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# IOT BASED ENHANCED HEALTH CARE, GLUCOSE DRIPS ALERT SYSTEMS

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***Abstract***: This article presents a new solution for healthcare through blood glucose drip alarm system based on the Internet of Things (IoT). The application system works with ESP-32 fuffer and does not recommend rubber welling or interacting with patients. The main function of the system involves continuous monitoring of the sugar level in the weighing bottle using an electronic sensor connected to the ESP-32 microcontroller. When blood sugar falls below the threshold value, the system gives real-time warnings through the website, phone calls, and messages. The web application plays an important role for doctors by providing information about patients and diabetes.The ESP-32 microcontroller facilitates seamless communication with load sensors and LCD display, providing doctors with the user interface to monitor patients locally. The system also includes multiple alert systems that will ensure that doctors are informed in a timely manner so that they can respond quickly to emergencies. This IoT-based diabetes drip alert system not only provides effective solutions to prevent diabetes complications, but also provides a flexible and flexible system for connection with other sensors or features. The system is versatile and has instant messaging features to help improve patient care in healthcare settings. The solution aligns with the growth of IoT applications in healthcare and unlocks the potential of the technology through advancements in medical care.

***Keywords*** **- Glucose level monitoring, Health monitoring, Cloud storage, ESP-32 sensor**

## I. INTRODUCTION

Health systems continue to evolve to meet the needs of an aging population and increasing chronic diseases. Among them, diabetes is a difficult health condition that requires careful control of diabetes. In cases where patients are given glucose, it is important to ensure a continuous and uninterrupted flow of glucose in the blood in order to control blood sugar. This article presents a novel solution, an Internet of Things (IoT)-based blood glucose drip alarm system, to increase patient safety and improve clinical operations. Effective use of communication) has demonstrated the ability to heal the sick. Our proposed system uses ESP-32 microcontroller, load sensor, LCD screen, but cannot create an advanced ability to instantly analyze the sugar in the bottle. The ESP-32 microcontroller acts as the body's brain by integrating data acquisition and processing.

The vacuum sensor measures the weight of the bottle and allows the system to decide on the high-pressure liquid. Doctors may evaluate the condition of soda bottles from time to time. But the real innovation lies in the communication process that goes beyond local products.

The system uses a variety of methods, including a web app, phone calls and text messages, to alert doctors when the glucose vial is low or empty. This ensures that healthcare personnel receive timely alerts, ensuring timely intervention and preventing patient care from being interrupted. Broad goals. By using IoT technology, we aim to improve communication between medical devices and service providers and ultimately create a more responsive and efficient system. The versatility and adaptability of the system is demonstrated by the integration of the ESP-32 microcontroller, load sensor, LCD display and parameters, making it a good candidate for seamless use in various medical applications. br>But the real benefit of our system lies in its communication that goes beyond local products. The system integrates a web app, phone calls and text messages to notify doctors of important glucose vial events. This ensures supervisors are alerted not only instantly but also across multiple communication channels, reducing care risk and enabling timely responses to disruptions in patient care. This article highlights the importance of new solutions that go beyond traditional care in the digital age. The IoT-based glucose drip alert system described in this article represents a significant step forward in using technology for health management, permanently ensuring glucose safety for patients. The integration of today's lines of communication and the combination of working with quality information places these systems at the forefront of advances in patient care.

## II. RELATED WORK

The first relevant study is GSM-based health monitoring, which demonstrates the advantages of focusing on monitoring vital

signs such as pulse and body temperature. The system is based on the global mobile communications (GSM) technology standard to facilitate continuous healthcare and provide a basis for patient distancing. The system uses sensors to capture real-time data about the patient's physical condition, focusing on vital signs, which are important indicators of overall health.

Author [1] "Design and Operation of Wireless Intravenous Infusion Monitoring System", Gao et al (2018): This study describes the design and implementation of a wireless intravenous infusion monitoring system that can monitor the infusion process and alert when there is a problem. Being portable, low cost and easy to use.

Author [2] "A Smart Health Monitoring System for Remote Cardiac Patients Using IoT and Fog Computing" by Gupta et al. (2019): This research proposes a smart health monitoring system using IoT and fog computing for remote cardiac patients. The system collects real-time data from wearable sensors, analyzes it locally, and provides timely interventions.

Author [3] "IoT-Based Health Monitoring System for Heart Patients" cited by Singh et al (2017): This article describes an Internet of Things-based health monitoring system designed for people with heart disease. and other vital signs provide immediate feedback to patients and doctors.

Author [4] "Smart Health Monitoring System Using IoT" by Raj et al. (2020): This study introduces smart healthcare services using IoT technology. It helps to intervene in time and improve patient care by remotely monitoring various health parameters such as body temperature, heart rate, and blood sugar.

Author [5] "Improving monitoring and management skills for the elderly based on the Internet of Things", Zhou et al. (2019): This study presents an intelligent monitoring and control system for the elderly using IoT technology. The system monitors the health of the elderly and provides timely assistance in case of emergency.

