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GROUP REF. : C2
PREF. SUBJECT :PS1-3
QUESTION N° : 1.8

In response to question Q.1.8, we consider that " It is expected that many areas can be automated using AI and other methods. On the other hand, it is necessary to develop countermeasures for infrequent events or to separate them" . To answer this question, we would like to introduce an example of automation of grid operation tasks of Kansai Transmission and Distribution, Inc. and the data-collecting environment for further automation.

In Japan, fault clearance during system faults, reclosing after fault clearance, voltage control during normal and emergency conditions, and grid stabilization measures for thermal,transient stability, and frequency maintenance are already automated. In other words, the system automatically calculates the necessary fault countermeasures based on the latest system model reproduced on a computer by taking in the voltage, current, and other telemetering information measured in the power system. In the event of an actual system fault, the system operates according to the results of the calculation to stabilize the system and maintain voltage.

In addition to these, Kansai Transmission and Distribution, Inc. is automating the tasks of forecasting the next day's total power demand for the Ksnsai area , which is performed at the central load dispatching center. In the past, demand forecasting tasks involved multiple work processes, and we spent a large amount of time on a single forecast. Moreover, because some of the processes involve judgment by the operator, there was a issue of the variability in forecasting accuracy due to differences in operator’s experience. Therefore, we created a demand forecasting model through the use of machine learning and proceeded to automate demand forecasting tasks. The automation of demand forecasting tasks has improved the accuracy of forecasts and increased operational efficiency.

However, there are areas where automation is not possible at this time, mainly in areas where events cannot be organized in sequence. For example, if severe weather is anticipated, preventive maintenance measures may be taken to minimize the impact on the grid, but it is necessary to create a discriminant model or formularization to determine whether or not to take preventive maintenance measures. In order to realize these goal, it is first necessary to obtain knowledge from past big data through machine learning, etc. However, the data-collecting environment has only recently been established and full-scale analysis will need to be conducted in the future.

In addition, there may be unavoidable truncation of infrequent events for which machine learning is not expected to be utilized. For example, human judgment will likely continue to be required to decide whether or not to shut down substation equipment to prevent physical injury when intrusion detection equipment reacts, etc.

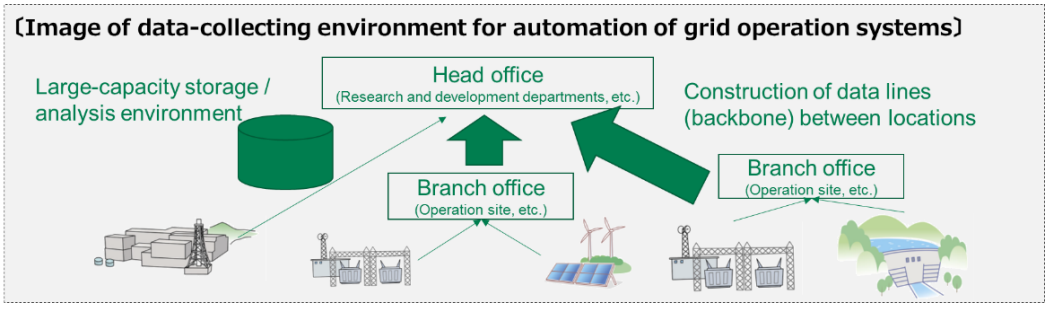

Fig. Image of data-collecting environment for automation of grid operation system