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"IOT BASED SMART WATER DISTRUBUTION

IN CANAL SYSTEM"

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IOT BASED SMART WATER DISTRUBUTION
IN CANAL SYSTEM

KEYWORDS

Sensors, Canal system, Surveying, Arduino Water Level Sensor, NodeMCU ESP8266 Development Board, NRF24l01+ Transceiver, Arduino Uno, My SQL Database-cloud.

INTRODUCTION

In India, approximately 3200 dams are present and it covers 1,70,000 sq.km for collecting water. There is also 2067.68 km long and complex canal network through which about 10lakh hectare of land gets water for irrigation and drinking purpose. The farmers are dependent on seasonal rain and after that bore well water for their crops. Canal irrigation is widely used source of water for irrigation.

Nowadays, the Control of water distribution through the canals has been treated as a central issue because of growing water scarcity and its difficulty to maintain by the government due to inaccurate information about the flow of water through the canals because of the less usage of technology.

Presently the water distribution in canal system is maintained manually, the gate keeper is responsible for delivering the water to local farmers as per their demand by opening and closing the canal gates. There is no information available to the government to identify and prevent the problems faced by the farmers. Proper equity in distribution of water is not maintained among all the farmers because of many reasons like:

- Government is not getting proper information of water distribution.

- Misappropriation in the flow of water in the canal system by few farmers or gatekeepers.

- Any natural disasters may cause damage to the canals.

OBJECTIVES

1. To Ensure proper water distribution among all the farmers and to provide the data of water distribution through canals, to the irrigation department for surveying and to take future decisions.

2. To Control all the canal gates from a single main control room and to provide water distribution information (Date & Time) to farmers, so they can know when the water will flow through canal in their agricultural land, resulting proper use of water by farmers.

3. To Collect and analyze all the information of water distribution and to provide proper data for more effective water distribution in canal system.

METHODOLOGY

The block diagram Of IOT Based Smart Water Distribution in Canal System is shown in figure 1 .
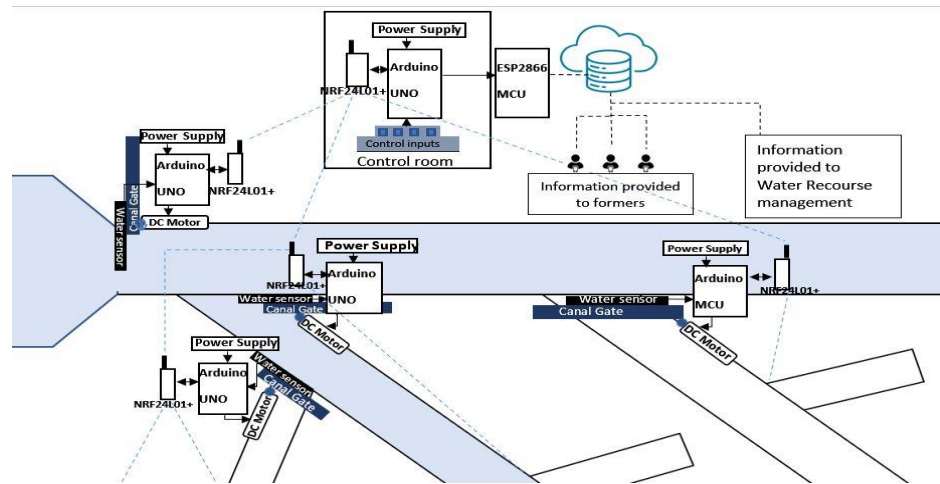

Figure 1. Block Diagram of IOT Based Smart Water Distribution in Canal System

Arduino Water level sensor, NRF2401+ transceiver, NODEMCU ESP8266 development board, Arduino Uno, DC motor, Power supply, 9v Battery and jumper wires are the materials used for constructing the model of IOT based smart water distribution in canal system.

The Water level sensor used in the IOT based smart water distribution in canal system is to sense the water flow through the canal. A NRF24L01+ transceiver is used to build a network of 2.4Ghz and can connect to 3125 nodes in a network, with 1000 meters from one node to other.

All the nodes (canal gates) are connected to each other which are controlled by a main node (control room).

Each node work as a transceiver which can transmit the information obtained by the water level sensor to the main node through which the data can be uploaded to the cloud or can receive the control

information from the main node and the water distribution data is conveyed to the farmers. The closing and opening of each canal gates are operated by the motor which is controlled by the control room (main node). Each canal gate consists of NRF24L01+ transceiver, water sensor, Gate mechanism interfaced with the NODEMCU ESP8266 development board.

RESULTS

Switch	Status	Gate	Water Sensor	Time	Location
S1	ON	OPEN	WS1 HIGH	03/04/2023 21:12 hrs.	Latitude: 22.3511148 Longitude: 78.6677428
S2	ON	OPEN	WS2 HIGH	03/04/2023 21:14 hrs.	Latitude: 22.3511155 Longitude: 78.6677430
S3	ON	OPEN	WS3 HIGH	03/04/2023 21:18 hrs.	Latitude: 22.3511166 Longitude: 78.6677432
S1	OF	CLOSED	WS1 LOW	03/04/2023 21:24 hrs.	Latitude: 22.3511148 Longitude: 78.6677428

Table 1. Results of IOT based smart water distribution in canal system

As shown in the table.1 when switch S1 is turned on, the status of the gate corresponding to the switch, water sensor data, including the distribution date, time and the location is uploaded to the database of cloud to ensure the proper water distribution throughout the network built. The same process is carried out for all the switches.

CONCLUSION

Building an IOT based smart water distribution in canal system in which all gates of canals are controlled by a single main control room and the water distribution information from each gate is uploaded to cloud through which the data can be analyzed and which Ensures proper water distribution among all the farmers. The analyzed data is redirected to the government to take further actions. The water distribution data (date and time) is conveyed to the farmers so that, they can know when the water will flow through canal in their agricultural land, resulting in proper use of water by farmers.

SCOPE FOR THE FUTURE WORK

Electricity distribution over long distances increases the temperature within power lines and thus causes significant energy losses in the form of heat. This can be solved using solar panels as they have low maintenance costs. If there is any breakdown or sudden damage near the canal gate, the control room may fail to notice it sometimes, the light indicator and buzzer can be used at the gate so that the person handling the control room can identify the issue through the light and buzzer sound.