M.KUMARASAMY
COLLEGE OF ENGINEERING
NAAC Accredited Autonomous Institution
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ISO 9001:2015 Certified Institution
Thalavapalayam, Karur – 639 113.

A Minor Project I Report on

AUTOMATIC DETECTION OF IMPURITY IN WATER USING ARDUINO UNO

Submitted by

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

M.KUMARASAMY COLLEGE OF ENGINEERING

(An Autonomous Institution Affiliated to Anna University, Chennai)

THALAVAPALAYAM, KARUR-639113.

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M.KUMARASAMY COLLEGE OF ENGINEERING

(Autonomous Institution, Affiliated to Anna University, Chennai)

BONAFIDE CERTIFICATE

Certified that this Report I titled **"AUTOMATIC DETECTION OF IMPURITIY IN WATER USING ARDUINO UNO" is the bonafide work of GIRI PRASATH K (927622BEE033), JAGANTHEESWARI E (927622BEE042), KOSALARAMAN T (927622BEE060)** who carried out the work during the academic year (2023-2024) under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project report.

SIGNATURE

SUPERVISOR

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SIGNATURE

HEAD OF THE DEPARTMENT

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Submitted for Minor Project I (18EEP201L) viva-voce Examination held at M.Kumarasamy College of Engineering,Karur-639113 on ……..

DECLARATION

We affirm that the Minor Project I report titled "**AUTOMATIC DETECTION OF IMPURITY IN WATER USING ARDUNIO UNO"** being submitted in partial fulfillment for the award of **Bachelor of Engineering in Electrical and Electronics Engineering** is the original work carried out by us.

REG.NO	STUDENT NAME	SIGNATURE
927622BEE033	**GIRI PRASATH K**	----------
927622BEE042	**JAGANTHEESWARI E**	----------
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VISION AND MISSION OF THE INSTITUTION

VISION

- ✓ To emerge as a leader among the top institutions in the field of technical education

MISSION

- ✓ Produce smart technocrats with empirical knowledge who can surmount the global Challenges.
- ✓ Create a diverse, fully-engaged, learner - centric campus environment to provide Quality education to the students.
- ✓ Maintain mutually beneficial partnerships with our alumni, industry and Professional associations.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

To produce smart and dynamic professionals with profound theoretical and practical knowledge comparable with the best in the field.

MISSION

- ✓ Produce hi-tech professionals in the field of Electrical and Electronics Engineering by inculcating core knowledge.
- ✓ Produce highly competent professionals with thrust on research.
- ✓ Provide personalized training to the students for enriching their skills.

PROGRAMME EDUCATIONAL OBJECTIVES(PEOs)

- ✓ **PEO1:** Graduates will have flourishing career in the core areas of Electrical Engineering and also allied disciplines.
- ✓ **PEO2:** Graduates will pursue higher studies and succeed in academic/research careers
- ✓ **PEO3:** Graduates will be a successful entrepreneur in creating jobs related to Electrical and Electronics Engineering /allied disciplines.
- ✓ **PEO4:** Graduates will practice ethics and have habit of continuous learning for their success in the chosen career.

PROGRAMME OUTCOMES(POs)

After the successful completion of the B.E. Electrical and Electronics Engineering degree program, the students will be able to:

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/Development of solutions:

Design solutions for Complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety,and the cultural, societal and environmental considerations.

PO4: Conduct Investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6:The Engineer and Society: Apply reasoning in formed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7:Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES(PSOs)

The following are the Program Specific Outcomes of Engineering Students:

- **PSO1:** Apply the basic concepts of mathematics and science to analyse and design circuits, controls, Electrical machines and drives to solve complex problems.
- **PSO2:** Apply relevant models, resources and emerging tools and techniques to provide solutions to power and energy related issues & challenges.
- **PSO3:** Design, Develop and implement methods and concepts to facilitate solutions for electrical and electronics engineering related real world problems.

Abstract (Key Words)	Mapping of POs and PSOs
Arduino, sensor, cloud system, client system	P01, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12, PSO1, PSO2, PSO3

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ABSTRACT

We present a novel and low-cost water quality monitoring system to diagnose the drinking water quality in municipal water distribution areas, where our system continuously monitors the drinking water which is ready to be distributed. This system ensures the quality of the drinking water before it reaches consumer sites. Initially, the quality of the drinking water is analyzed based on the parameters turbidity, temperature and conductivity. The system comprises of physiochemical sensors that can measure the physical and chemical properties of the water such as temperature, turbidity and pH. By the sensed data, water impurities are detected. Cloud computing is used to view the processed data and control the water flow. The networked sensors will transmit the sensed data through wireless technologies to a Cloud for converting and notifying the catalogued users to take the appropriate.

To assure the safe supply of drinking water, the quality should be monitored in real time, for that purpose a modish IoT based water quality assurance has been proposed. In this project, we layout the design of IoT based water quality monitoring system which oversees the quality of water in real time. This system in heres few sensors which calibrates the water quality parameters such as pH, temperature, turbidity. The measured values from the sensors are processed by the microcontroller and are remotely routed to the client system using IoT protocols. Decisively the sensors data can be perceived on the client side in real time using cloud computing. The proposed project is also integrated with an android application to monitor the quality in real time using IoT. The methodology involves preprocessing the sensor data to enhance its accuracy and reliability, followed by feature extraction to capture essential patterns indicative of water impurities. A machine learning model, trained on a vast dataset, is employed to classify water samples into different categories based on the presence and concentration of contaminants.

CHAPTER 1
SURVEY FORM ANALYSIS

1.1 NAME AND ADDRESS OF THE COMMUNITY

Priya, Poonga Nagar, Karur.

Ajay, Thanthonimalai, karur.

M.Kumar, Thalavapalaiyam, Karur.

