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An Efficient Water Distribution System for India using IoT

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Abstract

Water is one of the most important natural resources. Due to the growth of population and increasing Industrialization has made water resource management and distribution as a controversial issue. This paved way for the use of technologies like the Internet of Things. This paper mainly deals with the water distribution system for household appliances. In order to implement this system, each consumer should provided with mobile phones which consists of a embedded based water flow sensor ad to transmit the same to a remote monitoring station with the help of wireless transmitter and also with the solenoid valve which is electrically operated to supply water to the consumers. It is also proposed to employ a IoT modem for wireless communication and hence information is transmitted to many responsible consumers and officers to take immediate action under problematic situation.

Keywords — IoT modem, solenoid valve , flow sensor.

I. INTRODUCTION

India is a developing country with high population and growth rate. The world accounts 0.01% fresh water. It is estimated that about 40% of the total population in India would be living in urban area by 2030. By now 33% of population is living in urban area according to2015 survey. Hence water distribution is made necessary for household appliances in urban area. We have also came across the immense advancements in networking. Software and hardware technology facilitating millions of smart devices and objects to be connected to the internet. Hence using these technologies we can make water distribution in an effective and efficient manner. This smart water management system uses information and technology to reduce cost and usage of water resources Urbanization makes the country to be economically developed but at the same time it is also have some fair disadvantages. Urbanization has major issues on environment, transport and health problems. problems, cost of city administration. This brings out the importance of water management system for house hold appliances by making smart water distribution in high rise building. All variety of physical and mechanical objects in our environment can be connected through internet. This helps all our surroundings to communicate and co operate with each other for making water distribution in an efficient manner. In this paper we have proposed a solution for water distribution system for household appliances using IoT and information and communication system technology (ICT) and hence water scarcity in India ca be reduced . It also provides a review of smart water distribution and utilization of water resources for every Indian citizen to save the nation from water scarcity. This issues in environment includes increase in the demand of water usage, air and water quality drainage.

II. IMPORTANCE OF SMART WATER SYSTEM

the two main scope of water distribution and saving is farming and industries . about 19% of water in India is used by industries and about 70% of water is consumed by farming. It is also very important to identify amount and quality of water consumption. Many of the municipalities in India have decided to some restriction in the usage of water which is supplied. Along with some rules and rectification of leakages in pipeline also need to be rectified to avoid excess of water consumption. India can't deny the fact that they are under high stress and it is important to know the area for these water loses that can be improved.

Leakages in water:

Almost all countries is facing a major problem that is water leakage. This leakage in water is mainly caused due to aging of pipeline which corrodes. Excavation

across the road and high pressure in pipeline also causes damage and bursting in pipeline. This leakages are hard to detect since most of the pipeline is made underground. There are no detection methods in developing countries.

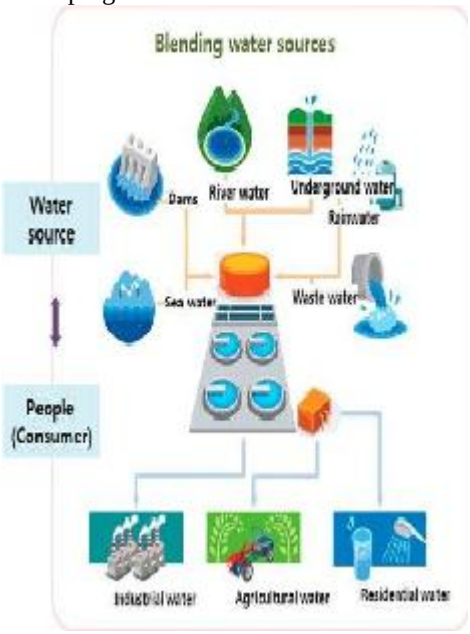

Fig:1 Smart Water Distribution System

Water quality:

Around one billion people in the world don't have pure water supply. Water contamination is mainly caused due to pollution and leakages. In African and Asian countries it is a real challenge to provide pure water challenge to provide pure water from source to destination i.e. tap. This contaminated water produces several diseases caused by contaminated water such as cholera and diarrhea.

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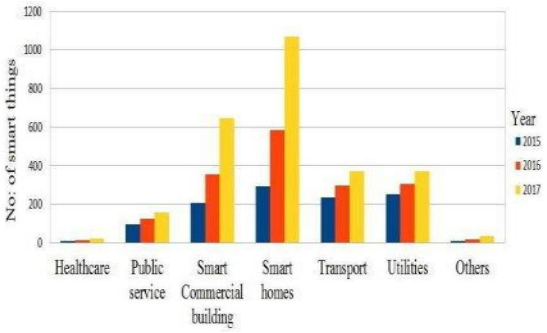

Fig:2 Gartner Research For Usage Of IoT

The working of IoT is as follows:

- ∑ A sensor is used to collect the data from environment.
- ∑ To collect and analyse this data an application is used to infer knowledge from it.
- ∑ The information that is collected is transmitted to necessary hubs.

