INTERNATIONAL JOURNAL
FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Infant Weighing Scale

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Abstract: In this project we Measure the Weight by connecting Load Cell and HX711 Weight Sensor module with Arduino. We have seen weight machines at hospitals for weight measurement of new-born baby, where machine shows the weight by placing the baby on the weighing machine. Here, we have made the different Weighing machine by using Arduino and Load cells, having capacity of measuring up to 10kg which is sufficient for new-born baby. Then we are adding some new features that is heart rate and body temperature of baby. We propose an innovative and practical design of baby weighing scale, heart rate and body temperature for the hospitals. To show the project, a working prototype of baby weighing scale is built using pressure sensor and Arduino Uno.

Keywords: Infant, Arduino Uno, Pressure Sensor, Thermal Printer, LCD display, Weighing Scale.

I. INTRODUCTION

The area of work of this project is based on Electronics Communication and Computer science. This project is basically done by Ardunio. Because Arduino can sense the surrounding by receiving input from a variety of sensors and can control its surroundings by controlling lights, motors, and other things hence Arduino is a main part of this project. Arduino coding is essential for sensing heart rate and body temperature by using arduino software. Heart rate, body temperature and blood pressure monitoring are very important parameters of human body. Doctors use various kind of medical apparatus like thermometer for checking fever or body temperature, BP monitor (checker) for blood pressure measurement and heart rate monitor for heart rate measurement. In this project, we have heartbeat monitor which counts the number of heart-

beats in a minute. Here we have used a heartbeat sensor module which senses the heartbeat by putting a finger on the sensor.

Weight record is essential to monitor the need of nutrition as well as fluid balance. Accurate weighing scale is a fundamental need for all special care neonatal units and delivery area. Measured weight at birth and daily is essential for the management of Low Birth Weight babies. Weight of birth is the single most useful predictor of neonatal morbidity and mortality. Birth weight helps in identifying the level of care needed for the baby and classification into weight for dates categories. Babies below 2000 grams have special needs and need nursery care for good health.

Small for dates and large for dates babies also need special new-born care. Therefore, a weighing scale for measuring the weight, temperature and heart beat at birth is important for all facilities where deliveries take place and where babies are looked after for care.
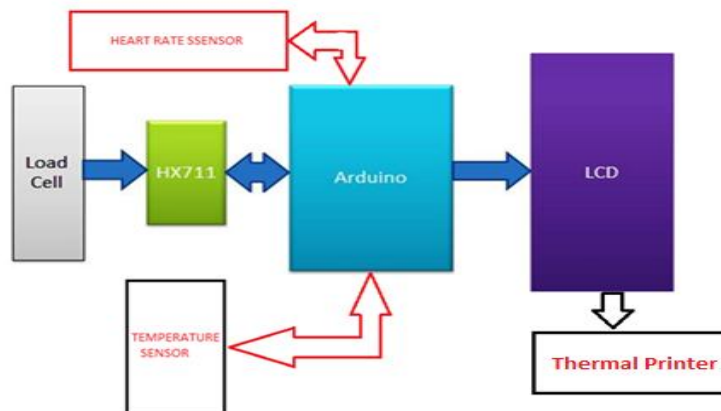
II. SYSTEM DESIGN

Fig. 1 Block Diagram of weighing scale

Here the block diagram shows the working of the whole system. In this the Load cell with the help of HX711 module measures the weight of the new-born baby. The digital temperature sensor measures the temperature of the body. The Heart rate sensor measures the heart beats of the body. Then all this data is processed in the arduino and the arduino is connected to the 16x2 LCD display. The display shows the weight, temperature and heart beats of the body. So one can see the ongoing parameters then all this is printed on hard paper i.e., receipt is generated through thermal printer so, one will have the hard copy of the generated data with them for future reference.

III. COMPONENTS OF THE SYSTEM

A. Load Cell

Load cell is one of the transducer which converts force or pressure into an electrical output. Then the Magnitude of this electrical output is directly proportional to the force being applied to load cell. Load cell has strain gauge, which distort when pressure is applied on it. And then strain gauge generates electrical signal on deformation as its effective resistance changes on deformation. The load cell usually consists of four strain gauges in a Wheat stone bridge configuration. Load cell is available in various range across market like 5 kg, 6 kg, 10 kg, 40 kg, 100 kg and more, here we have used Load cell, which can weight upto 10 kg. After that the generated electrical signals by Load cell due to pressure is in few millivolts, so they need to be amplify by some amplifier.

