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Saline Level Monitoring and Control System using IoT Cloud Control

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ABSTRACT

Saline is given to patients in hospitals to help them recover from dehydration and improve their overall health. When a patient is given saline, the patient must be constantly observed by a nurse or other carer, according to current health-care regulations. Almost every nurse or caretaker in the hospital is responsible for regularly monitoring the saline level. A large number of patients are damaged in hospitals as a result of doctors, nurses, and other caregivers' negligence and inattention to saline completion, as well as a shortage of nurses with sufficient expertise in hospitals and their enormous workload.The saline level monitoring and control system was developed to prevent the patient from being damaged and to protect their lives during the saline feeding period. The suggested system includes sensors that will operate as level sensors to monitor the critical level of saline in the saline bottle and control the infusion drop rate using a motor mechanism to increase and decrease the saline drop rate. The system will display saline droplet status, saline drop rate, and remaining time via an app that will be developed for hospital staff members' convenience. This proposed technology can be used effectively in both households and hospitals.

1.INTRODUCTION

These days technology is growing at a very high speed. Human lives have become much more dependent on elec- tronic devices. Todays world requires sophisticated control in its different electronic gadgets. The basic aim of saline level indicator is to ease human lives. Automation of the surrounding environment of a modern humanbeing helps to increase the work efficiency and saves time. Saline is fed when the patients body is dehydrated. A constant monitoring of the saline level in the bottle is required. If the empty saline bottle is not replaced immediately then the pressure difference between the patients blood pressure and the empty saline bottle causes reverse flow of blood into the saline. Theses situation can be serious threat to the patients well-being. Thus the automation device is suggested in order to avoid any inconvenience that may be caused to the patients in case of lacking of constant monitoring by patients relatives or hospital employees. The nurses can check saline droplet status of each patients bed without walking around patients room every hour. The device will send the status to the host unit and show the results. Therefore, nurses can checks a line droplet status.

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PROBLEMSTATEMENT

Almost in all of the hospital, a nurse or caretaker is re- sponsible for monitoring the saline level continuously without any interruptions. Due to the negligence and inattentiveness towards saline completion by doctors, nurses or caretaker of the patients and lack of nurses with sufficient skills in hospitals and their excessive workload, a huge number of patients are dying and are being harmed in the hospitals. Hence to prevent the patient from getting harmed and protect their lives during saline feeding period, we are going to develop the smart saline level monitoring and control system.

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OBJECTIVES

A. To detect the critical level of saline bottle using IR sensor.
B. To make the system that automatically stop the flow after emptying of saline bottle using motor mechanism to increasing and decreasing drop rate which is controlling through app.
C. To design android application to display the result in the form of saline droplet rate, remaining time to empty the saline bottle displayed on mobile phone.
D. Provide cost effective and automatic saline level monitoring and controlling system which can be effortlessly implemented in any hospitals.

PROPOSEDSYSTEM

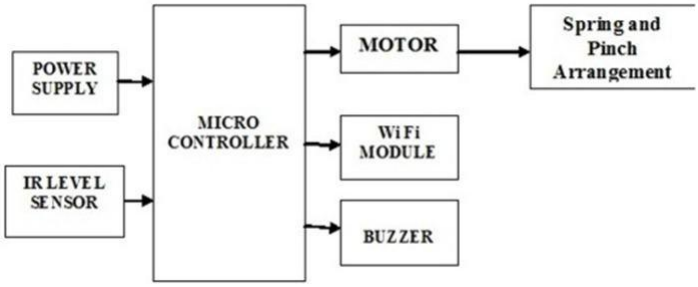

Fig. 1. system Architecture

This proposed system will function for different scenarios which are explained below as follows: When the system is power on, IR sensor (TX and RX) will detect the drops of fluid and on another aspect, the microcontroller will calculate drop rate (drops per minute). It will also count a number of drops then according to the number of drops; it will calculate the level of fluid and remaining time.

