

Report
Inter Departmental Project – I
on
BABY MONITORING SMART CRADLE

Submitted By

S.Jaya Ajay Kumar
201FA05086(ECE)

P.Lakshmi Tulasi
201FA04406(CSE)

P.Siddardha
201FA04440(CSE)

J.Hamsini
201FA04443(CSE)



Under the Esteemed Guidance of

P.Vijaya Babu
Assistant professor
Department of CSE



VIGNAN'S

Foundation for Science, Technology & Research

(Deemed to be University)

-Estd. u/s 3 of UGC Act 1956

(ACCREDITED BY NAAC WITH “A+” GRADE)

Vadlamudi, Guntur, Andhra Pradesh, India -522213

CERTIFICATE

This is to certify that the IDP report entitled “**Baby Monitoring Smart Cradle**” that is being submitted by **S.Jaya Ajay Kumar (201FA05086 ECE), P.Sri Lakshmi Tulasi (201FA04406 CSE), P.Siddardha(201FA04440 CSE), J. Hamsini (201FA04443 CSE)** of Vignan’s Foundation for Science Technology and Research, is a record of work carried out by them under the guidance of **P. Vijaya Babu of Computer Science And Engineering, G. Pradeep of Eleectronics and Communication Engineering.**

Signature of the faculty guide

P.Vijaya Babu

Signature of Head of the Department

Dr.Krishna Kishore

HoD, CSE

ABSTRACT

Cradle is a device that is used to put babies to sleep. It takes lot of efforts from parent to physically rock the cradle to generate swinging motion. When baby is kept inside the cradle it needs to be constantly monitored by parent to keep track of baby's activity.

The proposed idea in this prototype of smart cradle will allow the cradle to efficiently integrate it self with the help of sensors.

An Arduino microcontroller will be used to assemble all the sensors like water sensor,sound sensor,DTH sensor and hardware component required. Constant monitoring of the baby inside the cradle will be done.

The cradle is suitable for parents who are not able to invest all their time by sitting near the baby,also helps babycare centres to great extent. Other applications of this cradle can be at a maternity hospital as an assistant to the staff who are responsible to look after the baby.

CONTENTS

1. Objective.....	01
2. Introduction.....	02
3. Circuit diagram.....	03
4. Components required.....	03
5. Working &Result of project.....	07
6. Advantages and dis advantages.....	08
7. Applications.....	08
8. Future scope.....	08
9. Conclusion.....	09
10.References.....	09

1.OBJECTIVE

This IOT based automated baby monitoring system helps users to monitor their infants virtually. The suggested system is designed around arduino mega and IOT sensors like sound sensor, water sensor and DTH sensor. These sensors will be connected to the arduino mega. Conditions of the baby will be monitored using sensors. If baby is urinated, cradle will enable the user to know with the help of buzzer. If baby cries, sound sensor will detect the sound and the servo motor will automatically rotate with swinging frequency being modulated according to the sound frequency. DTH sensor will update the temperature and humidity of the room to the user's mobile through bluetooth module.

The design aims at following points:

