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# GLUCO-MIB: DEVELOP AN INTERNET-OF-THING SYSTEM FOR THE MONITORING GLYCEMIA IN HOSPITALIZED PATIENT WITH DIABETES MELLITUS TYPE 2

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## Introduction

Diabetes mellitus type 2 (DM2) is the most common type of diabetes in the adult population of Peru. In 2022, more than 32,000 cases of diabetes were reported (1). Hyperglycemia is associated with longer hospital stays and higher mortality rates. Poor glycemic control and complications during the hospitalization of diabetic patients prolong hospital stays, Fig 1. To prevent the problems that patients may experience during their hospitalization, constant monitoring and effective glucose control are required (2).

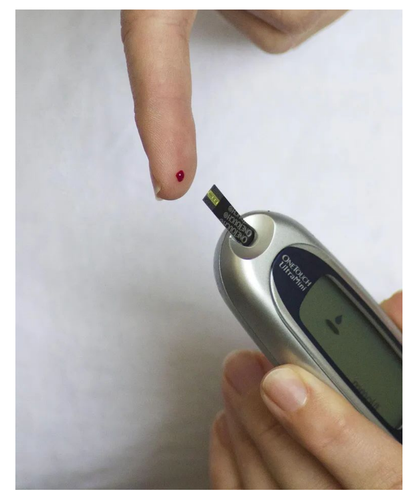


Figure 01.- Nurse monitoring the glucose level

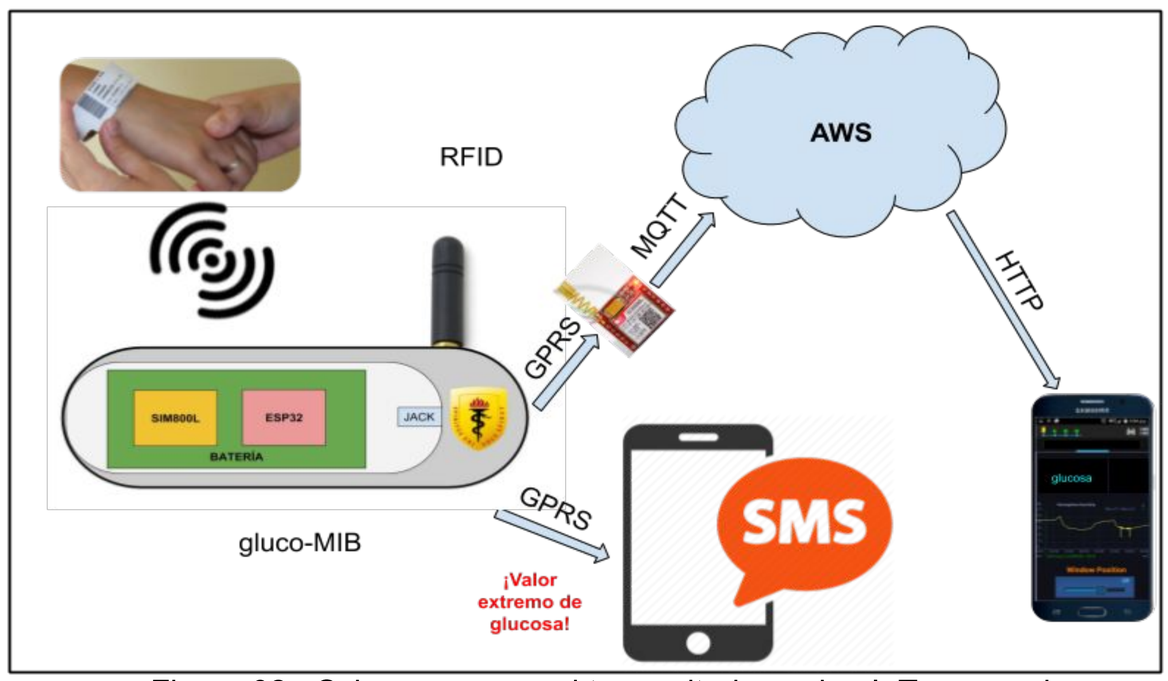



Figure 02.- Schema proposed to monitoring using IoT approach.

## Proposal

An action to reduce hospital stays and mortality rates requires effective glucose control. Glucometers primarily obtain blood glucose values through capillary means and normal values range from 70 mg/dL to 120 mg/dL. Nurses are in charged to recollet this data and They use paper to register theses values, but this action may cause bias. We propose an IoT system that help nurses to register data automatically by using RFID technology to identify patients and sending values to a server through MQTT protocol, and also with the capability to send alerts using SMS o callings. We pretend to reduce or eliminate bias during the registration process, see Fig 2.

## Development

An electronic device was developed that works with a One Touch glucose meter, enabling the automation of blood glucose readings and sending alerts when extreme glucose values are detected (Fig 3). Glucose values can be monitored through a web page, allowing for visualization via temporal graphs (Fig 4). Alerts are sent using 2G technology through SMS to healthcare personnel. Gluco-MIB also includes a mobile application used to assign patients a code established on the RFID wristband that will be placed on their hand, see Fig 05.

