



**FACULTY OF ENGINEERING
DEPARTMENT OF ELECTRICAL ENGINEERING
FINAL YEAR PROJECT REPORT**

**DESIGN AND IMPLEMENTATION OF REAL-TIME IV
INFUSION SYSTEM WITH DIRECT FLOW RATE CONTROL
AND AUTOMATED SAFETY STOPPAGE FOR CROWDED
HOSPITALS.**

BY

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*Project report submitted to the Department of Electrical Engineering in partial fulfillment
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JUNE, 2025

DECLARATION.

I, **KISALE TOM INNOCENT (BU/UP/2021/1338)**, hereby declare that this project is completely based on my research work except for citations and quotations which have been specifically acknowledged. It has not been submitted to any other examining body or academic institution for any academic award.

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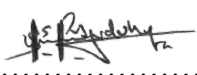
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APPROVAL.

This is to certify that the project proposal titled “Design and Implementation of Real-Time IV Infusion System with Direct Flow Rate Control and Automated Safety Stoppage for Crowded Hospitals” has been done under my supervision and is now ready for examination.

Eng. NDUHUURA JENSEN.

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LIST OF ACRONYMS

IR.....	Infrared.
LED.....	Light Emitting Diode.
IV.....	Intravenous.
LoRa.....	Long Range.
IoT.....	Internet of Things.
IC.....	Integrated Circuit.
WHO.....	World Health Organization.
LCD.....	Liquid crystal display.

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DEDICATION

I dedicate this report to my loving and caring parents, Mr. Kisale Tom and Mrs. Sabano Mary Elizabeth, for their inexhaustible love, support, and encouragement towards the success of my education.

In the same way, I also dedicate this report to my siblings, for all that mattered in my course.

ABSTRACT

With the increasing growth of the population in Uganda, healthcare plays a vital role in leading a contented life. In hospitals, ensuring patients' safety is the most important thing. Hence, automatic health monitoring systems are the most sought after because they give precise information while reducing the stress of medical practitioners and the attendants of the patients about missing certain critical data. Also, indicating when the intravenous fluid administered to the patient falls below a critical level is a tedious process and a tougher job. Monitoring the level of intravenous fluid level manually is a simpler job, but if not done with utmost care, it may affect the health of the patient severely. This may lead to blood loss or back-flow of blood to the IV tube from their veins. If the bottle gets fully drained, air enters the tube and, in turn, into the vein, which may prove disastrous to the patient. So, automating this system might prove really helpful. A system is designed such that if the Intravenous fluid reaches a critical level, it is sensed by the Infrared (IR) sensor set up, and a micro servo motor quickly blocks the fluid flow. An alarm sounds, and a message is sent to the nurses' dashboard indicating the fluid drop and flow rate. When this is done, the nurse can easily identify the patient and go there directly to change the bottle rather than keep checking every patient to notice if the fluid has reached the threshold level. This requires the use of an IR sensor placed at different levels of the bottle, a micro servo motor connected to the tube between the bottle and the patient's body, and the LoRa module, the buzzer, and the LEDs.

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