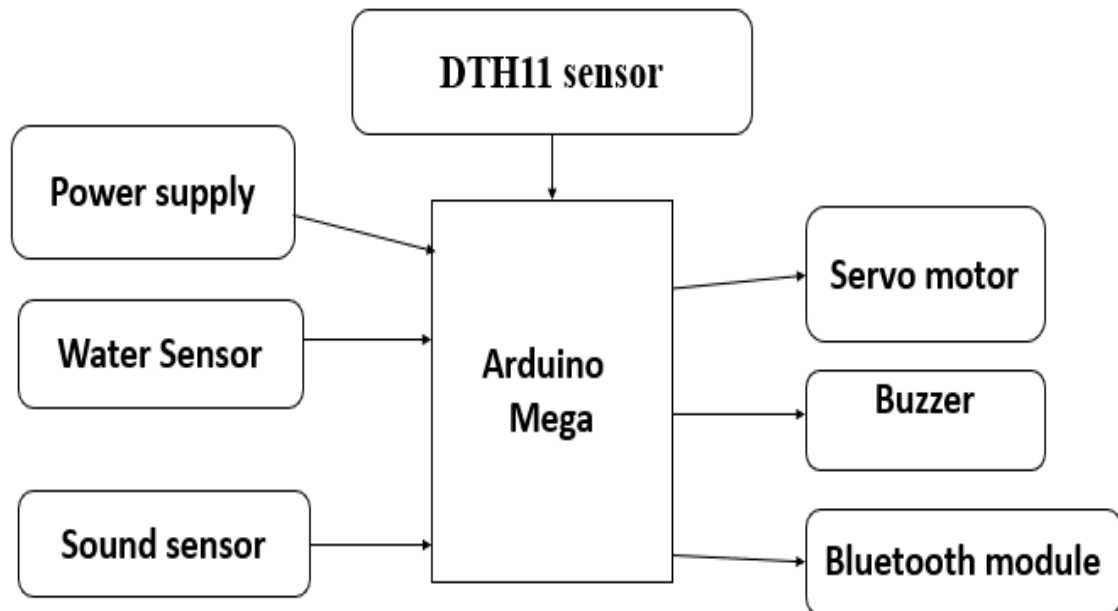
1. Cradle starts swinging automatically when baby cry.
2. If the baby stops crying before 2 minutes, then the cradle will stop automatically after 3 minutes of swinging.
3. Sounds an alarm when mattress gets wet.
4. Before the use of cradle in society, baby caring was completely by caretaker but in the nuclear family baby caring is very difficult. So there is a need for automation in the cradle section. As the baby needs more care and safety automation of cradle is very much difficult for safe design.

2.INTRODUCTION

Now a days, caring for an infant is a tough job for parents who are working away in different location.They join the baby in a baby care centres and there will be many babies which will complicate the task for a baby care centre. This task presents an infant observing framework for occupied guardians(babycare centres,maternity hospitals,a person who is taking care of baby but cannot spend their entire time sitting there) so they can guarantee the appropriate consideration and wellbeing of their children. This framework can recognize the child's cry and infant's room's temperature and humidity. Hence there will be continuous monitoring of the baby. This infant checking framework is equipped for distinguishing temperature and crying state of the child naturally.Arduino mega is utilized in managing all the connected components. Sound sensor is utilized to distinguish child's crying, DTH sensor to identify infant's temperature and humidity ,and send them to the guardian or parent using the IOT modules. This proposed framework can give a simpler and helpful route for occupied guardians as far as dealing with their infants.

Generally, the baby cradle is used for to make sleep and soothe to baby. For example, someone have to take care of their child till as they asleep. However, conventional cradle does not electronically equipped such like battery or adapter to automate the cradle automatically. In Addition to that, these kind of conventional cradle is used in villages areas or non developed cities due to its low prices. But the problem of this kind of designated cradle is that you need manpower to take care of your child and your child may not be safe and feel comfortable in the conventional cradle. Thus, we need automatic cradle to take care of child which uses the battery or power source. Besides, there are extra features or function is provided by the newly automatic cradle is beneficial for parents. Because in the present world people are very busy in their professional life so they do not get time to take care of their infants. It will be very difficult control the babies and if someone is hiring professional to take care of their infants

3.BLOCK DIAGRAM



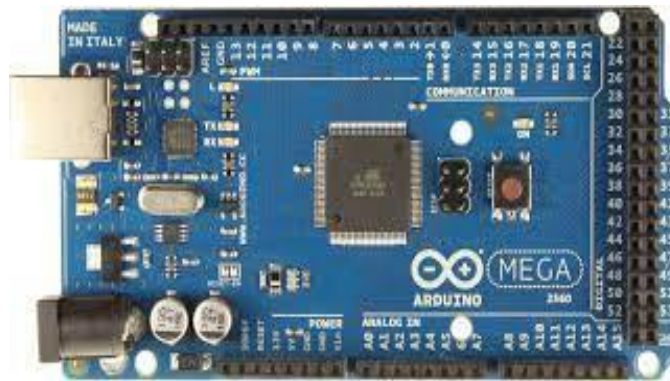
4.COMPONENTS REQUIRED

- 4.1 . Arduino mega
- 4.2 . DHT11 Digital temperature and humidity sensor
- 4.3 . Sound sensor (Input)
- 4.4 . Connecting Wires
- 4.5 . Battery
- 4.6 . Servo Motor
- 4.7 . Bluetooth Module
- 4.8 . Buzzer
- 4.9 . Water sensor

