Investigating distribution of sensors in canal and feedforward control simulation for canal automation

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Taiwan has a relatively unusual hydrology state, in which the actual accessible water resource is well below the
world average. As a result, allocating water resource is a constant issue in Taiwan. At the aspect of agricultural
water usage, it takes almost 70% of accessible water resource, but the present allocation system of agricultural
water cannot prevent waste of water. So the canal automation system, namely, kind of smart agriculture system is
well discussed nowadays. Even lots of robust canal automation systems are currently using worldwide, developing
canal automation system is a complicated procedure that depend on location and its agricultural culture. To achieve
canal automation, the canal must have sensors to retrieve real-time data of canal, so investigating the optimal
distribution of sensors is the first and important step to canal automation. This study focused on Shimen Irrigation
District which had a clear canal system, using information theory to discuss the optimal strategies for setting up
sensors. Moreover, a one-dimensional water profile model considering uncertain data is constructed for simulation
of feedforward control problem. These two components of canal automation system are essential for developing a
comprehensive algorithm.