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Acquisition and analysis of floc images by machine learning technique to improve the turbidity removal process

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ABSTRACT

This article reports on the implementation and use of a floc image acquisition and analysis system in a pilot water treatment plant to remove kaolin turbidity with a coagulant and flocculant. The system is based on the Hausdorff dimension (d_f) of the images and is used to obtain information about the image texture and to ensure that the flocs could be removed by the filtration system, and to use d_f values for corrections of the dosage of both chemical agents via signals with pulse width modulation that feed and control dosage pumps during treatment, ensuring a continuous adjustment for changing water conditions, which allows for a close on-site process control and a rapid response to changes in the quality of the effluent.

Keywords: Supervised machine learning; Coagulation; Flocculation; Turbidity; Hausdorff dimension

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