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## **E-CRADLE FOR INFANT CARE**

*<sup>1</sup>SHASHANK B BARAGUR,<sup>2</sup>KIRANKUMAR B M,<sup>3</sup>TOUQEER PASHA,<sup>4</sup>PRATHEEKUMAR N M, <sup>5</sup>HEMALATHA K N*

<sup>1234</sup>UG Student, <sup>5</sup>Asst.Professor

<sup>1</sup>Department of Electronics and Communication Engineering,

<sup>1</sup>Dr Ambedkar Institute of Technology, Bangalore, India

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### **ABS TRACT**

The project idea develops from the very fact that a parent finds it difficult to concentrate on their child as of their busy life. The situation aggravates when they have a job or have some household business, since they can neither compromise with their work nor can they ignore their child's needs. The microcontrollers can have eventual breakdowns that would simplify some of these new day problems. Cradle is an appliance which is used to carry a baby and for the comfort sleep of a baby. E-Care is a concept in which automatic movement of cradle when baby is disturbed, keeping track of baby temperature, maintaining hygiene of the baby and much more is possible. Unlike some of the existing models, which uses a microprocessor as the main controlling unit, this model uses IR wireless technology for less complexity and easy access and the slider crank mechanism used for the cradle swing makes smooth transition. The equipment of Baby care includes a dc motor, and different types of sensors performing different operations. The driver attached to the motor maintain constant speed.. Good quality, less weight material is used for the manufacturing of The Baby cradle. An instant mobile notification will be sent to parents or guardian if any abnormal activity is detected (like lot of crying, temperature rise, wet mattress) in the android application

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**Keyword:**Internet of Things, embedded c, android application,automatic swing, wet detection, music generation, software simulation.

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### **1. INTRODUCTION**

In this field of "Infant Care" several advancements have been made which is mainly due to the advancements made in the development of micro-controllers. There is a need to develop a new cost-efficient electronic baby cradle because the existing cradles are imported and costly. Parents in the present world are busy in their professional life. The main purpose of this smart cradle is to control all the features of cradle by a remote or application while simultaneously doing some other work. Its advanced features will reduce the burden of constant monitoring of baby by the user. The cradle design is classic Indian and the push and pull for swing as given by hand is replaced by automatic oscillations using a dc motor. The wet detection feature has been added to maintain hygiene. Mother's voice is provided to calm the baby while sleeping. The main objective of system is to design a fully automated smart baby cradle to help the professional and working parents. It provides automatic swing, monitor body temperature, provides music, maintain hygiene etc. Provides less expensive product. User friendly and simple operation. It will be very hard to control the babies and if someone is hiring baby sitters to take care of their baby. It may increase their expenses. Moreover, in today, life it is very hard to even for the homemakers to sit nearby their babies and take care of them whenever they feel uncomfortable. Though, it is automatic this model is very helpful for the nurses in maternity units of hospital.

## 2. LITERATURE SURVEY

Paper [1]. This paper suggests an algorithm for adjusting the cradle oscillation extent by the sensor signals. The e-baby cradle is made up of an adaptive oscillating device and other sensors. When the baby is cry, the sensors can judge the reason for crying according to detecting parameters, giving the signals to control circuit.

Paper [2]. Automatic baby rocker having a sound sensor to detect the crying of baby. Noise sensor consists of Electric MIC with a preamplifier. Signal from noise sensor is given to the microcontroller, which is used to control the DC motor swing. Few lights made up of LEDs are used to entertain the baby.

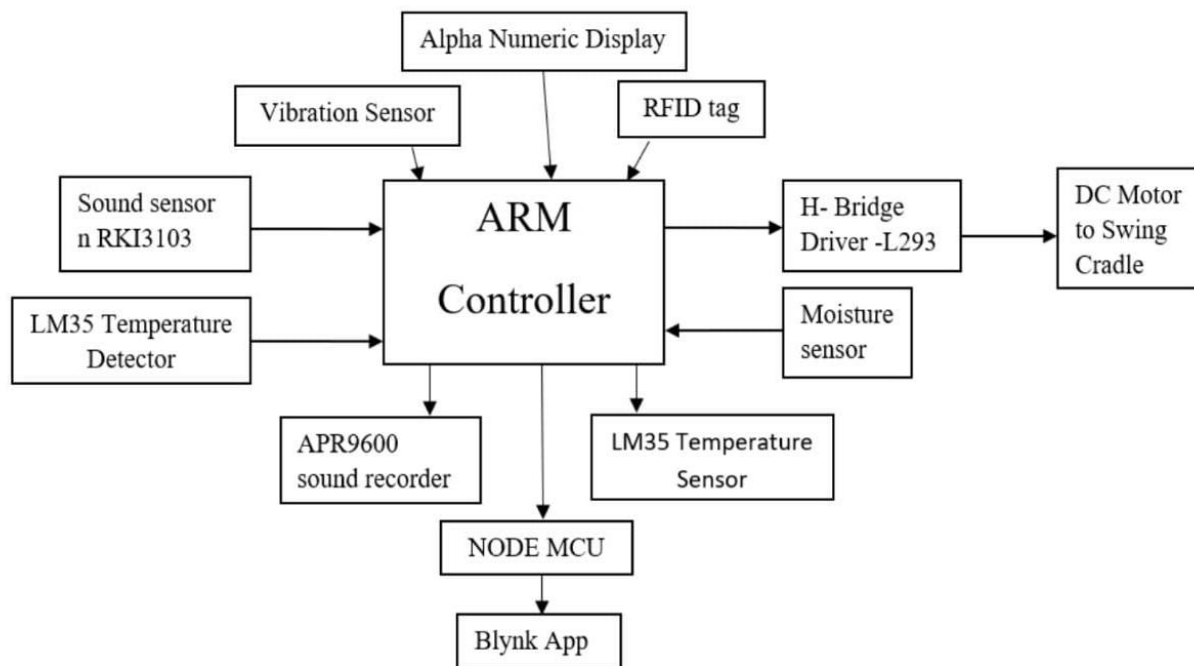
Paper [3]. This design focuses on automatic swinging of the cradle when baby starts to cry. If the baby stops crying before 3 minutes, then the cradle will stop after 4 minutes of swinging. It also sounds an alarm if baby cries for more than a specified time of 3 minutes indicating that baby needs attention and another alarm alerts when mattress gets wet.

