

Abstract

Al-Quran is a holy book that contains the words of Allah revealed to the Prophet Muhammad as a guide for Muslims. The classification is needed to make it easier to understand each verse of the Al-Quran. Recurrent Neural Network (RNN) is one of the machine learning included in Artificial Neural Networks (ANN) which is widely used to deal with Natural Language Processing problems because RNN is made to handle sequential data that are sensitive to sequences such as time series or sentences. The development of RNN, namely Long Short Term Memory (LSTM) and Gated Recurrent Unit (GRU), is applied to solve with this problem and expands the previous studies. Based on the analysis result, it can be concluded that the LSTM and GRU can outperform the performance the previous studies. LSTM is better at handling overfitting than GRU because the LSTM hamming loss is almost always winning. GRU can outperform LSTM when the model uses word embedding and dropout with a value of hamming loss of 0.103846154. This particular hamming loss is the best hamming loss among other scenarios. Regarding the speed of computation time, GRU can always surpass LSTM in each scenario, because GRU architecture is simpler than LSTM. GRU scenario with dropout produces the fastest test time compared to other scenarios, with duration of 9.661752701 seconds. Therefore, word embedding and dropout play a critical role in improving the performance of both models.

Keywords: *Al-Quran, Recurrent Neural Network (RNN), Long Short Term Memory (LSTM), Gated Recurrent Unit (GRU), Multi-label*