Fig. 2 Load Cell

B. HX711 Module

This hx711 module is useful to connect the load cell with the arduino uno. It converts the data from load cell and makes it compatible with the arduino uno.
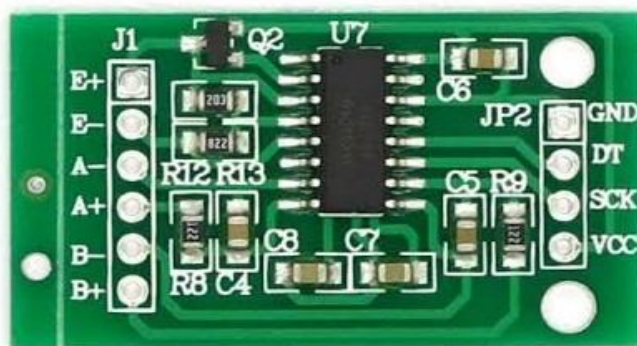

Fig. 3 HX711 Module

C. Temperature Sensor (DS18B20 Digital Temperature)

The DS18B20 is Digital Temperature sensor that provides temperature readings which gives the temperature of the body or device. The DS18B20 works on a cable that needs one data line and ground for communication with a Arduino. And, the DS18B20 can take

power directly from the data line , eliminating the need for an external power supply. This Digital Thermometer has many applications such as Thermometers, Thermostatic Controls, in Industrial Systems, in Consumer Products and Thermally Operated Systems.

Fig. 4 Temperature Sensor

D. Arduino Uno

Arduino Uno micro controller is a small computer on a single integrated circuit containing
a programmable input, processor, memory, and input and output peripherals. It is an integrated circuit which is programmed to do a specific task and sometimes called as mini computers. By minimizing the cost and size of whole circuit compared to a circuit that uses a separate memory, microprocessor, and input/output devices, the microcontrollers make it economical and cheaper option to digitally control even more devices and processes. The Arduino integrated development environment or IDE is a platform application which is written in Java, and is developed from the IDE for the Processing programming language. For programming purpose, we have to install this application in computer.
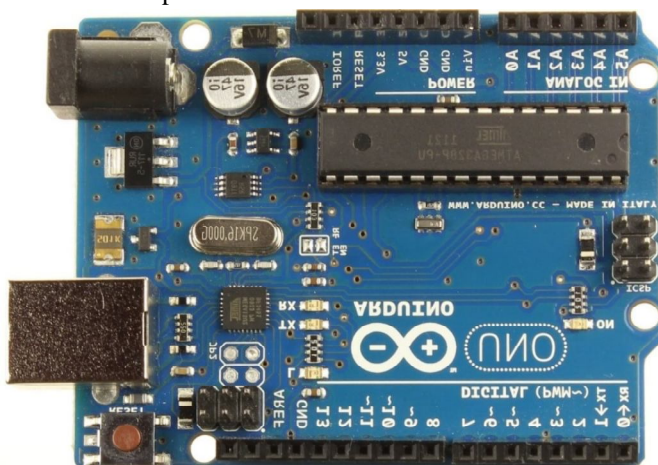

Fig. 5 Arduino Uno

E. Heart Rate Sensor

Heart rate, body temperature and blood pressure monitoring are very important parameters of human body. Doctors use different kind of medical instruments like thermometer for checking fever or body temperature, BP monitor (checker) for blood pressure measurement and heart rate monitor for heart rate measurement. In the project, we have used an Arduino compatible heartbeat sensor which counts the number of heartbeats per minute. Here we have used a heart rate sensor module which senses the heartbeat by putting a finger on the sensor.

Fig. 6 Heart Rate Sensor

F. 16X2 LCD Display

LCD stands for Liquid Crystal Display. LCD display is basically an electronic display and it is having many applications in the market. 16x2 LCD display is the basic module and is commonly used in various devices and circuits. LCD modules are chosen over seven segments and multi segment LED's. Since it is cheaper, easily programmable, animation and have no limitation of displaying special characters which is not possible in seven segments and so on. 16x2 LCD indicates that it can display 16 characters on each line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD contains two registers which are Command and Data.

Fig. 7 16x2 LCD display

G. Thermal Printer

For printing the hard copy of the above data we can use the thermal printer. It will also show the identity of unique information. The thermal printer will be connected through Arduino.

Fig. 8 Thermal Printer

IV. RESULTS

This project can be implemented in hospitals because in hospitals different tests are carried out in different places but by using this we can do the number of tests on single infant weighing scale. Also, unlike others it gives the hard copy of the result for future reference to the family. Also, we have made this system compact to carry out it easily where we want.

Fig. 9 Load cell mounted on two plates

Fig. 10 Infant Weighing Scale

V. CONCLUSION

This is basically the multifunctional machine which measures weight of the new-born baby as well as it measures the temperature of the body and with the help of heart rate sensor it measure the heart beats of the baby. And what more important is that it collects all data and displays it on LCD display and many times we can notice that we measure the weight and other parameters of our body and we forget that things with time. So to overcome this thing we have provided the all measured parameters on the hard paper with the help of thermal printer. The thermal printer gives the small receipt which can be carried out easily.

VI.ACKNOWLEDGMENT

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