Proceedings of the 8th World Congress on Civil, Structural, and Environmental Engineering (CSEE'23)
~~Lisbon, Portugal~~ Virtual Conference – March 29 – 31, 2023
Paper No. ICEPTP 108
DOI: 10.11159/iceptp23.108

A Study on the Proper Scheduling Of the Sand Filtration Process through Artificial Intelligence Learning

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Extended Abstract

Water quality management is becoming more difficult due to various causes, such as increasing difficulties in predicting and managing the future environment, and aging and decreasing maintenance personnel. With the advent of the 4th industrial revolution and the development of various data processing technologies, we were striving to lead a better future through information from the past. In Korea, research and development were underway to provide high-quality drinking water to the public through artificial intelligence-based technology. The artificial intelligence-based water treatment process can suggest operating conditions suitable for the current situation through current and past water treatment plant operation information. This reduces the strain on the operator and maintains the quality of drinking water. In this study, a method to increase process efficiency was sought by analyzing the past operation information of the sand filter plant of the water purification plant pilot plant through artificial intelligence-based learning.

Artificial intelligence-based learning was performed using water quality and operational data collected from a pilot plant in K city water treatment facility in Korea. Operational changes in the sand filtration process according to water quality and seasonal characteristics were analysed using water quality and operational data for at least 3 years. For successful learning of the model, outliers and missing values were corrected through the data cleaning method. Refined data was applied to various artificial intelligence-based learning methods to find suitable learning methods for the sand filtration process and to present the optimal operation scenario for automatizing operations.

A popular sand filtration process control method was established and operated based on changes in the water level in each tank [1]. This method could cause problems in the backwash schedule by increasing the number of backwashes than planned when handling raw water with high turbidity and abnormal water quality. When the sand filtration process was operated through artificial intelligence-based learning, it was possible to predict each group's backwash schedule problems and induce changes in the treatment flow to prevent them.

References

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