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DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING

Streamlining Industrial Wastewater Management Through Real-Time Cloud-IoT Monitoring

16EI262 -Project Review-III

***Presented* By**

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CONTENTS

AIM

To design a monitoring system of industrial waste water through real-time cloud-IoT.

OBJECTIVES

- To collect Industrial waste water in a reservoir.
- To calculate the proportion of suspended solid mixtures, alkalinity or acidity.
- To alert high carbon emission inside the reservoir.
- To check whether the wastewater can be further used for agriculture or farming purposes.

LITERATURE SURVEY

S.NO	TITLE OF THE PAPER, PUBLISHER AND YEAR	METHODOLOGY	MERITS AND DEMERITS	RESULT
1.	A low-cost system for real time monitoring and assessment of potable water quality at consumer sites International Journal For Applied Research in Science and Engineering (IJARSE) 2019	In this paper, manual collection of water sample at different locations, followed by laboratory analytical techniques in order the character the water quality.	Merits: ✓ Simple ✓ Low-cost Demerits: ✓ Limited Scalability ✓ Poor spatiotemporal coverage	Partial and time consuming industrial waste water treatment by physical monitoring.

PROBLEM IDENTIFICATION

- Direct disposal into the receiving waters, without any treatment.
- Waste Water from industries have constituents which can cause harmful & hazardous effect to human, animal, plants, aquatic & microbial life forms on the earth.
- Discharging untreated wastewater into the domestic sewer system makes the task of treating domestic sewage, a very difficult and costly exercise.

EXISTING & PROPOSED METHODOLOGY

EXISTING METHODOLOGY

- The existing method introduces manual collection of water sample at different locations, followed by laboratory analytical techniques in order the character the water quality.
- Analysis the physical, chemical and biological agent
- It uses :
  - ✓ **pH transmitter** with display: this device is used to display pH readings.
  - ✓ **SCADA** system screen: utilized to monitor all instrument measurements in real-time.

PROPOSED METHODOLOGY

- Turbidity is a measure of the cloudiness or haziness of a liquid, caused by the presence of suspended particles. Turbidity sensor detects the presence of suspended particles in the waste water.
- pH electrodes indicates the pH levels in the wastewater. i.e. acidic or alkaline, the cloud-based IoT system can automatically sense the rise of pH level. And Alerts the user in case of rise of gas emission.
- By implementing a cloud-based IoT system for real-time monitoring of wastewater treatment facilities, it is possible to improve the efficiency and effectiveness of these systems.

INNOVATION

- The project incorporates a variety of sensors, such as pH electrode and turbidity sensors, to monitor key parameters in the wastewater. This provides a more comprehensive understanding of the treatment process and enables organizations to make informed decisions and adjust the process as necessary.
- This System has the potential to improve sustainability and reduce the environmental impact of wastewater treatment processes. By using real-time monitoring and control, organizations can reduce waste, optimize energy use, and minimize any negative impact on the environment.