Author [6] "Internet of Things Based Patient Health Monitoring System" by Patel et al. (2018): This paper presents an IoT-based patient healthcare system that collects data from multiple sensors connected to the patient's body. The system constantly monitors vital signs and alerts doctors if there are any abnormalities..

Author [7] "Remote Healthcare Monitoring System" using IoT" by Kumar et al. (2016): This study introduces remote health monitoring based on IoT technology. The system collects data from electronic and medical devices, makes instant measurements and offers personalized medical service to users.

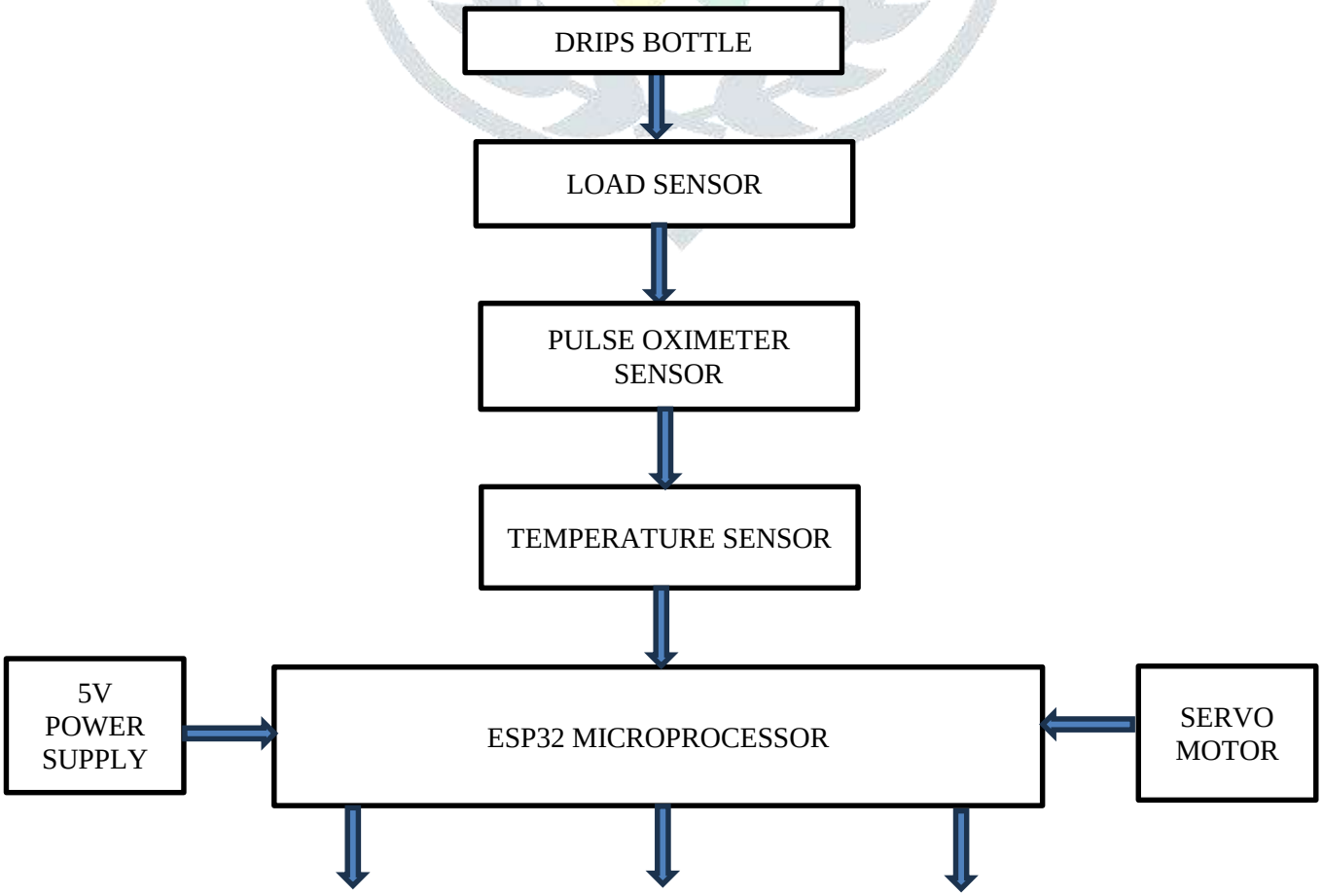
Author [8] "Intelligent Medical System for Heart Rate Monitoring Based on Internet of Things", Jain et al. (2020): This work presents an IoT-based smart medical
system for heart rate monitoring. The system uses a wearable device to continuously monitor heart rate and provide feedback to the user and doctor.

Author [9] "Wireless monitoring system for real-time patient health monitoring" by Mishra et al. (2018): This paper presents a wireless monitoring system for emergency patient care.

Author [10] "Improving healthcare services for the elderly based on the Internet of Things" Chen et al. (2019): This study developed an IoT-based remote healthcare system specifically for the elderly.

The system monitors many health conditions and provides personalized healthcare services to improve the quality of life of the elderly.

