Human Health Screening System using LabVIEW

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Abstract— The aim of this project is to send mail and alert the doctor. The basic system includes biomedical parameters like body temperature, heartbeat rate, oxygen supply and blood pressure monitoring. By manipulating the output parameters, an alert system can be implemented, which will alert the doctor in case of emergencies through email.

Keywords: body parameters, monitoring, alert, emergencies, Email

I. INTRODUCTION

LabVIEW stands for Laboratory Virtual Instrument Engineering Workbench.LabVIEW is a development environment and system-design platform for a visual programming language . LabVIEW was developed by National Instruments. Its key innovation is that it uses graphical diagrams rather than lines of text the graphical language is known as "G" to not be confused with G-code. Originally released for the Apple Macintosh in 1986, it is usually used for data acquisition, instrument control, and industrial automation on a various operating systems (OSs). The latest versions of LabVIEW are LabVIEW 2019 and LabVIEW NXG 3.1, released in May 2019.

II. DATAFLOW PROGRAMMING

LabVIEW recognizes that it can execute the two loops independently, and in a multiprocessing or hyperthreaded environment.The programming paradigm utilized in LabVIEW is based on data availability. If there is enough data available to a sub VI, that sub VI will execute. Execution flow is decided by the structure of a graphical diagram on which the programmer connects different nodes by connecting with wires. These wires propagate variables and any node can execute as soon as all its required inputs become available. This could be the case to run multiple nodes simultaneously, LabVIEW can execute inherently in parallel.

A. Graphical Programming

LabVIEW integrates the creation of user interfaces into the event cycle. LabVIEW programs-subroutines are termed virtual instruments (VIs). Each VI has three components: a diagram, a front panel, and a connector pane. The connector pane is employed to represent the VI within the block diagrams of other, calling VI's. The front panel contains controls and indicators. Controls (inputs) permit a user to provide information to the VI. Indicators (outputs) indicate, display the results for the inputs given to the VI. All of the objects placed on the front panel will appear on the block diagram as terminals. The block diagram contains structures and functions which perform operations of controls and provide data to indicators.

The structures and functions are found on the Functions palette in the block diagram and may be placed on the block diagram. Basically controls, indicators, structures, and functions are mentioned as nodes. Nodes are connected to one another using wires, e.g., two controls and an indicator are often wired to the addition function that the indicator displays the sum of the two controls. Thus, a VI often run as either a program, with the front panel serving as an interface, or, when dropped as a node onto the block diagram. The front panel defines the inputs and outputs for the node through the connector pane. This implies each VI are easily tested before being used as a subroutine into a bigger program. The graphical approach even allows non-programmers to build programs by dragging and dropping nodes which they are already familiar. The LabVIEW environment, with the included examples and documentation, makes it simple to create small applications. There is also a certain danger of underestimating the expertise needed for high-quality G programming. For complex algorithms or large-scale code. It is important that a programmer possess an extensive knowledge of the special LabVIEW syntax and the topology of its memory management. The most advanced LabVIEW development systems offer the ability to build stand-alone applications.

III. OBJECTIVES

The objective of patient monitoring is to have a quantitative assessment of the important physiological parameters of the patient during critical periods. The system program successfully meets the project objectives that are relevant patient health risk evolution and risk recommendations for the user. The following features and calculation of patient analysis was successfully performed .The whole work is focused on the following objectives: to develop computer-based patient monitoring system.

The proposed system was constructed to perform and to collect the required data from the recorder to computer as the main input .data required are ECG, Respiration and SPO2 signal. The software on PC uses the data to perform simple calculations to determine the patient monitoring. To design a human body parameter monitoring system through the system in hospital.

- Examining of temperature, heartbeat, blood pressure, oxygen supply to a patient using sensors.
- Standardization is required for data exchange.
- Interoperability among multiply components.

