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2Dam Water Level Monitoring and Alerting System using IOT with Neural Network

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Abstract: ***Water assumes a significant part in our everyday life in different fields. Acquaintance of new strategies with tackle the water related issues incorporates versatile administration, remote detecting with the new ideas like water security, worldwide coordination of data, and so on as of late, we can see an expanding measure of dam harm or disappointment because of maturing, quakes event and strange changes in climate. Thus, dam security is acquiring significance than at any other time as far as calamity the executives at a public level. In this way, the public authority is attempting to concoct a variety of lawful activities to get reliable dam security. Other dam the board associations are additionally taking different institutional and specialized measures for a similar reason.***

With regards to dam wellbeing issues, there is not really a bunch of rules for how and when water can be delivered and what should be the standard working strategy on the off chance that unexpected delivery is required. This venture proposes an IOT based dam the board framework. In this, four ultrasonic sensors in particular, temperature sensor, water level sensor and Humidity sensor are utilized to screen the condition of dam. The Node MCU is used to interface with all of the sensors and transfer data to the cloud. A servo engine is used to control the kick-off of dam entryways using AI calculations.

The fundamental goal of a flood is for waterways, lakes, or heavy rains to flood. The flood might occur at any time and in any year. Flooding poses a significant threat to living things. As a result of the flood, countless people have lost their homes and ranches, forcing them to deal with a slew of problems.

Keywords: IoT, Python, Embedded C, Node MCU, Flood detection

I. INTRODUCTION

Dry seasons and floods are now a common occurrence, and their combination poses a formidable threat that cannot be eliminated but must be dealt with. Excess storm water is likely to be moved to places where there is a water shortage. This would also aid in the development of more irrigational capacity, the age of hydropower, and the elimination of provincial irregularities. Dams have the potential to become a weapon of terror, rather than the haven of progress that they are supposed to be, because they can deliver a large amount of water downstream abruptly. In light of this predicament and its continued occurrence, some legitimate dam the executive's structure is required. In this project, an IOT-based dam board structure is being developed to prevent floods caused by ill-advised dam entryway opening and closing. An attempt is made to check the temperature, wetness, water level, and presence of humidity, based on which the first entryway pace is determined.

Node MCU is an IoT-based stage that plays an important role in the project. Ultrasonic sensors use ultrasonic waves to measure distance. The sensor head sends out an ultrasonic wave, which is reflected by the objective. Firebase is a web application development platform developed by Firebase, Inc. in 2011. The opening and closing of dam entryways is controlled by a servo engine. The Node MCU is an open source IoT platform with firmware for the ESP8266 Wi-Fi chip. This is used to communicate with ultrasonic sensors, and the data from these sensors is delivered to the cloud for a dynamic stage that is prepared using AI calculations in Python. The result of the AI computation will be communicated back to Node MCU, which will then determine how much of the dam's entryways should be opened.

II. LITERATURE REVIEW

Sonali Patil1et.al [1] Author plans the framework to illuminate individuals regarding the forthcoming flood through warning and ready messages.

Uyioghosa B. Iyekekpolo et.al [2] This creators paper centres around giving early admonitions to regions liable to be attacked by flood occasions utilizing Wireless Sensor Network (WSN).

Kalpesh R. Dashpute et.al [3] The Arduino Flood Detector System is created to be one of the quickest techniques to screen flood that will help drivers or street client to keep away from issue when flood happened

Methaq A. Ali et.al [4] In this creators paper, a model framework has been carried out for counterfeit control and observing utilizing IoT. Fluffy control is first mimicked utilizing MATLAB-R2018b then, at that point, fostering a fluffy calculation in view of Sugeno technique inside PLC (Programmable Logic Controller).

In paper [5] This work proposes an early admonition framework for stream overflows. The sensor network comprises of a stream level sensor Node those actions the distance between the sensor and the mass of water utilizing an accuracy ultrasonic sensor.