APPDESIGN

Using IoT cloud control lets you develop applications for Android phones using a web browser and either a connected phone or an on-screen phone emulator. The IoT cloud control store your work and help you keep track of your projects.
Go to the IoT cloud control home page: create.arduino.cc

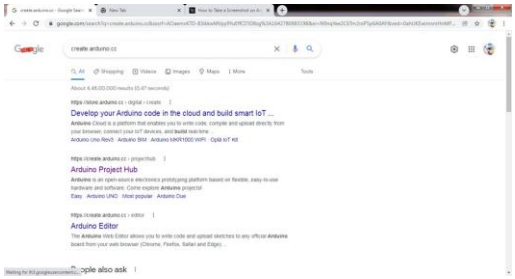

Fig. 2. IoT cloudcontrol

IoT cloud control Designer Window

The ”Designer” is where you create the Graphical User Interface (GUI) or the look and feel of your app. You choose components like Buttons, switches, and guage, and functionalities like Text-to-Speech, Sensors, and GPS.

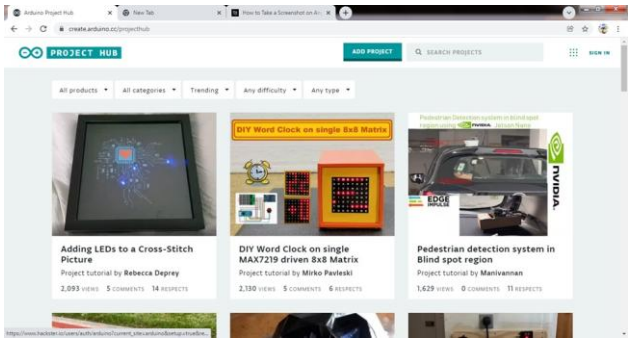

Fig. 3. IoT cloud control Designer window

step 1:Click on IoT cloud.

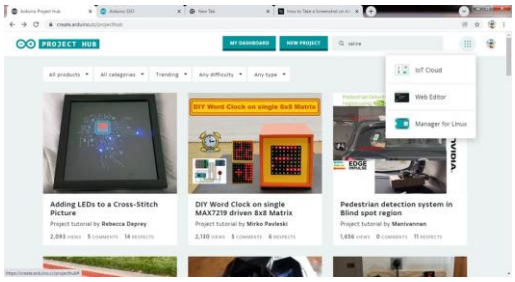

Fig. 4. select IoT cloud control

step2 : Click on create things.

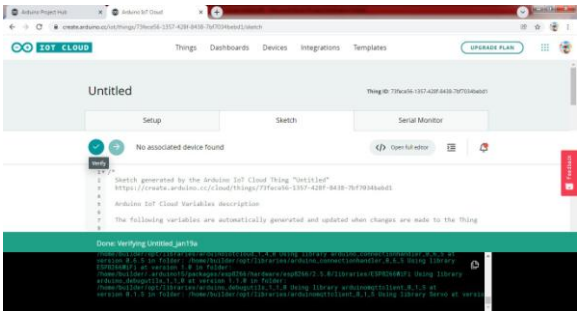

Fig. 5. To create new thing

Variable

Variable are what you can monitor or control to make your thing function for example a temperature or a smart lamp.Once created you can use them in your sketch.

Step 1:Click on add variable.

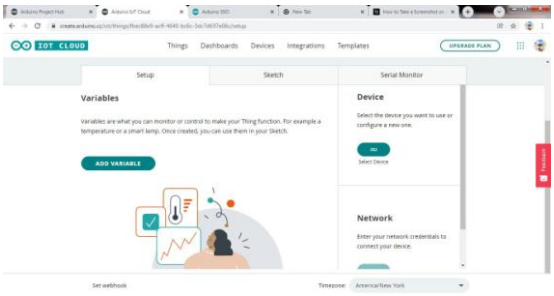

Fig. 6. To add variable

Step 2: Name the variable. After that we need to select variable type.here they have mentioned kind of a generic terms like acceleration, angle,area boolean like that.After selecting the variable type it will be automatically selected variable for us.Now we have to define wether it is read and write or read only.So we can consider that all the sensors are read only variables and all the output devices are read and write variables.

