Embedded Based Neonatal Resuscitation Inhibitor System

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Abstract:
The aim of our project is to minimize the death ratio of infants due to lack of medical attention. Neonatal resuscitation which means resuscitation of infants with birth with asphyxia. The aim of designing this system is to reduce the complexity which occurs when baby is suffering from asphyxia. The information of previous resuscitation are stored in the database and these data can be used as case study. This system can be used by the medical interns and also by the person who has little medical knowledge. In modern globalization many technologists are trying to update a new development based on automation which work very rigidly and with high efficiency. In future this system can be develope by using voice commands and can also be developed by using artificial intelligence. According to environment requirement of the neonatal word, an intelligent environment monitor system in neonatal word based on wireless sensor network is propose. The PIC18F2550 embedded development board is adopted as the core hardware platform using the sensor, zig bee, wi-fi android and other technologies, the system can realize real time monitoring of the temperature humidity light intensity and other parameters in the neonatal word. The result show that, the system can meet the general needs of hospital word and has better application prospect.

Keywords: Embedded System,.Net Software

I.INTRODUCTION

Neonatal resuscitation is also called as newborn resuscitation it is the resuscitation of new born infants with birth asphyxia. It is process of intervention after a baby is born to help it breathe and to help its heartbeat. Before a baby is born, the placenta provides oxygen and nutrition to the blood and remove carbon dioxide. After a baby is born, the lungs provide oxygen to the blood and remove carbon dioxide. The transition from using the placenta to using the lungs for gas exchange begins when the umbilical cord is clamped or tied off, and the baby has its first breath. Many babies go through this transition without needing intervention. Some babies need help with establishing their air flow, breathing, or circulation. Resuscitation is helping with Airway, Breathing and Circulation also known as ABCs. The first few moments of a new born's life can be most critical. If needed, effective emergency care during this transition can prevent lifelong consequences. Proper resuscitation requires essential equipment and knowledge of necessary protocols before delivery. Prior knowledge of the gestational age of the newborn is helpful in anticipating the need of resuscitation. Low birth weight and prematured delivery predisposed infants to the need for resuscitative efforts. The new born deaths are caused by neonatal medical service information in a modern development trend. More and more domestic hospitals have implemented overall construction based on the information platform and this system which helps in improving the hospital service, less doctors should br work efficiently and patient will also satisfied. However the current hospital information management is still not perfect for instant, these are still some problems with medical care of newborns; widespread difficulties exists under the requirements of scientific information securely and medical work particularly. After birth, the newborn come to a bright, noisy environment suddenly from a warm darh and quite on, they are physically fragite and cannot take care of themselves,

calling for meticulous care from medical care workers. Thus it is extremely important to create a favourable environment for the newborn, so they can be restored to the best condition. About 15% of the new born deaths are caused by neonatal. Traditionally, new born children have been resuscitated using mechanical ventilation with 100% oxygen, but there has since the 1980's increasingly been debated when new born infants with asphyxia should be resuscitated with 100% oxygen of normal air, and notably Ola DidrikSaugstad has been a major advocate of using normal air. It has been demonstrated that high concentrations of oxygen leads to generation of oxygen free radicals, which have a role in reperfusion injury after asphyxia. Approximately 10% of newborns require some assistance to begin at birth. About 1% require extensive resuscitative measures. Although the vast majority of newly born infants do not require intervention to make the transition from intrauterine to extrauterine life, because of the large number of births, a sizable number will require some degree of resuscitation.

II.LITERATURE REVIEW

At present scenario the death ratio is not so accurate.. Thus research is going on to solve this problem. In this project we are minimizing the death ratio of infants due to lack of medical attention and the main purpose of this project is to reduce the complexity which occurs when baby is suffering from asphyxia. Hence, in this project with the help of different technique we can reduced the death ratio.

