

## IOT BASED SMART CRIB FOR BABY SURVEILLANCE

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### ABSTRACT

Baby care has become more significant and demanding for working mothers in recent decades. Indeed home, working mothers will not have an enough period to track their babies regularly. They give the authority of their baby to either the babysitter or they shoot the baby to their grandparents' house. A crib with a computerized baby monitoring system has been designed as part of the proposed scheme. In the baby monitoring system, the necessary measures Temperature, breathing rate, gases in the atmosphere, activity, and the fetus's posture are all recorded simultaneously in the new born baby. The baby watching system is fixed to the crib so that an apparatus like atmosphere for the baby is created. The baby monitoring system tracks the baby continuously. The measured parameters regarding the Baby's health like temperature, pulse, humidity in baby bed will be displayed in web application. If the The recorded results show anything abnormal, necessary actions such as temperature control, fan on or off, crib vibration setting, baby music on will be taken. If the readings seem abnormal, the caretaker as well as the parent received warning message. The infant monitoring system helps parents perform timing operations and also makes it easier for caregivers. This baby monitor has proven to be less of a hassle for the most observant kids. This monitoring system is a widely effective IoT grounding system for Real-time monitoring with the safety measures.

**Keywords:** Infant Surveillance, Crib, IOT Mechanism, Actual Monitoring, Examination.

### I. INTRODUCTION

In latest years, both parents' employment has become much more typical in India. Baby monitoring could be the most difficult task for parents working during this time. Whereas the new born baby does have a guardian, maintaining a perspective of the baby as well as its health status would have been difficult and difficult for them. Additionally, almost one of every 10 babies is born sooner. Preterm infants are more sensitive than filled infants. Premature infants are tolerant to their circumstances at home. After arriving from units in hospitals, they were exposed to the environment. Premature infants are those who have been born earlier than expected. The baby's delivery date was more than three weeks earlier than expected. They are more probably to have medical conditions and are at an elevated risk of survival The baby's behavior necessarily requires. The baby's status should be monitored and controlled and in instantaneously. They'll be placed in a separate compartment or incubator for seconds observation. Premature infants require a longer stay in the hospital than do infants in the daycare or infant intensive care unit. PDA and hypotension, or breathing difficulties due to an immature respiratory system, are the most frequent issues that premature babies encounter. They also lose body 's temperature and tolerate diseases due to a compromised immune system, which create additional health hazards to the baby.

They require an extra controllers in an incubator to sustain the baby's core temperature, hydration, respiration rate, and breathing levels without support in order to preserve the baby's wellbeing. In the very same way, once a preterm newborn's stay inside the clinic comes to an end, they also have to be looked after more at residence. Babysitters and parents alone are unable to care for an infant on a regular basis.

In terms of appearance, the incubator safeguards and regulates the baby's health in health facilities with all of the factors that really need to be maintained. In alternative, there is still something suitable for the baby in the home, which can watch the baby minute by minute in terms of health issues and surveillance. The moisture and temperature around the newborn must be taken care of. With the Internet of Things, monitoring systems and automation with data interchange are rapidly expanding (IoT). Wireless sensors, software, hardware, actuators, cyber systems, and computer devices are all connected to an object that facilitates the network in an IoT device. With its data fetching software, it also allows for data transfer and management of the sensors and other linked

devices. Also with help of internet of Things, a second's real-time tracking system may be set up without any human intervention.

IoT devices are coupled with current technology, resulting in a combination of connectivity or interconnectivity upon that web, which can be managed and controlled remotely as needed, thanks to ongoing research, framework installation, and intelligent systems (AI). Computerized automated processes work in real-time and provide the optimum assistance in each step of the network. The Internet of Things also allows for examination mode for the tracking system, which helps in enhanced climate and medical monitoring. The functionality of the heartbeat parameters, humidity control, temperature control representation of insecure gases, and room humidity control are all measured with the use of genuine sensors in this study. The web interface keeps a record of the baby's health, including sensor readings. The sensors are connected to the Adriano board, which serves as a developing interface for the framework on board. This reduces the overall complexity of the newborn's basic circuit as well as the complexities of the onboard components. In a home, the baby's initially resting area is in the cradle. The baby's health status is tracked and controlled by all latest information and medical readings if this is taken care of. This cradle offers both comfort and security for the infant.