The following figure shows the framework for the typical IOT systems

The data collected from a set of sensors is transmitted to a central/decentralized system via. A connectivity like 3G, 4G, Bluetooth, Zigbee etc., depending on the distance and data speed required. There are two main problem that is to be taken care. They are ,

- ∑ This type of system needs to be provided steady power supply to all the sensor.
- ∑ The second problem is that this system needs security aspect of the hardware and connectivity is to be taken care.

The visualization of the data can be performed for easy understanding to the end user and alert systems can be made use to provide appropriate warning.

IV.BLOCK DIAGRAM

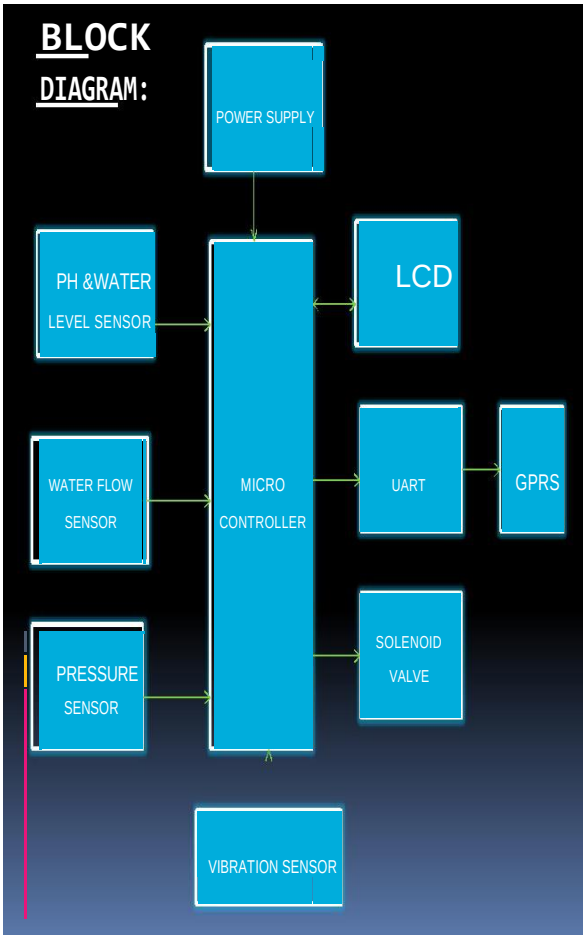

Fig:3 The Block Diagram For The Water Distribution System For Household Appliances

a. **Level sensors:** The level sensors are used to measure the level of the water in the reservoirs. There are types of level sensors they are the high level sensor, middle level sensors, low level sensors. These level sensors are used to measure the level of the water in the reservoirs.

b. **Flow sensor:** This type of sensors are used to measure the flow inside the pipes of houses. Any cracks or flaws inside pipeline can be detected using the vibration sensors.

c. **Microcontroller:** The microcontroller is used to control all activities of the sensors that are used in the system.

d. **PH sensors:** these sensors are used to measure the quality of water. These are placed between the pipeline of each houses.

This also detects that how much water is flown inside the pipeline of the houses.

e. **Vibration sensor:** This type of sensor is used to detect the cracks in pipeline in houses.

V. CONCLUSIONS

As mentioned earlier water stree is increasing day by day. India is going to face high scarcity in next 25 years. Low rainfall, floods, climate change are standing as challenges which will amplify and increase the effect of scarcity. Weather information are provided by ICT and it is playing a major role. All information regarding cyclone and tsunami are provided by ICT which saves life of thousands of India living in coastal areas. Wireless sensor technology and information technology along with Internet Of Things(IOT) can help solving the problrm of water scarcity. Hence this type of technologies can be used in water distribution system. This water distribution system is widely used in developed countries only. Deployment of such sensors and their protection is not possible in developing countries since these countries have unplanned water infrastructure and hence it is a challenging task. Hence water distribution system should be developed using smart water technology for household appliances. Low price devices and equipments having appreciable accuracy need to be developed in future. Subsidies in such devices are required from government side to make it practically applicable and implemented in all houses of India. Awareness should be created to the members of each houses about water distribution system. Sensors should be provided with the security. Hence, there is a need for low cost and low maintenance smart water system which is simple for household appliances in terms of datareliability.

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