

IOT BASED ENVIRONMENT MANAGEMENT SYSTEM

INTRODUCTION

IoT stands for Internet of Things. It refers to the interconnectedness of physical devices, such as appliances and vehicles, that are embedded with software, sensors, and connectivity which enables these objects to connect and exchange data. This technology allows for the collection and sharing of data from a vast network of devices, creating opportunities for more efficient and automated systems. Internet of Things (IoT) is the networking of physical objects that contain electronics embedded within their architecture in order to communicate and sense interactions amongst each other or with respect to the external environment. In the upcoming years, IoT-based technology will offer advanced levels of services and practically change the way people lead their daily lives. Advancements in medicine, power, gene therapies, agriculture, smart cities, and smart homes are just a very few of the categorical examples where IoT is strongly established.

PROBLEM DEFINITION

After a two-year study, The Lancet Commission revealed that more than 9 million people die each year from global pollution. Environmental hazards are putting one out of every 6 people — and our complex ecological systems — at risk Today, IoT-based environmental monitoring and clean technology can support the detection of noxious substances, chemical spills, harmful pollutants and more, enabling governments and industries to clean and protect our air, soil, and water.

METHODOLOGY

Environmental monitoring has become crucial to ensure healthy living. Enterprises are focusing on green technology by capitalizing on state-of-the-art environmental monitoring systems. IoT- based environmental monitoring systems allow supervisors and managers to monitor current/remote sites for conditions such as rain, temperature, humidity, harmful gases, etc. These systems are a combination of wireless sensor network operations which can be adjusted based on various parameters. These are small autonomous wireless sensor nodes and receivers connected over the internet. Once they collect important data, they transmit the same to cloudbased solutions for storage and analysis. These systems can be programmed to alert the supervisors in an abnormal environment. For instance, suppose there is a fire in a manufacturing factory. Since the fire is currently confined to a small area, the workforce hasn't realized it yet. However, an IoT-based environment monitoring system detects the sudden spike in the room temperature and sends an alert to the managers and teams. They can check the premises and take action accordingly to limit the loss. In certain cases, these systems can also send the information to the fire department, which can come and put out the fire before it spreads beyond control.

WORKING PRINCIPLE OF THE PROTOTYPE

There are four essential components for IoT-based environmental monitoring to support critical insights and decision making:

Monitor the Environment: Environmental condition monitors across fields, industrial sites and water management systems require installed sensors as well as an information delivery system, such as Digi Xbee wireless communication modules and sensor connectivity gateways. These connected devices gather and deliver critical information exactly where it is needed.

Measure Data: To measure environmental impact, these systems must make it possible to evaluate key data points that can indicate everything from water and chemical leaks to critical equipment failures. This data can be used by industrial operators and municipalities to measure their environmental footprint and take action to reduce waste, increase sustainability, manage valuable resources like water, and prevent environmental disasters.

Catalog Data: The massive amounts of data collected from environmental monitoring stations around the globe cannot be overstated. There are global databases that catalog an enormous range of environmental data, such as the Microsoft Planetary Computer. Industrial sites and other enterprises, similarly, must utilize cloud and data center storage to catalog the gathered data for accessibility by business applications .

Provide Actionable Insights from the Data and Analysis : The critical end game is actionable insights from data. Digi's IoT solutions, integrated with cloud applications like Microsoft Azure and Amazon Web Services, deliver data into complex software systems that enable personnel to gain those insights, get alerts and notifications, and take action .

RESULTS

This Project idea when implemented commercially will result in efficient monitoring and control of industrial automation Energy efficient routing in wireless sensor networks constitute a challenging research area. More energy saving methods are being developed so that the applications of wireless sensor networks can be further extended to many fields.