The cradle's circuits are simpler, which decreases the chance of short circuits. The cradle features a surveillance system, and the baby's position and area are constantly monitored, either through an interactive web - based application or via the cradle properly.

## II. METHODOLOGY

Method and The overall methodology aided in this research is shown in Figure. Concerns in the existing systems were identified by conducting a comprehensive literature review on studies related to baby monitoring systems. Then, we introduced a smart cradle that combines the concept of IoT with baby monitoring system. The system design is split into two phases, namely, the cradle design and control system design. A cradle prototype for the baby monitoring system was designed. In the control system design, the types of electronic components were determined and purchased for implementation in the system. Then, coding was carried out according to how the system was proposed. After the modeling phase, the designed baby monitoring system was then improves and boost through several tests to achieve the expected outcome. Subsequently the system was installed on the cradle prototype for the testing phase before finalizing the smart cradle. When the testing doomed due to some coding errors or other problems, the testing phase was replicated until the cradle achieved the expected outcome that satisfied the research objectives. The details regarding the components required in the baby cradle was decided to ensure that they can be installed without errors. We also examine available baby cradles that included a baby monitoring system in the market to gain some insights into the structure of the baby cradle. The priority is to ensure the safety of the baby. For the baby cradle, we designed the cradle dimensions and the main components, which allowed swinging and attachment of the developed monitoring system. Material selection is a key step in the process of designing any physical object. Selecting the appropriate material is one of the keys that lead to success. Our wooden baby cradle is build with red meranti wood. Wood is used mainly for its environment-friendly property. It was built as a classic baby cradle but with the latest technology. The baby cradle is rectangular in the shape and it has fences that keep the baby from falling off the front and side. The back side is same as door, but it does not handle sideways and it moves to 90 degrees from the initial state. A latch is used for the close and attach the cradle. The designed baby cradle is type of the 2-in-1. The fabrication established with shop drawings, including precise measurements. Then, the fabrication stage was done, and finally, the installation of the final project was done. Value-added development, including cutting, paneling, drilling, sawing, forming, 3D printing, and machining. The cylinder is place on top of the cradle is the baby's musical toy for the baby's head to calm and cause the baby to become drowsy.

## III. MODELING AND ANALYSIS

The structure plan is a divide into two parts, namely the crib design and a control system plan. A crib prototype for the baby surveillance system was a plan. In the control system plan, the types of an electronic part were insistent for implementation. We designed a smart baby surveillance system for the smart crib using an Aurdino-uno. The user has the ride to an authenticated to save the scanning records. The analysis and a daily

surveillance had done by a database and grow a prediction. The control on the motor command will be hosting by the database. The notification also sends by the authenticated person means parents.

