M.KUMARASAMY
COLLEGE OF ENGINEERING
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Thalavapalayam, Karur – 639 113.

DESIGN OF FLOW SENSOR FOR DRAINAGE SYSTEM

A MINOR PROJECT- I REPORT

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BACHELOR OF ENGINEERING

in

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

M.KUMARASAMY COLLEGE OF ENGINEERING

(Autonomous)

KARUR – 639 113

DECEMBER 2023

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR

BONAFIDE CERTIFICATE

Certified that this **18ECP103L-Minor Project I** report "**DESIGN OF FLOW SENSOR FOR DRAINAGE SYSTEM"** is the bonafide work of "**EZHIL RAGAVAN.A(927622BEC048),AJAY.D(927622BEC005),ABISHEK KUMAR.B(927622BEC301),DHARSHAN.T(927622BEC035)** who carried out the project work under my supervision in the academic year **2023-2024 ODD** .

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This report has been submitted for the **18ECP103L – Minor Project-I** final review held on 23.12.2023 at M. Kumarasamy College of Engineering, Karur.

PROJECT COORDINATOR

INSTITUTION VISION AND MISSION

Vision

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

Mission

M1: Produce smart technocrats with empirical knowledge who can surmount the global challenges.

M2: Create a diverse, fully -engaged, learner -centric campus environment to provide quality education to the students.

M3: Maintain mutually beneficial partnerships with our alumni, industry and professional associations

DEPARTMENT VISION, MISSION, PEO, PO AND PSO

Vision

To empower the Electronics and Communication Engineering students with emerging technologies, professionalism, innovative research and social responsibility.

Mission

M1: Attain the academic excellence through innovative teaching learning process, research areas & laboratories and Consultancy projects.

M2: Inculcate the students in problem solving and lifelong learning ability.

M3: Provide entrepreneurial skills and leadership qualities.

M4: Render the technical knowledge and skills of faculty members.

Program Educational Objectives

PEO1: **Core Competence:** Graduates will have a successful career in academia or industry associated with Electronics and Communication Engineering

PEO2: **Professionalism:** Graduates will provide feasible solutions for the challenging problems through comprehensive research and innovation in the allied areas of Electronics and Communication Engineering.

PEO3: **Lifelong Learning:** Graduates will contribute to the social needs through lifelong learning, practicing professional ethics and leadership quality

Program Outcomes

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2: 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.

PO 3: 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.

PO 4: 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.

PO 5: 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.

PO 6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: 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.

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: 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.

PO 11: 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 multidisciplinary environments.

PO 12: 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

PSO1: Applying knowledge in various areas, like Electronics, Communications, Signal processing, VLSI, Embedded systems etc., in the design and implementation of Engineering application.

PSO2: Able to solve complex problems in Electronics and Communication Engineering with analytical and managerial skills either independently or in team using latest hardware and software tools to fulfil the industrial expectations.

Abstract	**Matching with POs,PSOs**
Drainage, Node sensor, wireless sensor network	**PO1, PO2, PO3, PO4, PO5, PO6,PO7, PO8, PO9, PO10, PO11, PO12, PSO1, PSO2**

ACKNOWLEDGEMENT

Our sincere thanks to **Thiru.M.Kumarasamy, Chairman** and **Dr.K.Ramakrishnan, Secretary** of **M.Kumarasamy College of Engineering** for providing extraordinary infrastructure, which helped us to complete this project in time.

It is a great privilege for us to express our gratitude to **Dr.B.S.Murugan., B.Tech., M.Tech., Ph.D., Principal** for providing us right ambiance to carry out this project work.

We would like to thank **Dr.A.Kavitha, Professor and Head**, **Department of Electronics and Communication Engineering** for her unwavering moral support and constant encouragement towards the completion of this project work.

We offer our wholehearted thanks to our **Project Supervisor, Dr.A.Maheshwari., M.E., Ph.D.,Assitant Professor,** Department of Electronics and Communication Engineering for her precious guidance, tremendous supervision, kind cooperation, valuable suggestions, and support rendered in making our project successful.