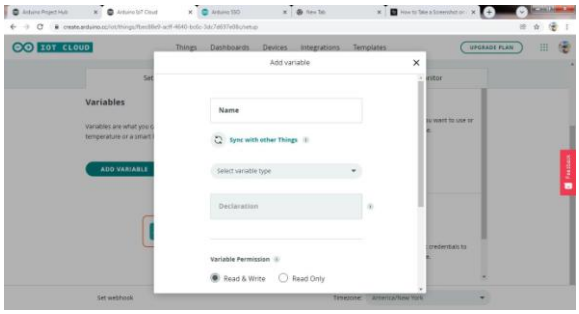

Fig. 7. To add variable name and type

Add device

Select the device you want to use or configure a new one. step1: Click on select device.

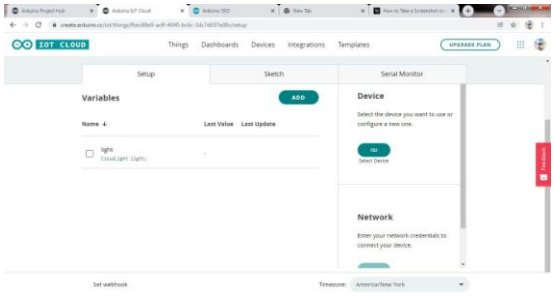

Fig. 8. To select device

Step 2:Select Ardiuno device.

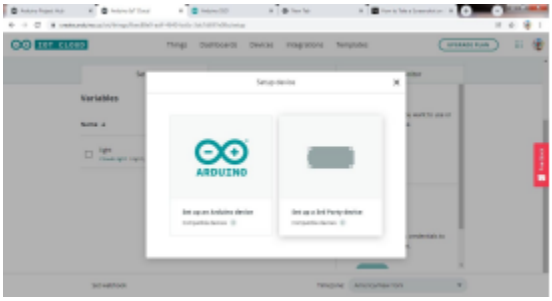

Fig. 9. setup device

step 3:Select device type.click on continue.

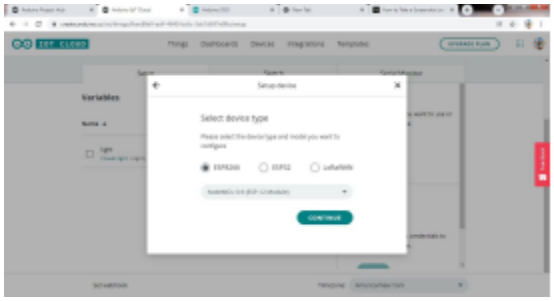

Fig. 10. to select device type

step 4: Name the device.

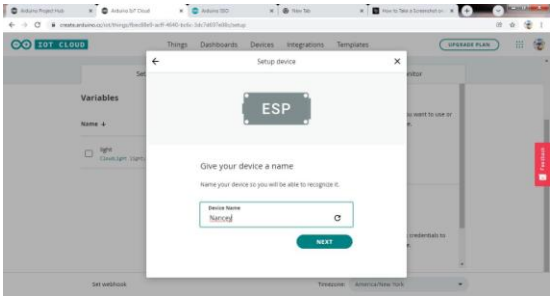

Fig. 11. Name the device

after adding device it will be created two credentials i) device id ii)secret key.We required this during coding.Click on download PDF. Click on save my device id and click on continue.

Fig. 12. device secret key

Network

Add network: Enter your network credentials to connect your device.

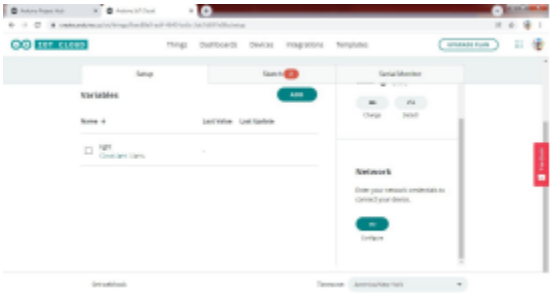

Fig. 13. To add network

configure network: You will find these network parameters in the secret tab in your sketch and your device will be able to connect to the network once the sketch will be uploaded. step 1: click on configure.Provide SSID name,password and secret key from pdf.

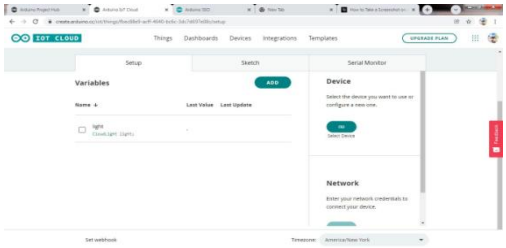

Fig. 14. Configure network

Dashboard

step1: click on dashboard.click on build dashboard.

