Chapter 14
IoT-Based Smart Water Treatment Plant of GIFT City

Parth Vinayak Brahmbhatt
Sankalchand Patel University, India

Rajan G. Patel
Gandhinagar Institute of Technology, India

Nimisha Patel
Sankalchand Patel College of Engineering, India

ABSTRACT

Water is a vibrant source for life, and its management and treatment are a crucial issue at the present time. A smart solution for city-level water treatment plant is gaining importance with the development in communication technology. We can avoid the issues pertaining to water management and treatment, such as distribution, quality, monitoring of overflows, pH (pouvoir hydrogène) value of water, etc., with help of information communication and technology. Based on this standard, the authors proposed a smart water treatment plant for the entire city using IoT with business processes direction and decision support systems. The suggested IoT architecture not only provides real-time monitoring for supply of pure water being transferred to the citizens but maintains the quality and purity of water supplied along with automation of motor operation, automatic valve controlling, and health monitoring of equipment. The system also delivers an alert to a remote user when there is a deviation of water quality parameters from the pre-defined set of standard values.

INTRODUCTION

Every living organism needs water to survive. Water treatment plant helps in controlling the quality of water and thereby reduces toxins in wastewater to a level by which nature can handle. Water Treatment Plant removes all sediment, bacteria, and other impurities before arriving at the water tap.

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Water is one of the most valuable ordinary resources. With hasty development, the resource is becoming rare swiftly. For organizations and systems that functions in the water industry, should have Supervisory control and Data Acquisition (SCADA) systems to monitor every parts of the water distributions systems but yet the real-creation limit of its installation points has restricted its practice. As stated in IoT and Hospitality, "The number of connected devices grow by two billion objects in the year 2006 to a projected 200 billion by the year 2020" (Evans et al, 2011). With the growing number of connected devices, the water industry is captivating gain of IoT sensors to monitor water levels, chemical leaks, and even control the water flows. Internet of Things (IoT) in water treatment uses the idea of smart sensors connected at numerous points in the water system. These sensors gather data and send it back to the monitoring systems. This statistic could contain, water quality, temperature changes, pressure changes, water leak detection, and chemical leakage detection. Our goal is to explain how we can use IoT technology more effectivity for water treatment.

The proposal is divided in the following sections: first section refers the quality of water to protect public health, support the economy and maintain a rich ecosystem. Second section refers the implementation of existing smart technologies for high quality service and strict control of operating costs for water treatment process. Third section is about water treatments (as a word originally means the act or) process of making water more useful by purifying, clarifying, softening or deodorizing it. Here, it defines about the combination of various process involved in making the water hygiene and make it more acceptable for specific end use. In this section, also illustrated the plant level technologies to meet its objectives of supplying safe drinking water used for smart city concept and it extended to a diagram with devices been used in the Water Treatment Plant (WTP). The IoT driven water treatment solutions helps in more productive and end up making well informed decisions for better operational strategies. Fourth section refers to the permission been granted for completing the project report on Water Treatment Plant at GIFT. The main aim is to build the most community focused large city in the world with a planned working in the process of Water Treatment Plant. Section 5 refers to the support and assistance provided by reviewers. Section 6 refers to the List of References for this proposal.

SECTION 1: IMPORTANCE OF WATER TREATMENT PLANT

Smart cities consist of six essential sectors which require to work in unison to accomplish a common aim i.e. making a city more liveable, sustainable and economical for its residents. These segments are smart energy, smart integration, smart public services, smart mobility, smart buildings, and smart water. One of a city's key parts of critical infrastructure is its water system. With growing populations in cities, it is certain that water consumption will increase as well. The term "smart water treatment plant" points to water infrastructure that ensures this valuable resource - and the energy used to transport it - is managed effectively. A smart water system is proposed to collect significant and actionable data about the flow, pressure and distribution of a city's water. Further, it is critical that the consumption and calculating of water use is precise. An effective smart water treatment solution can measure and keep a track on flow of the water running in an entire plant. The smart water treatment solution stands strong on three pillars namely; Sensors, Communication medium and IoT platform. A smart water treatment solution offers other benefits to the treatment plant such as;

- Custom apps as per the need of business