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# SMART DRAINAGE MONITORING SYSTEM USING ESP 32

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**ABSTRACT:**
The Smart Drainage Monitoring System transforms conventional drainage systems with its Arduino UNO- grounded result. It offers real-time information on water quality, inflow rates, and situations by integrating detectors. The system anticipates enterprises, detects possible problems, and maximizes drainage network effectiveness. It makes it possible for visionary flood tide forestallment measures, educated decision, timber, and remote monitoring. Reactive conservation is reduced, submerging threat is dropped, water resource operation is improved, and drainage system adaptability is increased using this new approach. It supports cost sustainability, operations. reduction, and the authority's environmental streamlined.

**Keywords:**
Arduino UNO, detector, monitoring, smart drainage monitoring system.

## 1. INTRODUCTION:

Preface effective drainage systems are essential for controlling stormwater runoff and preventing flooding in civic settings. In large metropolises with millions of residents, drainage systems are pivotal. The foundation for land blankness from fat and unused water is a drainage system.waste water and rainwater. Monitoring drainage conditions is necessary to insures that it continues to operate as intended. In actuality, drainage monitoring brigades aren't present in every area. It results in erratic drainage condition monitoring. Unreliable surveillance has contributed to the inhibition of drainage, which implies the salutation and causes cataracts in the area. also, homemade monitoring is inept. It requires numerous married individuals who can only record a small number of reports with poor wrath 1700668 delicacy. similar drainage line problems might seriously disrupt the megacity's diurnal schedule. If the right cleaning measures aren't followed periodically, issues like blockage from waste accoutrements, abrupt rises in water situations, and different dangerous feasts might be produced. Because the drainage system of the moment isn't computerized, it can be grueling to determine whether a blockage is in a specific area. also, waste in those drainage lines can sometimes produce dangerous fumes like carbon monoxide (CO), methane (CH4), and others that can beget serious problems if gobbled by humans in large amounts. These issues are generally faced by drainage workers and can result in death. also, weren't notified in advance of any inhibition, increase in the attention of those feasts, or rise in the water position. As a result, chancing and fixing the inhibition takes a lot of time and trouble. still, the lack of real- time monitoring capabilities in traditional drainage systems constantly results in parlous and ineffective conservation procedures. The smart drainage monitoring system has come a state- of- the- art result to these problems. This groundbreaking result transforms drainage system operation by fusing data analytics, sophisticated sensing technologies, and remote monitoring capabilities. Waterflow, position, and quality data are continuously collected and analyzed by the system through the integration of detectors throughout the structure. This information is also transmitted to a central control center, where it can be monitored in real time. The smart drainage monitoring system enables early discovery of issues such as blockages, excessive water situations, or anomalies in the system's performance. With this timely information, visionary measures can be taken, minimizing the threat of flooding and optimizing the effectiveness of the drainage system. likewise, the system can work with rainfall soothsaying data to

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anticipate heavy downfall events, allowing for visionary adaptations in drainage operations. Eventually, the smart drainage monitoring system promises to enhance the adaptability and effectiveness of civic drainage structures, creating safer and more sustainable communities.

## 2. SYSTEM SETUP:

**System Architecture and Design:**

Fig. below shows the system architecture of the proposed system, The network consists of sensor nodes, a network coordinator, and Cloud storage. A remote graphical user interface is further developed to examine the information and analysis results. Based on the proposed system, the ultrasonic sensor senses the blockage in the drainage and shows the distance of an object, the gas sensor shows the level of gas, and the water float detector shows the level of water in the drainage. The input of this data is taken by ESP 32, and if the value is above the threshold, then the buzzer gets activated and the value is shown on the screen. The power supply is given to the ESP

