BABY MONITORING SMART CRADLE

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Abstract:The baby monitoring system gives a reliable and efficient baby monitor that can play a vital role in providing better care and protection for any infant. This paper presents the design of Baby Monitoring smart cradle system using Raspberry Pi3. This system architecture consists of sensors for monitoring vital parameters such as Arduino Mega, DTH11 (digital temperature and humidity temperature). For this it uses a camera in order for parents to view their child .Parents of today's generation are often busy in their professional life. This demands a requirement to develop a new low cost indigenous infant safety system based smart cradle system. Since existing cradles are very expensive, this project presents the design and implementation of a low cost Infant Safety Baby's Cradle System

Index terms: Raspberry pi3, Ardiuno Mega, DTH11, sound sensor, DC motor, USB camera.

I INTRODUCTION

To design and development of an intelligent baby care, which has ability to monitor bed-wet condition, baby movement,and body temperature. To make baby cradle is safe and comfortable for baby with using sensor to detect the movement of the baby body as well as bed-wet condition to keep away body from hygienic environment. This baby monitoring smart cradle system is the finest solution for parents who cannot find sufficient time for their babies busy parents. This baby monitoring smart cradle system can detect the baby's body temperature, wetness and sound, especially baby's movements present position can be displayed on a mobile, this video can be seen mother, father or another person who can watch the baby away from him or her. This baby monitoring system is capable of detecting motion and crying condition of the baby automatically. The Raspberry Pi 3module is used to make the total control system of the hardware, sound sensor used to detect baby's crying, and USB camera is used to capture or record the baby's movement.To make cradle innovation that is more flexible and expensive to market. As we are very well familiar with the hurdles faced by Parents to nurture their infant and especially in case if both the Parents are working.
To give 24 hours of time in such cases is next to impossible. Thus, we need to develop something unique that can help Parents to have a continuous surveillance/watch on the Baby/Infant and can notify about the same. Thus, we have come up with an idea to design a Smart Cradle System using IOT which will help the Parents to monitor their child even if they are away from home & detect every activity of the Baby from any distant corner of the world.

II PROBLEM STATEMENT & PROPOSED SOLUTION

Since the advent of human civilization, society has specified certain gender roles .Taking care of the child is considered as the responsibility of mother solely. Difficult for women to manage both work and home in this era of gender equality Reducing burden on women as a mother. Allow women to contribute more towards the society. Develop a system capable of soothing and monitoring the baby itself. Design a smart cradle, with distinctive features i.e. automatic swing (using cry detection), interactive toysand two way communication

III LITERATURE SURVEY & RELATED WORKS

A baby rocker or crib was developed by Steve Bang which worked automatically when a sensor had sensed a noise or sound matching that of a baby cry. The sensor was made of a microphone which ran on electricity along with the help of a pre-amplifier. Arduino was used to receive the signal from the above mentioned noise sensor and a simple DC motor was used for the rocking operation [1].
The fact that a bassinet swaying can be controlled through varying rhythms which can be adjusted when desired was displayed by Yang Hu. Pressure Sensors were placed at different positions on the bassinet for this purpose. The controlling circuit operates whenever different signals are generated by the sensor networks. These sensor networks posses the capability to determine the reason for the baby's cry by considering different parameters [2].
An electronic machine or device attached to a typical crib which is pivotally mounted was designed by Gim Wong. An ordinary microphone was placed which detected the infant's cry and actuated a movement such that a throw was actuated which is more or less similar to how a person does the push-pull operation. [3].
The latest development in this field is the SNOO Smart Sleeper designed and developed by Dr. Harvey Karp. The bassinet designed is very easy to set up initially and takes complete care of the baby inside. It comes with three swaddle sizes and also prevents the baby rolling over the bassinet. The setup has Smartphone app interface and can also be operated manually. The only possible drawback however is the fact that the cost is very high [4].

