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Development of Abnormality Detection System for Power Plant Facility

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Abstract

In recent years, unplanned breakdowns due to the degradation of power plants are on the rise, and power generation is expected to change frequently as renewable energy increases. The KEPRI(Korea Electric Power Research Institute) has developed an abnormality detection system to avoid unplanned breakdown of power plant. It is necessary for the power plant facilities to detect abnormal condition early before the occurrence of the fault to minimize maintenance cost.

In this paper, we compared some multivariate signal estimate model algorithms which are AAKR (Auto-Associated Kernel Regression), AANN (Auto-Associated Neural Network) and AAMSET (Auto-Associated Multivariate State Estimation Technique) by validating test data. The developed algorithm improves abnormality detection reliability by adding training data compression and optimization techniques. Based on commercial software language, we developed App.(Application) to improve user convenience and versatility. Development App. verified prediction accuracy using two kinds of data. First, GT (Gas Turbine) data of the power plant acquired the sensor data through the DCS (Distributed Control System). Second, diesel power generator data of island area acquired IoT(Internet of Things) sensor data which newly installed by KEPRI. Both types of data confirmed that the developed App. has the same or better performance than the commercial App.

In the future, we plan to build a real-time monitoring system to expand the power plant facilities to be applied. Through additional App. development, we'll build Intelligent and digital power plant system to optimize O&M(Operation and Maintenance) and asset performance.