**Hardware Implementation:**

- **ESP 32**: ESP32 is a low-cost System on Chip (SoC) Microcontroller from Espressif Systems, the developers of the famous ESP8266 SoC. It is a successor to ESP8266 SoC and comes in both single-core and dual-core variations of the Tensilica's 32-bit Xtensa LX6 Microprocessor with integrated Wi-Fi and Bluetooth.
- **Gas Sensors**: Gas sensors are devices designed to detect and measure the presence and concentration of specific gases in the surrounding environment. They are used in various applications, including industrial safety, environmental monitoring, indoor air quality assessment, and automotive systems.
- **Ultrasonic Sensor:** Ultrasonic sensors are devices that use ultrasonic sound waves to detect and measure distances to objects in their vicinity. They emit high-frequency sound waves beyond the range of human hearing (typically above 20 kHz) and measure the time it takes for the sound waves to bounce back after hitting an object.
- **Water float detector:** A water float detector, also known as a water level sensor or water level float switch, is a device used to detect the presence or level of water in a tank, reservoir, or other water storage or containment systems. It typically consists of a buoyant float attached to a lever or arm mechanism.
- **Liquid Crystal Displays (LCDs):** LCD Liquid crystal Display LCD is a blend of two solid and liquid states of matter. It is an electronic display module with a 16x2 LCD screen, which says that it has 16 characters with respect to 2 rows. LCD uses a liquid crystal to produce a visible image. Such a technique has been used to show a picture on a laptop or some other computer tool.

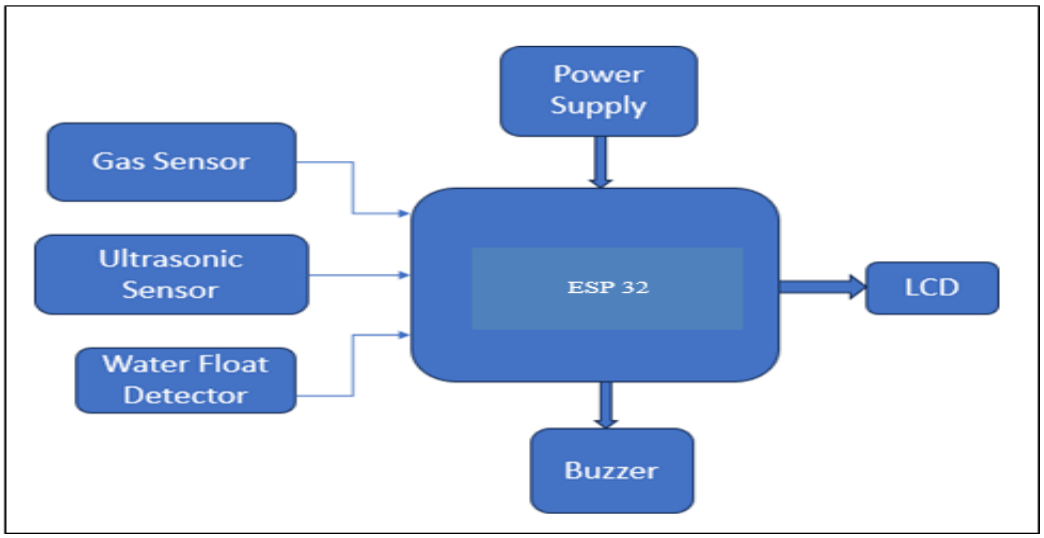


*Fig. 2.1: System Architecture*

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## I. System Design:

As Shown in picture fig. the device (Hardware) to the power supply. Initially, the System shows theflow rate and the system's environmental state, with or without dangerous gases. If the ultrasonic sensor or gas sensor is triggered, the buzzer will be activated.