Luca Schenato et.al [6] This creators paper portrays the execution of a FBG sensor to gauge water levels in a barrier. The sensor depends on a 3D-printed mechanical transducer through which the outside pressure is changed over into longitudinal strain applied on the fibre.

RUYA XIAO1 et.al [7] Precision assessments of various perception meetings from the two GPS and BDS are led, and results show that the exhibition of BDS is practically identical to that of GPS, particularly for longer perception meeting arrangements.

Yue Yang et.al [8] The study presents a test structure and depicts the examinations conducted in this review. The findings revealed that the suggested technique can achieve millimetre level estimation accuracy and has the advantages of simple activity, quick estimation time, internet checking, and low cost, all of which meet the requirements for assessing dam surface removal.

Dola Sheeba Rani et.al [9] This creators paper incorporates the compelling and adaptable strategy for the location of flood and cautioning framework.

III. PROBLEM STATEMENT

According to the Central Water Commission's dam safety rules, a crisis flood warning system for downstream regions should be established, and specialised instruments should be designed and implemented to ensure the dam's security and the lives and property of those downstream, including identifying weak points and installing billboards, hooters, alarms, and mobile vans with a Public Address (PA) system. This undertaking proposes an IOT based dam the executive's framework.

IV. PROPOSED SYSTEM

Other existing systems perform worse than the Dam Water Level Monitoring and Alerting System employing IOT and neural networks.

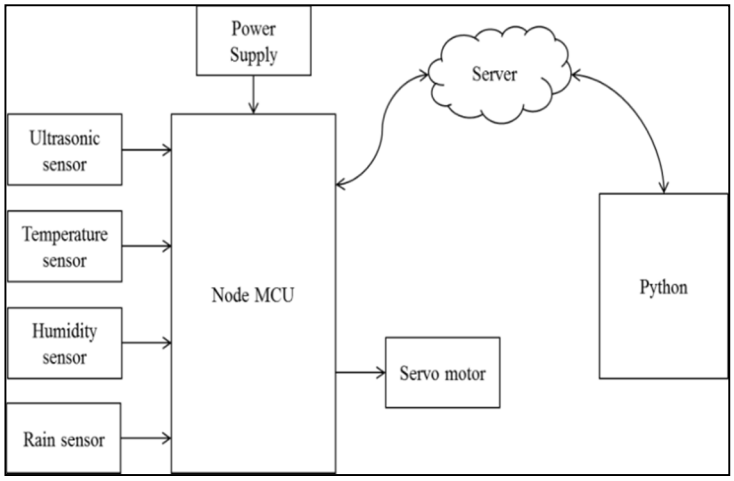

Fig 1: Block Diagram of Proposed System

1) Temperature sensor - to determine the temperature in the dam area.
2) Water level measuring ultrasonic sensor
3) Humidity sensor - detects humidity.
4) Node MCU is an IoT-based stage for connecting to the cloud and transferring data.
5) Python-based AI calculation
6) Power Supply - to turn on the framework

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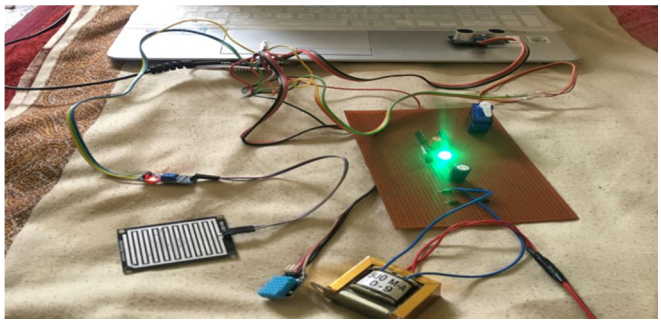


Fig 1.1: Hardware Implementation

The framework incorporates a DHT11 Digital Temperature Humidity Sensor for detecting changes in humidity and temperature. It's a high-level sensor module that includes resistive humidity and temperature identification components. A float sensor, which functions by opening and closing circuits (dry contacts) as water levels rise and fall, reliably perceives the water level. It usually rests in the closed position, indicating that the circuit is shorted and that no electricity has yet passed through the wires. When the water level falls below a predetermined level, the circuit completes itself and feeds power to the completed circuit, which triggers an alarm. The framework's stream sensor monitors water flow.

