Bangladesh University of Business and Tecnology(BUBT)

Project Report on,
Dynamic Rocking Cradle

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Abstract

The contemporary range of working moms has substantially increasing nowadays. At the same time, infant care has grown a big problem for each family, which pretense a maximum dad and mom take infants to his/her grandparent's residence or take them to infant protection home. Parents are not able to monitor their babies' day-to-day activities. To overcome a several risk, this primarily based on the Dynamic Rocking Cradle and is described as an eco-friendly, economically. The project is to enhance the quality of the existing baby cradle by incorporating a new module for monitoring baby's pee and dynamic motion of the cradle.

Keywords— Dynamic Cradle, pee detection , control motion, Arduino Sketch, Blynk app, IoT sensor.

Contents

Chapter 1

Introduction

1.1 Overview

Generally, the baby cradle is used to relax and help the baby fall asleep. For example, parents must look after their child till the infant sleeps. However, traditional cradle doesn't have provisions such as a battery or an adapter to automate the cradle. These traditional cradles are more common in villages or rural areas due to it's less cost and availability. But the fact is that we need human beings to require care of your infant and your baby might feel unsafe and uncomfortable in the normal cradle system. so, we'd like Dynamic Rocking Cradle to take care of infant that consists of an independent power source. There are various other features provided by the Dynamic Rocking Cradle which are beneficial for the parents. In this era, parents are restricted to the work due to their hectic schedule in their day-to-day life and so they enough time required for the infants. In today's world even the mothers don't have sufficient time to sit at nearby place along with their infants to help them whenever they are in trouble. Despite of this fact that this process is automatic, this tool has proven to be of great relief for the parents and as well as nurses in medical units and wards of hospital.

1.2 Purpose

Under fast-paced life conditions, everyone is busy in their professional life including parents. With both working parents, it's very difficult to take care of their babies efficiently. They leave the house Early and come back late at the time of dinner. Also, not all parents can afford a permanent help around the house. Parents might not have the time to soothe their babies or rock their babies back to sleep in the middle of the night. Also, studies show that the baby sleeps well while being rocked or swung lightly in a rhythmic manner. Considering the Global Scope, in western countries the rooms of parents and baby are separate. With this we can clearly infer that many parents cannot attend their baby in the middle of the night if he/she requires any assistance.

Chapter 2

Literature Survey

2.1 Existing Problem

One of the existing problems of baby cradle system is that they can be limited in terms of their functionality and features. Traditional baby cradles typically provide only a basic means of holding and rocking the baby, and do not offer any additional features such as automatic cleaning or monitoring of the baby's vital signs. Another problem with traditional baby cradles is that they may not always be safe for the baby. For example, if the cradle is not stable or secure, it could tip over and cause injury to the baby. Additionally, if the baby is not properly strapped or secured in the cradle, they could fall out and suffer serious injury. Finally, traditional baby cradles may not always be hygienic, especially if they are not cleaned regularly. This can be a problem for both the baby and the caregiver, as it can increase the risk of infections and other health issues.

2.2 Proposed Solution

The solution of the proposed system can be many. This Dynamic Rocking Cradle which will be able to detect baby's pee. The rain sensor would be placed in the baby's diaper or in a specialized area of the cradle, and would be designed to detect when moisture levels increase. When the rain sensor detects an increase in moisture, it would send a signal to the cradle system, alerting it to the fact that the baby has peed. The cradle system would then initiate a cleaning process to ensure that the cradle is clean and hygienic for the baby. The cleaning process could be triggered automatically by the rain sensor, or it could be initiated manually by the caregiver. The system would be designed to be easy to operate, with simple controls and settings that can be adjusted to suit the preferences of the caregiver.

The cradle would be engineered to move dynamically, mimicking the motion of being rocked in a caregiver's arms. The system would be designed with customizable features such as adjustable movement speeds, vibration levels. This would allow the caregiver to customize the system to suit the needs and preferences of the baby and the caregiver.

Overall, the proposed solution for a dynamic baby cradle system that can detect pee by a rain sensor and move dynamically would provide a convenient and hygienic solution for baby care. The system would be designed to meet the needs of both the baby and the caregiver, providing a safe, comfortable, and customizable solution for baby care.

