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Health State-Monitoring for Pregnant Women to reduce the risk in their life during Pregnancy

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ABSTRACT: In this paper, Pregnancy may be a special condition during which women undergo various health complications throughout the amount of gestation. Conventional health monitoring systems are either too specific or too general, therefore not flexible enough to be fitted to pregnant women. During this project, requirements and challenges in health monitoring of pregnant women are summarized. First, the precise requirements for health monitoring are derived, including adaptive monitoring, need for giant data, and real time monitoring. Then a primary ever reference architecture is proposed specifically for health monitoring of pregnant women. Mobile devices, body sensors, cloud and thin client of health care professionals are integrated together through the proposed architecture for an end to finish self-adaptive health monitoring solution design. Aside from self-adaptation supported system dynamics, other features of the proposed architecture are mobile device as a gateway for body and ambient sensors, risk factor evaluation and possibility identification, and prolonged monitoring. The proposed architecture facilitates big data analytic and real time monitoring by remote thin client of health professionals through the help of cloud infrastructure.

KEYWORDS: Pregnancy, Remote Health Monitoring, IoT, Real time Monitoring.

I.INTRODUCTION

Pregnant women are generally at higher health risk in comparison to non-pregnant women as demonstrated by a recent study, where pregnant women experienced incidences of stillbirth), gestational hypertension), anaemia, and antepartum haemorrhage, and congenital malformations (CMFs). Haemorrhage remains the leading explanation for maternal mortality, accounting for over one quarter of deaths. An identical proportion of maternal deaths were caused indirectly by pre-existing medical conditions aggravated by the pregnancy. A number of the foremost contributing causes of fetal death are maternal infections like Haemophilus influenza, syphilis and HIV, and intrauterine fetal growth restriction. Monitoring the health of pregnant women is an urgent need that deserves significant attention. Generally, continuous health monitoring systems are designed for either patients with specific health issues. Conversely, pregnancy may be a phenomenon, therefore, pregnant women are neither patients nor persons with optional health care monitoring needs. Contemporary patient monitoring systems are too specific, and thus, don't adapt to the changing health needs of pregnant women.

The ambient factors like socioeconomic status, pollution, season of the year etc., also can influence the women's health during pregnancy. Therefore, pregnancy can't be treated as one monolithic health condition rather pregnancy condition exhibits fluid and dynamic health monitoring needs that change throughout the duration starting from the purpose of conception to postpartum and is influenced by many factors. A reference architecture is desired to create technology driven, affordable, specific and scalable next generation health monitoring systems for pregnant women. To the simplest of our knowledge, there's no health monitoring architecture available specifically to satisfy the requirements for pregnant women.

II.SYSTEM MODEL

The main advancement of the project is the monitoring of other parameters that indicates the certain critical conditions on the occurrence of the physical changes. Here we have implanted with the GPS system which helps them to locate their position and to contact relatives. The project consists of four major divisions as follows,

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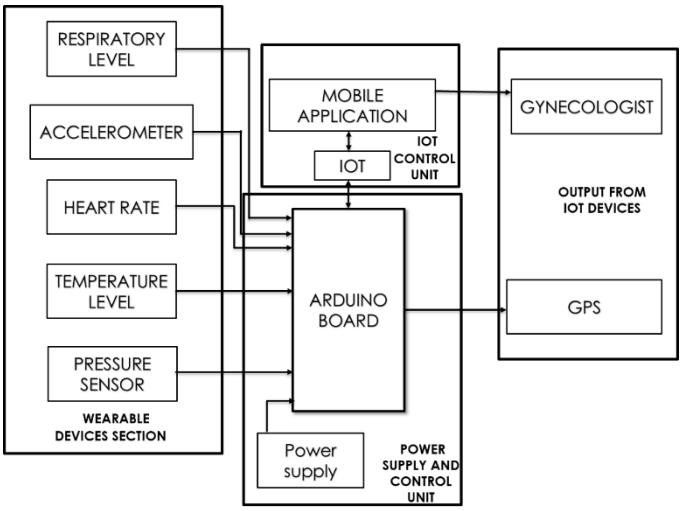
1. Wearable Devices Section,
2. Power Supply and Control Unit,
3. Output from IOT Devices,
4. IOT Control Devices.



