

IOT Based Neonatal Caddy

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Abstract:

There are many causes of premature births like late maternal age, Obesity, Gestational diabetes, Problems with the placenta, etc. Progress in the medical research and innovative intensive care units makes it possible to deal with the critical issues in the premature birth. New born require proper care of bonding and soothing, diapering, sponge baths, circumcision and umbilical cord care, feeding and burping during early infant stage. It can be managed when baby is under the observation of the doctor. In the critical care unit, hygiene and body temperature of the neonatal is maintained. But daunting situation arises when it is the time to take the premature baby at home. From hospital to home baby may get infected if it is not fit to cope up with the surrounding. In this scenario, doctors advice parents to restrict the outdoor visits of the baby as child's immunity is very low at this stage and he/she is prone to catching infections and viruses very easily. To avoid complications, and even fatality, the baby should be kept in safe and conducive environments for at least the first few months. This may lead to long stay of the baby and mother in the hospital. To address this issue the IoT based Neonatal Caddy will be the best solution to carry the baby outdoor. The transparent case or carrier with appropriate ventilation of the caddy, parents can keep eye on the baby movements.

Keyword: IOT, Neonatal Caddy, Microcontroller

I. INTRODUCTION:

A neonatal intensive care unit (NICU), also called as an intensive care nursery (ICN), is an intensive care unit which takes care of ill or premature newborn infants.

II. LITERATURE REVIEW:

A blower is fitted on caddy to maintain the body temperature of the baby. Digital display on the caddy will be helpful for monitoring inside temperature of the caddy. In addition, parents can observe the said parameters on the

mobile app, if they are at remote place, with help of the IoT hardware

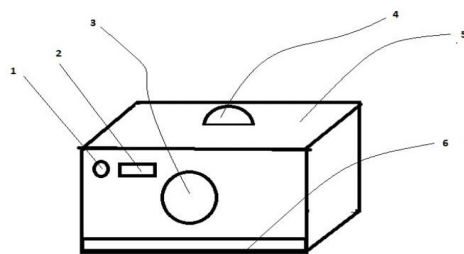
installed on the caddy. Inside temperature of the caddy can be maintained by adjusting the appropriate speed of the blower available in the caddy. Speed can be either adjusted by means of the physically adjusting the regulator of the blower or by means of the IoT hardware if parents are at remote place.



H. Buzzer- :



Microcontroller mounted on the arduino board will be operating the speed regulator of the blower, temperature sensor mounted inside the caddy, display device and the cloud platform of the IoT.



- 1.Heat Blower
- 2.Digital Display
- 3.Regulator
- 4.Handle
- 5.Carrier
- 6.Lithium Ion Battery

Figure: Schematic of the IoT based Neonatal Caddy

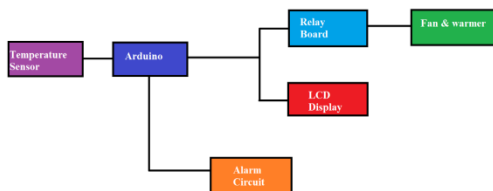
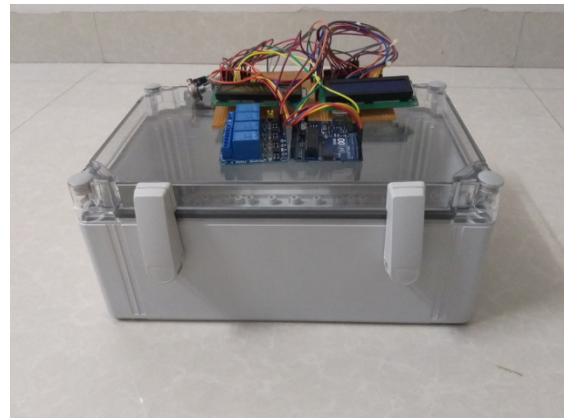
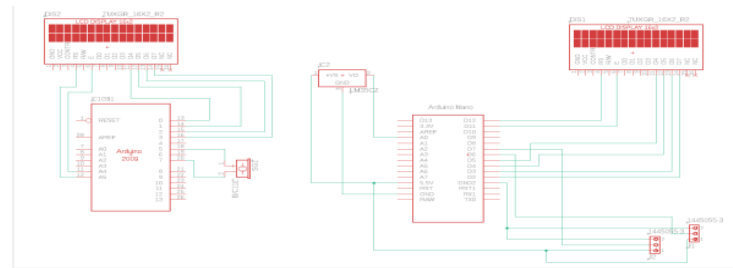