IV EXISTING METHOD

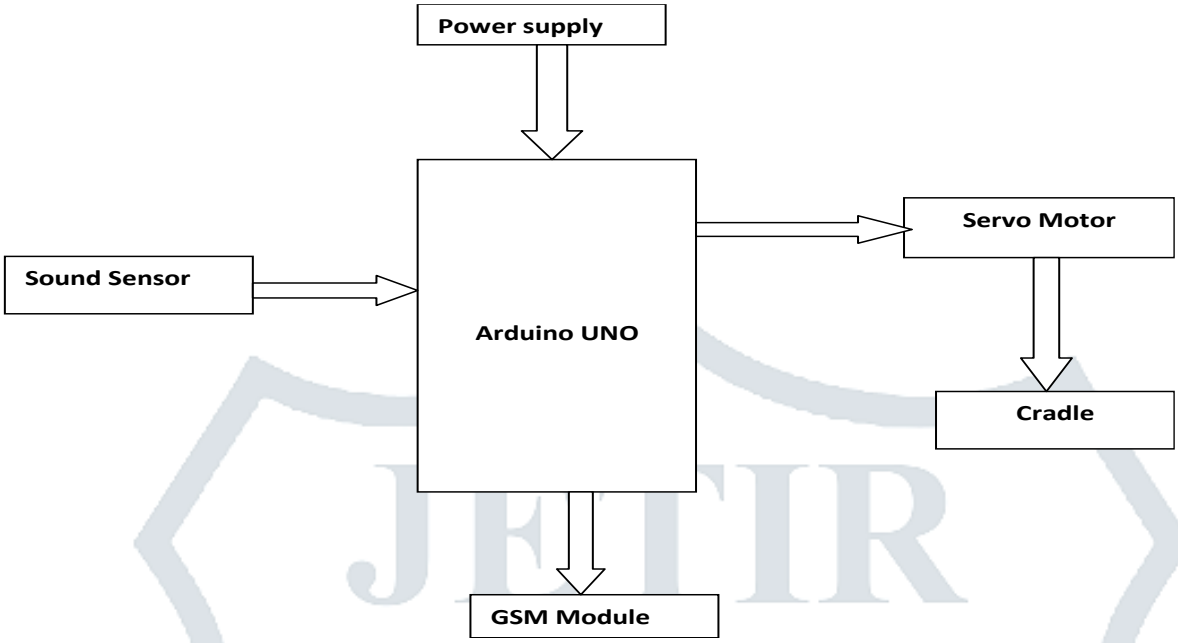


Fig1: Block diagram of existing smart baby cradle

In this existing method , we are using an arduino uno ,audio sensor,servo motor ,cradle, power supply. The arduino sensor is connected to arduino. It detects sound of baby cry starts the DC servo motor then the servo starts swing the cradle until the baby stops crying. A SMS is sent to mother with help of GSM module. This existing method has less features ,this is the reason for going to implement a proposed having some new features.

