Deep Learning as an Early Detection System
for Rotary Percussion Drilling Malfunctions

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To mine in the underground, the method of blasting and blast hole drilling methods are mainly, and widely accepted. The hole drilling methods are done with rotary percussion drill. However, there are problems in terms of difficulty of operating and mining cost resulting from its failure occurs, and thus it is hard for mining companies to find a way of mining underground efficiently, profitability, and safely. From this background, it is necessary to build the early detection system for drill bit failure. This system needs the technology of CNN (Convolutional Neural Network Smart Mining, which is the process of using information, autonomy, and technology to improve safety, reduce operating costs, and improve mine site productivity. In this research, drilling vibration from rotary percussion drill is transmitted as acceleration waveform and used as input data for building the system. The data is collected replacing the kinds of diameter of bit or drilling condition. This data is for developing the model introduced CNN to detect the difference between Normal drilling and the other kinds of drilling with something error. For Firstly, batch of waveform data is input model as training data to make the model recognize the data pattern. Secondly, validation process confirms the correct answer rate against the training data, and then, the test for the model is practiced. Finally, by comparing each accuracy in phase of test from 4 types of models built with different kinds of data and the ideal way of the input waveform data is found.

Keywords : Convolutional Neural Network, Deep Learning, Rotary Percussion Drilling