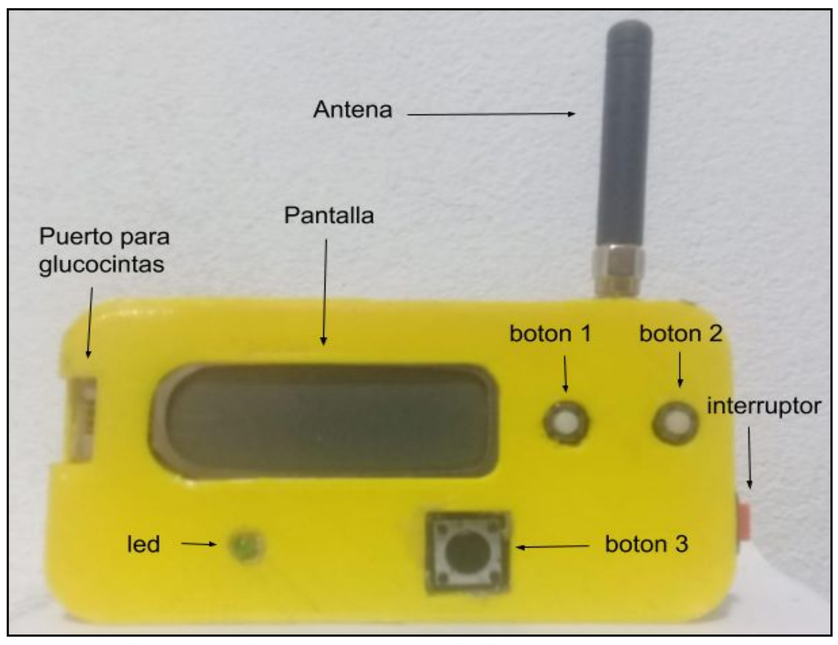



Figure 03.- GLUCOMIB Prototype


Figure 04.- Mobile App developed.in AppInventor

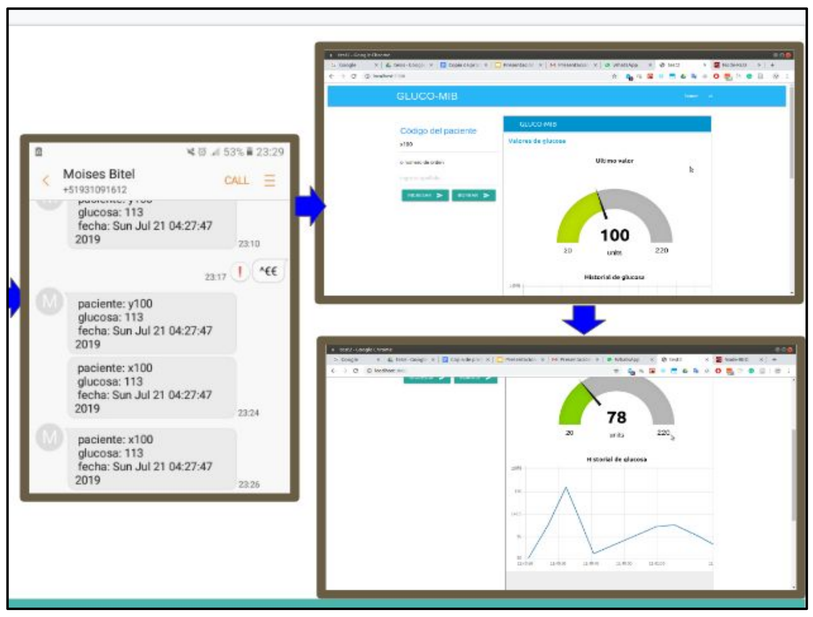
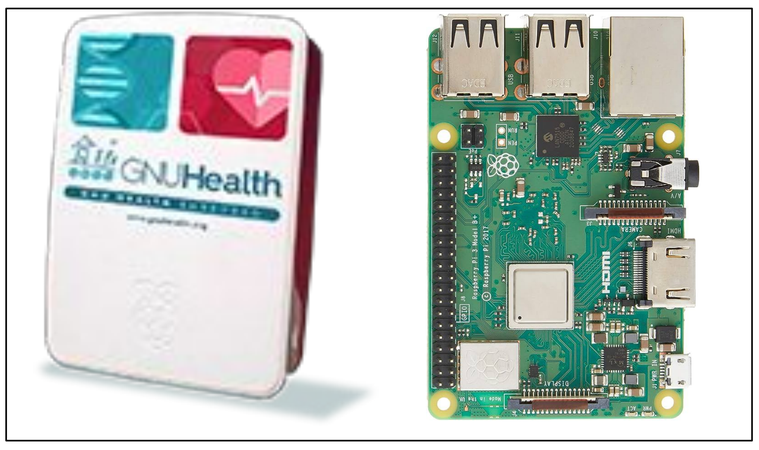



Figure 05.- Alerts through SMS

## Next Steps

We want to include a local server using an Electronic Health Record named GNU-HEALTH for being used in rural areas in Perú where the internet connection is not possible because of the radical geography.

Gluco-mib




Edge server (EHR)

Rural areas in Perú

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2. Smiley D, Umpierrez GE. Management of hyperglycemia in hospitalized patients. Ann N Y Acad Sci. 2010 Nov;1212:1-11. doi: 10.1111/j.1749-6632.2010.05805.x. Epub 2010 Oct 29. PMID: 21039589; PMCID: PMC3733469.