We would like to thank our **Minor Project Co-ordinator**, **Dr.K.Sivanandam, M.E., Ph.D., Associate Professor**, Department of Electronics and Communication Engineering for his kind cooperation and culminating in the successful completion of this project work. We are glad to thank all the Faculty Members of the Department of Electronics and Communication Engineering for extending a warm helping hand and valuable suggestions throughout the project. Words are boundless to thank our Parents and Friends for their motivation to complete this project successfully.

ABSTRACT

Drainage is defined as the infrastructure for drying the land from the excess and unutilized water; rainwater and waste water. Drainage conditions should be monitored in order to maintain its proper function. In fact, not all areas have drainage monitoring team. It leads to irregular monitoring of the drainage condition. The irregular monitoring has contribution on the clogging of the drainage that imply to the siltation which trigger flooding in the neighbourhood. Manual monitoring is also inefficient. It needs a lot of dedicated persons who are only able to record limited report with low accuracy. These weaknesses lead to the slow handling for problems in drainage. This work discuss about the design of drainage systems intended to monitor conditions at several points in drainage system using wireless sensor networks. Some sensor nodes are deployed at several determined points to be connected each. The monitoring parameters are nothing but the flow of water through the drainage pipe lines. This system is expected to monitor the drainage conditions real time continuously. If the flow is decreases it is alert that the flow is decreases ,then we can come to know that there is a blockage..

KEYWORDS: Drainage, Node sensor, wireless sensor network

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LIST OF ABBREVIATIONS

ACRONYM		ABBREVIATION
WNS	**-**	**Wireless Node Sensor**
OLED	**-**	**Organic Light Emitting Diode**

CHAPTER-1

INTRODUCTION

Drainage is defined as the infrastructure for drying the land from the excess and unutilized water; rainwater and waste water (team 1997). The type of drainage channel can be natural channel or constructed channel. In an urban, drainage channels built to control the surface water due to rain, waste water, so it does not disturb the activities and the country's facilities and property in the community.

Drainage conditions should be monitored in order to maintain its proper function. In fact, not all areas have drainage monitoring team. It leads to irregular monitoring of the drainage condition. The irregular monitoring has contribution on the clogging of the drainage that imply to the siltation which trigger flooding in the neighbourhood. Manual monitoring is also inefficient. It needs a lot of dedicated persons who are only able to record limited report with low accuracy. These weaknesses lead to the slow handling for problems in drainage.

In an urban area, drainage has an important role in the prevention of flood danger. Much researcher have research about the drainage system is related to drainage design as found in the study (Leonardo 2013) (Dwiati 2011). While researches about management of drainage has not been much discussed. Some researchers who have done research on the management of drainage are among others (Adianta 2012).

This paper will discuss the design of drainage systems to monitor conditions at some point in drainage by wireless sensor networks (ref.no.1,3). Some node sensors are deployed at some point will be communicated and will transmit the data about the condition of drainage to server. The parameters will be monitored are water levels in drainage, water discharge and rainfall conditions around the drainage area. The monitoring parameters are nothing but the flow of water through the drainage pipe lines (ref.no.6). This system is expected to monitor the drainage conditions real time continuously. If the flow is decreases it is alert that the flow is decreases, then we can come to know that there is a blockage.

CHAPTER-2

LITERATURE SURVEY

Drainage is defined as the infrastructure for drying the land from the excess and unutilized water, rainwater and waste water (team 1997). The type of drainage channel can be natural channel or constructed channel. In an urban, drainage channels built to control the surface water due to rain, waste water, so it does not disturb the activities and the country's facilities and property in the community.

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CHAPTER-3

WORKING PRINCIPLE

The flow sensor sense the flow and given some monitored parameters to the ESP8266. The monitoring parameters are nothing but the flow of water through the Drainage pipe lines. This system is expected to monitor the drainage conditions real time continuously. If the flow is decreases it is alert that the flow is decreases, then we can come to know that there is a blockage. The working principle is based on the circuit diagram given below (fig.no.1).