Chapter 3

Theoritical Analysis

3.1 Block Diagram

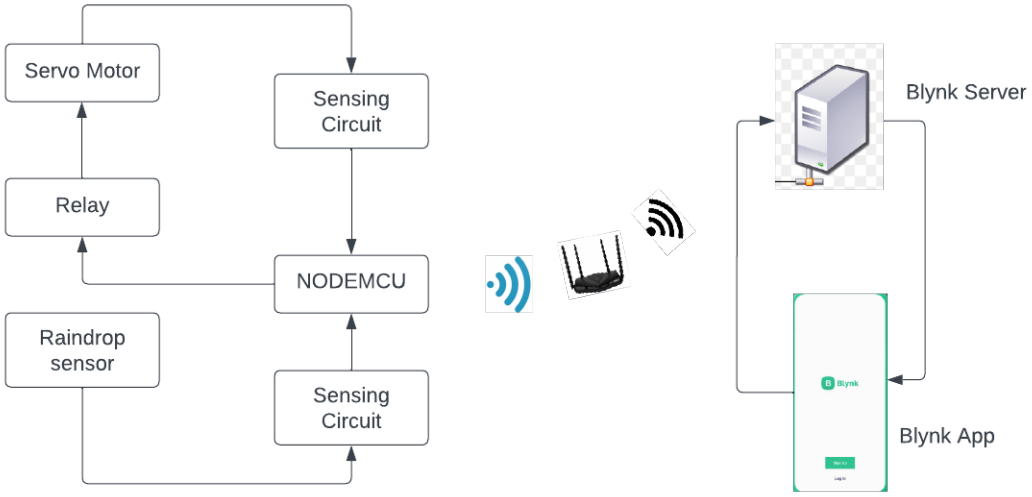


Figure 3.1: Block diagram

3.2 Software Designing

Blynk in IoT platform:

Blynk is an IoT platform for iOS or Android smartphones that is used to control Arduino, Raspberry Pi and NodeMCU via the Internet. This application is used to create a graphical interface or human machine interface (HMI) by compiling and providing the appropriate address on the available widgets.

Figure 3.2: Blynk

Arduino Sketch:

A sketch is the name that Arduino uses for a program. It's the unit of code that is uploaded to and run on an Arduino board. The Arduino programming language is based on Processing, which is aimed at visual artists. Hence a development version being a 'sketch'. Processing is a programming language, development environment, and online community that since 2001 has promoted software literacy within the visual arts.

