease. Rehabilitation is very necessary for people who have disorders of the body movement system. The use of deep learning can create a sensor detection system that focuses on the recognition of human activity, to simplify the therapy process for patients.

In this research, the classification of daily activity movements was carried out using the two-layer Long Short-Term Memory (LSTM) method based on smartphone sensors. Multisensory-based systems, namely accelerometer and gyroscope sensors on smartphones, have advantages, where users can move freely without worrying that objects are not detected, so they can be used as system inputs and help the detection system run properly. This research consists of several stages, starting with the system processing train data and validating 10,299 data from the UCI dataset site, then the system enters the training stage using the LSTM model to train the data and produce the best model. Furthermore, the data is ready to be tested and classified into six classes, namely walking, walking upstairs, walking downstairs, sitting, standing, and laying. Then, the system will generate performance using precision, recall, and f1-score parameters.

The result of this final project is an analysis of the effect of hyperparameters on the LSTM model. The model with the best performance is obtained at the number of hidden layer feature values 64 and 4901.33 iterations with 92.03% accuracy, 38.95% batch loss, 92.33% precision, 92.03% recall, and 91.97 f1-score. %. Based on the accuracy results, the hyperparameters in the LSTM model can affect the performance and performance of object detection systems based on accelerometers and gyroscope sensors.

***Keywords**: Accuracy, F1-Score, LSTM, Precision, Recall, Motion System.*