BLOCK DIAGRAM

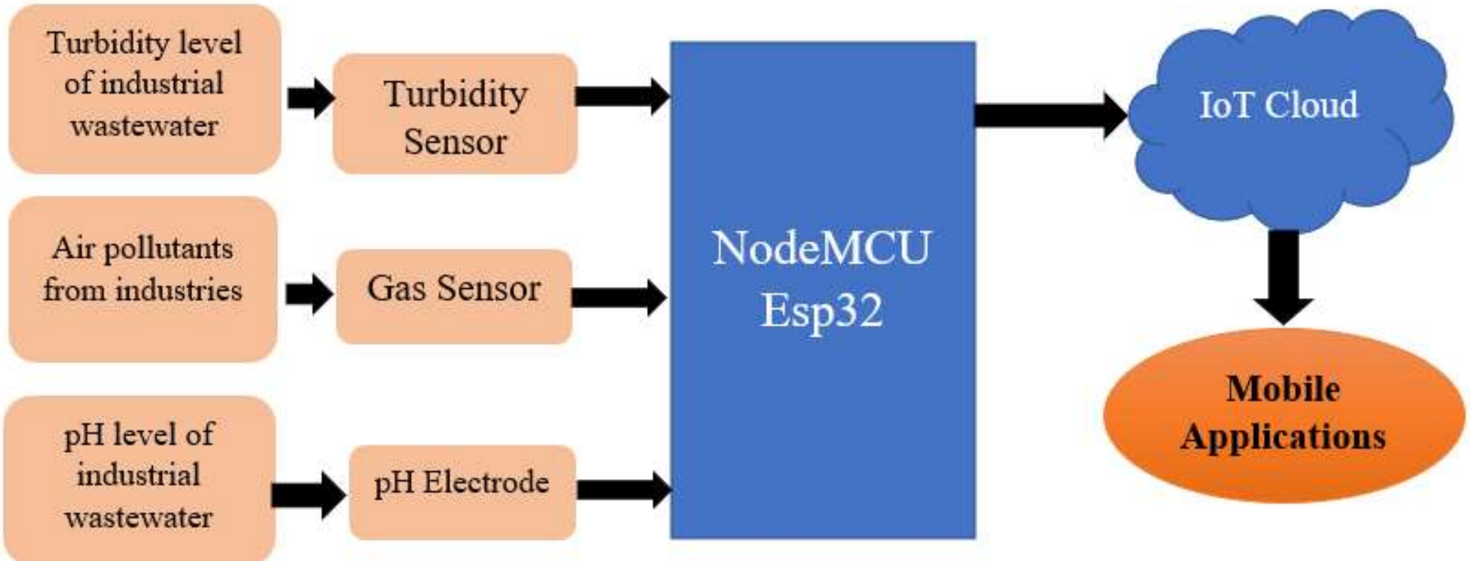

Figure. 1. Block diagram for the proposed system

DESCRIPTION OF BLOCK DIAGRAM

- The turbidity sensor provide real-time data on the turbidity levels of the wastewater, which can then be used to control and optimize the treatment process.
- The pH sensor used to monitor pH levels in the wastewater are too acidic or too alkaline, the cloud-based IoT system can automatically adjust the treatment process to bring the pH levels back to the optimal range.
- By implementing a cloud-based IoT system for real-time monitoring and controlling of wastewater treatment facilities, it is possible to improve the efficiency and effectiveness of these systems.
- Integration of the Internet of Things (IoT) and cloud computing has the potential to maximize the use of both.

SOFTWARE DESCRIPTION

NodeMcu Esp8266 :

- The proposed system uses NodeMcu Esp8266 to send data to the cloud via Wi-Fi connection and it is programmed via Arduino IDE to handle the process of controlling the measured data.

- It provides a set of GPIO (General Purpose Input/Output) pins that allow to control electronic components for physical computing and explore the Internet of Things (IoT).

Database Entry:

- Details of the waste water and its chemical composition obtained and entered directly into the IoT Website server.