**III. BLOCK DIAGRAM**



APPLICATION | NOTIFICATION | 12V BUZZER

## IV. METHODOLOGY

The development process of the IoT-based sugar drip alert system aims to create a solution to meet the urgent need for doctors to be notified about low sugar or bottled sugar. By using advanced medical devices such as ESP-32 microcontroller, load sensor, LCD display and control data, the system is designed to ensure efficient and uninterrupted operation of patients.

Adjust the level and trigger an alarm when it falls below the preset threshold. This approach can help doctors refill vials in a timely manner, avoid interruptions in patient care, and ensure fluid is always available when needed. Consider hardware related to performance, reliability and ease of use. The system aims to increase patient safety and ensure healthy functioning by using these products effectively and providing timely intervention and control of blood sugar.

### 4.1 System Overview

"IoT-based Enhanced Health Glucose Drip Monitoring System" uses modern technology to monitor and control blood glucose for intravenous (IV) administration in hospitals. The system integrates an ESP-32 microcontroller and an array of sensors and actuators, providing instant control of IV drip flow, improving patient safety and care. Through seamless communication and a clear feedback process, doctors can manage and optimize the administration of glucose drips, ensuring patients receive the best results and reduce health risks.

#### 4.1.1 Esp-32 Microcontroller

As the central function of the "enhanced blood glucose drip monitoring system based on the Internet of Things", the ESP-32 microcontroller plays an important role in data acquisition and physical control. It effectively collects data from multiple sensors integrated into the setup, such as a 10 kg weight sensor that monitors the weight of the IV bag. Thanks to its processing capabilities, the ESP-32 can interpret this information and make instant decisions on how to control water flow. It works with a stepper machine to precisely control the infusion process, ensuring zoptimum glucose levels while minimizing the risk of over-infusion or intravenous fluid depletion. It also helps communicate with user interfaces such as microcontrollers, LCD displays, and web applications, providing important information to level IV users and system processes.

Overall, ESP-32 microcontroller forms the backbone of the system, providing a well-integrated and intelligent health and management system

#### 4.1.2 10kg Load Sensor

The 10kg weight sensor is an important part of the IoT-based medical glucose drip monitoring system and plays an important role in accurately monitoring the fluid level of the IV bag. Its sensitive sensor continuously measures the weight of the IV bag and instantly signals the need for additional fluid. This feature is important to ensure downtime to prevent drip interruptions and thus maintain the quality of patient care. The reliability and sensitivity of the load cell are important because they directly impact the body's ability to properly control fluid flow.Patient care and clinical safety. Its reliable performance provides accurate fluid tracking, allowing doctors to take proactive measures and ensure uninterrupted fluid management. The involvement of this sensor demonstrates its importance in the efficient execution of care, ultimately benefiting patients and physicians.

#### 4.1.3 Servo Motor


Servo motors are rotary or linear actuators that provide precise control of angular or linear position, speed and acceleration. It has a motor and sensor for position feedback and is controlled by a closed loop to maintain the desired position. Here the servomotor is used to control the flow of fluid from an IV bag to a patient's hand while preventing the reversal of blood flow.

Here's a breakdown of the process:

**1. Initial Position (0 degrees):** The servomotor is positioned at 0 degrees, which indicates that the fluid flow is off or at a minimum flow rate. In this position, the ball inside the tube is likely blocking the flow of fluid.

**2. Fluid Exceeds IV Bag:** When the fluid level in the IV bag exceeds a certain threshold, a sensor detects this increase. This signal triggers the servomotor to rotate to a specific angle, such as 270 degrees.

**3.Rotation and Ball Release:** As the servomotor rotates to 270 degrees, it pushes the ball inside the tube out of the way, allowing the fluid to flow freely through the tube.

**4. Fluid Flow to Patient:** With the ball out of the way, the fluid flows down the tube towards the patient's hand, delivering the necessary medication or nutrients.

**5. Preventing Reversing Blood Flow:** By controlling the flow of fluid with the servomotor, the system ensures that there is a consistent flow towards the patient's hand. This prevents any potential backflow of blood into the IV line, which could occur if the fluid flow were to stop or reverse.

Overall, the servomotor plays a crucial role in regulating the flow of fluid from the IV bag to the patient, providing precise control and preventing any complications such as blood flow reversal.

## V. CONCLUSION AND FUTURE SCOPE

Intravenous (IV) drip monitoring systems play an important role in ensuring the safety and effectiveness of patient care. These systems help doctors accurately monitor medications and fluids, identify differences in dosage or flow rates, and quickly respond to problems or adverse events. Using an IV monitoring bag can help doctors promptly monitor the status of IV therapy and take appropriate action if problems arise. IV bag monitoring systems have many benefits for patients and doctors. They can help reduce the risk of drug misuse, improve patient outcomes and reduce healthcare costs. By providing real-time monitoring of the vascular system, doctors can quickly detect and respond to problems that could adversely affect patients, such as changes in fluid. In summary, vein screening is an important tool in today's healthcare environment, and their use can improve patient outcomes and safety.As technology continues to develop, these systems will become more efficient and effective in the coming years and the quality of treatment patients receive in their veins will further increase. Things are looking good in the healthcare industry with new technologies and advancements that have the potential to improve patient outcomes, increase efficiency, and reduce costs.

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