V PROPOSED METHOD

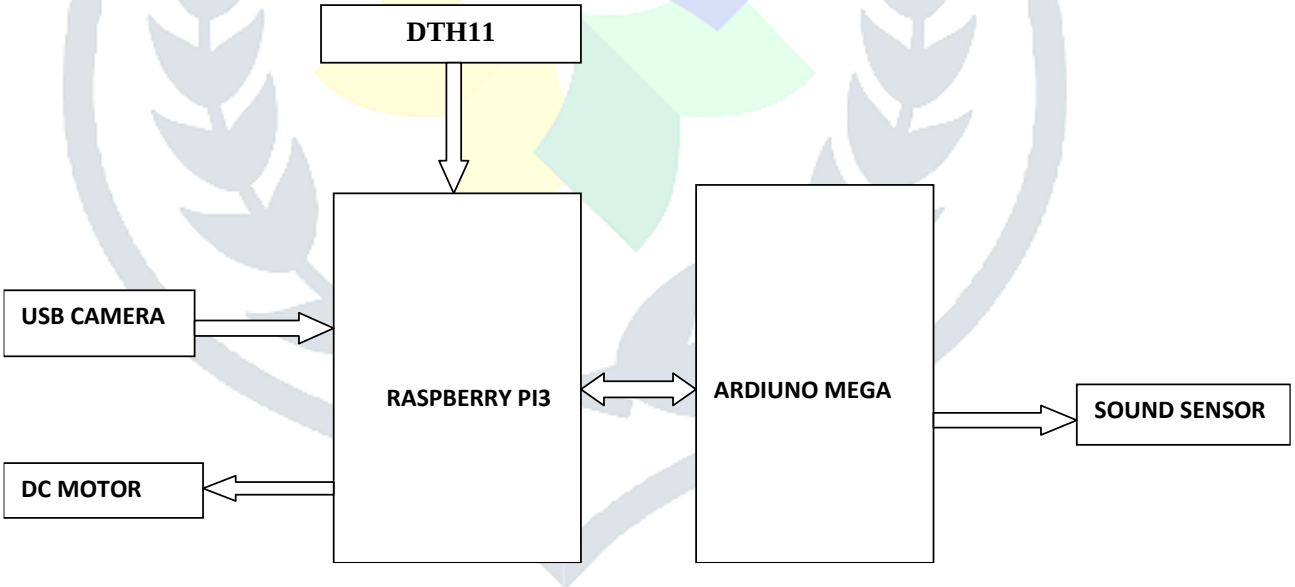


Fig2: Block diagram of proposed method

This is the block diagram of proposed method having new features with various inter connections. We are using Raspberry pi3, Arduino MEGA, DTH11 (digital temperature and humidity sensor), USB camera, sound sensor, DC motor. The Raspberry Pi and Arduino form the centre of the whole mechanism. DC Motor is connected directly to the Raspberry pi3, so that the clock and directions instructions can be received. Similarly the Sound Sensor is also connected to the Arduino and the program is written to interface these two Arduino connections. The Raspberry Pi has 4USB ports and accordingly, an USB Webcam is connected to one of the ports. The data transfer from Arduino to Raspberry Pi is through a concept called USB serial communication.

