

ABSTRACT

Speech recognition is one of the sciences that is part of Natural Language Processing (NLP), which is a branch of Artificial Intelligence (AI) which aims to make machines understand commands or speech in the form of voice signals. Speech recognition technology can be implemented in helping humans in everyday life, one of the problems that can be solved by implementing speech recognition in making smart key systems based on voice-based commands.

In making the design of speech recognition for this system, the Mel Frequency Cepstral Coefficients (MFCC) feature extraction is used to produce the cepstral coefficient, then with the results of the cepstral coefficient, it will be processed using the Long Short Term Memory (LSTM) algorithm to provide predictions for the spoken speech. be input to the system. Then in implementing the design, using cloud computing, the trained model is connected to the Raspberry Pi which regulates the solenoid to lock or open the door.

In this study, two different datasets were used, namely a manual dataset and a dataset owned by Google, further modeling using deep learning was carried out to obtain system performance analysis results, namely the combination of the hyperparameter optimizer and learning rate until the optimal value was obtained in dataset one. Nadam optimizer at a learning rate of 0.0001, namely accuracy test 87.9%, precision 88%, recall 88% and F-1 score 88%. while in the dataset the two optimal values are the combination of the Nadam optimizer at a learning rate of 0.001, namely 99.1% accuracy test, 99.1% precision, 99.2% recall and 99.2% F-1 score. Furthermore, the results of the test on the tool showed that the best results were female sex at a distance of 5 cm with 88% accuracy, 76% precision, 100% recall and 86% F-1 score.

Keywords: *Intelligent key, natural language processing, mel frequency cepstral coefficients. long short term memory, artificial intelligence.*