International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 06 | June 2022 www.irjet.net p-ISSN: 2395-0072

INTELLIGENT HSE-HAZOP CRADLE FOR HOME AND HOSPITAL BABY MONITORING

Yogeswaran A[1], Sharveshkumar R[2], Harini C[3], Dr. Anil Kumar K K[4]

[123]*Student, Department of Electronics and Instrumentation Engineering, Kumaraguru College of Technology, Coimbatore, Tamilnadu, India*
[4]*HOD & Professor, Department of Electronics and Instrumentation Engineering, Kumaraguru College of Technology, Coimbatore, Tamilnadu, India*

Abstract - *The world is getting digital day by day and rapid industrialization is taking place as well. This requires manpower more and more. In this hectic schedule taking care of newborns is still a barrier for a working woman. This majorly has an impact on all the lives of a working women. This should not be a stopper for a potential woman who could change the world with her power. With the responsibility in mind and considering the aspects of the population below the poverty line and middle class, we are proposing an HSE-HAZOP-based smart cradle. This autonomous cradle will serve as a helping hand for all the women and will save them from the daily pressure of handling their newborns.*

Key Words: **HSE – Hazop, Automation, Multisensory fusion, Sensors**

1. INTRODUCTION

A new baby's care can be challenging for modern parents and the busy schedule of nursing staff. It raises questions regarding the baby's comfort, security, and health. A smart cradle provides parents with full-time monitoring and parental care through multisensory fusion. The technology used is HSE-HAZOP based and used for developing an automated cradle system that will send alert messages to the mobile phone.

1.1 OBJECTIVE

The proposed project is to create a real-time monitoring system with the Node MCU. She takes care of the baby in the womb in a wise bed. Automatically turns on rockers in case a baby cries and shows up with an LED. If the mattress becomes wet, the caregiver is notified immediately. Finds a child's work with a digital camera. Compatible with mobile. HSE-Hazop Based Design (Health, Safety, and Environment).

2. PROBLEM STATEMENT

Societies have defined specific roles since human civilization began. The responsibility of taking care of a child falls on the parent or caretaker. Difficult to manage both work and home in this era and the concern of the baby. Our solution to this is to design an intelligent HSE-Hazop cradle that can be used at home and in a hospital for monitoring babies.

3. PROPOSED SYSTEM

The idea of an intelligent HSE-Hazop Cradle for hospital and home child monitoring was born out of considering the serious issues that plague our current environment. We were investigating every one of the social issues that we are fit for taking as an issue of articulation. In the past couple of many years, there has been a critical ascent in the quantity of female investment in power to industrialization. Due to this, many female workers have to avoid home to manage their daily schedules. Because dealing with babies has now turned into a test for such females. Such females need to depend on a third individual to deal with the child. The mother consistently stresses the prosperity of the child. Yet, ultimately, the sufferings of motherhood lead us to pick the issue of bridging the gap between motherhood and the everyday life of ordinary women. Ultimately, this is what led us to make a Smart Cradle framework. This idea can likewise help in observing infants in clinics since every one of the medical caretakers and doctors can't be with the newborns constantly. This system is truly useful in homes as well as in medical clinics, such as hospitals.

3.1 CIRCUIT DIAGRAM

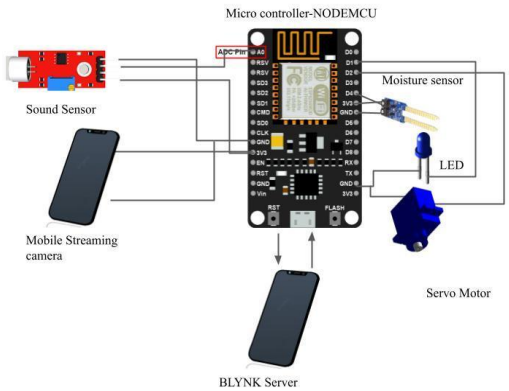


Figure1: Circuit diagram of the system

3.2 LIST OF PROPOSED SOLUTIONS

3.2.1 Automatic Rockers:

First, we focussed on making the rockers to be activated automatically when the child cries using any of the microcontrollers. Majorly we were relying upon Node-MCU because of its consistency and availability in the market. The idea we drafted was good for working. But activating rockers alone cannot make the cradle as smart as we think. Still, we were updating the framework further.