A plastic valve body, a water rotor, and a corridor impact sensor make up the water stream sensor. Rotor rolls whenever water passes through it. Its speed varies depending on the stream's speed. A HC-SR04 Ultrasonic Range Finder Distance Sensor is also included in the framework. The Ultrasonic sensor deviates from the SONAR standard and is designed to determine the distance between an article and the sensor using ultrasonic waves. The stream sensor detects the flow of water in the dam, and Arduino uses this information to determine the width of the dam's entryways. Each sensor is linked to a Node MCU regulator, which cycles and saves data. The framework has Wi-Fi, which is useful for accessing the framework and its data via IoT. The Firebase server acts as a mediator between the equipment (Node MCU) and the code (Python). Node MCU provides data to the server, and Python receives various sensor benefits from the server. Artificial intelligence (AI) is used to forecast flood conditions, and dam entryways are either closed or open.

V. METHODOLOGY

According to the Central Water Commission's rules on dam security, a crisis flood warning system should be set up for downstream regions, and specialised instruments should be imagined and implemented to ensure the dam's safety as well as the lives and property of people downstream by identifying weak points and installing billboards, hooters, alarms, and mobile vans equipped with a Public Address (PA) system.

1) A DHT11 Digital Temperature Humidity Sensor is used to detect temperature changes in the frameworkIt's a high-level sensor module that includes resistive damping and temperature detection components. A float sensor, which functions by opening and closing circuits (dry contacts) as water levels rise and fall, reliably senses the water level. It usually stays in the closed state, indicating that the circuit is shorted and no electricity is flowing through the wires. When the water level falls below a predetermined level, the circuit completes itself and transfers power via the completed circuit to activate a warning. The stream sensor on the framework keeps an eye on the flow of water. A plastic valve body, a water rotor, and a corridor impact sensor make up the water stream sensor.

2) Rotor rolling occurs when water passes through the rotor. Its speed varies depending on the stream's speed. A HC-SR04 Ultrasonic Range Finder Distance Sensor is also included in the framework. The Ultrasonic sensor deviates from the SONAR standard and is designed to determine the distance between an item and the sensor using ultrasonic waves. The stream sensor determines the flow of water in the dam, and Arduino uses this information to determine the breadth of the dam's doors. Each sensor is connected to a Node MCU regulator, which cycles and records information. The framework has Wi-Fi, which is useful for accessing the framework and its data via IoT.

3) The Firebase server functions as a middleman between the code and the equipment (Node MCU) (Python). Python provides several sensor benefits from the server, whereas Node MCU provides data to the server. Flood conditions are predicted using AI computations, and dam entryways are either blocked or open.

VI. RESULT AND DISCUSSION

In this project, we used sensors to collect data such as temperature, humidity, rain status, and water level, which were then sent to Node MUC. The Node MCU is used to control tasks and communicate values to the server, which is then passed on to Python. Python will produce the expected result, and we have previously done a programme in Python that gives the water level, then we look at Humidity status and dam water level and give the entryways are opened at first, the water will begin to flow, and if the Humidity are in conflict, there will be vulnerability about the dam's limit to hold the most amount of water.

A. Results For Winter

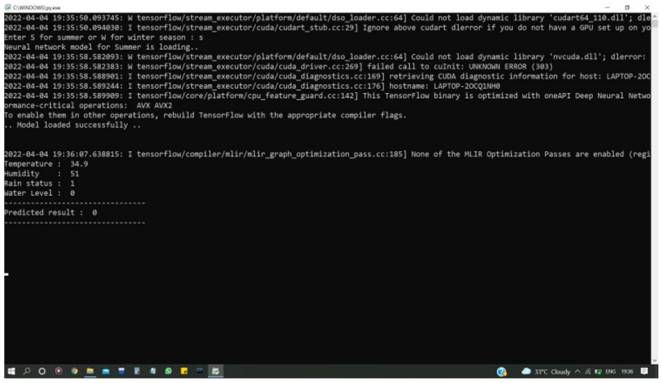


Fig 2: Predicted Result (1)

In above Fig we saw that the Temperature is 34.9, Humidity is 51, Rain states is 1 as well as the water level of the dam is 0 then we predict the result is 0 means that the Door opened is 0%. Door opened or closed is depend on that Temperature, Humidity, Rain status and water level.