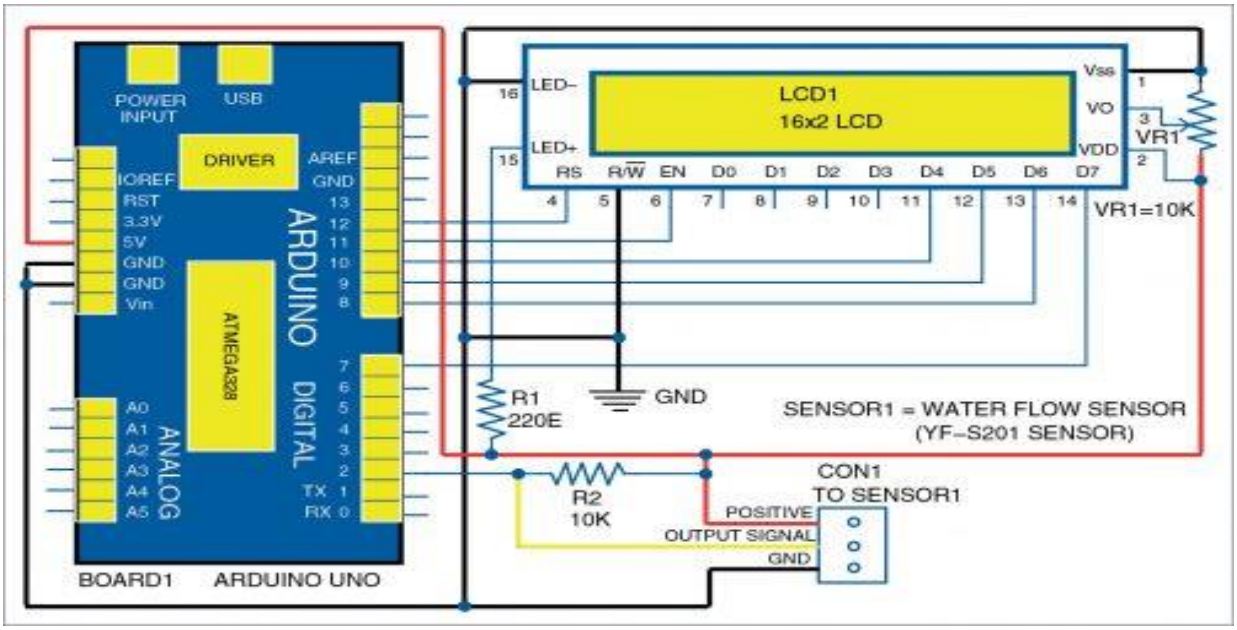

Fig.no.1: Circuit Diagram

CHAPTER-4

WORKING MODEL

COMPONTENTS USED :

There are some used. The hardware components are.,

- WATER FLOW SENSOR,
- ESP8266,
- OLED DISPLAY.

BLOCK DIAGRAM:

