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Design test of a Scalable Long-Range Model for Water Loss Detection and Audit

Water Resource and utility companies experience difficulty and challenges in detecting water loss as well as undertaking reliable and efficient water audit. Water losses affect clients and consumers in the short-term, as well as the company's ability to provide quality services to them in the long-term. This challenge is mainly due to the fact that most water service providers in Kenya manually monitor water loss, and as a result, water consumption and distribution audits are largely fashioned in the same manual process. The cases of water loss are due to moribund infrastructure, wear and tear or human interferences like siphoning, which largely go undetected, and are probably only discovered after the fact. Consequently, mitigation of these incidences of water loss, as well as auditing of water distribution and infrastructure is difficult, largely uncoordinated and inherently cumbersome. This situation necessitates the need to implement a technology-based system that can enable rapid and instantaneous detection of water loss. A Long-Range (LoRa) based technology prototype is therefore designed and implemented to enable detection of water loss and audits to be performed remotely and affordably. LoRa technology has proven to be an adaptable and efficient model to manage data and provide solutions to long-lived water loss. This study enabled the design and development of a long range WPAN or Wireless Sensor Network (WSN) model based on IEEE 802.15.4g LoRa standard. This study reviewed the technological challenges, architectural and logical design for the implementation of a scalable long-range model to detect losses in real time, remotely and accurately. The study used the PPDIOO methodology towards achieving and implementing network design lifestyle. The designs prototypes were set-up in a testbed, monitored, reconfigured and adjusted for efficiency and applicability. The best data propagating design was chosen as a result. The study contributed to the body of knowledge.

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