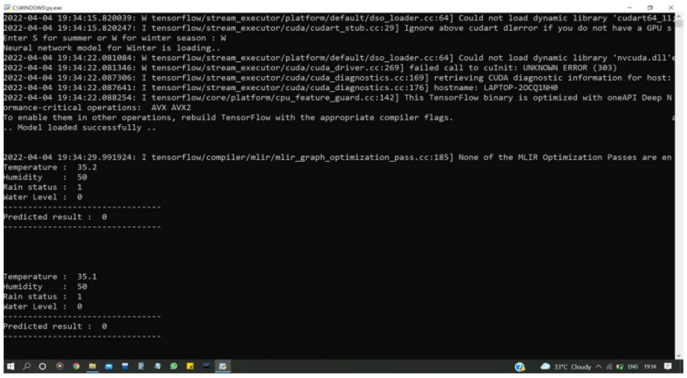


Fig 3: Predicted Result (2)

In above Fig we saw that the Temperature is 35.2, Humidity is 50, Rain states is 1 as well as the water level of the dam is 0 then we predict the result is 0 means that the Door opened is 0%. Door opened or closed is depend on that Temperature, Humidity, Rain status and water level.

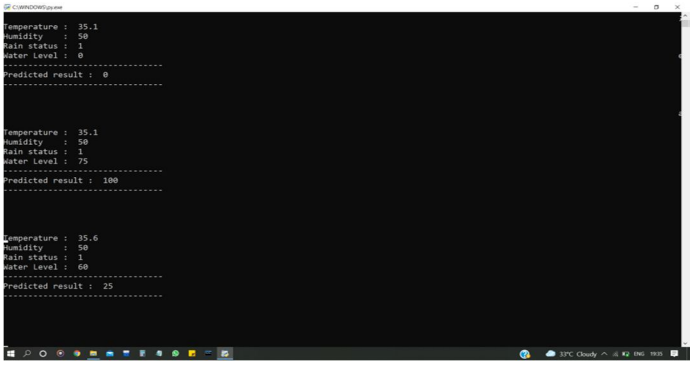


Fig 4: Predicted Result (3)

In above Fig we saw that the Temperature is 35.1, Humidity is 50, Rain states is 1 as well as the water level of the dam is 75 then we predict the result is 100 means that the Door opened is 100%. Door opened or closed is depend on that Temperature, Humidity, Rain status and water level. As well as we saw that the Temperature is 35.6, Humidity is 50, Rain states is 1 as well as the water level of the dam is 60 then we predict the result is 25 means that the Door opened is 25%. Door opened or closed is depend on that Temperature, Humidity, Rain status and water level.

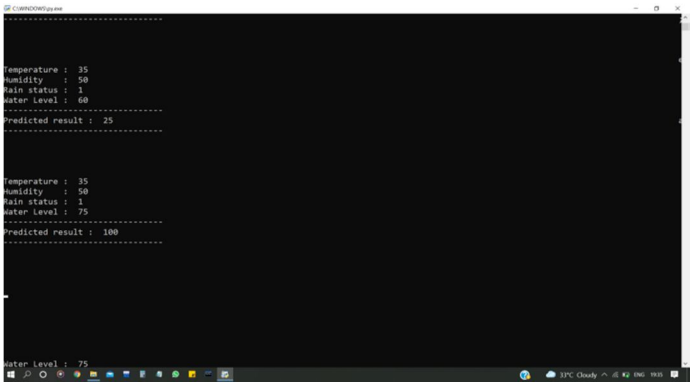


Fig 5: Predicted Result (4)

In above Fig we saw that the Temperature is 35, Humidity is 50, Rain states is 1 as well as the water level of the dam is 75 then we predict the result is 100 means that the Door opened is 100%. Door opened or closed is depend on that Temperature, Humidity, Rain status and water level.