3.2.2 Temperature and Humidity Detection:

After activating the rockers, the main problem only because the child starts crying is because of the humidity/ temperature around the baby. So, we decided to have temperature/ Humidity detecting sensors in the cradle which help us to know when there is an abnormal temperature or something similar that the baby could not bear.

3.2.3 Focussing on Problem:

Thus we identified the baby's cry but still, we should do something to stop this at the starting stage. So, we decided to activate rockers when the baby starts crying, and simultaneously we will turn on a colorful LED to glow which will gradually divert the baby from crying. Also, we will have a small fan or a rotating toy on it.

3.2.4 Connecting with The Internet of Things:

Now, we have identified the problems and have worked on the same. That's what a Hazop device will do. But we needed something new with the technology and added all the operations which can be controlled anywhere in the world by embedding it with the Internet of Things by using the ESP8266 module.

3.3. IMPORTANCE OF PROPOSED SOLUTIONS

The proposed project is to develop a real-time monitoring system with ESP8266. Figure 1 is a block diagram for our smart project. She takes care of the baby in the womb in a wise bed. It automatically turns on the rockers in case a baby cries and plays a lullaby with LEDs to light up. If it is found wet in the cradle bed, it immediately sends a notification to the caregiver. Finds a child's work with a digital camera.

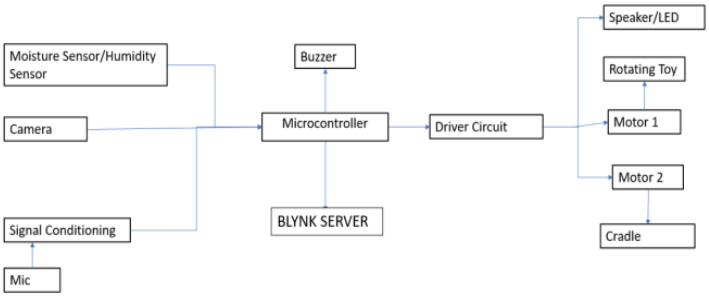


Figure2: Input and Output interface of the system

4. HARDWARE

The hardware section describes the hardware part involved in the Intelligent HSE-Hazop-based Smart cradle. It is the most important for a mechanism to make it function properly as this cradle deals with a unique design that is completely safe from electric short circuits and it takes the care of the baby.

4.1 DESIGN

Figure 3: Front view of the design

Figure 4**:** Side view of the design

4.2. DESCRIPTION

The design of the baby cradle shown was created by using NX10. In this baby cradle, we have designed cradle scales and key parts, allowing for the flexibility of an advanced monitoring system. The systematic selection of the best material for the given application begins with the properties and costs of candidate materials. Wood is used for its eco-friendly property. It is designed as an old-

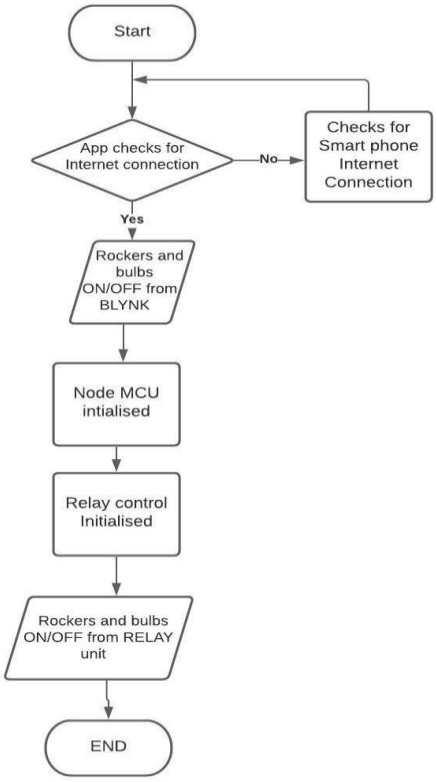
fashioned baby carrier but with the latest technology. Meranti wood is softer than other wood and simplifies the process of building a prototype. A latch is used to close and attach the cradle. A baby cradle designed is a 2-in-1 model. Hence, it is easier for the end-user to change the baby's diaper or clothes. This design is also suitable for children 2 years and older. Meranti wood is softer than other woods, and it eases the process of building the prototype, or Strong PVC can also be used.

