

VIRTUAL MIDWIFE FOR PREGNANT WOMEN AND ALERT SYSTEM

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Abstract -- All over the world almost all maternal death occurs in developing countries. Everyday nearly 830 women die due to pregnancy. In Many of the developed and developing countries, medical systems are not concentrating on sharing information. When we see pregnant women in urban and rural areas, rural circle women face higher rates of problems after and during labor than the women in urban cities. Many pregnant ladies may not be able to do their regular check-ups in the first stage pregnancy and this leads to higher rates of deaths (infants and mothers). Thus, our project aims in developing a compact device to assist and alert system by which the measured parameters from the sensors are transmitted through IOT and it is displayed in the smart phone for personalized care. Each patient will be able to choose their own midwife or nurse or medical staffs and are taken special care during Pregnancy with the help of our device.

Keywords -- *Midwife, Virtual Midwife for Pregnant Women and Alert System (VMPWAS), Alert System, Mobile Application, IOT Based.*

I. INTRODUCTION

Virtual Midwife for Pregnant Women and Alert System aims to cut back the Maternal Morbidity (MMR) and death rate Rate (IMR) by ensuring the safety of pregnant women with constant health monitoring which will prevent complications. Maternal mortality magnitude relation = (Number of maternal deaths / ranges of live births) X one hundred,000 .94% of maternal deaths occurred in lower and low middle-income countries.[4] The infant mortality rate in 2020

was 29.848 deaths per 1000 births. The World Health Organization (WHO) has nominative 2020 as “International Year of the Nurse and the Midwife,”. A midwife is a health professional educated to support and care women during labor, birth and pregnancy. Midwife help to stay healthy in pregnancy and if complications arise during child birth they help them for complications. Nurses and midwives play important role in this system and they contribute to improve the well-being and health of pregnant women. They maintain good relationships with the patients and their cooperation with other staffs of health care team to ensure the proficiency of good health care and services to individuals. One of the Midwife from Myanmar (Nan Than Tha Oo) has been recognised by the worldwide Health force Alliance (the Alliance) for her exceptional add saving lives and up kid and maternal health in rural areas. In her expertise no mother has died throughout or shortly once physiological condition.

So, our project aim is to make sure a healthy physiological state by regular health check-ups and constant health watching with IoT sensors and get the vital health readings of pregnant women and alert the nurses/midwife/doctors immediately in case of any abnormalities in the readings. [10] To develop a user interface app for patients and medical staffs to communicate with each other around the pregnancy period. Our system records the necessary vitals such as body temperature, heart rate, oxygen level of the pregnant women using IOT sensors. [8] The complete

medical records of the patient are stored in cloud Firestore so it is accessible to the medical staffs in case of emergency. Each patient will be able to choose a midwife/nurse/doctor, who will be in-charge of the patient throughout the pregnancy and during labor. If any vitals go abnormal an alert is automatically sent to their respective medical staff for them to reach the patient. Apart from the alert messages, it also reminder for drinking water and suggests a healthy diet. It has a support group which connects other pregnant women in their locality for moral support.

II. IOT IN HEALTHCARE

IoT automates patient care advancement with facilitate of tending quality resolution, new technologies and health care mobility solution.[5] The IoT device collects, transmits data such as blood sugar, oxygen, pressure, ECGs and weight. These readings will be stored within the cloud and might be accessed by an authorized person, who can will be a medical staff, insurance company, an external consultant or a participating health firm, to permit them to appear at the collected knowledge despite their place, device and time. (Fig 1)

Accordingly, technology driven setup brought down the value, by reducing surplus visits, rising the allocation and coming up with and utilizing higher quality resources.[1] IoT devices gets the necessary information and pass that information to doctors for period of time following, whereas dropping notifications to individuals regarding important components through mobile apps and alternative connected devices.[6] Thus, IoT allows following, period of time alerting and observance that allows higher accuracy and active treatments, apt intervention by medical staffs and improve all patient's health.