B. Results for Summer

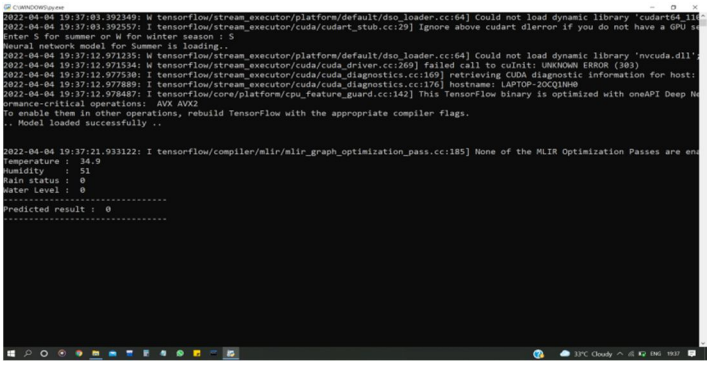


Fig 6: Predicted Result (5)

In above Fig we saw that the Temperature is 34.9, Humidity is 51, Rain states is 0 as well as the water level of the dam is 0 then we predict the result is 0 means that the Door opened is 0%. Door opened or closed is depend on that Temperature, Humidity, Rain status and water level.

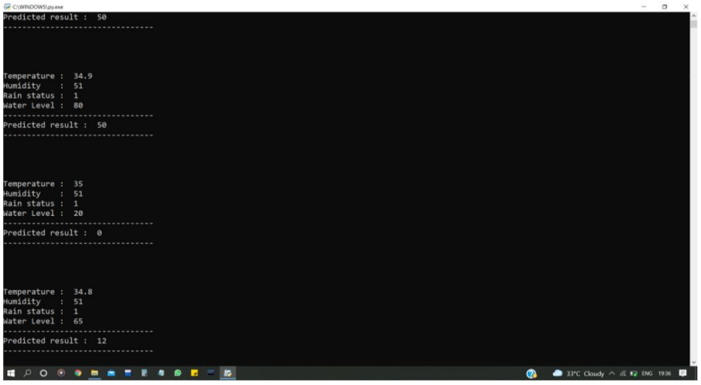


Fig 7: Predicted Result (6)

In above Fig we saw that the Temperature is 34.9, Humidity is 51, Rain states is 1 as well as the water level of the dam is 80 then we predict the result is 50 means that the Door opened is 50%. As well as we saw that the Temperature is 35, Humidity is 51, Rain states is 1 as well as the water level of the dam is 20 then we predict the result is 0 means that the Door opened is 0%. Door opened or closed is depend on that Temperature, Humidity, Rain status and water level. And we saw that the Temperature is 34.8, Humidity is 51, Rain states is 1 as well as the water level of the dam is 65 then we predict the result is 12 means that the Door opened is 12%.

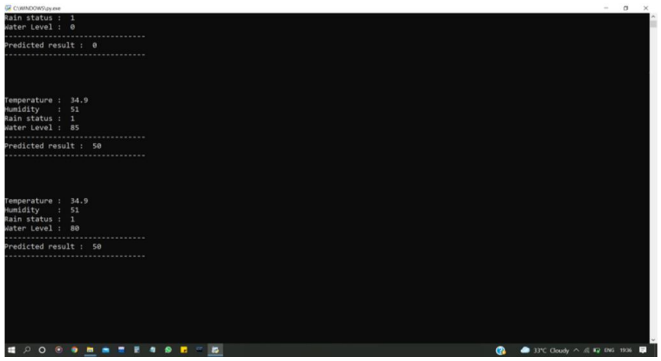


Fig 8: Predicted Result (7)

In above Fig we saw that the Temperature is 34.9, Humidity is 51, Rain states is 1 as well as the water level of the dam is 85 then we predict the result is 50 means that the Door opened is 50%. As well as we saw that the Temperature is 34.9, Humidity is 51, Rain states is 1 as well as the water level of the dam is 80 then we predict the result is 50 means that the Door opened is 50%. Door opened or closed is depend on that Temperature, Humidity, Rain status and water level.

