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AN IOT BASED WATER SUPPLY MONITORING SYSTEM

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ABSTRACT

Water is the most precious and valuable for all the human beings but, now a days water supply systems are facing problem in real time operation this is because less amount of water in resources due to less rain fall.Population is increasing day by day with increase in populationurban residential areas have increased because of this reasons water has become a crucial problem which affects the problem of water distribution, waterconservation, water consumption and also the quality of water.so, there is need of proper monitoring and controlling system. In this project, we are focusing on real time monitoring of water supply in IOT platform.Water supply can be done with continuous water level monitoring so the proper distribution can be done with available amount of water in tanks,the water flow monitoring,whole pipeline monitoring.Internet of things is nothing but the network of physical objects embedded with electronics, sensors, software, and network connectivity. We are going to use different sensors for monitoring the system here the measured values from sensors can be processed by controller. Sensor Data monitored and can be viewed on central server using cloud computing with unique IP address. Motivation of this project is the smart city concept as different cities are working on this project.
KEYWORDS- Water supply system, level sensor, Pressure sensor, chlorine detection sensor, water flow sensor, Internet of things, Raspberry pi, cloud computing

INTRODUCTION

Now a day, water has become a big problem because of less rain fall the water resources are not able to supply sufficient water therefore, saving water is everyone's responsibility. To save the waterwe have to concentrate on the issues such as proper water supply, over consumption, analysis of available water, water flow rate, pressure of water flow in pipeline, quality of water. To overcome these problems we need a better technology for monitoring the supply system.

There are different traditional methods for water supply monitoring and making it automated. In the traditional methods, water level sensing is done using different microcontrollers these methods are used to make the supply automated. Wireless communication protocols were used for short range low data rate communication.In traditional methods data cannot be smonitored on server. The online water monitoring systems are high cost associated with installation and calibration. There is need of water pipeline monitoring so that water flow rate measurement, leakage detection and water level sensing so that whole water supply system can be monitored and controlled.

By focusing on problems in traditional methodsour paper design and develop a low cost embedded system device for real time monitoring of water distribution system in IOT platform. In our design we are going to use a new model of raspberry pi B+ model. Specialized IOT module can be used for accessing the sensor data from controller to cloud; different sensors such as flow sensor, water level sensor, pressure sensor can be used. Data can be viewed on the cloud using special IP address. It also provide a Wi-Fi for viewing data on mobile

IOT

Internet of things (IOT) is a world where billions of objects can sense, communicate and share information; all interconnected over public or private Internet Protocol (IP) networks. These interconnected objects have data regularly collected, analyzed and used to initiate action, providing a wealth of intelligence for planning, management and decision making.IOT was invented by British entrepreneur kelvin Astona member of the Radio Frequency Identification (RFID) development community in 1999, and it has recently become more relevant to the practical world largely because of the growth of mobile devices, embedded and ubiquitous communication, cloud computing and data analytics.Each thing is uniquely identifiable through its embedded

computing system but is able to operate within exiting internet infrastructure.Cloud computing is low cost processing unit, also large-scale, which is based on IP a connection for calculation and storage. There are different application areas such as water quality monitoring, water distribution system monitoring, environmental condition monitoring, home automation all these make the city as a smart city. Our proposed system introduces cloud computing technique for viewing sensor data on the internet.

BACKGROUND

In this we have taken literature review on different systems which are implemented for water distribution.In the previous systems water level monitoring, flow monitoring is implemented with different microcontroller it will send this data to PC with a short range, low data rate protocol this restricted for a particular area.I have taken a survey of water supply department in municipal corporation of Aurangabad city for observing and understanding the water distribution system how water comes in overhead tanks, pipeline structure, level monitoring ,water flow rate and leakage detection here I observe thatall the monitoring and controlling work is manual. Labors are appointed here for monitoring the water level, control valves this takes time and also the man power because of this we cannot overcome the problem of over consumption, overflow which affects the water supply system it is challenge for water utility department Aurangabad municipal corporation is trying to make the water supply system reliable and efficient they are also working on the project to make this automated system as Aurangabad city is working on smart city project this thing motivated me design and develop a system which will be useful to municipal corporation for monitoring water supply system. I am proposing a system in IOT environment. Joint Research of Smart Water Management with Imperial College London worked on ICT, sensor technology in collaboration with NFCthey worked on visualization of health condition of water infrastructure and hydraulic conditions, understanding of water pressure, capturing a pre-failure of water pipe, smart operation of water with virtual modeling this ICT work is efficient. Water conservation with low cost can be done with Sensors that are first logged baseline water usage without visualization. Then, two display such as ambient and numeric, were given in a random order, each shows individual and average water consumption. Quantitative data along with participants difference in the effectiveness of numeric displays and visualization are very important they have worked on Sustainability, ambient displays, persuasive technology these system is very complexI have taken the market survey, I observe that there are various companies which are working on water management and they have instruments for water management and monitoring.The SIWA Management System for drinking water and wastewater transport is based on system modules and offer functions like optimization, simulation, prediction, and monitoring of leaks. The modules are easy to operate because the user interface is coordinated with SIMATIC WinCC / PCS 7 control technology.SIWA OPTIM calculates the most economical pump, well and water tank schedules. SIWA OPTIM is a scalable management system that supportsthe operation of (remote) water supply systems. the ideal distribution of pumping current to the individual Model-based analysis module that models the water distribution network's hydraulic data and makes it possible to compare the theoretical and actual network conditions Connection to process control/SCADA module for exchanging data between the central unit and the control center/SCADApumps is calculated for a preset pressure level. The systemdata required is obtained from sources like the pumps 'characteristics and the system characteristics in all relevant pipeline segments. Energy STAR certified company also provides water management system.