VI DESING OF PROPOSED METHOD

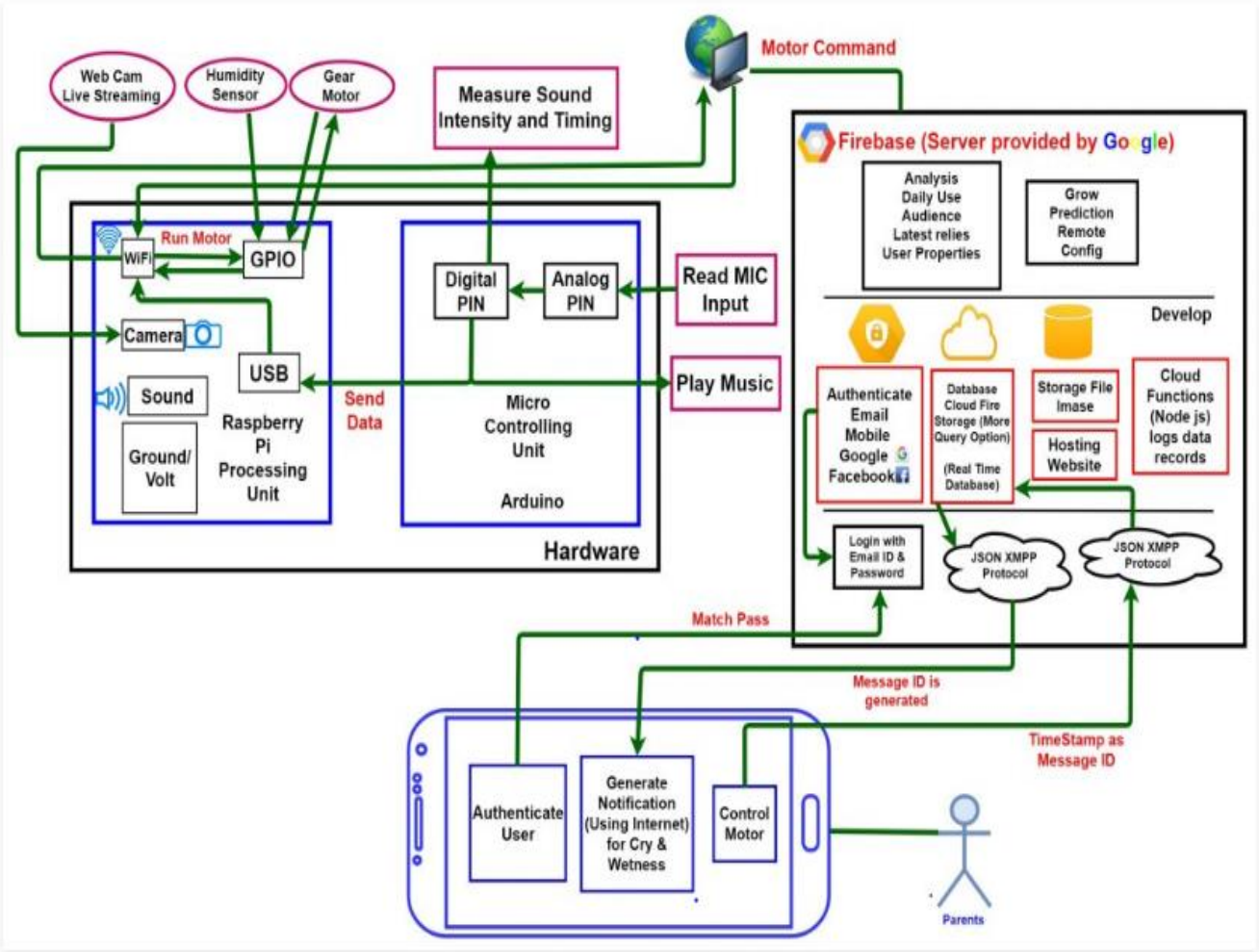
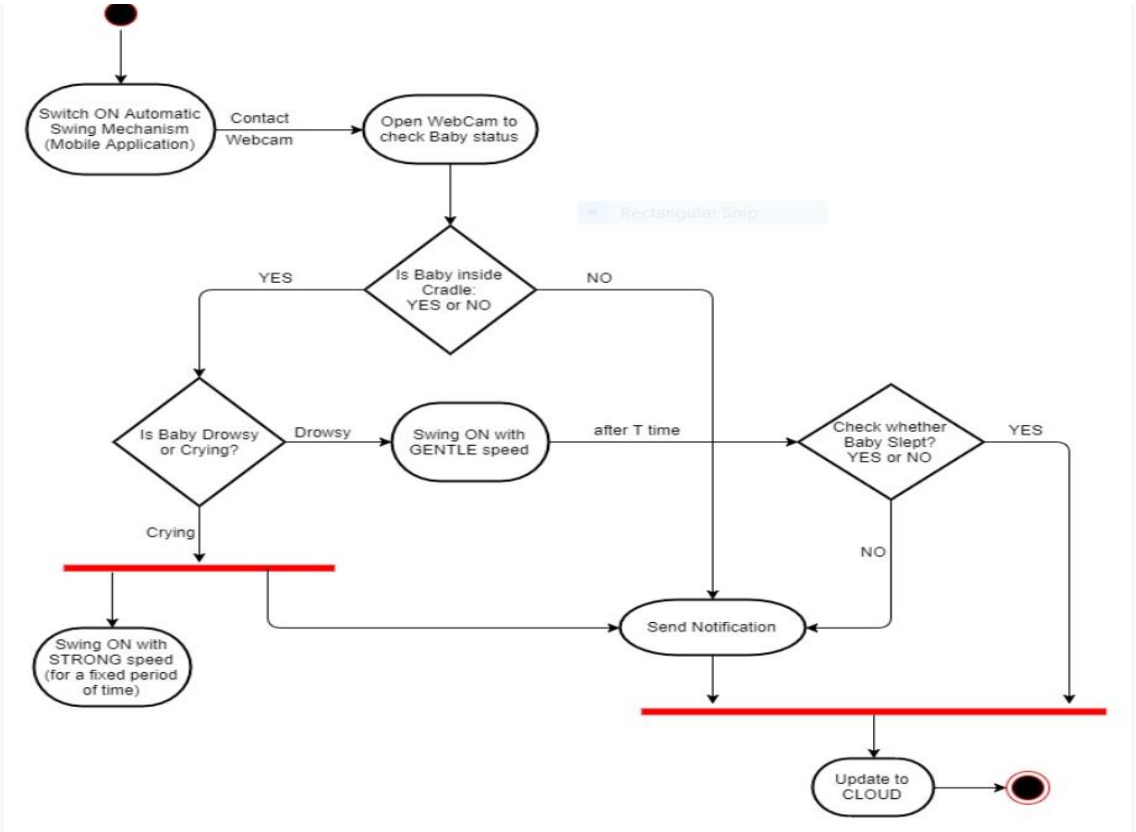