VII. CONCLUSION

It has been seen that remote sensor network based climate checking frameworks are minimal expense, little size and effectively dependable. Be that as it may, these frameworks can't be utilized for huge region on the grounds that every Node is generally invigorated by energy restricted battery. This paper performs review of different ecological and flood calamity discovery and observing frameworks and different correspondence advances which help to enhance the powerful flood identification and flood cautioning issue.

REFERENCES

[1] Sonali Patil1, Jija Pisal2, Aishwarya Patil3, Siddhi Ingavale4, Prajakta Ayarekar5, Prof. Mrs. ShaguptaMulla, “A Real Time Solution to Flood Monitoring System using IoT and Wireless Sensor Networks”, International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 06 Issue: 02, Feb 2019 .

[2] Uyioghosa B. Iyekekpolo, Francis E. Idachaba and Segun I. Popoola, “Early Flood Detection and Monitoring System Based on Wireless Sensor Network”, Proceedings of the International Conference on Industrial Engineering and Operations Management Washington DC, USA, September 27-29, 2018.

[3] Kalpesh R. Dashpute, “FLOOD DETECTION USING IOT”, IJARIIE-ISSN(O)-2395-4396 7746, Vol-4 Issue-2 2018.

[4] H. Yuliandoko, Subono, V. A. Wardhany, S. H. Pramono and P. Siwindarto, "Design of flooding detection system based on velocity and water level DAM with ESP8266," 2017 2nd International conferences on Information Technology, Information Systems and Electrical Engineering (ICITISEE), 08 February 2018, pp. 396-401, doi: 10.1109/ICITISEE.2017.8285537

[5] Ernesto Leon, CristianAlberon, Miguel Wister and Jose A. Hernández-Nolasco “Flood Early Warning System by Twitter Using LoRa” Proceedings 2018, 2, 1213; doi:10.3390/proceedings2191213

