Massive IoT Monitoring System for the South-to-North Water Diversion Project in China

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About South-to-North Water Diversion Middle Route Project (SNWD)

- Artificial canal across Henan and Hebei province to Beijing and Tianjing
- Total length is 1432km
- Total Investment is RMB 200 billion
- Accomplished in 2014. Currently, 90% of residential water supply in Beijing is from SNWD project
Challenges for Canal Safety Monitoring

Numerous Engineering Entities

• Dam: 1277 Km
• Floodgates: 318
• Bridges: 1256
• Drainage culverts: 469
• …

Numerous Impacting Factors

• Leakage for dam
• Seepage for drainage culverts
• Settling for dam, floodgate
• …
Challenges for Water Safety Monitoring

**High Quality Requirements**

- Goal: the quality of water received in Beijing should be above grade II.
- Canal is too long and crosses main industry areas in Hebei.
- Accidents may cause pollution.

**High Quantity Requirements**

- No reservoirs along the canal.
- Water level should be kept stable.
Challenges for Intrusion Monitoring

High Loss for Intrusions
- Many crossings with roads, railways, and rivers, through which it is easy to get in.
- People will get drought with high probability if fallen into the canal.

Limited Protection Methods
- Unattended and less on duty.
- Physical isolation fence is weak.
Key Challenges for the Safety Monitoring System

- Varying Monitoring Environments
- Enormous Types of Sensors
- Enormous Types of Data
- Complicate HetNet Architecture
- Complicate Integrated Platform
Safety Monitoring System for South-to-North Water Diversion (SNWD) Middle Route Project

- Design of a sensor network for the monitoring of South-to-North Water Diversion Middle Route project.
- Development of an integrated information platform for the management of the water diversion project.

Project & Partner

- National S&T Major Project (2014ZX03005001)
- Office of the South-to-North Water Diversion Project Commission of the State Council
Key Technologies: R&D on Smart Transmission Gateways

Configurations
- Wireless Communication Tech. 2G/3G/4G/WiFi/Zigbee/BLT/470
- Seamless Handover
- Remote Control and Configure
- DVI+HDMI+DisplayPort
- High Compression Rate for Data Preprocessing
Key Technologies: R&D on Integrated Web-and-GIS based Control and Display Platform

Application: Intrusion Monitoring System According to Web of Things Architecture
Application: Smart Video Monitoring System
Innovation
Collaboration
Commercialization

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