



**TITLE:-**

**IOT BASED SMART CRADLE SYSTEM FOR BABY  
MONITORING**

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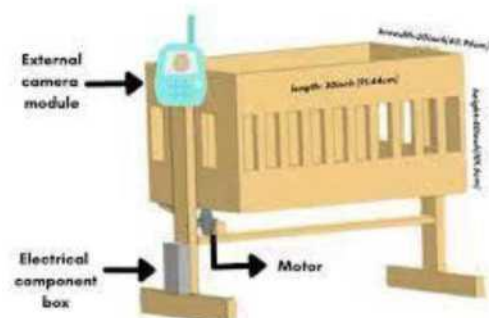
## CONTENTS

- ABSTRACT
- INTRODUCTION
- OBJECTIVE
- LITERATURE SURVEY
- PROPOSE SYSTEM
- HARDWARE
- ADVANTAGES
- OUTCOMES AND BENEFITS
- CONCLUSION



## ABSTRACT:-

The IoT-based smart cradle system for baby monitoring is an innovative solution aimed at providing parents with real-time insights into their baby's well-being and comfort. This case study examines the development, implementation, and benefits of such a system, highlighting its features, functionality, and impact on parenting. Since we are in the twenty first century parents of small child are do jobs or work. They might have work to be done at home also. So simultaneously doing work and monitoring the baby could be trouble. So, for these many kinds of parent we are developing a cradle which consist of too many useful features. Cradle system has ability to send alert when baby is crying, it can also swing automatically when baby is crying. Cradle system also gives alert when baby does potty in the cradle. Cradle also has the ability to send alert regarding body temperature of the baby. There is some High alert also available regarding babies' health. Likewise, there are multiple features in the cradle system. For sending the alert we are using Buzzers . Cradle system is the solution of the multiple problems.



## **INTRODUCTION :-**

The Internet of things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interactions. The Internet of Things thus promises a strong added value to each domain. By connecting objects, people and environments, it becomes possible to develop improvements that can only be beneficial. As far as time and security is concern with the help of IOT we will build a cradle system which will make parents stress free and most important it will be safe and secure for the baby. So, managing the work in time and taking care of baby is very important factors. Cradle system will give parents required time to parent for rest, as if the parents both mother and father goes for the job or even if the mother is house wife. Being stress free will definitely create the great atmosphere which will make great atmosphere around the baby. So, it doesn't matter if there is no one to swing cradle it will do swing automatically if the baby is crying. It doesn't matter if baby has done pee and no one knows about for long time, but not need to worry cradle system will also give the alert about the wetness in cradle. Also, if baby is getting fever or cold for security purpose of the baby. Proposed system will help the parents, so that they can take good care of their baby