CIRCUIT DIAGRAM

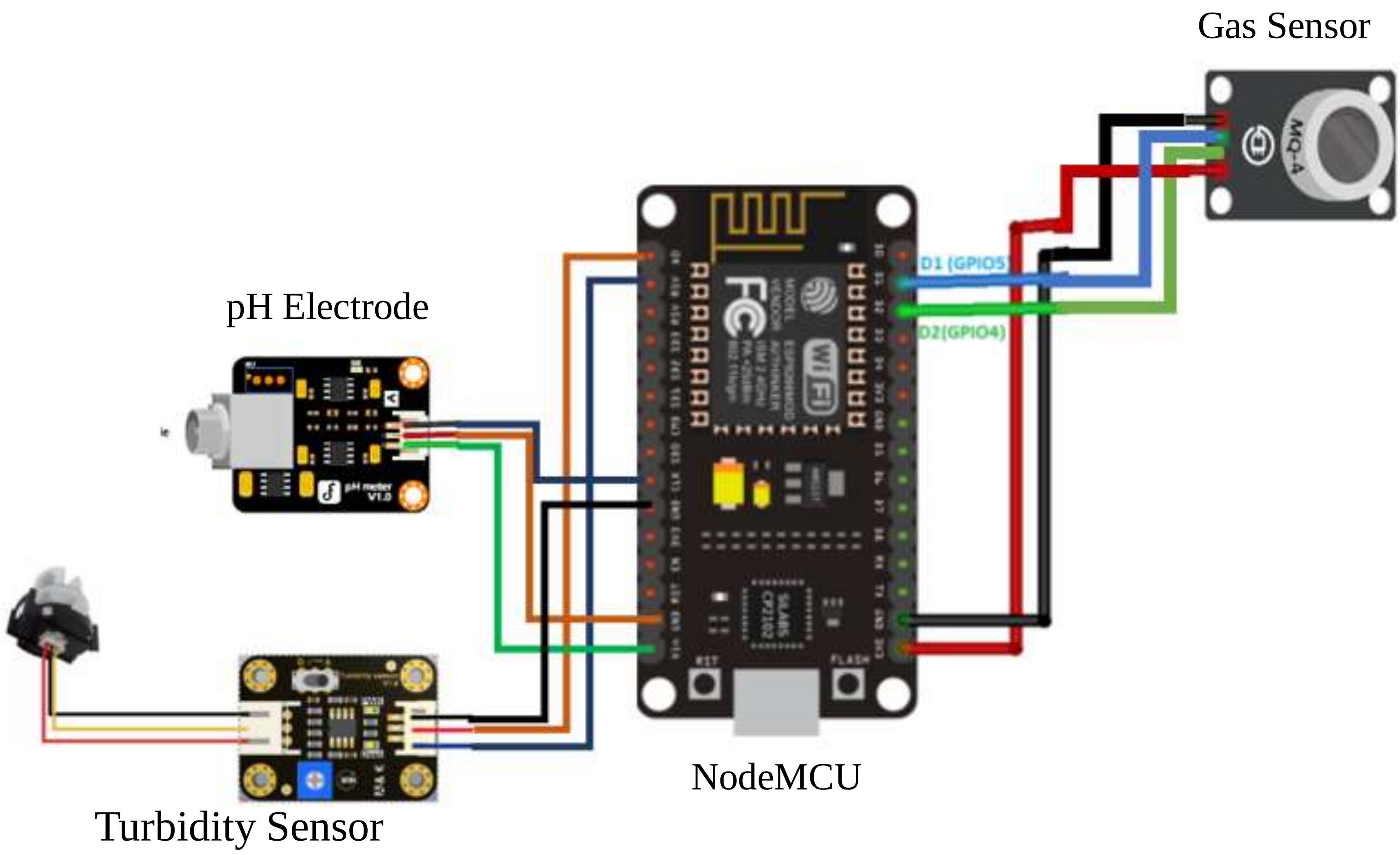

Figure. 2. Circuit diagram for the proposed system

HARDWARE DESCRIPTION

Turbidity Sensor:

- Turbidity is a measure of the cloudiness or haziness of a liquid, caused by the presence of suspended particles. A turbidity sensor is a device used to measure the turbidity of a liquid sample, typically in water treatment and monitoring applications.
- The sensor typically works by shining a light through the liquid and measuring the amount of light that is scattered or absorbed by the suspended particles.

pH Electrode :

- The pH of a solution is measured using a pH electrode, which reflects the acidity or alkalinity.
- It's commonly utilized in aquaponics, aquaculture, and environmental water testing.
- The data from the pH sensor is collected on the analog pin of the NodeMcu using the BNC adaptor. This analog signal is converted into a digital using Analog to Digital Converter (ADC).

pH SCALE

pH = 0	battery acid, strong hydrofluoric acid
pH = 1	hydrochloric acid secreted by stomach lining
pH = 2	lemon juice, gastric acid, vinegar
pH = 3	grapefruit, orange juice, soda
pH = 4	tomato juice, acid rain
pH = 5	soft drinking water, black coffee
pH = 6	urine, saliva
pH = 7	"pure" water
pH = 8	sea water
pH = 9	baking soda
pH = 10	Great Salt Lake, milk of magnesia
pH = 11	ammonia solution
pH = 12	soapy water
pH = 13	bleaches, oven cleaner
pH = 14	liquid drain cleaner