IV. FRONT PANEL

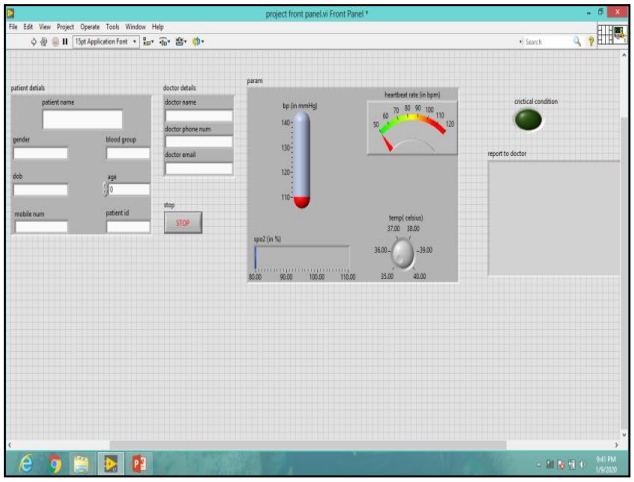

Fig. 1.1: Front panel

The front panel contains the details of the patient including name, DOB, gender, phone number, age, blood group, patient ID. It also contains the details about the doctor to whom the mail should be sent. The detail of the doctor contains his name, mail ID and his phone number.

There are various controls used to continuously monitor the various body parameters of the patient. The parameters are body temperature, heartbeat rate, blood pressure, SPO2 measurement. A round LED indicator is present to alert the physician in the emergency conditions. The report to be sent to the doctor is displayed in the string indicator. The report writes the measurement of the body parameters measured during the critical condition.

V. BLOCK DIAGRAM

In this initialize case patient details and doctor details are in the file directory gets initialized. Then the details are read from the file and gets visible on the front panel in their respective columns. All the controls and indicators are set to their default values. (For example-the default value for the blood pressure120/80 mmHg).

A. Initialize

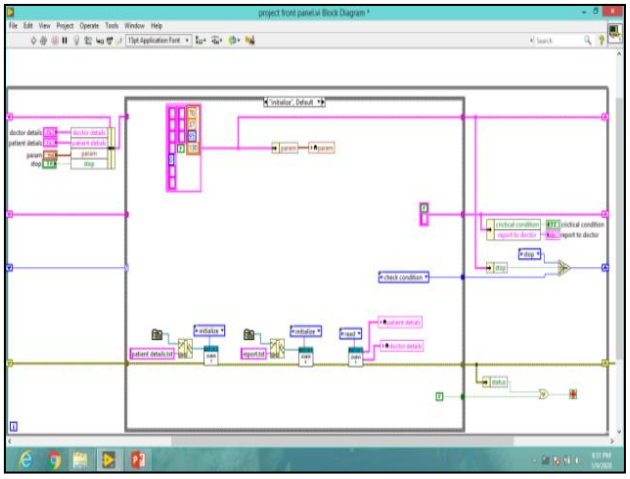

Fig. 1.2: Initialize Window

B. Check Condition

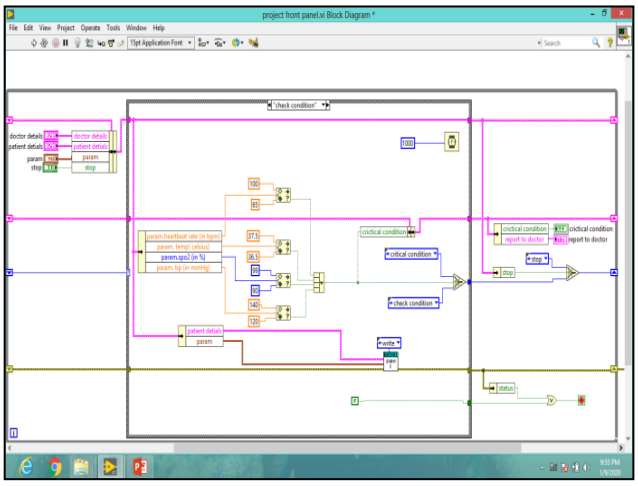

Fig. 1.3: check window

The code for monitoring the minimum and the maximum ranges of the body parameters. When the value of body parameters of the patient exceeds or fall below the given ranges, it moves to the critical condition case. Normal condition of heart beat rate is 65 bpm and critical condition of heartbeat is 100 bpm, normal body temperature is 36.5 degree Celsius and critical body temperature is 37.5 degree Celsius, SPO2 normal range is 90% and the critical SPO2 range is 99%, blood pressure minimum range is 120 mmHg and the maximum range of blood pressure is 140 mmHg.