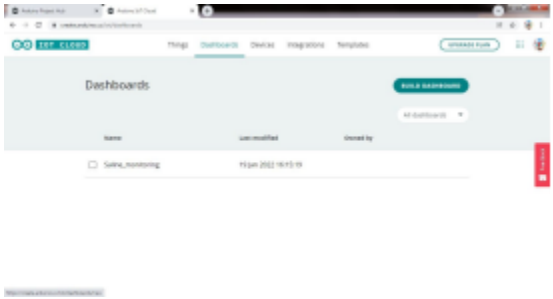

Fig. 15. Dashboard

step2:select widgets for example select switches.Thiswidget is displaying example data.Select a source variable to display its value.

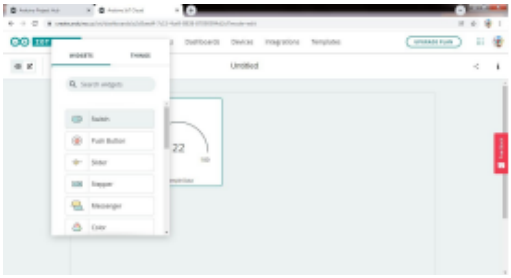

Fig. 16. To select widgets

step3: name it and link.After that click on done.

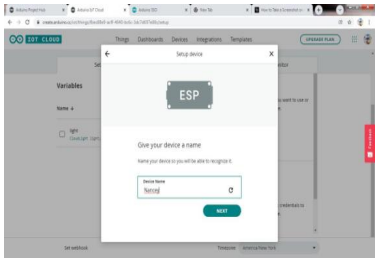

Fig. 17. widget settings

Things
step 1: click on things. step 2: click on untitled.

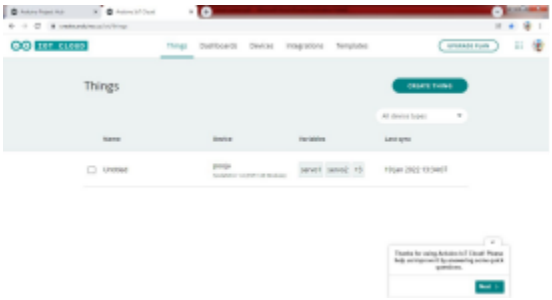

Fig. 18. To select thing

step 3: Click on sketch for coding.

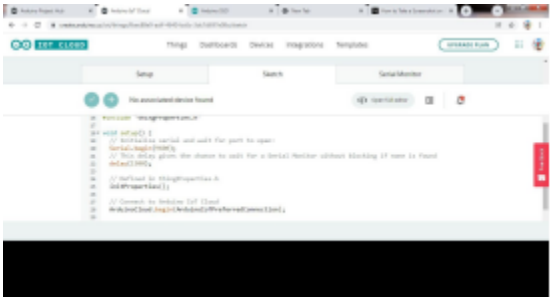

Fig. 19. sketch

step 4: After coding verify the code and upload.

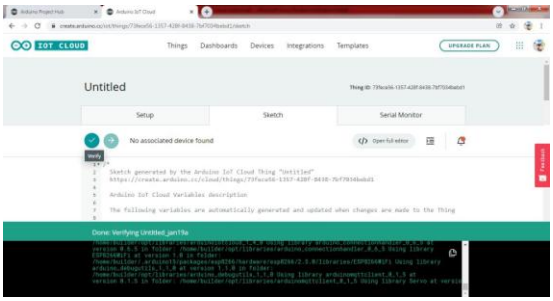

Fig. 20. To verify the code

RESULT

DEVELOPED AN ANDROID APPLICATION

Successfully developed an android application to display the result in the form of saline droplet rate,remaining time to empty the saline bottle displayed on mobile phone.

Fig. 21. Home screen of Saline monitoring

CONCLUSION

As the entire proposed system is automated, it requires very less human intervention. It will be advantageous at night.It can wirelessly send the information and display the results in the form of saline droplet rate, remaining time to empty the saline bottle. This will reduce the stress in continual monitoring by the doctor or nurse.

ACKNOWLEDGMENT

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