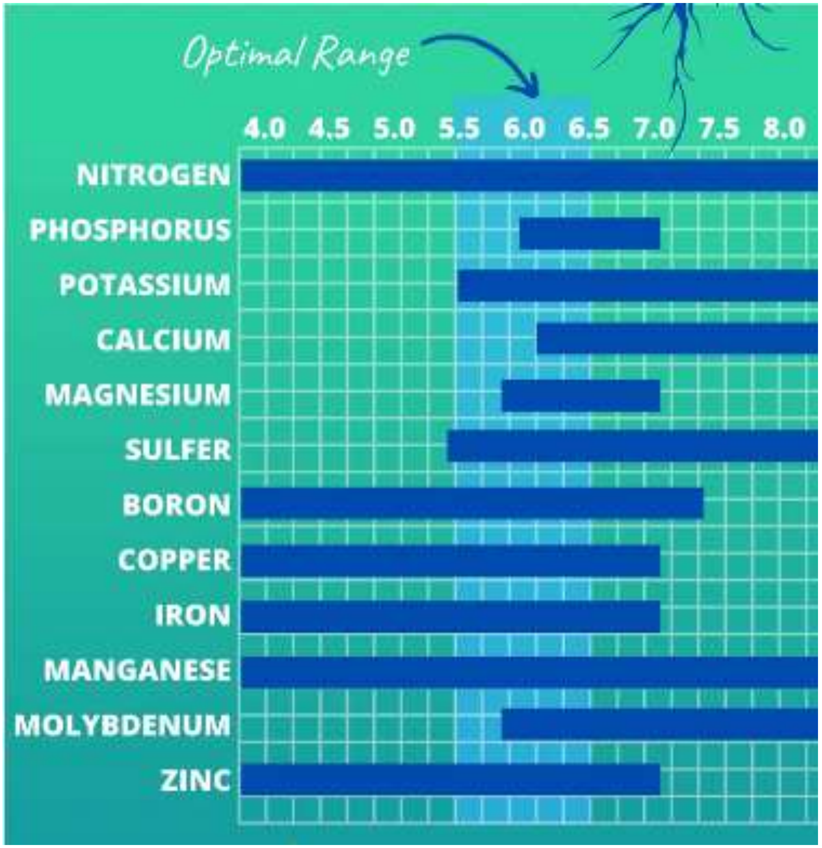

Figure.3 pH Level Chart

HARDWARE SETUP

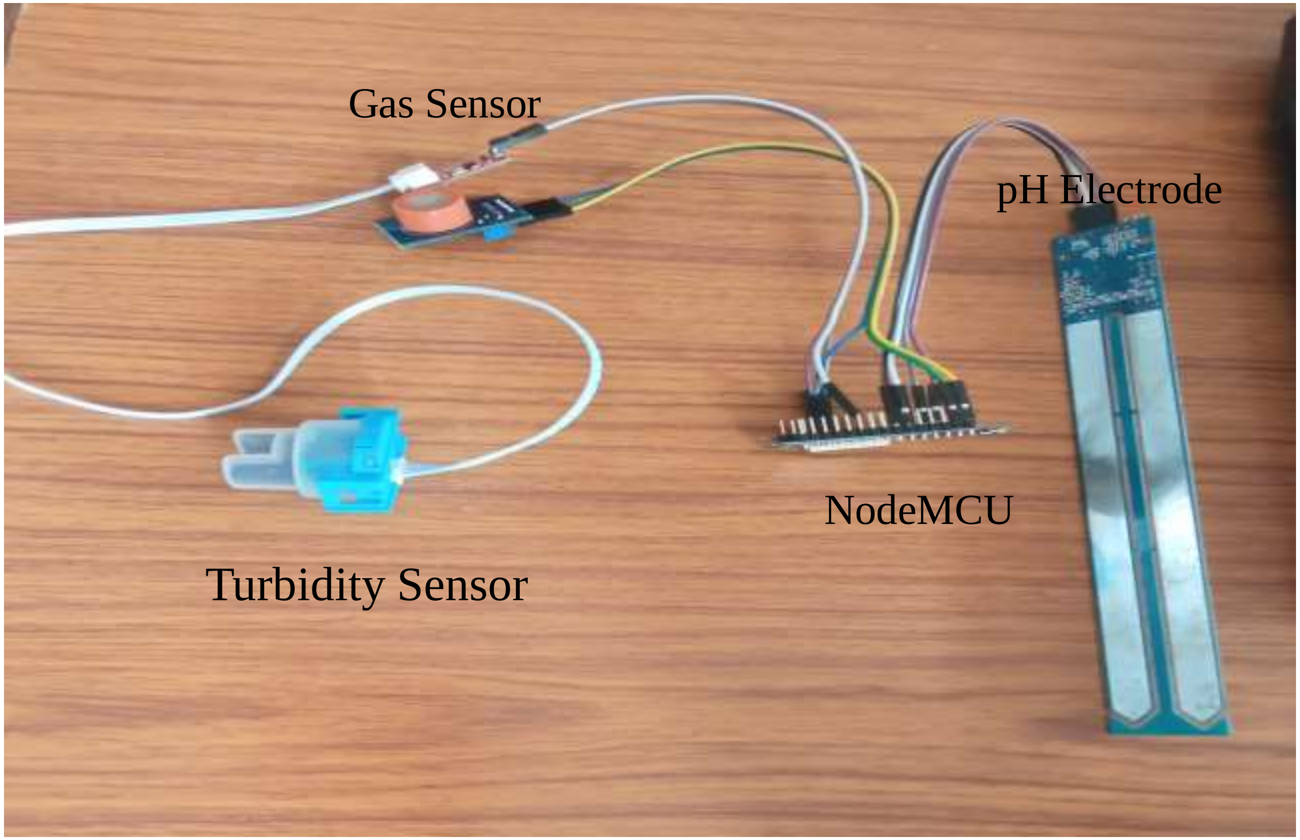

Figure.4 Hardware setup of the proposed system

RESULTS