Raja, Anna Nagar, karur.

Gomathi, Jeeva Nagar, karur.

1.2 PROBLEM IDENTIFICATION:

- The current water purifiers are removing impurities along with the minerals.
- Water impurities lead to waterborne diseases, gastrointestinal issues and health problems.
- Animals that rely on water for their daily needs can face challenges in finding suitable and clean water.
- Growth and yield. The certain chemicals can be absorbed by plants, leading to reduced plant

1.3 PROPOSED SOLUTION:

- The idealogy of this project is to detect impurity in water.
- So we can remove only impurities using this method
- The purity of liquid is calculated by temperature, ph, turbidity sensor.

CHAPTER 2
LITERATURE REVIEW

Paper 1:

Title: Arduino Based Water Quality Monitoring And Notification System Using GSM

Inference:

The Arduino and all the components initialized by giving 5v input to them. The sensors which we using, begin to take readings from the water and send back to the arduino microcontroller. The microcontroller analyze the data as per the code, which is programmed into it**.**

Paper 2:

Title: An Arduino-based Water Quality Monitoring System using pH
Inference:

The researchers were able to develop a system that may monitor and collect information on the four water quality parameters: pH, temperature, turbidity, and TDS. They can then store this information in a Thing Speak channel and on an SD card in CSV file format. The designed drinking water quality monitoring device was put into use with an Arduino Uno microcontroller

Paper 3:

Title: IOT Based Smart Water Quality Monitoring

Inference: It briefly elaborates a typical IOP based water quality monitoring system. It presents a comprehensive survey of contemporary iot-WQMS for domestic water. In this concern, many critical parameters (e.g., sensors, cloud service and gateway) are discussed and compared.

Paper 4:

Title: Approach of water pollution Indication using Arduino Uno

Inference: Monitoring of Turbidity, PH & Temperature of Water makes use of water detection sensor with unique advantage. The system can monitor water quality automatically and it is low in cost and does not require people on duty. Only by replacing the corresponding sensors and changing the relevant software programs, this system can be used to monitor other water quality parameters.

Paper 5:

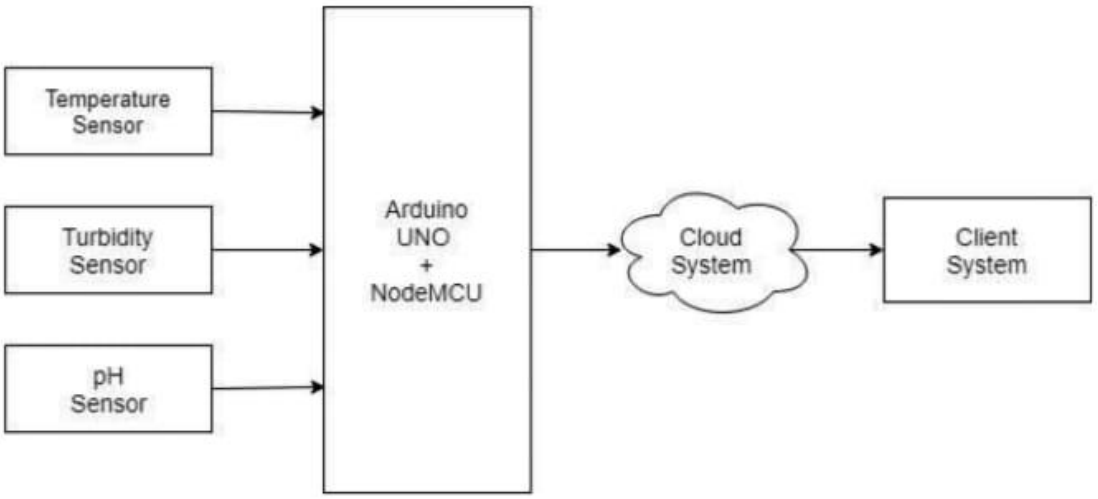
Title: Monitoring of water impurities in smart city

Inference: The system developed for tested with various types of water and the outputs displayed on webpage are noted. The simulated web page output through cloud is display. The critical stage of the distributed water to the houses is found with contamination of salt and turbidity is alerted to the city municipal. The level of turbidity and salt contamination was updated to the web. The system was experimented for the water tank which was used in houses and its details are observed.

CHAPTER 3

PROPOSED METHODOLOGY

3.1 BLOCK DIAGRAM



3.2 DESCRIPTION

Contaminated water mainly contains different types of elements known as Total Dissolved Solids. Physical impurities in water like dust, rust, clay and sand stay suspended in water and make it contaminated. In addition, microorganisms and other pathogens also make water unsafe for use.

3.3 COST ESTIMATION

S.NO	COMPONENT DESCRIPTION	QUANTITY	COST
01	Temperature	1	286
02	PH	1	510
03	Turbidity	1	1247
04	Arduino UNO	1	459
		TOTAL	2502

CHAPTER 4

FUTURE SCOPE & ITS IMPLEMENTATION PLAN

The future scope of automatic impurity detection in water using Arduino Uno involves enhancing accuracy, scalability, and real-time monitoring. Implementing a plan could include. Sensor Integration: Integrate advanced sensors for detecting specific impurities such as heavy metals, bacteria, or chemicals. Ensure compatibility with Arduino Uno. Data Communication: Implement wireless communication modules (like Wi-Fi or Bluetooth) to transmit data in real-time. This enables remote monitoring and quick response to impurity issues. Data Analysis: Develop algorithms for data analysis on impurity levels. Consider machine learning techniques for predictive analysis and anomaly detection to enhance accuracy. Remember to adapt the implementation plan based on the specific impurities you aim to detect and the environmental conditions of the deployment location. Regular maintenance and updates are also crucial for the sustained effectiveness of the system

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