III.METHODOLOGY

EMBEDDED SYSTEM

Our methodology of designing the Neonatal Resuscitation Inhibitor on the basis of the embedded system. An embedded

system is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints. It is also a combination of hardware and software, either fixed in capability or programmable, that is designed for specific function or for specific functions within layer system. In the embedded system, we are using the sensor, controller and wireless module. The sensors we used are the motion sensor, temperature sensor, and heartbeat sensor. The motion sensor is used to detect the body movement.

The temperature sensor is used for sensing body temperature of the baby and these sensors are attached to the microcontroller. We can design microcontroller based system by using microcontroller, we can display information which is send by controller. The information can display at the receiver side. For display, we are using the software. The information is stored into the database by using the software and can be used for the further case studies.

.NET ver 2014

.NET framework (pronounced *dot net*) is a software framework developed by Microsoft that runs primarily on Microsoft windows. .NET does not work on any specific operating system. .NET creates a unified environment that allows developers to create programs in C++, Java or Virtual Basic. It interfaces easily with Windows or Microsoft.

MEMS MOTION SENSOR (A3G4250D)

The A3G4250D is a low-power 3-axis angular rate sensor able to provide unprecedented stability at zero rate level and sensitivity over temperature and time. It includes a sensing element and an IC interface capable of providing the measured angular rate to the external world through a standard SPI digital interface. An I2C-compatible interface is also available. The sensing element is manufactured using a dedicated micro-machining process developed by STMicroelectronics to produce inertial sensors and actuators on silicon wafers. The IC interface is manufactured using a CMOS process that allows a high level of integration to design a dedicated circuit which is trimmed to better match the sensing element characteristics.

HEART BEAT SENSOR

Heart beat sensor is designed to give digital output of heat beat when a finger is placed on it. When the heart beat detector is working, the beat LED flashes in unison with each heart beat. This digital output can be connected to microcontroller directly to measure the Beats Per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.

TEMPRATURE SENSOR(LM35)

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. . The LM35 device is rated to operate over a −55°C to 150°C temperature range, while the LM35C device is rated for a −40°C to 110°C range (−10° with improved accuracy).

IV.BLOCK-DIAGRAM

TRANSMITTER
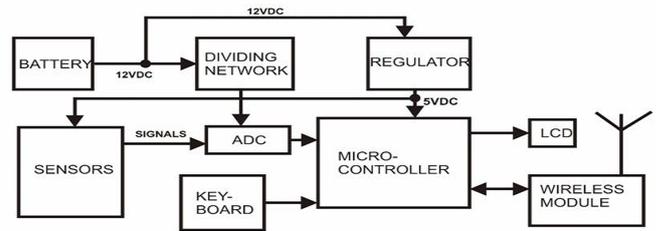
RECEIVER
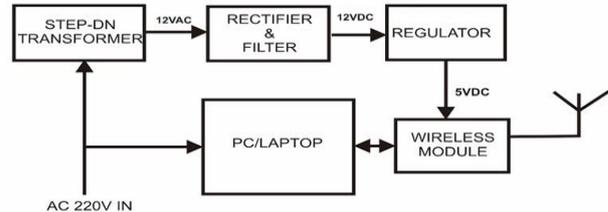
V. CIRCUIT DIAGRAM
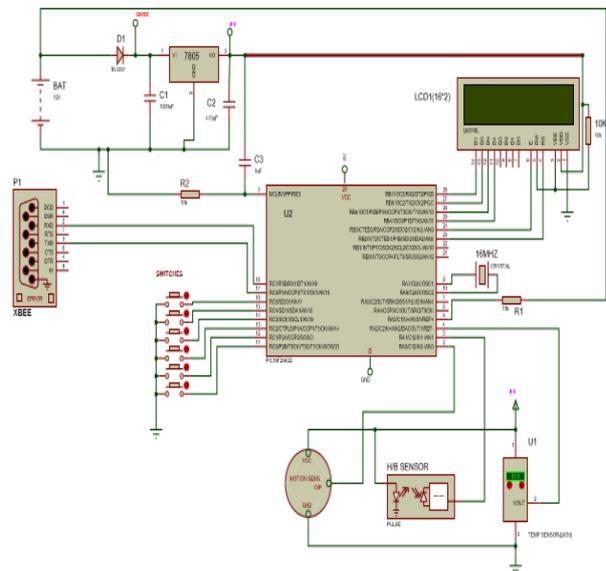
1) Transmitter