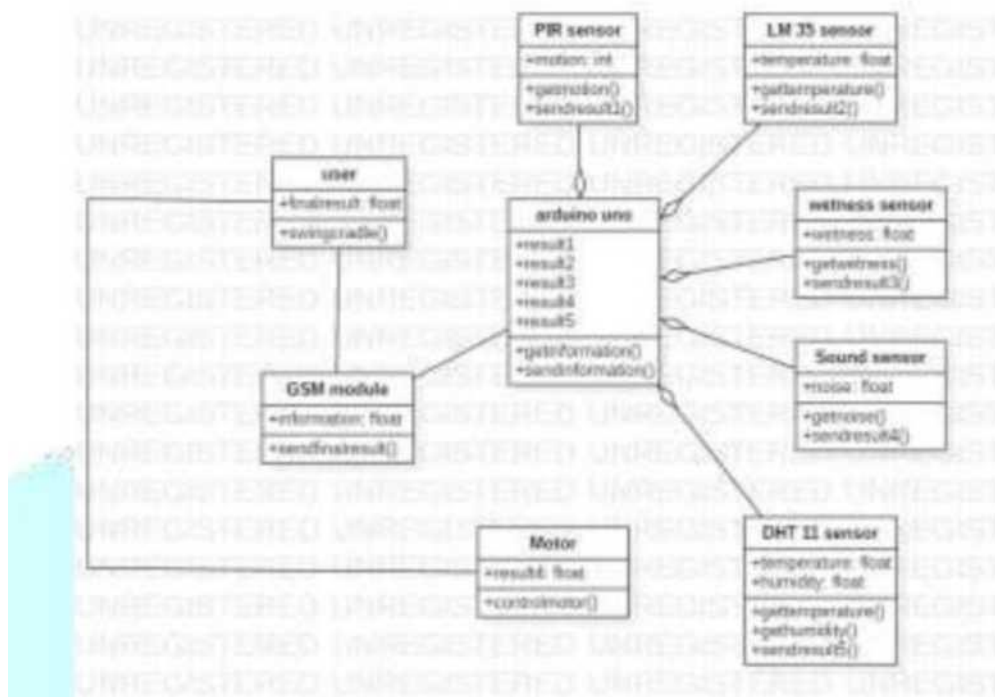
## **OBJECTIVE:-**

Many of IOT devices are being develop in the IT sector. There are some cradles also, which are built with integration of IOT, but still there are some less feature which could be threat to the health of the babies. As we have seen in India or any other industrializing nation that both parents need to go to work and also look after the baby which increases workload on both the parent, it could also affect their professional life and their babies' life. Due to less featured cradle systems and parents busy schedule we are implementing modern day cradle system.

## LITERATURE SURVEY:-

For taking care of the baby there were some nannies who were getting paid for taking care of baby. There are some baby health care centres also which takes money and monitor the baby or sooth the baby. As far as time passes there had been lot of fraud detected in these kinds of centres from newspaper and news channels, we get the awareness about it. There are some cradles also designed, but they usually have only one or two features. From that one or two features they itself were making trouble for taking care of baby or disturbing the baby from sleep. Before concluding to the system that we have to build, we surveyed some papers and they are as follows with problems that found: First paper is "General Idea about Smart Baby Cradle" published in 2016. In this research paper author state that cradle will swing automatically. But proposed system was making too much noise of swing due to which baby was getting disturb from sleeping. The system had only one module and that was also leading to problem for baby. Second paper is "Development of an Intelligent Cradle for Home and Hospital Use" published in 2015.

## PROPOSE SYSTEM:-

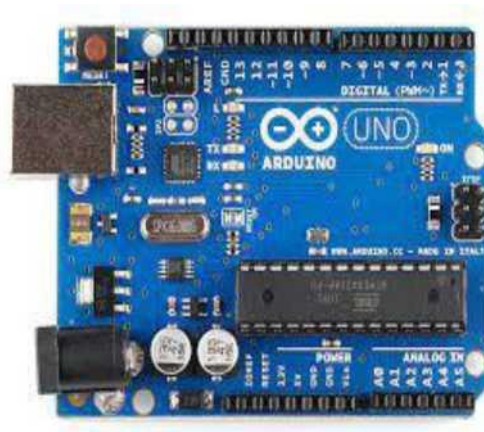


Class diagram is a static diagram. It represents the static view of an application. Class diagram is not only used for visualizing, describing, and documenting different aspects of a system but also for constructing executable code of the software application. If the baby is making noise or baby is crying then sound sensor will hear that frequency and it will start swing. Also, SMS alert will send to parent through the GSM module. If the baby had wetted the matrices of the cradle then alert SMS will send to the parent through the GSM module. If the body temperature of the baby changes rapidly with comparing atmosphere then alert SMS will send to the parents through GSM module. If baby is moving in cradle or any kind of movement detected by the PIR sensor then alert SMS will send to the parent through the GSM module. If baby is crying and simultaneously there is wetness detected then alert will send as baby is crying due to wetness. Even after the cradle swing to the five minutes and baby is still crying then there will be high alert will send to the parent.

## **HARDWARE:-**

### **Arduino Uno Microcontroller :**

Arduino Uno is one of the most commonly used hardware in the Arduino series. It is low cost, easily available and is quite compact. It has an on-board USB to serial chip so we can easily load code into the on-board at mega328 controller.



**Gear Motor :** In this system the gear motor is used for swinging the cradle. Since gear motor converts the electrical power into mechanical power. The motor starts swinging when baby starts crying.

**PIR :**

The PIR sensor is used for motion detection. It is used to detect a moving object particular people.

**GSM Module :**

This GSM modem has a SIM800A chip and RS232 interface while enables easy connection with the computer or laptop using the USB to Serial connector. SMS can send and receive using AT command

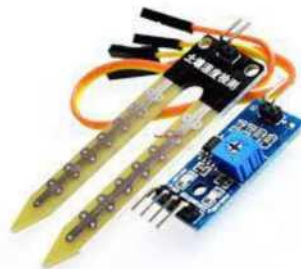


**DHT11:**

DHT11 is the basic temperature module and humidity sensor module with digital output at low cost. It will update regarding room temperature.

**Moisture Sensor-**

Moisture sensor is used for finding wetness. If the baby wets the cradle then the sensor indicates it.

**Sound Sensor :**

This is a very easy to use Sound Detection Sensor module. This sensor will able to capture the sound of baby.





