



Soil water content prediction with machine learning in greenhouse.

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Water resource scarcity increases due to extreme weather events and long-term climate change. Agricultural water utilization efficiency becomes a key issue of water resource and food production nowadays. This study provides a novel method for predicting and controlling the evolution of soil water content in a greenhouse. Our experiment implemented with monitoring instruments installed, collecting air temperature, relative humidity, soil temperature, and soil water content. Cherry tomato, which is one of the most common global greenhouse fruits, was chosen to grow in the potting soil. A well-controlled water content condition in soils can allow for a more appropriate heat balance and protects plant roots systems and reduce the water waste. We used an ensemble-learning method to predict and optimize the irrigation process. The results showed that the machine learning method is more efficient than the widely used Hydrus-1D based on the Richards equation when the soil information is limited. Nevertheless, the quality of the simulation results from the machine learning method is highly dependent on the training period.