BLOCK DIAGRAM

III.WEARABLE DEVICES SECTION

Continuous monitoring of these parameters has been recorded and compared with the reference level provided by the doctor and stored in cloud for the future record. Therefore if any one of the parameter is increased or decreased for a period of time is noted and it would might lead to a severe health complication if it is not consulted and diagnosed early.Wearable Devices are one in which they consists of the various devices to monitor the parameters such as

- Temperature
- Orientation of the patient
- Oxygen level
- Pressure
- Heart rate

IV. POWER SUPPLY AND CONTROL UNIT

All electronic circuits' works only in low DC voltage, so we'd like an influence supply unit to supply the acceptable voltage supply for his or her proper functioning. This unit consists of transformer and regulator. Monitoring of the parameters and comparing it with the normal reference values provides the controller with a data which is used send as a report to the doctor via the application.The control unit is the one which consist of a microcontroller for the whole operation of the project. Thus, they act as the brain used for the conversion of the output from the sensors for the comparison of reference.

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V. OUTPUT FROM IOT DEVICES

Android app is a one through which the data is viewed for additional features such as contact details. However, the respiratory level varies for pregnant women from normal women due to the increase of the upper abdominal level. The heart rate is increased for pregnant women from the normal level by 80-90 beat per minute. The blood pressure rapidly increases which indicates the abnormal condition of the baby within the mother's womb. This helps the doctor to plan the next medical procedure before the arrival of the patient. The GPS system helps the user on reaching their home and till reaching the hospital it is able to be tracked by the doctor.

VI.IoT CONTROL DEVICES

This application which can be used by both the Gynecologist, the concerned pregnant lady and the patient's concerned relatives. From this application, both of them can be able to know the health conditions of blood pressure, temperature and heart rate before and after the occurrence of any critical situations.From this application, the data can be analysed by the doctor for the risk evaluation for both the Child and the Mother. From this application if the patient is of met with an unexpected medical situation it enables them to contact their doctor and their closed relatives. Data from this App can be used by the doctor to diagnose the patient and be able to ready for the next medical procedure without any delay during the arrival of the patient.

V. RESULT AND DISCUSSION

In the fig 1,the data is of measured from the normal person and the they are continuously kept in comparing with the reference data which is used to predict the abnormal situations

Fig. 1 Output by Heart Beat and Pressure

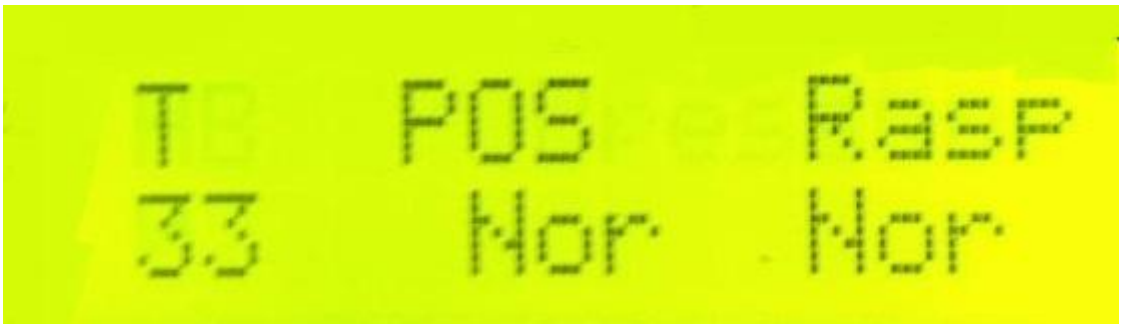

Fig. 2 Output Data of Temperature, Position and Respiratory Sensor

VI. CONCLUSION

In this paper, we have presented the architectural design of an IoT based health care monitoring system dedicated to pregnant women. The focus is on making it adaptive to hanging health attributes throughout the consequential gestational periods while maintaining the effectiveness, efficiency and accuracy of the system outcomes. This architecture is independent of the technology used to implement it, even though some

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currently available tools and technology have been suggested to realize this system. We look forward to effective integration of the social media technology to the system architecture, so that patients can freely share their experiences during pregnancy and contribute to enhancing awareness about the complications associated with it and how to handle them well.