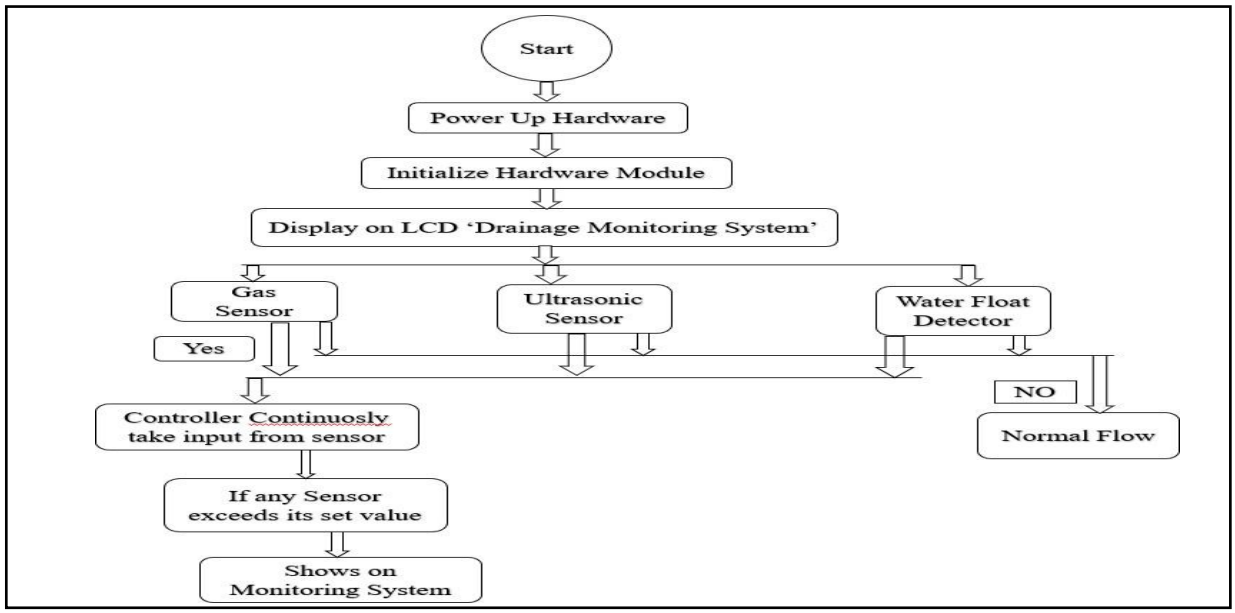


*Fig. 3.1: System Design*

## II. Algorithm Used:

Step no. 1) Power Up hardware.
Step no. 2) Initialize hardware Module.
Step no. 3) ESP sense Sensor value.
Step no. 4) Gas sensor check for gas level.
Step no. 5) The input value is sensed by the ESP. Step no. 6) If value is above the threshold value. Step no. 7) The Buzzer will get activated.
Step no.8) The monitored value is shown on the LCD.
Step no. 9) Stop.

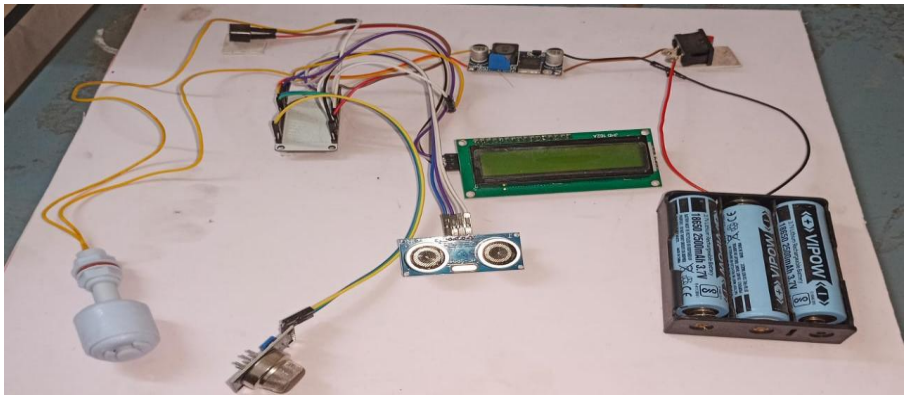

*Fig.4.1: Model*

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## III. CONCLUSION:

A smart drainage monitoring system offers significant advantages for the efficient and effective management of drainage systems. By integrating advanced sensors, real-time data visualization, and analysis techniques, these systems provide valuable insights and enable proactive decision-making. The benefits of implementing a smart drainage monitoring system include:

a) Early problem identification
b) increased operational effectiveness
c) increased safety and risk mitigation
d) data-driven decision making
e) better maintenance planning
f) environmental benefits

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