III. HARDWARE SETUP

In this hardware setup (Fig 4) various types of sensors been used to check basic parameters such as temperature, oxygen level, heart rate for the maternal. Sensors are integrated and connected to the system thus it helps to obtain readings and displayed in the serial monitor. IoT is more and more permitting devices to integrate that square measure capable of connecting

to the web and supply data on the state of health of patients and transfer data to doctors United Nations agency assist it.[2]

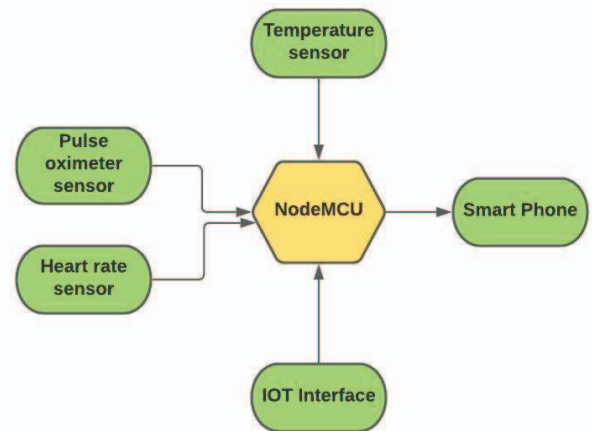


Fig 1 Block Diagram

IV. SENSORS

A. Pulse Oximeter and Heart-Rate Sensor

The MAX30102 is an associated integrated pulse monitor and pulse oximetry module. It contains photodetectors, internal LEDs, low noise physics with close light-weight rejection, and optical part. The MAX30102 (Fig 2) provides a whole answer to change the technique for wearable devices and mobile. The MAX30102 works on a separate three.3V power offer and a single one.8V power offer for internal LEDs. Communication is on regular I2C-compatible interface. The module stops operating by a package with zero standby current, permitting the ability rails to stay stay powered in any respect time. This measures the heartbeat and oxygen level of the patients.

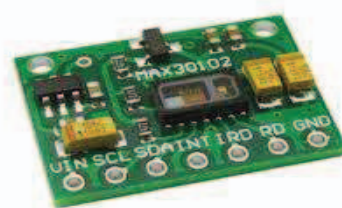


Fig 2 Pulse Oximeter and Heart-Rate Sensor

B. Temperature Sensor

The temperature sensors live preponderantly want to measure the vital sign of the patient. It measures temperature accurately than the semiconductor. Usually, women's vital sign bear changes throughout gestation.

The MAX30205 temperature detector exactly measures temperature Associate in Nursing provides Associate in Nursing nursing over temperature alarm/interrupt/shutdown output. The detector options a two.7V to 3.3V offer voltage vary, low 600 μ A provide current, and a lockup-protected I2C-compatible interface that create it ideal for medical applications and wearable fitness. This device operates over the 0NC to +50NC temperature vary Associate in Nursing 8-pin TDFN package. (Fig 3)



Fig 3 Temperature Sensor

V. HARDWARE

1. NodeMCU - ESP8266

The Node Micro-Controller Unit is an ASCII text file package and h/w development setting that is engineered around a cheap SoC (System-on-a-chip) referred to as ESP8266. The ESP8266 contains all vital parts of the fashionable pc. Random access memory, central process unit, Wi-Fi, SDK and a modern software that produces it a decent selection for the net of Things (IoT) comes of all types. However, as a chip, the ESP8266 is additionally troublesome to use and access. you have got to solder wires, with appropriate analog voltage, to

its pin for easy tasks like causation keystroke to "computer" on the chip or powering it on. This level of combination isn't a haul victimisation the ESP8266 as AN embedded controller kick in factory-made physics.

2. 5V and 3.3V Power Module

A module provides physical containment for several power elements, sometimes semi-conductor devices. Power semi-conductors' area unit usually soldered or shaped into a mass by heat and pressure on an influence electronic substrate that carry the ability semiconductors, provide thermal and electrical insulation and contact wherever required.

3. MB102 Breadboard

The MB102 bread board power offer module is straightforward to use, most convenient bread board part which will be another with any bread board associated comes wherever 3V, 5V or each power is required. The module additionally provides a switch to show ON and OFF the complete power offer module. one more feature may be a USB I/p with 2 three.3V, 2 5V and four GND pinout for further power pin necessities.

4. 9V Lamp Adapter

Adapter Power offer Charger with five.5mm DC Plug is of extremely reliable and top quality, it's contact protection, over hot protection, European customary and RoHS compliance. it's straightforward to hold and light-weight whereas movement. The utterly regulated 110~240V may be used worldwide. The output voltage is 9V. The goop output current reaches 1A.

