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A Study of Smart Watertank Automation System

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Abstract-: ***Increasing amounts of evidence indicate that lncRNAs are implicated in various complex human diseases. The small fraction of experimentally confirmed lncRNA-disease associations has created an urgent need for computational prediction models. Although numerous approaches have been proposed, there remains significant room for improvement. To tackle the cold-start problem and accurately represent associations, this paper treats the prediction of lncRNA-disease associations as a recommendation problem and introduces a method based on matrix factorization and neural networks. First, to better represent lncRNAs and diseases, their embeddings are learned through matrix factorization. Then, features of associations are represented by integrating embeddings of lncRNAs and diseases. Finally, a neural network is used to predict potential associations.***

Keywords-: ***Internet of Things (IoT), Node MCU, ArduinoUNO, Water Tank, Ultrasonic Sensor, Water Level Depth***

I. INTRODUCTION

Water is the main element used in daily livings, whether for home or commercial purpose. Overuse of water is now a significant problem that is harming our environment. Lack of water may result from excessive wasting, which can also cause other environmental issues like climate change, droughts, rising pollution, and rising human demand. As there is a limited supply of fresh water, it is crucial to use and manage it properly. Monitoring water waste in different sectors, such as residential, commercial, or industrial locations, is urgently necessary.

Water tanks are a popular way of storing water in many parts of the world, especially in areas where water supply is unreliable. However. Monitoring water tank levels can be a challenging tasks, as it requires constant attention to ensure adequate water supply. Due to excessive supply of water, the majority of individuals experience water shortage and water tank overflow issues. Hence there is a requirement of water tank level monitoring and motor pump control system, which will check the water level from the water tank and users can take necessary actions immediately to save water from wastage. Water tank level monitoring and motor pump control system can be employed in various applications like food grains storage units, industrial locations, commercials and residential areas.

This work aims to design and develop an Internet of Things (IOT) based on water tank level monitoring and motor pump control system that analyses the level of water and to takes necessary steps to prevent water waste from water tank. It also intimates the user about the water level of tanks, if it reaches beyond the maximum level.

II. LITERATURE SURVEY

1. An automatic water tank level and pump control system was created by Premi et al. [1]. The system's sensor devices monitor and regulate the water level in the pump as well the overhead tank. The sensor detects the level of the overhead tank and transmits various signals to the arduino, which are used to turn the motor pump on and off. The circuit has a buzzer that will sound when the water level in the overhead tank reaches a certain level.

2. A system created by Getu et al. [2] checks the level of the tank`s water using a level detector, and then it adjust the water pump`s status based on the information it collects. This design makes use of a motor pump and a seven-segment display. The suggested system consists of a digital logic processor circuit and a water level sensor. The suggested technology eliminates the need for manually controlling water needs in urban and rural areas.

3. Shrenika et al. [3] created a non –contact water level monitoring system using LabVIEW and Arduino. The water depth in the tank is calculated by an ultrasonic sensor. The program will collect data from the sensor and transmits it to the arduino board, which will then use the data to either turn on or off the pump. This idea gets around the problems with most existing systems that uses SS sensor, which corrode when in contact with water-based chemicals.

4. Santra et al. [4] introduced a system that gauge the water level using ultrasonic sensors. The system makes use of a microcontroller, water level sensor and indicator, and water level pump controlling system. In this system, Arduino Uno R3 is supplied by DCSMPS. The system receives power supply from SMPS. When an ultrasonic sensor detects a change in water level, it sends a signal to the water microcontroller and begins to echo pulses. The primary drawbacks of this project are the costs associated with the devices that are used.

5. Perumal et al.[5] proposed an IoT-based protocol for the purpose real-time water level monitoring in disaster prone areas, the working theory behind this prototype was based on the water level, a crucial parameter for controlling the systems flow, particularly in areas that are proneto flooding. The water level was assessed using ultrasonic sensors was shown on a LCD and stored on a server. On the host, this

managed water monitoring system is installed. Results were displayed on a remote dashboard and social media platforms like Twitter handles once the water level exceeded.

6. An IoT tool that can be assists in monitoring and controlling water use suggested by Wadekar et al. [6]. The data on the water level is updated continuously through sensors that are positioned inside the tank. This data is loaded on the cloud. A person can use an Android application to visualize the data related to water levels. The operation of the water pump is automated and controlled according to the tanks water level. If there is insufficient water in the tank, the water pump activates and turn off as the tank is about to be filled.

III. SYSTEM ARCHITECTURE

1) Sensor Technology: - Installation of water level sensors within the water tank to accurately measure and monitor the water levels in real-time. For this system we are using ultrasonic sensor. Ultrasonic sensor detects level of water and transmits a sound signals to the bottom of the water tank, which is the target and the water level to be measured.

2) Internet of Things (IOT) integration: - This enables stakeholders to receive alerts and notifications regarding potential wastage events, facilitating timely intervention. The internet of things(IoT) is a system of interrelated computing device, mechanical and digital machines objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring, human-to-human or human-to-computer interaction.

3) The Arduino IDE :- The Arduino Integrated Development Environment-or Arduino software(IDE) Contains text editor for writing code, a message area, a text console, a toolbar with button for common functions and series of means. It connect to the Arduino hardware to upload programs and communicate with them. This software can be used with any Arduino board.