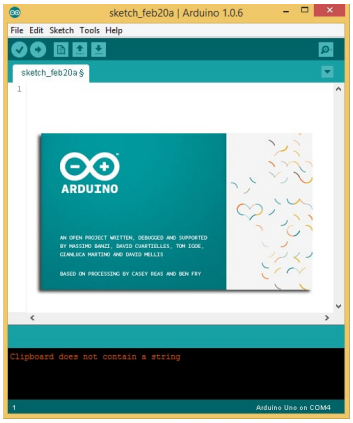
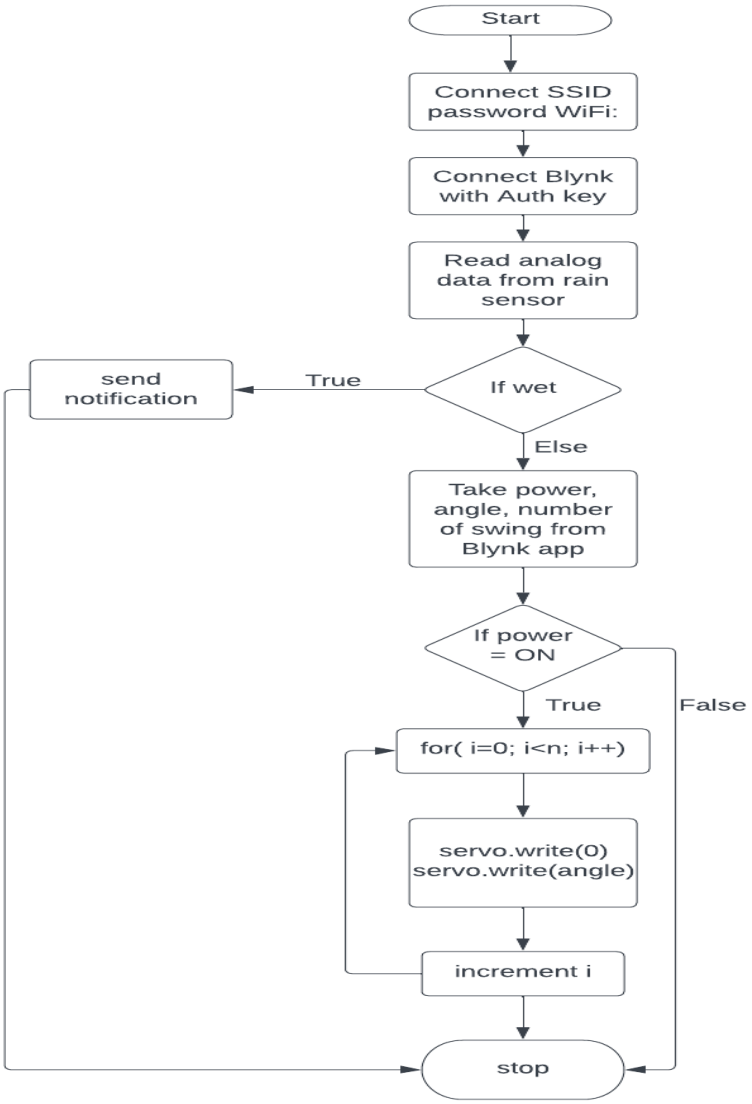


Figure 3.3: Arduino Sketch

Chapter 4

Flow Chart



Chapter 5

Results

The yield appeared beneath signifies cradle motion, clothe moisture of the baby data received from the IoT simulator sensor. The web app displays all these data. There are set of buttons on the web application that can be used to control the cradle dynamically.

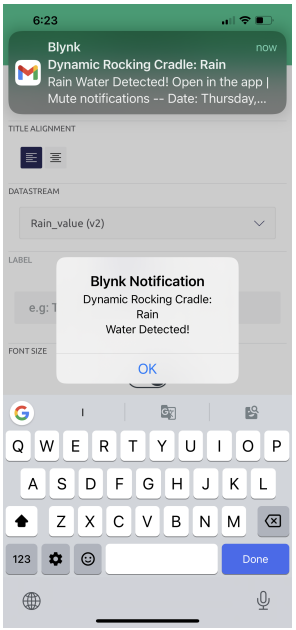


Figure 5.1: Blynk Notification

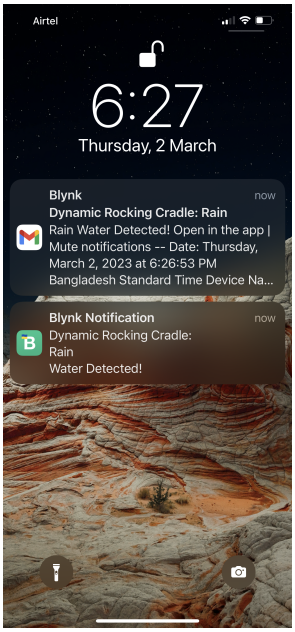


Figure 5.2: Email Notification

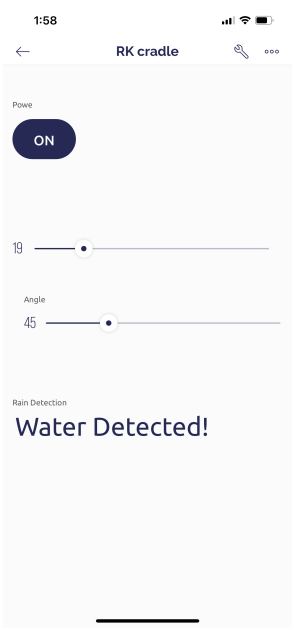


Figure 5.3: User Interface

Chapter 6

Advantages and Disadvantages

6.1 Advantages

A dynamic rocking cradle can provide a range of benefits for both babies and parents, by promoting comfort, sleep, development, and convenience.