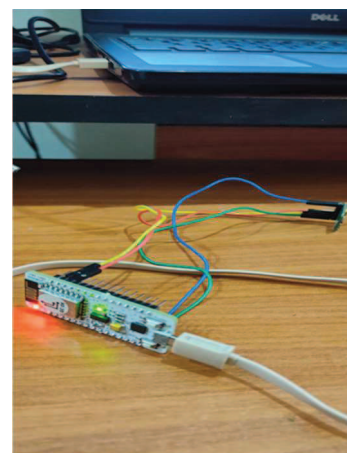


Fig 4 Hardware setup

VI. SOFTWARE

1. *Flutter*

Flutter is an open-source user-interface by Google. It helps to create app for iOS, Android, Mac, Linux, Windows, Web and Google Fuchsia from single codebase. "Sky" is the first version of flutter which runs on Android OS.

2. *Android studio*

We use android studio for developing our application, which is the officially integrated development environment for Google's android OS. It can be downloaded on macOS, Linux and Windows based OS. It is the replacement for E-ADT as primary integrated development environment for native AAD (Android Application Development). Android studio - 4.1.2 is version used in this system.

3. *Git*

Git may be a software to trace changes in any files, unremarkably used for correlating work among programmers together developing source code throughout s/w development. Its main goal embrace knowledge integrity, speed and support for non-linear, distributed workflows. in contrast to client-server systems, each git directory on all pc may be a full-fledged cache with full version-tracking talents and complete history, independent of central server or a network access.

4. *Firebase*

Firebase is developed by Google for design web and mobile applications. it absolutely was essentially AN independent company based within the year 2011. In 2014, Google obtained the platform and it's currently their head providing for application development. firebase has been declared to be used by Google to trace users while not their concern. On July 14, 2020, a legal proceeding was filed against Google of violating California privacy law and federal wiretap law. We used firebase database to store the personal details of the medical staffs and patient's history for reference. The readings from the sensors are sent to the Cloud Firestore and stored there to be displayed in the smart phone.

VI. SYSTEM DESCRIPTION

In this method the heart rate sensor, temperature sensor and oximeter sensors are managed by using NodeMCU controller. Data obtained by the sensors are analysed by the controller. IoT referred to internetworking of physical devices. IoT used in this technology will be able to transmit the data longer distance.[3] The NodeMCU (Node Micro-Controller Unit) is an open-source s/w package and h/w development setting that's designed around reasonable SoC (System-on-a-chip) referred to as ESP8266. The ESP8266 contains all vital parts of the trendy pc.[7] Random access memory, central process unit, networking, SDK and a modern OS. From this hardware an alert will be sent to the doctors or nurse or midwife to mobile applications, we will be having two user interface applications one for the medical staffs and the other for the pregnant women or patient.[9] Through this application medical staff can access the medical history of their patients (Fig 5)

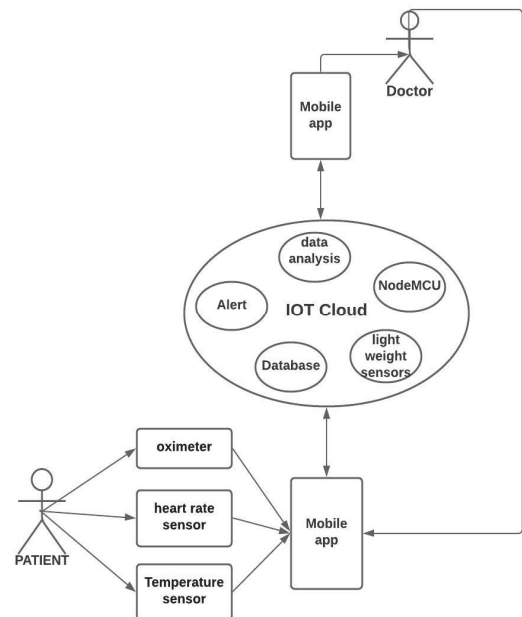


Fig 5 System Architecture

VII. ACKNOWLEDGEMENT

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VIII. CONCLUSION

Still, in underdeveloped and developing countries, almost all of the maternal deaths happen at home. So as to reduce these problems, a compact assistive device is designed and the necessary parameters such as the temperature, heart rate and oxygen level for pregnant women is obtained by using various sensors. The device is lightweight thus used as home monitoring device. Constant monitoring of the vital parameters of women in the rural areas, reduces infant and maternal mortality. The measured parameters are transferred through the IoT. It provides timely health assistance for mothers. The readings are displayed in the smart phone through IoT thus communication becomes easier.

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