iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** XII **Month of publication:** December 2022

DOI: https://doi.org/10.22214/ijraset.2022.46736

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue XII Dec 2022- Available at www.ijraset.com

Dam Monitoring System using IOT

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Abstract: Proposed system is an automatic dam water level, soil moisture monitors and gate opening application using IOT. The idea is to describe possibilities of IOT applications in dam monitoring and safety. Here sensors are used to sense the water level ,soil moisture and flood then the dam gates are open when water level reaches the full reservoir level (FRL). The sensors are used to measure different levels and to check the water level and provides alert accordingly to the authorized user. When water level reaches to the water sensor, it is sensed and a alert is given to the authorities using software application and when it reaches the second higher level an another alert is sent on application. When it exceeds maximum water level, a red alert is given to the sensors to provide a signal to the microcontroller so the dam gates are open automatically
Keywords: Dam monitoring, alert system, Dam automation using IOT, Water level detection, Gates opening and closing

I. INTRODUCTION

Dam plays a major role in our life as they used for purposed such as flood control and generation of electricity. There are more than 5200 major and minor dams in India. The dam operators are facing many problems as the weather condition keeps changing and also the monitoring of dams cannot be done continuously by them. Manual observation takes much more time and can also cause loss of real time data and sometimes became the reason for upcoming disaster. The proposed system will help in reducing this problem which is faced by the dam authorities. The project is to implement the applications which will monitor the water level and will send the collected data to the authorities and the opening of gates will be automated when the water exceeds the certain level. For monitoring and alerting on real time basis the internet of things is chosen.

Dam monitoring is a complex and long term process which has to be improved accordingly. A new useful system for dam water monitoring and management should be established which can provide water level in real time and can allow us to make quick decision regarding the safety operations of the dam reservoir.

The project is to implement the application which will monitor the dam and will send the collected information to the authorities and also the gates will be open automatically when the water exceeds the certain level. For monitoring and alerting on real time basis the internet of things is chosen.

Use of IoT in project- An IoT platform is designed to reduce development time for your IoT project by providing ready-made, reusable a technology stack.

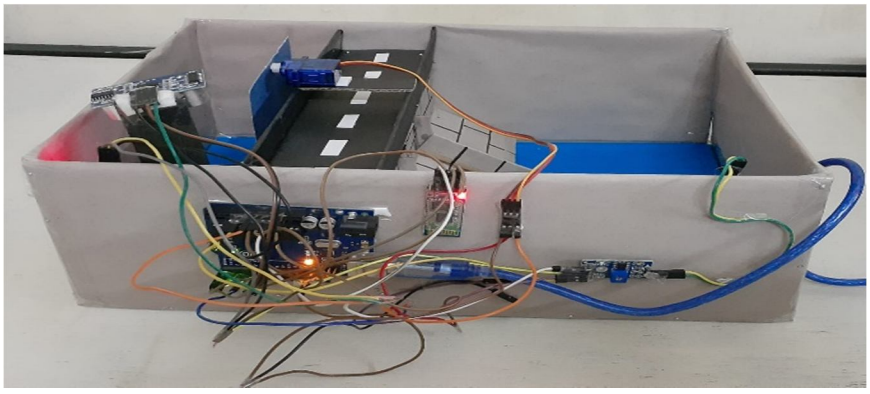
II. LITERATURE SURVEY

AUTHORS	TITLES	SAMPLE	METHODOLOGY	FINDINGS
1. Sai Sreekar Siddula P.C. Jai [2019]	Water Level Monitoring and Management of Dams using IoT	Use of Wireless sensors network with software for dam safety management	Determining the level of water, Short range communication, long range communication	-Water Level Sensor can be used to sense Water level. -In case of floods the routing of water can be done more efficiently considering level of water across different dams.
2. V. Sathya, Harshitaa Mahajan, Amit Kumar Singh[2019]	Automate the Functioning of Dams Using IoT	ability to initiate constant alarms regarding the current status.	advanced remote sensing features	-Watching structure and administrators model offer assistance for dams.

