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SMART CRADLE

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ABSTRACT

Now-a-days it is difficult to handle multiple work simultaneously. In the present world people are very busy in their professional life so they do not get ample time to take care of their infants. For working women who have a baby, it becomes difficult to monitor and taking care of various activities for baby. So, if someone hiring professional to take care of their infants it may increase their expenses from monthly expenditure. Moreover, in today's life it is very hard, even for homemakers to sit nearby their babies and soothe them. Generally, the baby cradle is used to make sleep and soothe to the baby. For example, the guardian has to take care of the child until as they asleep and also check mattress to keep them hygienic. If baby cries, guardian of the baby comes and soothe the cradle. Out of which swinging a cradle for a baby manually and checking mattress at regular intervals becomes very time consuming which needs to be automated. This project presents the work of a new design and implementation of SMART CRADLE. In this, we used sound sensor, servo motor, micro-SD card module and rain sensor. Here, when the sound sensor senses baby cry it swings the cradle automatically by the help of servo motor, then activates a toy and also plays lullaby. Rain sensor gives an alarm when mattress get wet.

Keywords: Smart Cradle, sound sensor, servo motor, micro-SD card module and rain sensor.

I. INTRODUCTION

In the present scenario where both the parents are busy in their professional life, it become difficult for them to get sufficient time to take care of their infants. Sometimes it is not affordable for them to hire a nanny or admit their child to creche during their job timing. It is found that, most of the times baby stops crying or sleeps when they are in a cradle which provides them a gentle rhythmic motion and also by listening lullaby. In today's life style, it is very difficult for parents and nanny to sit nearby their child and sooth them whenever they cry. Where working parents often feel it difficult to accomplish both the obligation of work & parenting, we have designed a system which would help the parents and even homemakers during their household works to take care of their babies without paying physical attention. In the proposed design, there will be a circuit placed along with the cradle which will sense the baby cry and takes necessary actions. An alarm will be given when mattress gets wet which is helpful to keep baby hygienic.

The system is designed to help parents and nurses in infant's care. The design aims at following points:

- Cradle starts swinging automatically when baby cry.
- Lullaby will be played automatically after cradle swing.
- A toy will be activated after lullaby.
- Sounds an alarm when mattress gets wet.

II. METHODOLOGY

According to the researcher there are useful ways to pacify and calm the baby which has given below:

I. Suckle a baby
II. Rocking motion
III. Singing a song

[1] Smart Baby Cradle by Aniruddha Patil; Nitesh Patil and Anjali Mishra [2018]: In this system the cradle has motor which will rotate the mobile toy and noise sensor detection which will sense the noise when the baby is crying or making loud noise. Automatic swing of cradle is performed when baby cries loudly. A servo motor will rotate (swing) the cradle up to an angle that is safe when infant is inside the cradle. A camera will be used to

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track the baby inside the cradle. A GSM module to communicate with a remote device that is operated by parents. And an Arduino microcontroller to control and monitor the activities of the cradle.

[2] The automatic cradle system by Vijayamahantesh Hiremath, Dr. P. Vankataratnam [2017]: In this intelligent baby cradle system was developed. The cradle was capable of detection the movement of the baby and initiate cradle swing. in addition, within the event of Bed wet or physiological condition, the developed device is capable of causing SMS. The device may be accustomed minimize the work of the fogeys and nurses in home and hospitals severally.

[3] Automatic E-Baby Cradle Swing based on Baby Cry By Misha Goyal & Dilip Kumar, June 2013: E-Baby Cradle swings automatically when baby cries, for this it has a cry analysing system which detects the baby cry voice and accordingly the cradle swings. The system has inbuilt alarm that indicates the condition when the mattress is wet, which is an important parameter to keep the baby in hygienic condition.

III. MODELING AND ANALYSIS

A. Components Required

- Arduino UNO
- Sound Sensor
- Rain Sensor
- Servo motors
- Micro SD card module
- Buzzer
- 2N3904
- Speaker

B. Procedure

1. Connect the Arduino UNO in the Breadboard.

2. Connect GND to GND in the Power input of the Arduino UNO, connect the VCC to 5V in the Power input of the Arduino UNO.

3. Connect the three pins of sound sensor VCC, GND and A0 pin to VCC, GND and pin 7 pins of the Arduino respectively.

4. Interface Micro SD Card to the Arduino UNO by connecting CS pin to pin 10, SCK to pin 13, MOSI to pin 11, MISO to pin 12, VCC to VCC pin and GND to GND pin of Arduino respectively.

5. Connect 2N3904, Emitter pin to GND, Base pin to pin 9, Collector pin to speaker.

6. Connect a 220 Ohms to 1K Ohm's resistor between pin 9 and base terminal of 2N3940.

7. Interface servomotor to Arduino by connecting motor pins VCC, GND and DATA pin with VCC, GND and Pin 3 respectively.

8. Interface servomotor to Arduino by connecting motor pins VCC, GND and DATA pin with VCC, GND and Pin 4 respectively.

9. Interface rain sensor to Arduino by connecting A0 pin of rain sensor to pin 6 of Arduino uno and also connect VCC and GND pins of rain sensor to VCC and GND of Arduino.

10. Connect positive pin of buzzer to pin 8 of Arduino and negative pin of buzzer to GND pin.

11. To power up the Device, plug in the USB Port to Arduino UNO, then plug it on your PC. By doing this, the Device will turn on and this will allow you to upload the codes into the device.