5. WORKING OPERATION

NodeMCU to be connected to the hotspot of the smartphone needs to be identified as the name of the hotspot, the password, and token code letting the server of Blynk connect them. You may need a computer once to transfer the code from the Arduino IDE to the NodeMCU kit to configure the software component of the project. Figure 1 shows that the server of the Blynk application will process the smartphone-NodeMCU connection. Blynk libraries are ZIP files that can be downloaded from the GitHub website to be imported to the Arduino IDE library. Blynk server will check for internet connection, NodeMCU with android hotspot, the NodeMCU code includes the token code, the name of hotspot, and its password. The information included in the code must be matched with the hotspot information to allow ESP8266 to connect with the Wi-Fi to be a channel to exchange commands between the smartphone and NodeMCU. The remaining processes are just commands sent from the Blynk application to NodeMCU to control loads that are connected to the relay kit. The sensor output value is sent reverse to the Blynk application from the NodeMCU kit.

To show the temperature value in Celsius degrees on the android display, NodeMCU will send the sensor output value in voltage to the Blynk application back. As with the process of turning on / off the final flowchart, the Blynk server will check the internet connection and the hotspot name and password, the amount of sensor output to indicate the correct temperature. The gauge tool shows the temperature in the Blynk application after setting the input pin and the temperature scale.

Now the Rockers and the LED lights can be accessed based on the user's requirement. The sound sensor checks and gets the rockers activated if the baby cries. The temperature and humidity of the cradle are identified and constantly updated on the Blynk server if the temperature is varied users will get a notification. This is the working principle of the proposed smart cradle.



6. RESULTS AND DISCUSSIONS

There are many key features of the Intelligent HSE-Hazop Cradle for home and hospital baby monitoring. Decent Work and Economic Growth. It focuses on good health and wellbeing. Also, it is affordable and consumes less energy. It serves as a partnership to achieve the parenting goals. HSE-Hazop free (HAZOP method based on the Health, Safety, and Environment Design).

7. CONCLUSION

In this project, we are successful in doing a prototype of a Cradle that will work automatically. We can turn ON the Rockers and the light based on the user's requirement through IoT. By detecting sound, the LED lights and the Motor will be turned ON for a particular time. The Camera and LIVE feed are added. We can send a notification to the Mobile phones through the server. Baby's Sleep data can be derived.

8. REFERENCES

[1].Madhuri P. Joshi, Deepak C. Mehetre," IoT Based Smart Cradle System with an Android App for Baby Monitoring", Third International Conference on Computing, Communication, Control And Automation (ICCUBEA)

[2]. S, Kavitha & R, Neela & M, Sowndarya & Madhuchandra, & Kamal, Harshitha. (2019). Analysis of IoT-Based Smart Cradle System with an Android Application for Baby Monitoring. 136-139. 10.1109/ICATIECE45860.2019.9063773.

[3].Prof. A. R. Patil, "Smart Baby Cradle an IOT based Cradle Management System.", 2018 International Conference on Smart City and Emerging Technology (ICSCET).

[4].Harshad Suresh Gare, Bhushan Kiran Shane, Kavita Suresh Jori, Sweety G. Jachak,"IOT Based Smart Cradle System for Baby Monitoring" International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 06 Issue: 10 | Oct 2019

[5]. F. .Natheera, S.Sundaravadivel, N.L.Visakan, S.Viswanathan and M.Vivekkumar, Smart Cradle, Asian Journal of Applied Science and Technology (AJAST) (Open Access Quarterly International Journal) Volume 2, Issue 2, Pages 291-300, April-June 2018.

[6]. IOT Based Baby Monitoring System for Smart Cradle by Waheb A. Jabbar, Senior Member, IEEE; Hiew Kuet Shang, Saidatul N. I. S. Hamid1; Akram A. Almohammedi; Roshahliza M. Ramli1, Member, IEEE and Mohammed A. H. Ali, Member, IEEE[2017]

[7].Prof. A.D. Anijkar et.al., "General Idea about Smart Baby Cradle", Int. J. of Innovative Science and Eng., Jan-Feb 2014.

[8].Rachna Palaskar, Shweta Pandey, Ashwini Telang,Akshada Wagh, Ramesh R. Kagalkar, "An Automatic Monitoring and Swing the Baby Cradle for Infant Care" Int. J. of Advanced Research in Computer and Commun. Eng., Dec 2015

[9].Harshad Gare, Bhushan Shahane, Kavata Jori, Sweety Jachak, "IOT Based Smart Cradle System for Baby Monitoring", International Research Journal of Engineering and Technology (IRJET), Oct-2019.