Paper [4]. DC motor can offer cradle movement motion according to the given power. As per the microcontroller programming dc motor rotates in one direction for three seconds and then in another for the other three second. Additional features include: Alerting parent or care takers when the mattress gets wet and information regarding the body temperature rise by sending SMS to android application.

Paper [5]. They designed a crib adapter for automatic swinging. Once the crib is manually tilted to one direction and then released, it will permit the inertia to actuate the locking and actuating the arms to operate under the biasing force of spring coexisted with the gear. Hence, the spring-loaded motor begin to operate and the lever, which is attached, to crib is oscillated in back and forth movement to 90 Hz.

## 3. BLOCK DIAGRAM

The block diagram (Fig.1) consists of a pictorial representation of the final model of the system. The voltage supply for different circuits is from 9 to 12 V. For easy use of the design, an adaptor is used. The central unit used here is ARM microcontroller. The ac supply is indirectly used for continuous use of the different functions. The connection of all the sensors to the cradle is shown in figure.



## 4. METHODOLOGY

This system is microcontroller based that is being designed and aimed to help parents and nurses in infant care. Features being: Cradle starts swinging automatically when baby starts to cry and swings till the baby stops crying. Sends a notification if baby cries for more than a stipulated time indicating that baby needs attention. System starts playing mother's voice automatically when baby cry and stops when the baby stops crying. Sends a notification when mattress gets wet thus maintain the hygiene of the baby. A temperature sensor kept under the bottom cover where the baby sleeps can sense the temperature all time and sends analog signals to the central unit. Vibrator sensor will detect if baby tries to leave the cradle or someone picks the baby. RFID tag will keep monitoring the location of the baby. The E-cradle

works on two major modes: A low speed and a high speed mode. While on both the modes, care has been taken to maintain a speed in such a range that the baby doesn't get disturbed or scared during the change of modes. The rotatory speed of the DC motor is directly proportional to the supply voltage, and hence if the supply voltage changes, the speed of the motor also changes. Here the voltage regulation is designed using LM317 regulator. For speed controlling, voltages of 12V and 7V are given to the DC motor. In which the 12V is directly taken from the supply mains via an adapter and 7V is derived using LM317 regulator. Care has been taken that the wet detection circuit operates on less voltage levels to reduce the risks of baby experiencing discomfort. The wet detection circuit is basically an astable multi-vibrator circuit with a small break in its path which form a detector. Detector is actually has two plates with a break in between those plates so when liquid falls in the path, it completes route of conductivity and then generates waveforms. A voice cry detector will take crying of the baby as input and as output the cradle starts swinging. Node MCU sends a notification if baby cries for more than a stipulated time indicating that baby needs attention. Sound sensor outputs mothers voice when baby cry and stops when the baby stops crying. Moisture sensor alerts nod MCU when it gets wet to sends a notification to maintain hygiene of the baby. A temperature sensor kept under the bottom cover where the baby sleeps can sense the temperature all time and sends analog signals to the inbuilt ADC of the RL78 controller. Vibrator sensor will detect if baby tries to leave the cradle or someone picks the baby. RFID tag will keep track the location of the baby and outputs the signal to android application

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## 5.RESULTS:

The cradle design is classic Indian and the push and pull for swing as given by hand is replaced by automatic oscillations using a dcmotor. The wet detection feature has been added to maintain hygiene. Mother's voice is provided to calm the baby while sleeping. The main objective of system is to design a fully automated smart baby cradle to help the professional and working parents. It provides automatic swing, monitor body temperature, provides music, maintain hygiene etc. Provides less expensive product. User friendly and simple operation. It will be very hard to control the babies and if someone is hiring baby sitters to take care of their baby. It may increase their expenses. Moreover, in today, life it is very hard to even for the homemakers to sit nearby their babies and take care of them whenever they feel uncomfortable. Though, it is automatic this model is very helpful for the nurses in maternity units of hospital.

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## 6. ADVANTAGES

- New automated System.
- No manual attention required.
- Easy to implement and use.
- Baby health gets monitored all the time and maintain hygiene.
- Use of Wi-Fi module makes the monitoring from Long Range
- Immediate attention can be achieved.

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## 7.APPLICATIONS

- In metropolitan cities as modern cradle.
- In hospitals.
- In orphanages.

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## 8.CONCLUSION

Thus, the above designed system will be of great use to the working parents and nurses for taking care of the infants while doing other work simultaneously. This system emphasizes the importance of childcare and child health.

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