12. If you have the codes uploaded in the device, you can power up the device using a battery instead. You'll be needing a Battery snapper with a Jack, then you can connect the battery in the power jack of Arduino UNO.

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C. Schematic Diagram

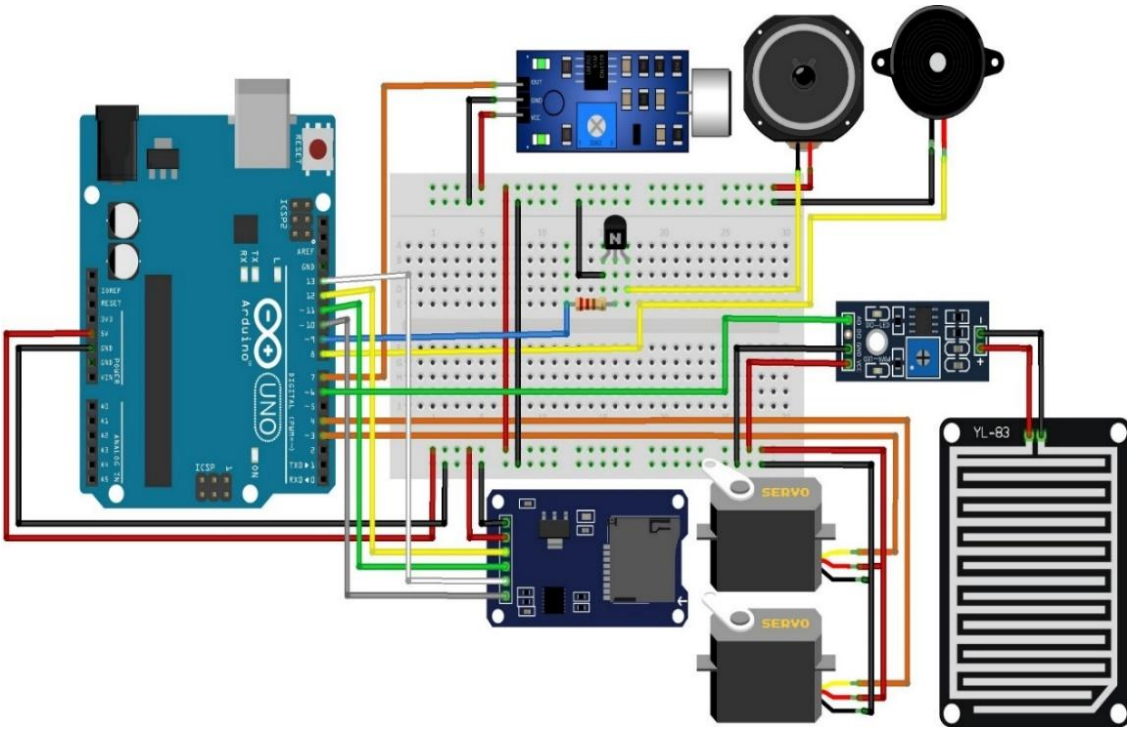

Figure 1: Schematic diagram

D. Working

1. Start the Arduino.
2. Check if the baby is making any noise or cry.
3. If yes, it triggers Servo Motor which leads to swinging of the Cradle. Also plays lullaby.
4. If baby still cries, then activate a toy to stop baby cry.
5. To keep baby hygienic when mattress gets wet, automatically buzzer will be activated.

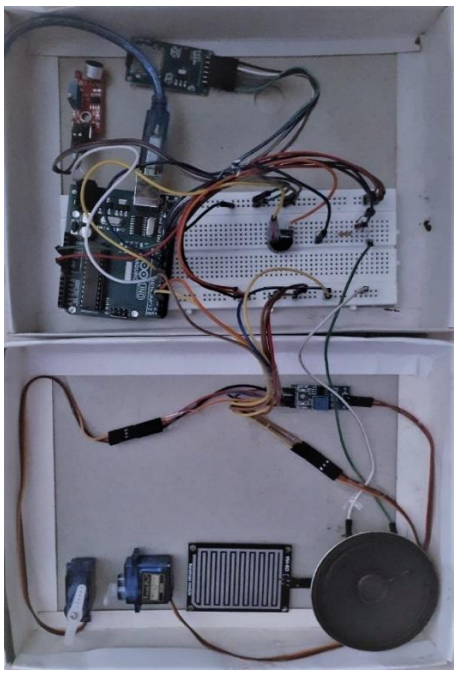

Figure 2: Smart Cradle

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IV. CONCLUSION

A smart cradle is the best solution for parents to observe their babies in this busy era. It is just an approach of taking advantages of modern technology which has no effect on daily activities of parents. Since technology has been developed greatly, it can contribute to the society in various ways. Smart cradle is the best example where working parents have lot of workloads already and they have to take care of their babies as well. Smart Cradle assures them that their baby is safe and secure inside the cradle. As we said in introduction our aim is to develop a smart cradle which makes ease for working parents to handle their infants. This smart baby cradle would let the working mother to do their household works with taking care of their baby at the same time.

V. FUTURE SCOPE

In future we can add more features to make more efficient and user-friendly. The feature we can add to this device such like parents can monitor their baby live via 3G, rotating toy with music and camera, and the sound detector to detect sound of the baby could be added to enhance the system features.

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