3. Dr. Nagesha Shivappa , Aishwarya S Rao, Aishwaya Jahnavi S Athreya [2020]	Dam Automation using IoT	Use microcontroller for monitoring and controlling the water distribution management	Automatic Dam Gate Control and Corrosion Detection	-They have developed a system where the controlling of dam gates is done through the data collected with the help water level sensors
4. Kavitha.R, Jayalakshmi and Senthil Kumar.K [2018]	Dam Water Level Monitoring and Alerting System using IOT	the application system with integration of Internet of Things to ensure the safety to the public about the flood occurrence due to the increase in the water level in dams/reservoirs.	Structure of the operation in the system, Structure of the flow of operation of the system, Schematic block diagram of system, Overview of the system design.	-The sensor data is collected and then are uploaded to the cloud database where the automatic comparison analytics about the increase in water level is noted. So the prior stages of rise in water level are alerted to the public respectively

In [1] the author has proposed the approach which gives description for the development of an information system based on the existing systems with the use of some sensors and IoT. This paper also proposes an idea of collecting and sharing real-time information about water levels to an authorized central command centre through far field communication.
In [2] the author has introduced the use of microcontroller for monitoring and controlling the water distribution management by usage of various sensors, controls valves, automatically and proactively manage outflow during crisis by using statistical data of the environment.
In [3] the author proposes the use of microcontroller for monitoring and controlling the water management by the use of various sensors, control valves, automatically manage outflow during high level water crisis by using statistical data of environment.
In [4] the author proposed the application system with the use of Internet of things to ensure safety to the public about the prior alerting of flood occurrence due to the increase in the water level in dams. Cloud database technique is used which encapsulate the periodic monitoring water level data and vicinity information.
In [5] Semantic web technology seems to be in the infant stage as only little efforts have been taken on ontology construction with cross-domain application. The core concern of this work is on two decision-making processes namely data filtering and data annotation. Certain process is followed in this work: (i) Pre-processing (ii) Proposed Jaccard Similarity Evaluation (iii) Data filtering and Outlier Detection (iv) Semantic annotation and clustering.
In [6] Industry and Institute both are equally responsible to develop quality students. In this paper, cross domain (Industry domain and Institute domain) ontology based semantic models are developed to bridge the institute-industry gap using Protégé 5.5.0 editor. The classes and sub classes of Industry Institute ontology are designed with the help of domain experts.

III. METHODOLOGY



1) *Step 1*- Water level sensor will detect water so we will set a value if water exceeds the level then red led will glow and servo motor will be on. It will be on until the water level is not medium.
2) *Step 2*- As soon as the water level reaches to medium level then it closes the gate with the help of servo motor.
3) *Step 3*- Ultrasonic sensor is also used for water detection here also we will set value if it exceeds that level then buzzer will be on.
4) *Step 4*- Soil moisture is also used here for detecting the amount of water in the soil.
5) *Step 5*- Bluetooth will also be there so the values will be seen in the Bluetooth serial monitor app. Conducting wires connects every component to Arduino through which components gets signal.