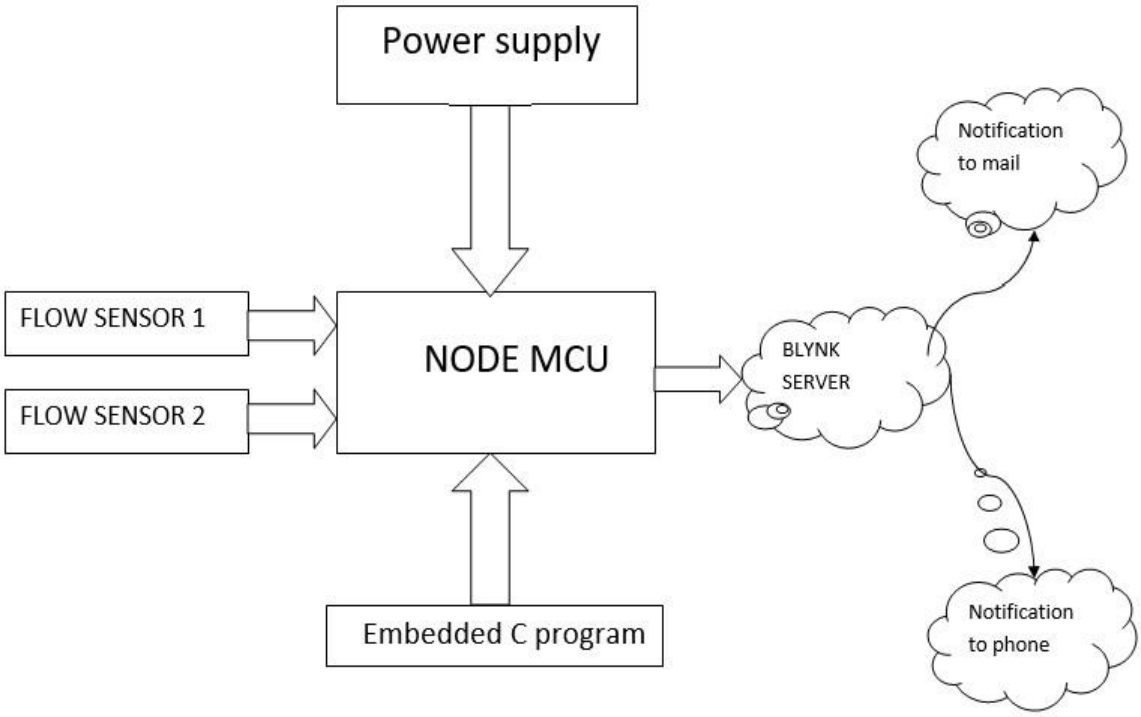

Fig.no.2: Block Diagram

As per block diagram (Fig.no.2) the flow sensors are connected to the NODE MCU which is encoded Fig.no.2: Block Diagram with the 'Embedded C program' and the power supply also given to the NODE MCU. By the NODE MCU, we can get the notification to the phone or to our mail which was link with the 'BLYNK SERVER' .

CHAPTER-5

RESULT

By using our creation(Fig.no.3), we can sense the flow of water in a pipe line if there is any blockage in the pipe line definitely the flow of water will decrease, the decreased flow of water is sensed by the flow sensor and it gives some parameters to the ESP8266. The ESP8266 is programmable to alert if the flow is decreased. The ESP8266 is connected with a OLED display which displays the rate of the flow of water and volume of the water.

Fig.no.3:Working Model

CHAPTER-6

CONCLUSION AND FUTURE SCOPE

CONCLUSION:

The important component is sensor nodes consist of sensors unit, processor, RTC (Real time Clock), SD cards, wireless communication unit, and supply units. In the drainage monitoring systems, the sensors are rainfall sensor, water level sensor, and water discharge sensor.

FUTURE SCOPE:

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The future scope is, by adding some more sensors to identify that by what the blockage is caused. For example, by using the flow sensor we can know the flow, by that flow we can identify that there is an blockage or not. Now, by adding some more sensor, we can find that the cause of the blockage. By that, we can clear the blockage without any man power, by reducing the man power in the cleaning proposes, we can reduces the death rate due to that a man cleaning a blockage.

REFERENCES

[1]Stankovic, John A.(2006), “Wireless Sensor Network”, Department of Computer Science, University of Virginia.

[2]Wayne Manges., April 1999, “It's Time for Sensors to Go Wireless. Part 1: Technological Underpinnings.”, Sensors Magazine.

[3]Roberto De Lottoa, Tullio Facchinettia, Paolo Gambaa, Emanuele Goldoni, *Wireless Sensor Networks for urban applications: evaluation and practical considerations*. .

[4] Leonardo Taawoeda, Alex Binilang, Fuad Halim, ”Perencanaan Sistem Drainase Kompleks Perkantoran Bupati Bolaang Mongondow”, Jurnal Sipil Statik Vol.1 No. 2, Januari 2013(95-104).

[5]Th.Dwiati, 2011, “Metode Perkiraan Laju Aliran Puncak (Debit Air) sebagai Dasar Analisis Sistem Drainase di Daerah Aliran Sungai Wilayah Semarang Berbantuan SIG”, Jurnal Teknologi Informasi DINAMIK Volume 16, No.2, Juli 2011 : 124-132.

[6]Adhianta S.K, 2012, “Monitoring dan Pengendalian Sistem Drainase Berdasarkan Algoritma Fuzzy berbasis Mikrokontroller ATMEGA 8535”, Tugas akhir Jurusan Teknik Elektro Universitas Islam Indonesia Yogyakarta.

[7]CNizar,2013, “Pengertian Hidrolika” http://www.ilmusipil.com/pengertian-hidrolika. 1 April 2014