Figure.5 Testing of the system

RESULTS

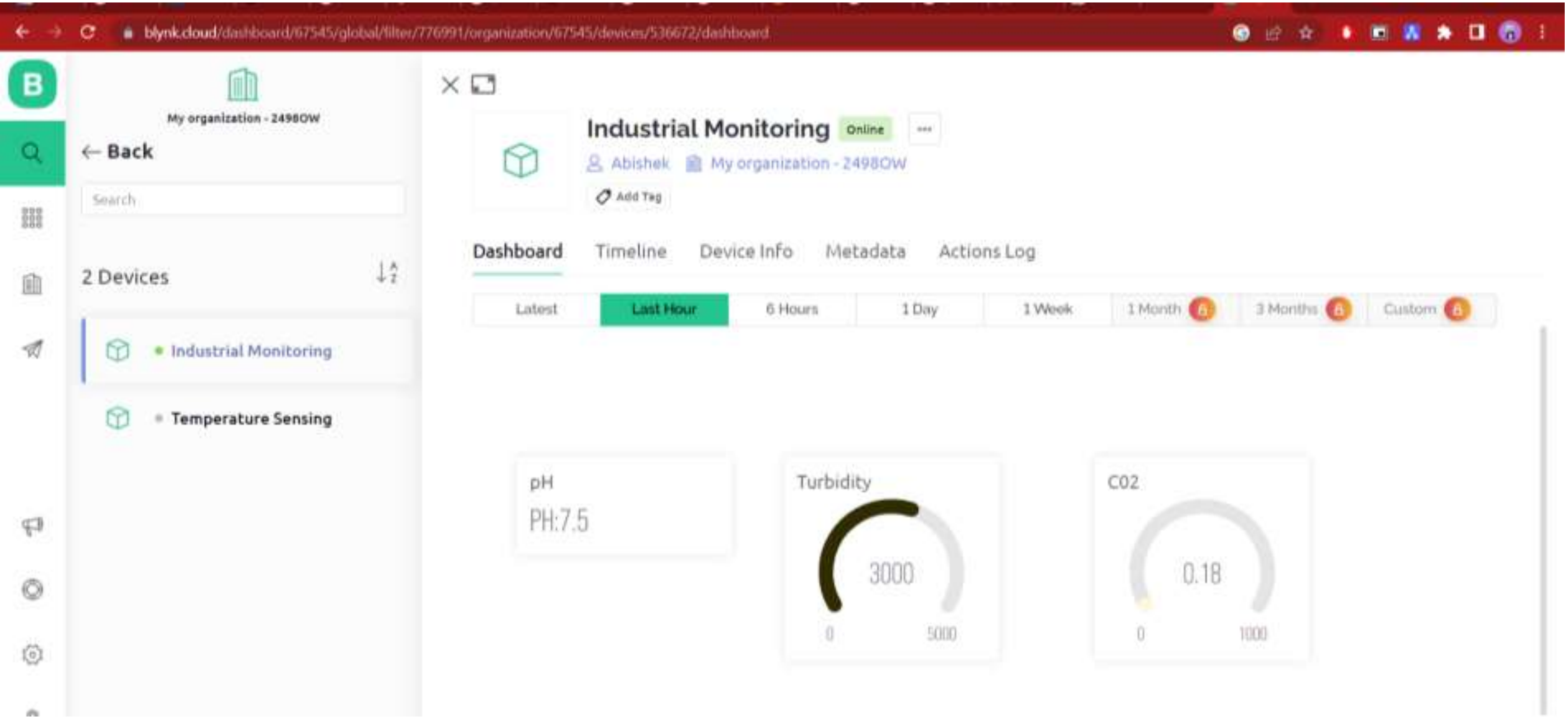

Figure.6 Response of the system

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THANK YOU