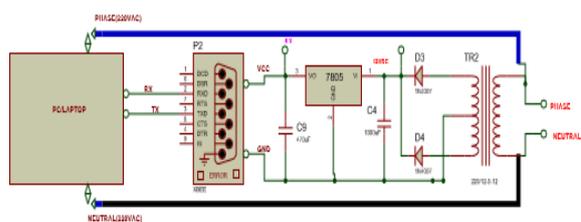Figure.1. Transmitter

2) Receiver

Figure.2. Receiver

VII.WORKING

The prototype model of an Neonatal Resuscitation Inhibitor system is based on the embedded system and .net working will be made in the following. The transmitter section is made up of sensory part and embedded system, which collect the data from infant like heartbeat, temperature and movement of new born baby. All that data converted into digital form and can be seen

in receiver display, which shows every little changes happen to in infant's baby. In this section we are using a 12 volt battery as power supply to operate this section and another reason for that is in case we used domestic power supply if anything happens while operating on infants than baby might get hurt. In transmitter section we are using PIC controller, switches, heartbeat sensor and temperature sensor LM35. PIC controller consist an inbuilt 10-bit analog data coming from sensors into a digital data.

Also we are using wireless system between transmitter section and receiver section by using zigbee module which transmit digital data to receiving side. Switches are used by the user to send the signals of infants status according that the display will show the next procedure to operate and user will perform his task accordingly. When infants born doctors only have three minutes to check the condition of infants whether it is a complex or normal if it is complex then we have to operate an infants within three minutes to show him the track of time we are using LCD display which show timer of three minute.

The receiver side of this device consists a display unit which show the all procedure of operating of infants. The digital data from the transmitter section is received by the wireless module which is interfaced with the display unit. We are using a laptop/PC in this project as a display unit which will show the heart rate, temperature and motion of new born baby. The major use of Pc is that it will be helpful for medical interns to watch and understand the NRI procedure by displaying it with projector in outside of the operating room and doctor won't be disturb an operating an infants. Another advantage is that every infants that operate this device it can save all the procedure in its database.

VIII.IMPLEMENTATION OF SENSORY MACHINE

To evaluate the performance of the device, the first is to test the device on a baby mannequin during the resuscitation training at the hospital, before the device is applied on a real baby. A mannequin is embedded with sensors, and a software interface connected to the mannequin is designed to detect and record the rise and full of the temperature, motions in mannequin. The mannequin is embedded with motion sensor near the chest. The temperature sensor is located in the armpits. The heartbeat sensor is located on the chest of the mannequin.

IX.PROBABLE OUTCOME

The project after completion should be able to give how to minimize the death ratio of infants due to lack of medical attention and to reduce the complexity which occurs when baby is suffering from asphyxia with the help of different types of sensors and controller PIC18F-2550 we can use to reduce the death ratio.

X.RESULT

We evaluated our references and overcome the drawbacks it contains that are it was complicated to implement, hard to understand, can not be easily installed also expatriation was required to handle it .We also use less no. of sensors that was easy to understand by us and other people who has less medical knowledge. The installation cost of our system is less and also the cost incurred during the designing process of our system was also very less.

XI.CONCLUSION

Hence we can conclude that even the little movement is detected by our motion sensor A3G4250D, the heartbeat is sense by the heartbeat sensor BH1790GLC, and also the temperature is sense by the LM35 sensor. The reading and data given by the above mention sensors is efficiently save and transmitted to the receiver section and saved in the data base. We can also conclude that by the use of less sensors is also helpful in monitoring the NRI procedures.

XII. REFERENCES

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