DESCRIPTION OF COMPONENTS:

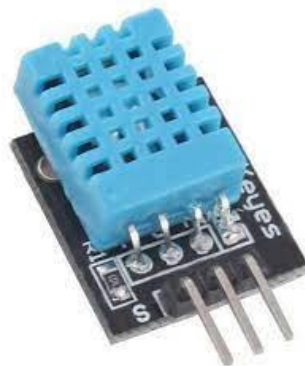
4.1 . Arduino mega

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560 (datasheet). It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the micro controller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Mega is compatible with most shields designed for the Arduino Duemilanove or Diecimila. The Mega 2560 is an update to the Arduino Mega, which it replaces.



4.2 . DHT11 Digital temperature and humidity sensor

The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed).



4.3 . Sound sensor (Input)

The sound sensor is one type of module used to notice the sound. Generally, this module is used to detect the intensity of sound. The applications of this module mainly include switch, security, as well as monitoring. The accuracy of this sensor can be changed for the ease of usage.



4.4 . Connecting Wires

Connecting wires allows an electrical current to travel from one point on a circuit to another, because electricity needs a medium through which to move. In the case of computers, wires are embedded into circuit boards, carrying pulses of electricity that are interpreted as binary signals of zeros and ones.



4.5 . Battery

It is used to give supply for for mall electrical Components.



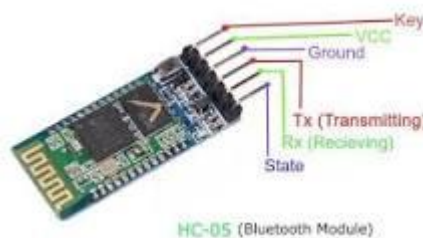
4.6 . Servo Motor

A servomotor is a closed-loop servomechanism that uses position feedback to control its motion final position. The input to its control is a signal (either analogue or digital) representing the position commanded for the output shaft. The motor is paired with some type of position encoder to provide position and speed feedback.



4.7 . Bluetooth Module

It is used to connect small devices like mobile phones using a short-range wireless connection to exchange files. It uses the 2.45GHz frequency band. The transfer rate of the data can vary up to 1Mbps and is in range of 10 meters.



4.8 . Buzzer

An Arduino buzzer is also called a piezo buzzer. It is basically a tiny speaker that you can connect directly to an Arduino. You can make it sound a tone at a frequency you set.



4.9 . Water sensor

Water sensors detect the presence of water .