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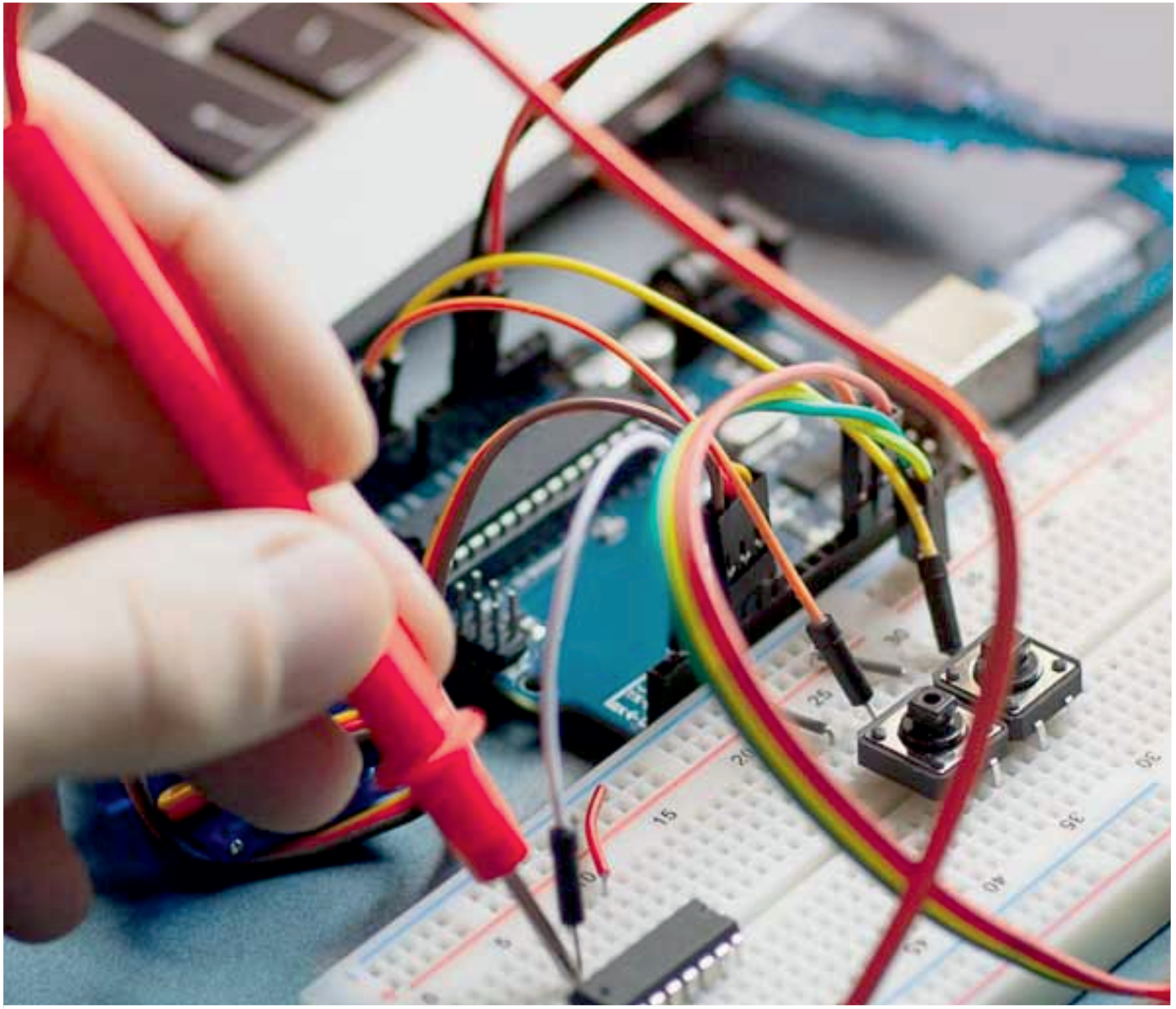

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