

ABSTRACT

Predictive maintenance of railway point machines is discussed in this thesis, which is a vital equipment for ensuring the safety of railway operation. The predictive maintenance system is proposed based on time-series current-signal monitoring which gathered when the railway point machine is operated. Time-series data would be extracted and filtered based on scalable hypothesis testing. This study investigates two scenarios of number of features that would be utilized as dataset, (1) 100-features dataset and (2) 10-features dataset. In order to obtain the optimum machine learning model, we examine the hyperparameter tuning for machine learning model which use grid-search 5-fold cross validation method. Three machine learning algorithms would be employed, namely support vector machine, random forest, and artificial neural network which are the most frequently used in the predictive maintenance application especially for classifying the equipment's conditions. The machine learning model is trained and tested by using the experimental data collected from railway point machine test-bench in multi-classifications which are normal, warning, and failure conditions. The results show the great accuracy and efficient method of random forest algorithm using 10-features dataset for classifying the railway point machine's conditions.

Keywords: railway point machine, machine learning, predictive maintenance, condition monitoring