- Soothing and calming effects: A dynamic rocking cradle can mimic the gentle rocking motion of a mother's womb, which can have a soothing and calming effect on babies. This can help to reduce fussiness, crying, and overall stress levels for both babies and parents.

- Relief from colic and reflux: The gentle movement of a dynamic cradle can help alleviate the symptoms of colic and reflux, which can be common in babies. The motion can help to reduce discomfort, encourage digestion, and ease the symptoms of these conditions.

- Improved hygiene: A dynamic rocking cradle that can detect a baby's pee can help to promote better hygiene by automatically alerting parents when the baby needs a diaper change. This can help to reduce the risk of skin irritation, infection, and other health issues associated with prolonged exposure to urine.

- Time-saving: A dynamic cradle system that can detect a baby's pee can save parents time and effort by eliminating the need for constant monitoring and frequent diaper checks.

6.2 Disadvantages

Overall, while a dynamic baby cradle system can offer several advantages, there are also potential drawbacks to consider, such as cost, maintenance, limited use, dependence on technology, and safety concerns. Parents should carefully evaluate these factors when considering whether a dynamic cradle system is right for their family.

- Cost: A dynamic rocking cradle can be more expensive than a traditional, stationary cradle. Depending on the features and technology involved, the cost of a dynamic cradle system can vary significantly.

- Dependence on technology: A dynamic cradle system that relies on electronic components or mechanical parts may be vulnerable to malfunctions or failures, which can be inconvenient and potentially dangerous for babies.

- A dynamic cradle system that includes moving parts or electronic components may pose safety risks if not properly designed, installed, and maintained. Parents should ensure that the system they choose meets safety standards and guidelines.

Chapter 7

Application

A dynamic baby cradle system has various applications that can provide benefits to both babies and parents. The applications of dynamic baby cradle systems are varied and can provide benefits to both babies and parents in a range of settings, including homes, hospitals, care facilities, travel, childcare centers, and parenting support. By implementing the latest sensing and IoT technologies in baby care practices, every aspect of traditional cradle methods can be fundamentally changed.

Chapter 8

Future Scope

Future developments in sensor technology and data processing could lead to even greater accuracy and reliability in detecting pee. This could help to reduce false alarms and improve the overall performance of the system. Future dynamic rocking cradle could be personalized to individual babies, taking into account factors such as age, weight, and sleep patterns to provide more accurate and effective monitoring and alerts.

Chapter 9

Conclusion

The present work reduces the human effort and particularly mother's stresses in working times. The equipment Baby care includes a motor, sensors, and oscillating carriage. The overall mechanism is mobile which allows easy movement from room to room. The electric powered motor will actuate the links by shaft and the links actuates the bed in a constant speed which is attached to the carriage. The main advantage of this device is its low initial cost, and has allowed operating cost. The device affords plenty of scope for modifications for further improvements and operational efficiency, which should make it commercially available and attractive.

References

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- Smart Cradle For Baby Using FN-M16P Module[http://pices-journal.com/ojs/index.php/pices/article/view/151]