SYSTEM MODELING

Before explaining the proposed system let us give how water flows into the taps in houses. Cities usually source water from rivers, lakes, and ground water reservoirs. From these water sources, the water is pumped from pump houses into treatment plants through pipes. Water is cleaned at the treatment plant and from there it is piped into reservoirs. The reservoir is the storehouse for the treated water.Water is pumped from these reservoirs to the overhead tanks spread across the city. The water then gets distributed to houses and factories through a network of pipes working on gravitational force. In some cases, the water is directly supplied from the reservoirs to the houses.Water is a basic need of every human being everyone have to save the water. many a times with lack of monitoring, overflow of these overhead tanks can occur because of this lots of waterget wasted, another thing because of overflow in the pipelines with more pressure there is possibility of pipeline damage, leakage detection is one more problem all these problems are because of lack of monitoring, manual work, less man power ,to overcome these problems we are going to propose a system using Raspberry pi in IOT environment.
Water level of tanks, available water in tanks, flow of water, leak in pipeline, flow rate, also water sensing component in tap all these parameters can be observed using IOT. We can access all the data on internet with

separate IP address form anywhere. Using this system all the tanks in city also can be observed also we can control the valves so that proper supply can be done. We are going to work on a prototype model with whole pipeline set up, control valves and tanks here water sensing component get fitted to tap if water will not come for some period it will trigger a message.

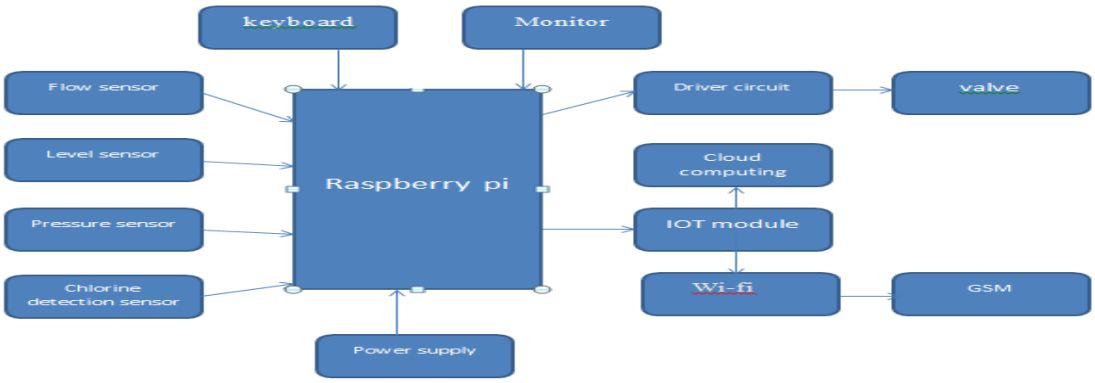

Figure 1: Block diagram of proposed system

In proposed system, Raspberry pi is used as a core controller. The raspberry pi is run on Linux kernel it has a quad core processor with 1GB RAM. LINUX OS is boot on Raspberry pi. Water flow Sensor, water level sensors, pressure sensor, chlorine detection sensors reading can be taken directly from command line. Python programming is used to read the sensors value at set intervals. The raspberry pi sends the data to IOT module it will send the data to internet using cloud computing. The monitoring parameters of water from sensors are transmitted through IOT module to the gateway which will responsible for data analysis using a separate IP address the data can be viewed anywhere in the world.we are going to use a water sensing component which is fitted to tap if water will not come for two days it will trigger a message.

APPLICATION AREAS

This project will be useful to Municipal Corporation for water supply distribution. This system also can be used in chemical industries, nuclear plants. Data can be accessed from anywhere.

ADVANTAGES

Using this system secure and continuous monitoring can be done there is no need to go on field for monitoring, No need of manual handling so the manual work can be reduced it makes the system more efficient and reliable with low cost.

CONCLUSION AND FUTURE WORK

In this paper, the review of previous system and design of a water supply system in IOT environment using Raspberry pi is presented. Proposed system consist of different sensors, Raspberry pi with quad core processor, IOT module these all devices are low cost, more efficient, reliable and capable of sending, processing, analyzing data and viewing it on cloud proper monitoring and control can be done.We are concentrating on different parameters so that whole water supply system can be monitored.In future work we plan to implement our system and take proper results.

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