4) IDE (Integrated Development Environment), via Type B USB cable.

The word “Uno” means “one “in Italian and was chosen to mark the initial release of
Arduino software. The Uno board is the first in a series of USB-based Arduino Boards; it and version 1.0 of Arduino IDE were the reference versions of Arduino, which have now evolved to newer release.

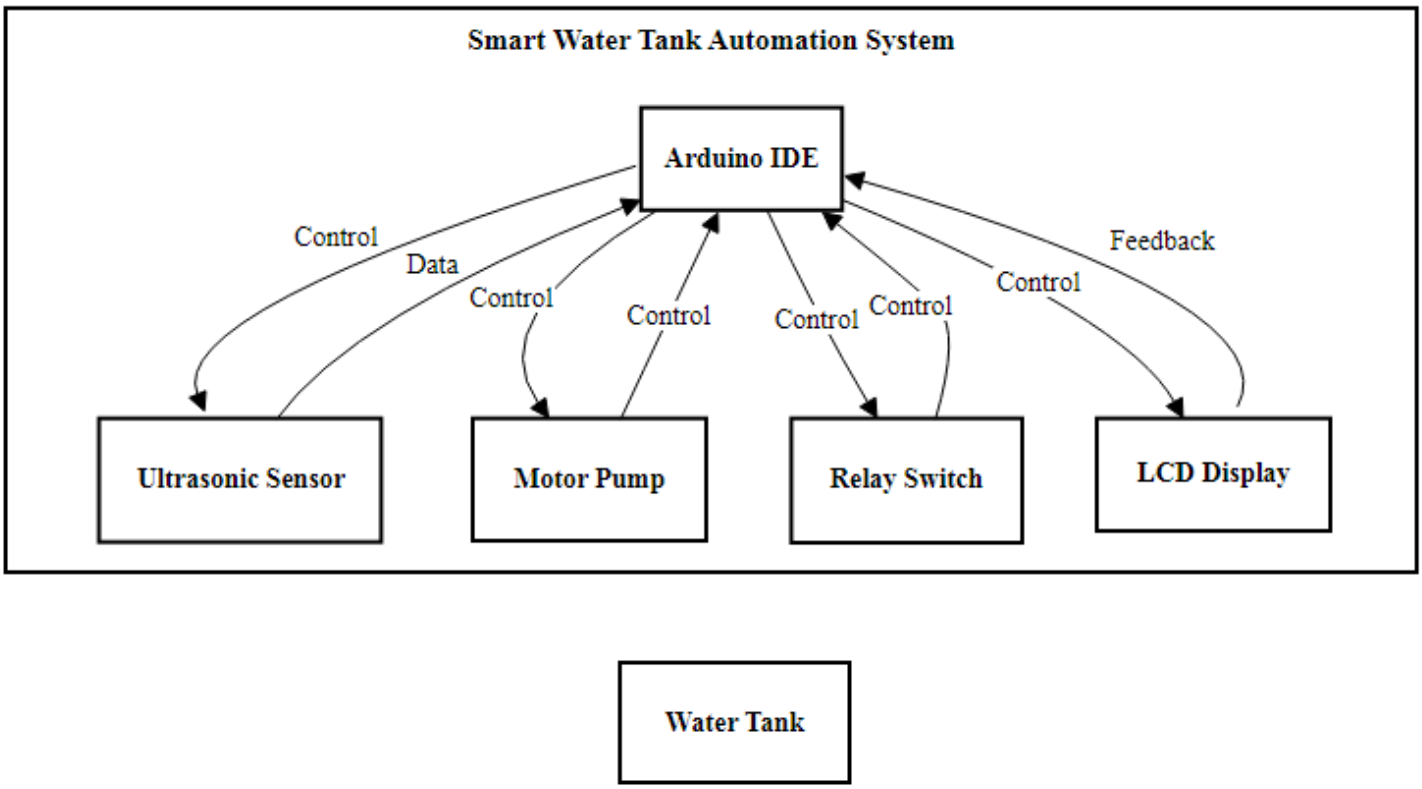

Figure 1. System architecture

IV. Advantages of System

1) These systems can monitor water levels and usage patterns, allowing for more efficient water management. By optimizing water usage, they help reduce waste and promote conservation.

2) Users can remotely monitor and control their water tanks through LCD Display.

3) Smart systems provide real-time updates on water levels, leaks, and other parameters. This enables users to promptly address any issues, preventing potential water damage and reducing repair costs.

4) Automation features allow the system to adjust water flow based on demand, optimizing usage without requiring manual intervention. This ensures a continuous water supply while minimizing energy consumption.
5) The system is low-cost, making it affordable for various applications.
6) The system is easy to install and requires minimal maintenance

CONCLUSION

A smart water tank automation system utilizing Internet of Things (IoT) technology is an innovative and efficient solution for preventing water waste. This system enables remote monitoring and management of water tank levels using sensors and communication devices. By integrating IoT technology, the smart water tank automation system provides real-time data on tank water levels. This information helps optimize water usage and prevent overflows or shortages. Overall, employing IoT technology in smart water tank automation offers significant benefits, including reduced water waste, efficient water management, cost savings, and enhanced environmental sustainability.

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