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Reading Gate Positions with a Smartphone

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Worldwide many flow gates are built in water networks in order to direct water to appropriate locations. Most of these gates are adjusted manually by field operators of water management organizations and it is often centrally not known what the new position of the gate is. This makes centralized management of the entire water network difficult. One of the reasons why the measurement of the gate position is usually not executed, is that for certain gates it is not easy to do such a reading. Tilting weirs or radial gates are examples where operators need special equipment (measuring rod and long level) to determine the position and it could even be a risky procedure. Another issue is that once the measurement is done, the value is jotted down in a notebook and later, at the office, entered in a computer system. So the entire monitoring procedure is not real-time and prone to human errors. A new way of monitoring gate positions is introduced. It consists of a level that is attached to the gate and an app with which a picture can be taken from the level. Using dedicated pattern recognition algorithms, the gate position can be read by using the angle of the level versus reference points on the gate, the radius of that gate and the absolute level of the joint around which the gate turn. The method uses gps-localization of the smartphone to store the gate position in the right location in the central database.