If these ranges exceed the maximum range or fall below the normal condition, the LED will indicate that the critical situation, can send the report through mail.

C. Front Panel under Normal Condition

This is the front panel for the project under patient's normal condition. When the body parameter of patient is in normal condition, the LED does not glow and the report remain empty.

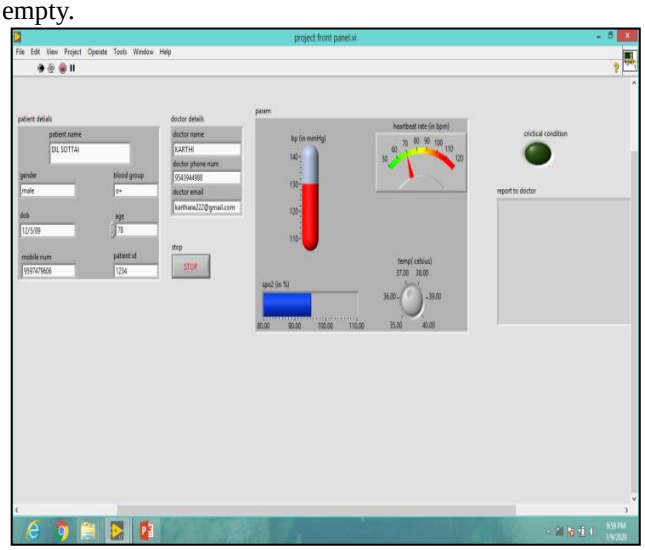

Fig. 1.4: Front Panel under Normal Condition

D. Front panel under critical condition

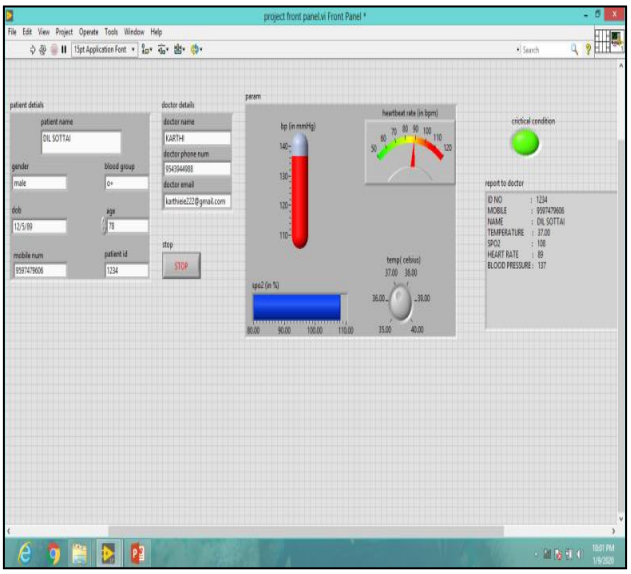

Fig. 1.5: Front panel under critical condition

This is the front panel of the project under patient 's critical condition even any one of the body parameter exceed over the given maximum range or below the given minimum range, the LED start glowing and the report is send to the doctor immediately through the mail.