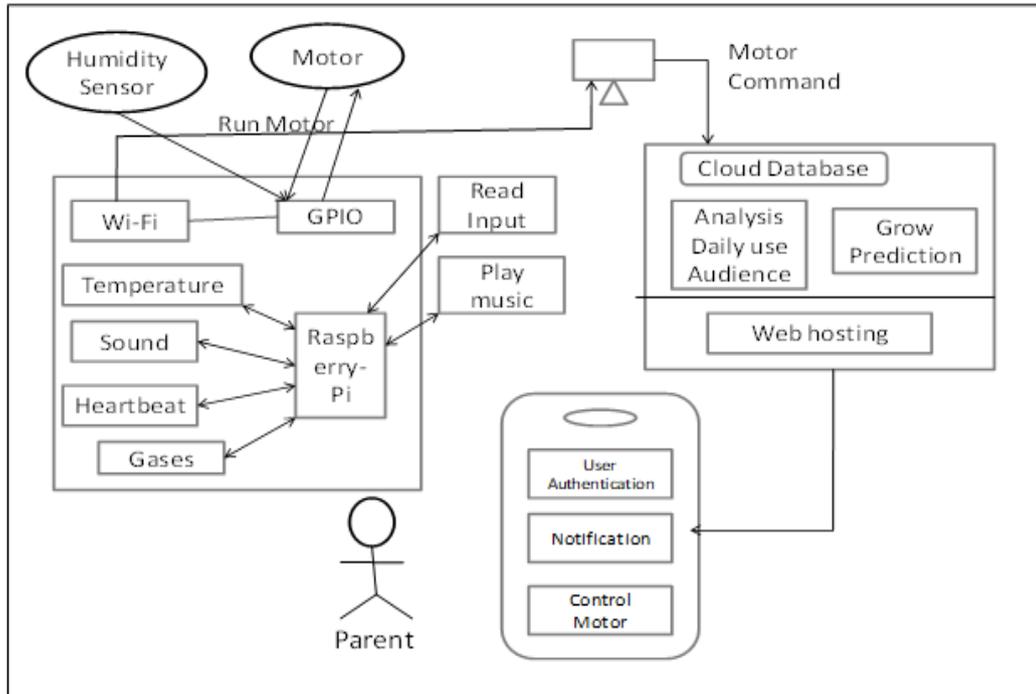


Fig 1: System Architecture.

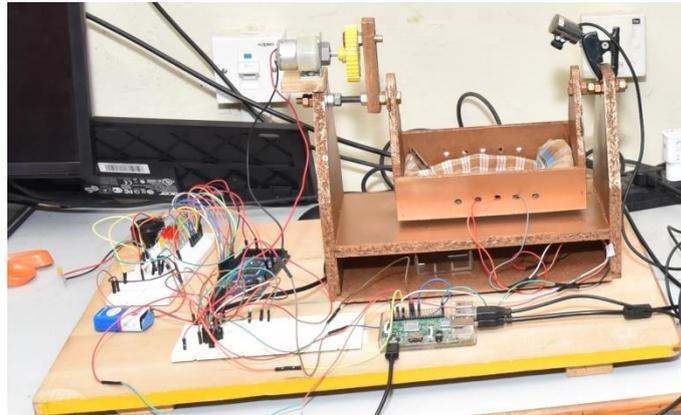
Ardino-uno is a multifunction board with a dual microcontroller that works on the collateral appliance with Wi-Fi and microcontroller. There are some required parameters for the little one that to be in need of surveillance on every day from time to time. Such framework is body temperature, gas sensor, and pulsation that are dignified using sensors. A microphone module is attached to the crib that gives the required indication of the baby, whether he/ she is crying or not. With this, the reason for the baby's crying is temperature, pulsation difference, nature calls, or the baby's hunger can be recognized. The sensor's scanning will be prepared by the microcontroller and take down data is communicated using Wi-Fi module. The sensor scanning will be surveilled, and the required actions will be prepared according to the baby's situation.

As per the scanning, if the temperature is elevated and the baby is whimpering, the heater put under the crib supply enough heat for the baby to comfort zone. In other way, when the temperature is too elevated, a portable fan is present on the uppermost part of the crib, which is handled with levels of speed. As well as, if the baby whimper, the attached music player in crib plays the songs, and that will be handled by the microcontroller or external source. The crib is managed using a servo motor that makes the crib swing whenever the baby whimper. This will be to determine using a microphone.

#### IV. RESULTS AND DISCUSSION

In the Web application, you can see how hardware and software communicate. The data collected by sensors such as a gas sensor, temperature sensor, and pulse sensor can be monitored by the web application. the findings for the infant's condition, including whether the baby has a high or low temperature, whether the baby is safe or has any heart rate abnormalities, and whether the baby has gone for any nature calls. After taking into account each characteristic for the infant's movements, it concludes that the baby is safe.

For the baby in the cradle, the suggested technology creates an incubator-like environment. It makes caring for children easier for both parents and caregivers. Working women and ordinary parents would benefit greatly from the system. This system supports mothers and caregivers in periodically monitoring the baby's health. This system allows parents to understand their baby's health without the assistance of a doctor, and parents can monitor their baby through video surveillance 24 hours a day, seven days a week. Future updates will include sensing cough and frequent sneezing of the baby with the help of a microphone attached, and this will be alerted with a message among other things.



**Fig 2:** Hardware Unit

## V. CONCLUSION

All the main points of the research work are written in this section. Ensure that abstract and conclusion should not same. Graph and tables should not use in conclusion. In the developed system all necessary sensors that are used for measuring the parameters, In the application, the parents gets necessary alarm messages or alerts regarding the temperature, moisture, gases, baby's bed dampness, crying sound and pulse rate of the baby on their web application. Every minute monitoring of baby can be done. The necessary framework for baby monitoring with the screening of necessary parameters like health monitoring and full-time surveillance of the baby is demonstrated.

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