Fig3: Design of proposed method

Tools Used:

- Software Used:
  1. Advanced IP Scanner
  2. PuTTY
  3. WinSCP
  4. Raspbian OS
  5. Arduino IDE – v 1.8.5
  6. Notepad++ – v 7.5.6
  7. Python IDLE – v 3.4
  8. Android Studio – v 3.0.1
- Hardware Used:
  1. Raspberry Pi 3
  2. Arduino Mega
  3. DHT11 Digital Temperature and Humidity Sensor
  4. Sound Microphone (Input)
  5. USB Camera
  6. 9v batteries
  7. NPN Transistors
  8. PN Junction Diodes
  9. IC chip (L293D)
  10. 10k ohm Resistors
  11. LEDs
  12. DC Motor (30 rpm)
  13. Plastic Gear

VI FLOWCHART



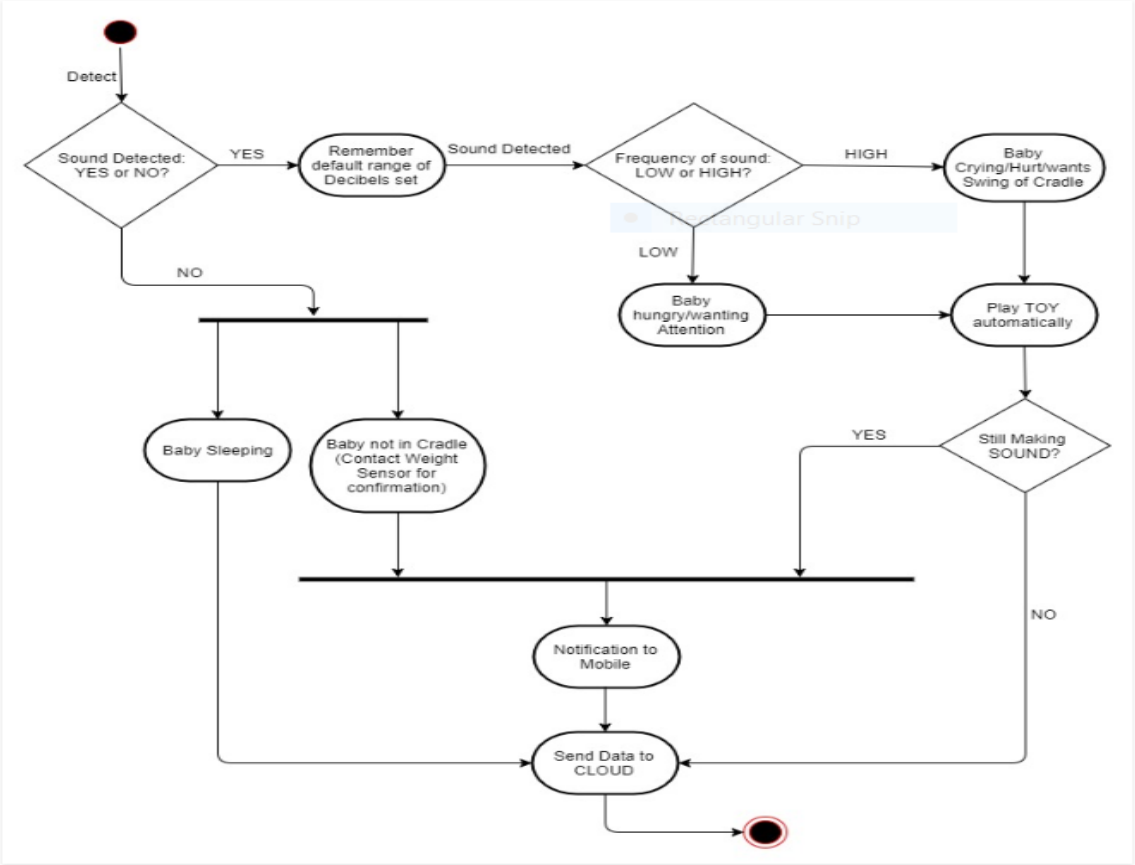
First we need to switch on the mobile application then on the camera to check the baby status.