IV. DIAGRAMS

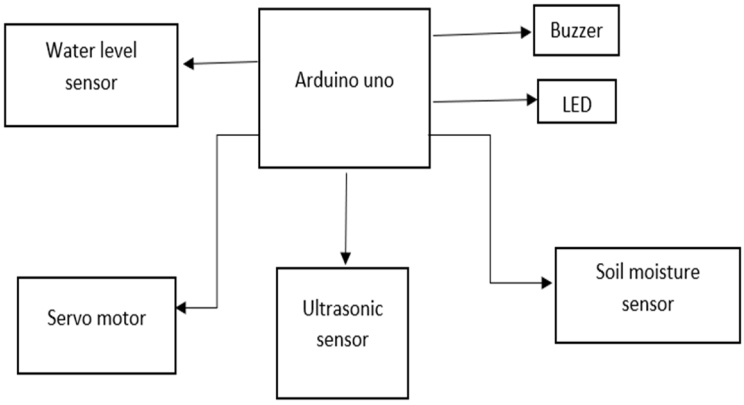


Fig 1- Block Diagram for Dam Monitoring Process

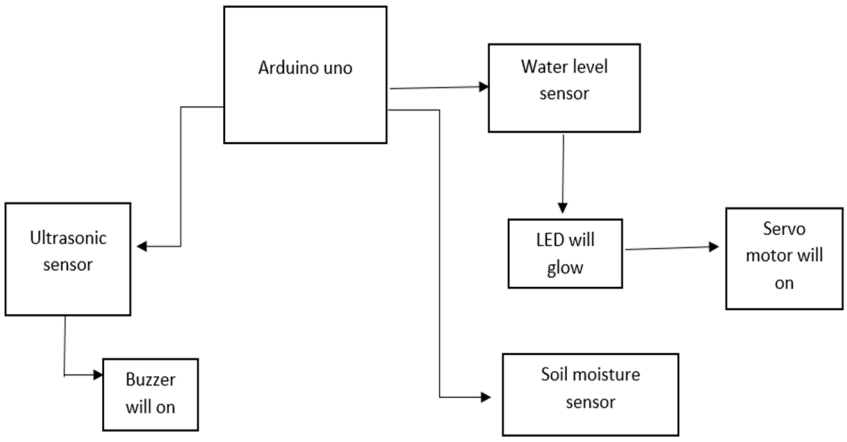


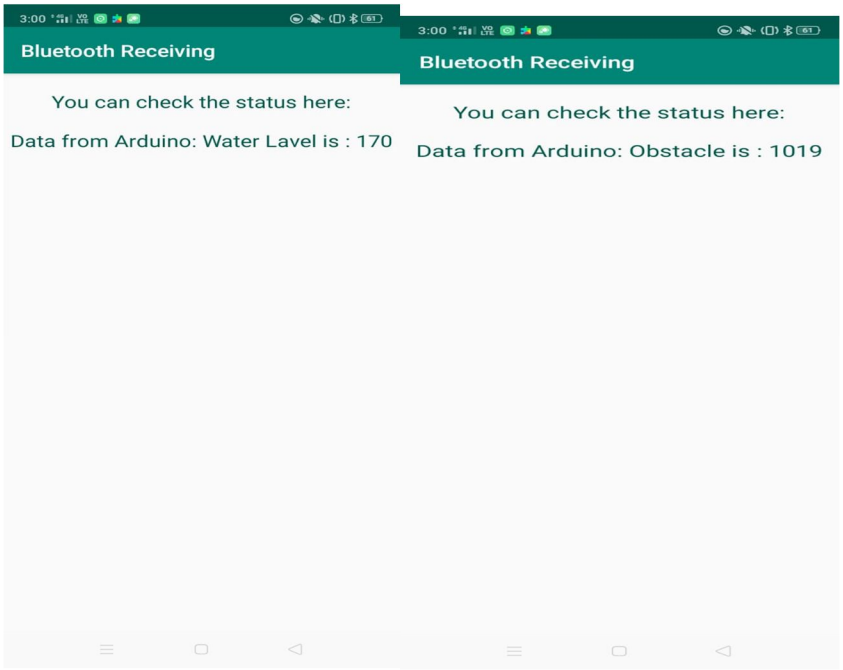
Fig 2- Flow Diagram for Dam Monitoring Process