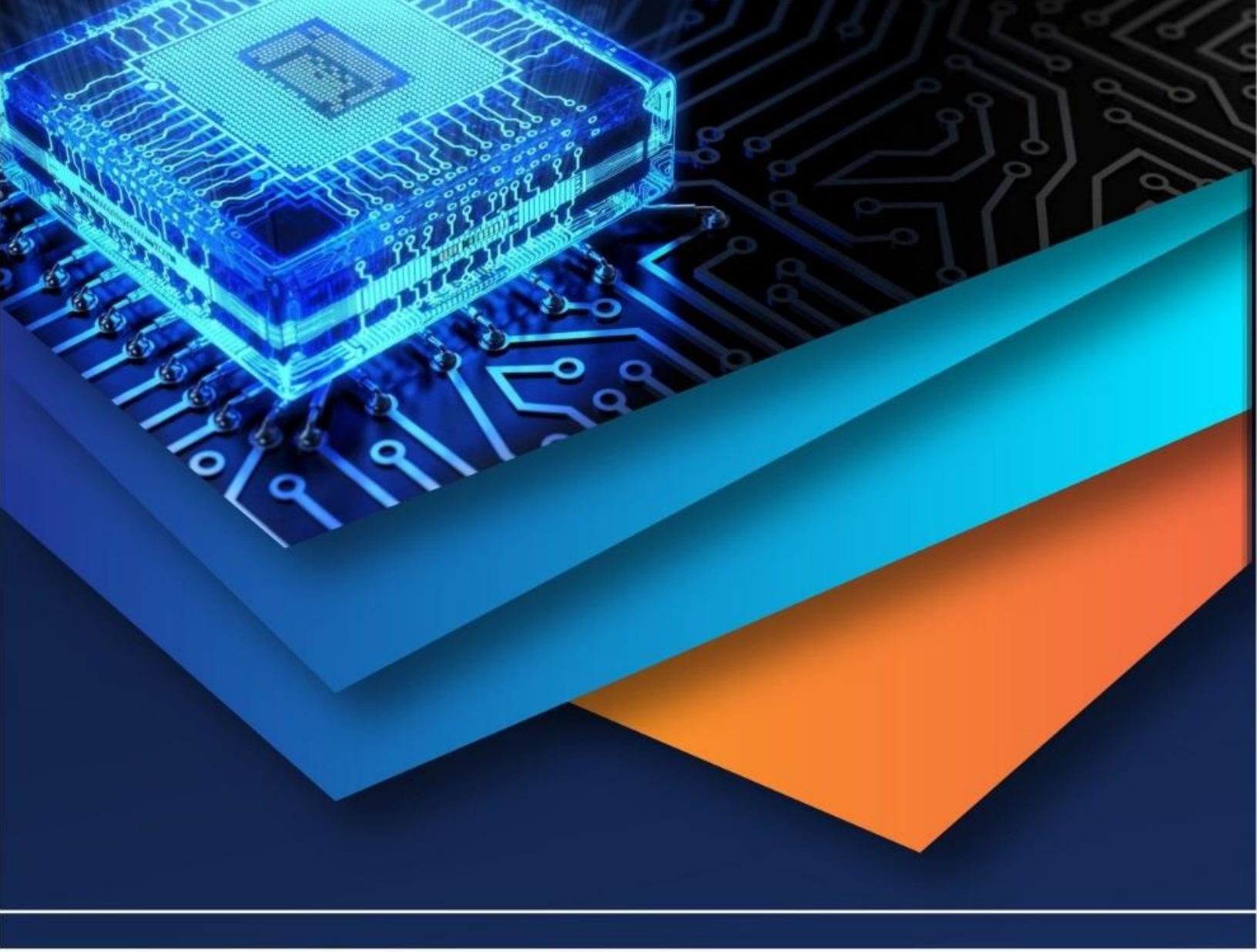
[6] L. Schenato, J. P. Aguilar-López, A. Galtarossa, A. Pasuto, T. Bogaard and L. Palmieri, "A Rugged FBG-Based Pressure Sensor for Water Level Monitoring in Dikes," in IEEE Sensors Journal, vol. 21, no. 12, pp. 13263-13271, 15 June15, 2021, doi: 10.1109/JSEN.2021.3067516.

[7] R. Xiao, H. Shi, X. He, Z. Li, D. Jia and Z. Yang, "Deformation Monitoring of Reservoir Dams Using GNSS: An Application to South-to-North Water Diversion Project, China," in IEEE Access, vol. 7, pp. 54981-54992, 2019, doi: 10.1109/ACCESS.2019.2912143.

[8] Y. Yang, X. Sang, S. Yang, X. Hou and Y. Huang, "High-Precision Vision Sensor Method for Dam Surface Displacement Measurement," in IEEE Sensors Journal, vol. 19, no. 24, pp. 12475-12481, 15 Dec.15, 2019, doi: 10.1109/JSEN.2019.2940069.

[9] M. A. Ali, A. H. Miry and T. M. Salman, "IoT Based Water Tank Level Control System Using PLC," 2020 International Conference on Computer Science and Software Engineering (CSASE), 2020, pp. 7-12, doi: 10.1109/CSASE48920.2020.9142067.

[10] D. S. Rani, G. N. Jayalakshmi and V. P. Baligar, "Low Cost IoT based Flood Monitoring System Using Machine Learning and Neural Networks: Flood Alerting and Rainfall Prediction," 2020 2nd International Conference on Innovative Mechanisms for Industry Applications (ICIMIA), 2020, pp. 261-267, doi: 10.1109/ICIMIA48430.2020.9074928.



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