E. Mail Sending VI

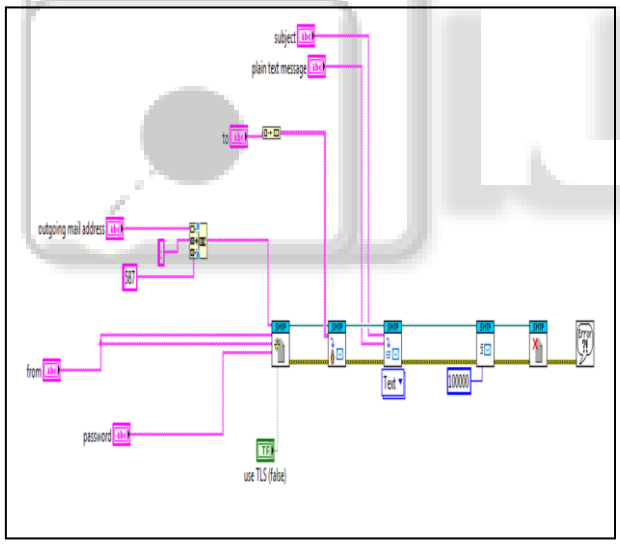

Fig. 1.6: mail sending VI

This code is to send the mail using LabVIEW interface during patient's critical condition by smtp protocol. The doctor receives the mail when the patient is in critical condition so that the doctor may know the condition of the patient at anytime and anywhere.

VI. SUBVI'S

A. To Read the File

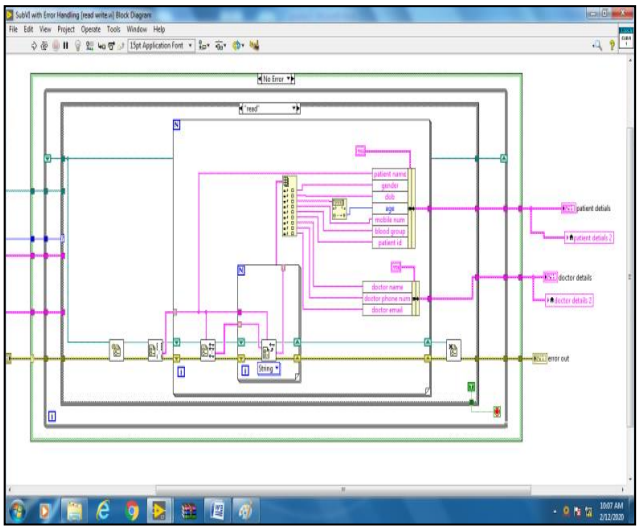

Fig. 1.6: To Read the File

This block diagram is to read the details of the patient and the doctor given in the file. The values or details of the patient and the doctor read from the file are visible in the front panel.

B. For Periodical Updation Of Patient's Body Parameters

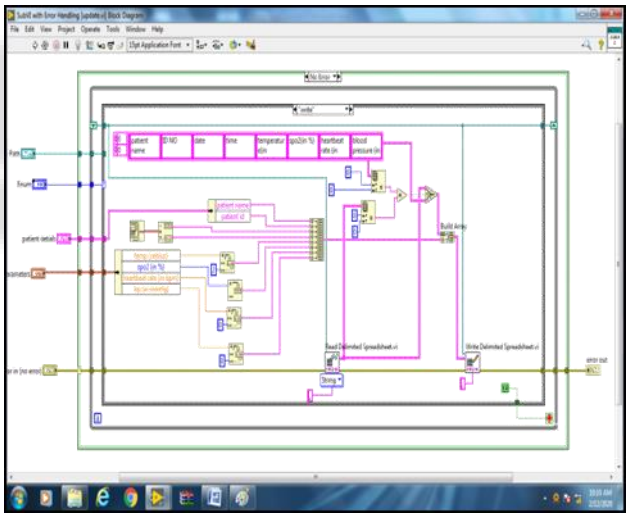

Fig. 1.7: For Periodical Updation of Patient's Body Parameters

This block diagram is for the periodical updation of the body parameters of the patient. The file contains the date and time with their body parameters record for every second.

VII. CONCLUSION

The proposed system will be a revolution in the Medical field and will have a great impact in rural areas where the doctor to patient ratio is very low. The proposed system will also have a low cost of implementation and hence can be employed everywhere. Thus, we can able to transmit the data which is sensed from the remote patient to the server through mail or SMS. This system provides continues monitoring of patient. This system designed efficiently and met all expectations as set earlier.

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