Case 1: If the baby is inside the cradle

A: it checks whether baby is drowsy .if so swings the cradle and checks whether baby is slept are not ,sends notification to mobile.

B: if baby is crying sends notification to mobile.

Case 2: if baby is not inside the cradle ,sends notification.



VIII RESULTS

Thus we have implemented an baby monitoring smart cradle that is capable of sending live video information of the baby using the USB camera, that is accessible to both mobile phones and laptops. This cradle provides an important functionality of detecting baby's cry using a sound sensor and alerts the parents by an email notification. By using DTH11we can find baby's body temperature and bed wet condition of baby.

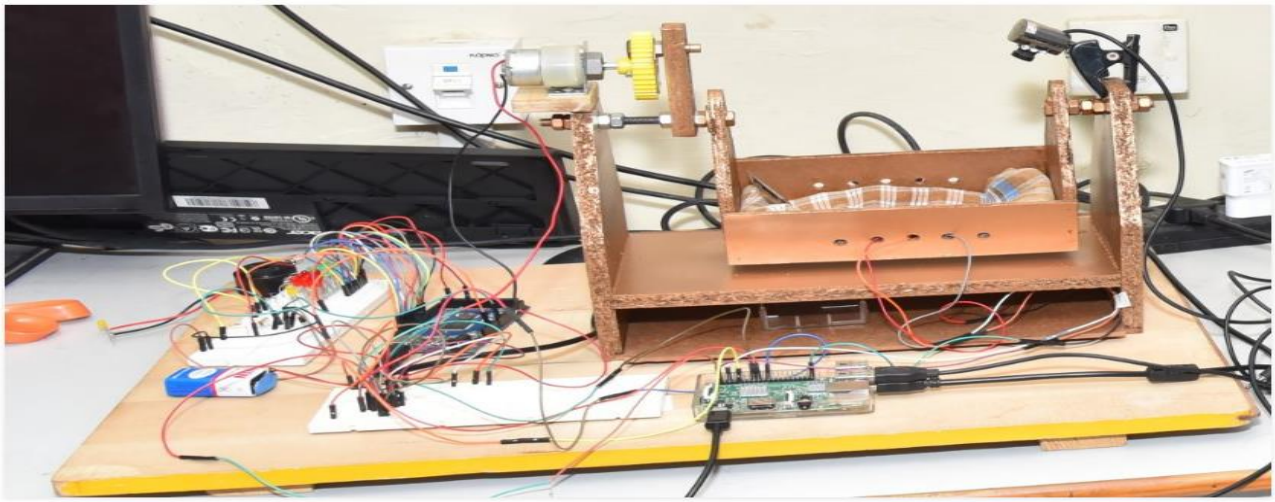


Fig 4: Final result of project

IX CONCLUSION

Technology has been developed in a great way that it makes human work simpler. So, in that aspect to convenient the baby monitoring smart cradle has been designed. The baby monitoring smart cradle is the finest solution for today's parents who cannot find the sufficient time for their babies. This baby monitoring smart cradle would let the working mother to do household works besides taking care of baby at the same time. It is economical and user friendly. The baby monitoring cradle can be used in hospitals and home. It is very useful for working parent and hospitals to take care of babies.

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