Figure:.Block Diagram of Neonatal Caddy

III.HARDWARE DESIGN



IV.CIRCUIT DIAGRAM



V.WORKING OF TEMPERATURE CIRCUIT

LM 35 (Temperature Sensor) acts as an input to the Arduino Nano Which acts like the “Brain” of the project.

LM 35 senses the temperature and gives the input to the Nano .

Arduino Nano checks the temperature and displays it on the LCD.

If the input temperature is below the minimum temperature the Arduino Nano switches on the lamp through the relayboard .

And if the temperature is above the maximum level then the Arduino switches on the fan.

The respective message is displayed on the LCD.

For the Alarm circuit:

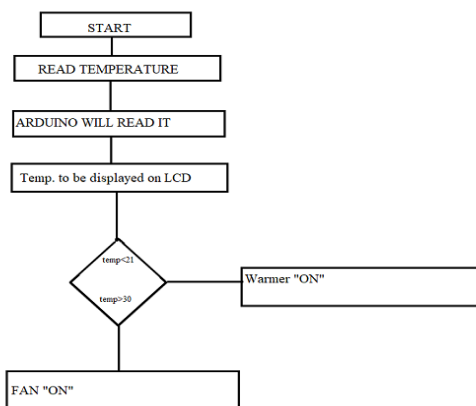
The RTC circuit keeps the track of time and dates

When it's time for any medicines it will inform the Arduino

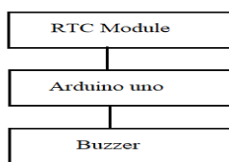
The Arduino will display it on the lcd and will start the buzzer

VI.FLOWCHART OF TEMPERATURE AND TIMER CIRCUIT

Flow chart for temperature unit:



Flow chart for timer circuit:



VII.ALGORITHM OF TEMPERATURE AND TIMER CIRCUIT

Algorithm for temperature circuit:

- Start

- Define the bits for LM 35 and LCD.
- LM 35 will read the temperature.
- Arduino will process the input.
- It will compare the value with the input values, if the value is less than the minimum value then the Arduino will switch the warmer "ON".
- If the value is greater than the maximum value then the Arduino will switch the fan "ON".
- The respective temperature and switching will be displayed on the LCD.

Algorithm for alarm circuit:

- The RTC module (given the time specifications and the dates) keeps a track of time and when it is time for the medicines it will give an indication to the Arduino
- The Arduino in turn will ring the buzzer and display on the lcd that its time for the baby's medicines

VIII. ADVANTAGES

- Excellent Security and care for premature babies (upto 27 weeks of gestation).

IX. DISADVANTAGES

- It is costly

X.APPLICATIONS: In hospitals for keeping a track on the health of premature babies and babies in critical condition. And for babies with serious health conditions.

Future Expansion

Earlier the incubators could hold babies which were 34 weeks but with future development we might be able to care and hold babies which are 30 weeks old. We will be able to measure the accurate weight of the baby and also monitor its breathing pattern.

RESULT

When temperature exceeds the set point fan turns "ON". When the temperature falls below the set point the warmer turns "ON". The alarm circuit gives an alert after some delay.

CONCLUSION

Thus we understood how an incubator works, how it makes changes inside it according to the surrounding temperature and keeps the baby healthy.

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