Chapter 10

Appendix

```
#define BLYNK_TEMPLATE_ID "TMPLoaa9Beao"
#define BLYNK_TEMPLATE_NAME "RK cradle"
#define BLYNK_AUTH_TOKEN "r7WxaXywVjP0weZN7mh6JcsYiGcTeoOn"

// Your WiFi Credentials.
// Set password to "" for open networks.
char ssid[] = "BUBT_Computer_Lab-520";
char pass[] = "bubt1234";

// define the GPIO connected with Sensors & LEDs
#define SERVO1_PIN     2 //D4
#define SERVO2_PIN     4 //D2
#define RAIN_SENSOR    5  //D1
#define GREEN_LED      14 //D5
#define RED_LED        13 //D7
#define WIFI_LED       16 //D0
```

```
//#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>

#include <Servo.h>
Servo servo;
int RAIN_SENSOR_Value = 0;
bool isconnected = false;
char auth[] = BLYNK_AUTH_TOKEN;

Servo servo1,servo2;
int angleValue = 90; // start angle in the middle
int stepValue = 5; // angle increment per loop
int minAngle = 0; // minimum angle
int maxAngle = 180; // maximum angle
int delayTime = 20; // delay time between steps (in milliseconds)

#define VPIN_BUTTON_2    V2
#define VPIN_SERVO_ANGLE V0
#define VPIN_SWING_COUNT V1
#define VPIN_POWER_BTN   V3

BlynkTimer timer;

void checkBlynkStatus() { // called every 2 seconds by SimpleTimer
  getSensorData();
  isconnected = Blynk.connected();
```

```
  if (isconnected == true) {
    digitalWrite(WIFI_LED, LOW);
    sendSensorData();
    Serial.println("Blynk Connected");
  }
  else{
    digitalWrite(WIFI_LED, HIGH);
    Serial.println("Blynk Not Connected");
  }
}

void getSensorData()
{

  RAIN_SENSOR_Value = digitalRead(RAIN_SENSOR);
   if (RAIN_SENSOR_Value == 0 ){
    digitalWrite(GREEN_LED, LOW);
    digitalWrite(RED_LED, HIGH);
  }
  else{
    digitalWrite(GREEN_LED, HIGH);
    digitalWrite(RED_LED, LOW);
  }
}

void sendSensorData()
{
```

```
  if (RAIN_SENSOR_Value == 0 )
  {
    Blynk.logEvent("rain", "Water Detected!");
    Blynk.virtualWrite(VPIN_BUTTON_2, "Water Detected!");
  }
  else if (RAIN_SENSOR_Value == 1 )
  {
    Blynk.virtualWrite(VPIN_BUTTON_2, "No Water Detected.");
  }
}

void setup()
{
  Serial.begin(9600);

  servo1.attach(2);
  servo2.attach(4);

  pinMode(RAIN_SENSOR, INPUT);
  pinMode(GREEN_LED, OUTPUT);
  pinMode(RED_LED, OUTPUT);
  pinMode(WIFI_LED, OUTPUT);
  pinMode(SERVO1_PIN, OUTPUT);
  pinMode(SERVO2_PIN, OUTPUT);

  digitalWrite(GREEN_LED, LOW);
  digitalWrite(RED_LED, LOW);
```

```
  digitalWrite(WIFI_LED, HIGH);

  WiFi.begin(ssid, pass);
  timer.setInterval(2000L, checkBlynkStatus); // check if Blynk server i
  Blynk.config(auth);
  delay(1000);
}
int i, pos, noOfSwing, swingAngle,totalAngle, deductedAngle, powerButton
BLYNK_WRITE(V0) //taking angle input (0-90)
{

  swingAngle=param.asInt();
  Serial.println(swingAngle);
  Blynk.syncVirtual(V0);

}
BLYNK_WRITE(V1) //taking number of swing
{

 noOfSwing= param.asInt();
 Serial.println(noOfSwing);
 Blynk.syncVirtual(V1);

}
BLYNK_WRITE(V3) //taking power status
{
  powerButton= param.asInt();
```

```
  Serial.println(powerButton);
  if(powerButton==1){
    swing();
   }
  Blynk.syncVirtual(V3);

}
void swing()
{
  int halfAngle=swingAngle/2;
  totalAngle=angleValue+halfAngle; //servo middle point, 90 theke 90+swi
  deductedAngle=angleValue-halfAngle; //jehetu mirroring hoitese tai 90-
  for(i=1;i<=noOfSwing;i++) {
          servo1.write(totalAngle);
          servo2.write(deductedAngle);
          delay(500);
          servo1.write(deductedAngle);
          servo2.write(totalAngle);
          delay(500);
  }
  //kaj seshe middle point a ene rakhar jonno
  servo1.write(angleValue);
  servo2.write(angleValue);
  //blynk a sob value 0 kore deyar jonno
  Blynk.virtualWrite(V0, 0);
  Blynk.virtualWrite(V1, 0);
  Blynk.virtualWrite(V3, 0);
```

```
}

void loop()
{
  Blynk.run();
  timer.run();
}
```