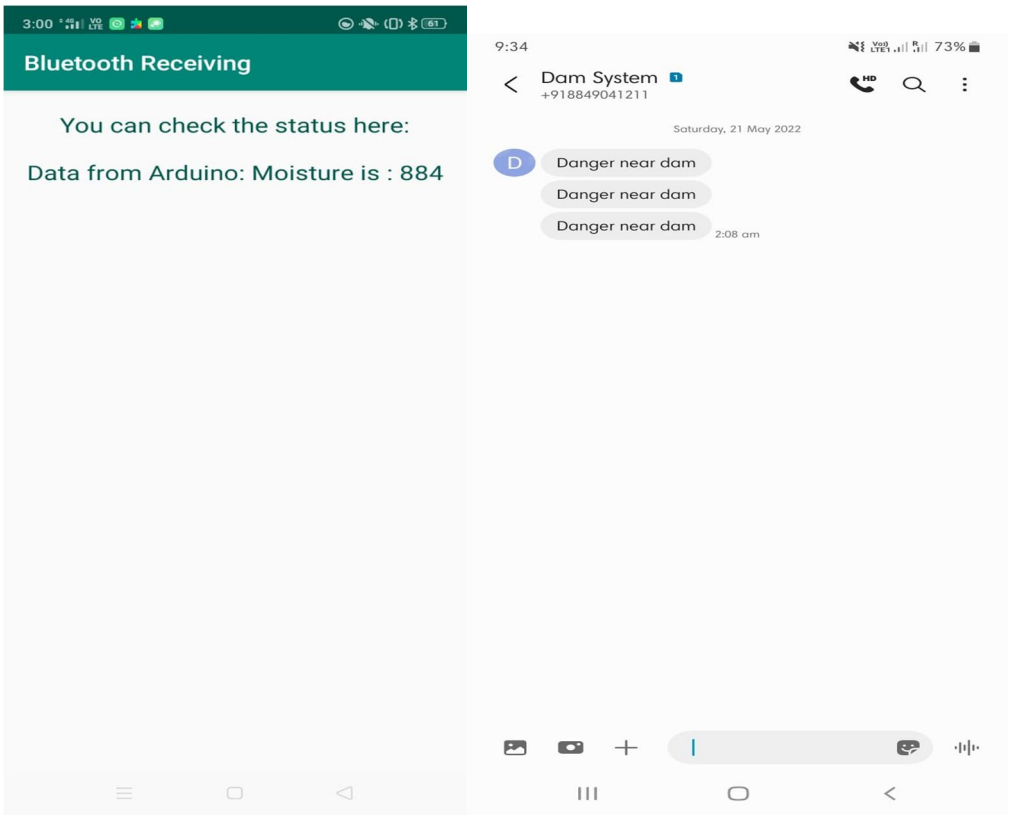
Water level sensor will detect water so we will set a value if water exceeds the level, then red led will glow and servo motor will be on.

1) It will be on until the water level is not medium. As soon as the water level is medium then it closes the gate by using servo motor.
2) Ultrasonic sensor is also used for water detection here also we will set value if it exceeds that level then buzzer will be on.
3) Soil moisture is also used here for detecting the amount of water in the soil.
4) Bluetooth will also be there so the values will be seen in the Bluetooth serial monitor app.

V. RESULT

The result generated in above system is calculating the level of water, moisture of soil, any obstacles detected and displaying it on our application and sending alert or danger message to authorized number. As per the collected information dam gates open and close automatically.





VI. CONCLUSION

In everyone's life water is the most basic need. But a lot amount of water will also adversely affect human life. We here trying to overcome these problems by this dam automation application. This propose automated mechanism of water level monitor control and alerting system using sensor, NODE MCUV2 in dams ensure efficient of available water resource, and it will generate more accurate result which is the best method to overcome manual judgement. The main advantage of this system is that it can be controlled from anywhere. It is an IOT based, so the speed of data transmission will be high and probability of loss in real time data will be less.