## **.ADVANTAGES :-**

- > Cost efficient
- > User friendly
- > Ensures safety
- > Minimum manual work
- > Baby sooth comfortably
- > Baby stays healthy

## **SCENARIOS:-1)scenario -1**

. As we are parents of 21 century ,we are busy in our daily task and other professional work load ,at this peak hours of our life to take of our children is a vital task. This Cradle system has ability to send alert when baby is crying, it can also swing automatically when baby is crying. Cradle system also gives alert when baby does potty in the cradle. Cradle also has the ability to send alert regarding body temperature of the baby. There is some High alert also available regarding babies' health. Likewise, there are multiple features in the cradle system. For sending the alert we are using Buzzers . Cradle system is the solution of the multiple problems like if a mother is working in her kitchen with baby ,it is very harmful to the life of baby in that age , and also to keep the baby in office workspace is also very dangerous. This cradle system is very useful for mother working from home. They can easily complete there office work and as well as babies need simultaneously by using this smart cradle system.







## CODE:-

```
#include <Servo.h>

Servo myservo; // create servo object to control a servo
int pos = 0;    // variable to store the servo position
int sensorPin = A1; // Change to the analog pin you are using for the moisture sensor
int ledPin = 13;  // LED connected to pin 13
unsigned long previousMillis = 0;
const long intervalRun = 10000; // 10 seconds
const long intervalStop = 10000; // 10 seconds
bool servoRunning = false;

void setup() {
  Serial.begin(9600);
  Serial.println("Reading From the Sensor...");
  myservo.attach(9); // attaches the servo on pin 9 to the servo object
  pinMode(sensorPin, INPUT); // set the sensor pin as an input
  pinMode(ledPin, OUTPUT);   // set the LED pin as an output
  delay(2000);
}

void loop() {
  unsigned long currentMillis = millis();

  // Read the analog output from the moisture sensor
  int moistureAnalogOutput = analogRead(sensorPin);

  // Map the analog value to a range that suits your moisture sensor
  int mappedOutput = map(moistureAnalogOutput, 0, 1023, 0, 255);

  // Print the mapped output for debugging
  Serial.print("Mapped Output: ");
  Serial.println(mappedOutput);

  // Turn on/off the LED based on the mapped analog output
  if (mappedOutput > 10) {
    digitalWrite(ledPin, HIGH);
  } else {
    digitalWrite(ledPin, LOW);
  }

  // Servo motor control
  if (!servoRunning && currentMillis - previousMillis >= intervalStop) {
    // Start the servo motor
    servoRunning = true;
    previousMillis = currentMillis;
  }

  if (servoRunning) {
    // Run the servo motor for 10 seconds
    if (currentMillis - previousMillis <= intervalRun) {
      for (pos = 0; pos <= 75; pos += 1) {
        myservo.write(pos);
        delay(15);
      }

      for (pos = 75; pos >= 0; pos -= 1) {
        myservo.write(pos);
        delay(15);
      }
    } else {
      // Stop the servo motor
      servoRunning = false;
      previousMillis = currentMillis;
    }
  }
}
```

## **OUTCOMES AND BENEFITS :-**

Upon successful implementation, the IoT-based smart cradle system offered numerous benefits to parents:

1. **Real-time Monitoring:** Parents could monitor their baby's sleep patterns, environmental conditions, and movements in real-time via the mobile application.
2. **Remote Accessibility:** The system allowed parents to check on their baby remotely, providing peace of mind and flexibility.
3. **Insights and Analytics:** Data analytics provided insights into the baby's sleeping habits, helping parents identify patterns and optimize sleep routines.
4. **Safety Alerts:** The system alerted parents in case of any anomalies such as sudden temperature changes or unusual movements, ensuring the baby's safety.
5. **Parental Convenience:** By automating monitoring tasks, the system reduced the need for constant vigilance, allowing parents to attend to other tasks without compromising on their baby's well-being

### **Project video drive link:-**

[https://drive.google.com/file/d/1OOxjJPAXNb2tw\\_10b95RSKvljCEhGM-l/view?usp=drivesdk](https://drive.google.com/file/d/1OOxjJPAXNb2tw_10b95RSKvljCEhGM-l/view?usp=drivesdk)

## **CONCLUSION:-**

Growth of technology has been rapidly increased. Since technology has been developed greatly it can contribute to the society in various way. Automated cradle is the best example where working parents have lot of work load already and they have to care of baby as well. Cradle system assures them that their baby is safe and secure inside the cradle. Cradle which is less expensive and more secure and have more features. As health of small baby is always factor for which parents are always worried. So that cradle system is built for that purpose that baby will be healthier. This automatic baby cradle would let the working mother to do household works besides taking care of baby at the same time .