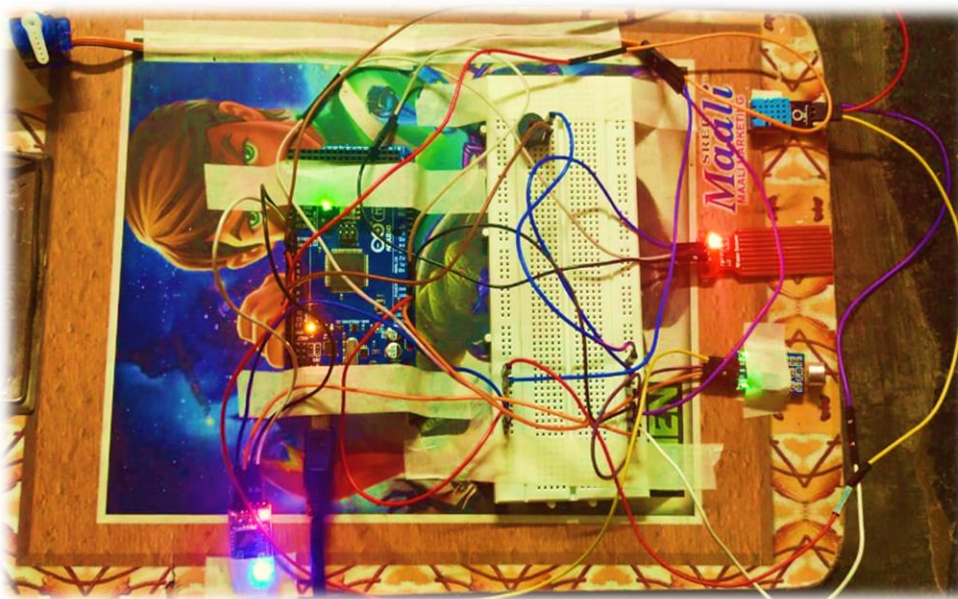


5.WORKING OF THE PROJECT

Baby monitoring system assures the safety by monitoring its position continuously and it also reads the data from the respected sensors.

- Arduino mega is the control unit where all the components are connected to it and all the readings of the baby such as temperature, sound, water (urine),humidity are collected
- DTH sensor helps in identifying readings of the temperature of the room of baby.
- Water sensor detects whether the baby is urinated or not.If urinated it notifies the user using buzzer.
- Sound sensor helps in detecting the cry of the baby and modulates the frequency of servo Motor according to the frequency of the baby's cry.

Result:



6.ADVANTAGES AND DISADVANTAGES

ADVANTAGES:

- The cradle is suitable for parents who are not able to invest all their time at home sitting near the baby.
- This system considers all the minute details required for the care & protection of the Baby in the cradle.
- It is easy to use because it does not need any extra knowledge of hardware and software and also it does not need any human interaction to rock the cradle.
- It is an innovative, smart & protective Cradle System to nurture an infant in an efficient way.

DISADVANTAGES:

- Although the cradle is capable enough to monitor the baby but it does not comfort the baby as much as mother does.
- Components of cradle are fragile and it needs to be handled carefully.
- It is unable to sense emotion of the baby, so noise sensor cannot differentiate between baby's laugh and cry.

7.APPLICATIONS

1. Can be used by parents who are not able to invest all their time looking after the baby.
2. Can be used at a maternity hospital as an assistant to the staff who are responsible to look after the baby.
3. Can be used at baby care centers.

8.FUTURE SCOPE

1. Modules of noise detection and urine detection have been implemented. Our future scope includes modules of attaching a toy which can be used to ease the baby, when he is bored or crying.
2. A set of servo motors will be used to rock the cradle, Also a camera will be attached to see the movement of the baby inside the crib. All the components of the cradle will be synchronized with GSM modules which will be used to communicate with smart cradle and messaging will be used as a medium of communication.

9.Conclusion

Proposed idea of smart cradle is a less expensive and easy to use system. It can help improve the quality of infant care system. This system will provide parents assurance that their infants is well taken care of. The constant capturing and monitoring of various biomedical parameters of the baby helps the mother to understand baby's internal health status.

10.References

1. Marie R. Harper, La Mirada, Maxine R. Blea:, "Automatically rocking baby crdle", US3769641, Date of Patent: Nov. 6, 1973.
2. S. Durga, S. Itnal, K. Soujanya, C. Z. Basha and C. Saxena, "Advanced and effective baby care monitoring Smart cradle system using Internet of Things," 2021 2nd International Conference on Smart Electronics and Communication (ICOSEC), 2021, pp. 35-42, doi: 10.1109/ICOSEC51865.2021.9591955.
3. M. P. Joshi and D. C. Mehetre, "IoT Based Smart Cradle System with an Android App for Baby Monitoring," 2017 International Conference on Computing, Communication, Control and Automation (ICCUBEA), 2017, pp. 1-4, doi: 10.1109/ICCUBEA.2017.8463676.
4. W. A. Jabbar, H. K. Shang, S. N. Hamid, A. A. Almohammed, R. M. Ramli, and M. A. Ali, "IoT- BBMS: Internet of Things-Based Baby Monitoring System for Smart Cradle," IEEE Access, vol. 7, pp. 93791-93805, 2019.
5. C. Lai and L. Jiang, "An Intelligent Baby Care System Based on IoT and Deep Learning Techniques," the year, 2018.
6. Y. K. Dubey and S. Damke , "Baby Monitoring System using Image Processing and IoT," 2019.