VII. FUTURE WORK

Also, real time data can be recorded in automation application. Also, we can compare with dam prototype, this idea can be implemented in existing dams. Also, can go for total six gates. In that two is automatically operated and one is semi-automatically operated and remaining two are manually operated

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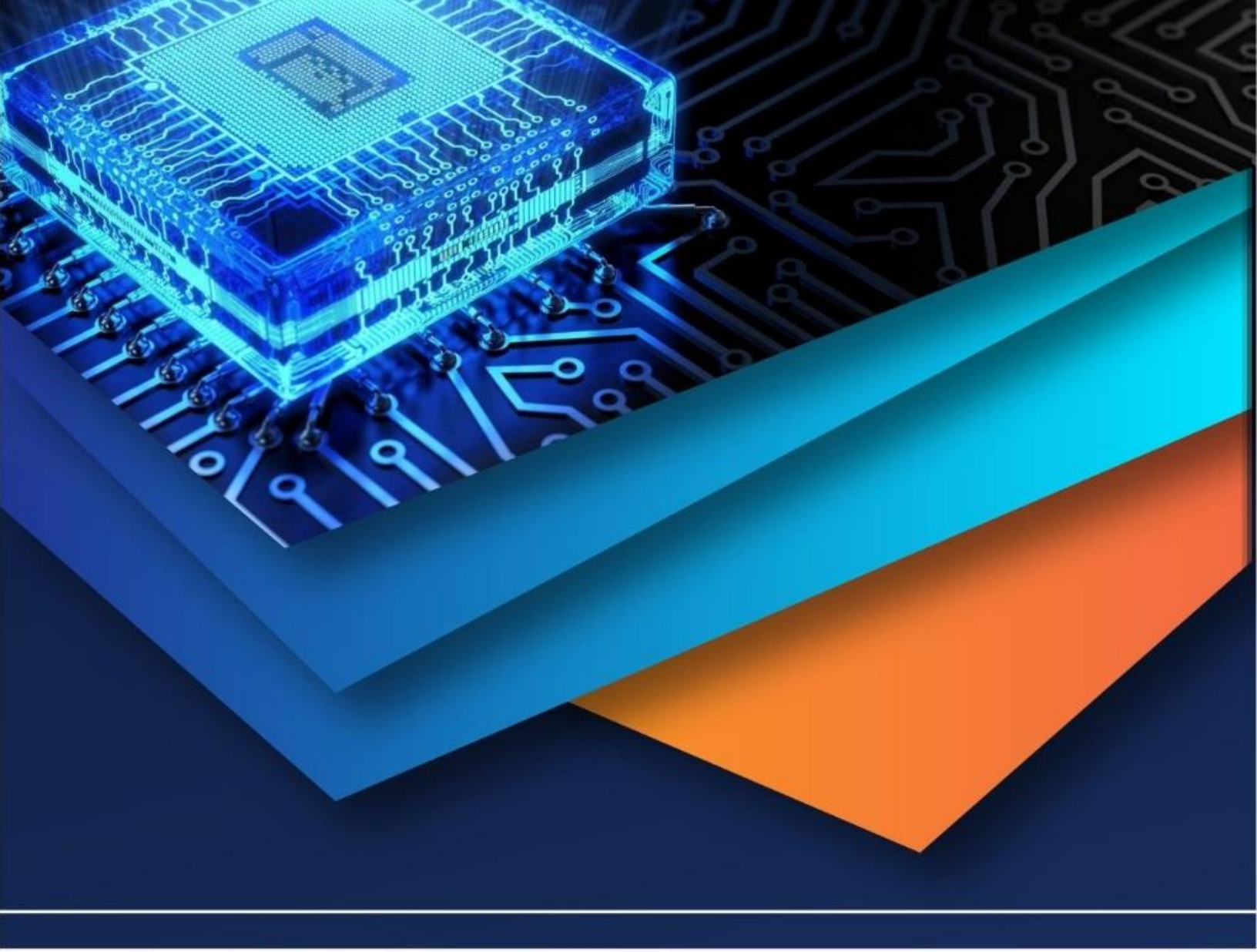

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