

Machine Learning based Diagnostic Approach to Condition Monitoring of Railway Platform Screen Door Systems

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Abstract – This study focuses on the use of machine learning-based fault classification to investigate the condition monitoring of Platform Screen Door (PSD) Systems in the railway industry. PSDs are safety systems installed in subway or train stations to prevent passengers from falling onto the tracks. The electromechanical system consists of sliding doors or gates that run along the platform edge and only open when the train is properly aligned with the platform. PSDs provide improved safety, increased passenger comfort, reduced energy consumption, and support transportation efficiency. Failure of PSD systems can result in serious consequences, so monitoring the condition of PSD is important to prevent failures and increase availability. PSD system exhibits signals of faults prior to failing its function. These fault signals can be detected during service times, and necessary maintenance can be performed to ensure high availability. The study employs machine learning algorithms to classify system-induced faulty conditions from collected data. Successful outcomes will enable a future online AI-based predictive monitoring of PSD systems. This work is carried out as a part of the ‘Ecological Motor Control and Predictive Maintenance with AI (ECOMAI)’ project, which is an industrial R&D project with participation of 2 universities and 8 companies from Germany, Austria, and Turkey. Project objectives include generating a PSD fault library, collecting data from faulty cases, developing AI-based software, and modeling the PSD system in Simulink. Outcomes of these studies will be fed to other partners involved in the project for creating a targeted AI development kit.

Keywords – Platform Screen Door, Condition Monitoring, Machine Learning Algorithms