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An IOT based baby monitoring and smart cradle system

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Introduction

Availability of high speed internet and wide use of mobile phones leads to the popularity of IoT. One such important concept of the same is the use of mobile phones by working parents to watch the activities of the baby while babysitting.

This proposed work deals with the health and security of the infant. The system consists of various sensors to monitor the actions of the baby. This information will be sent to the parent through the mobile application.

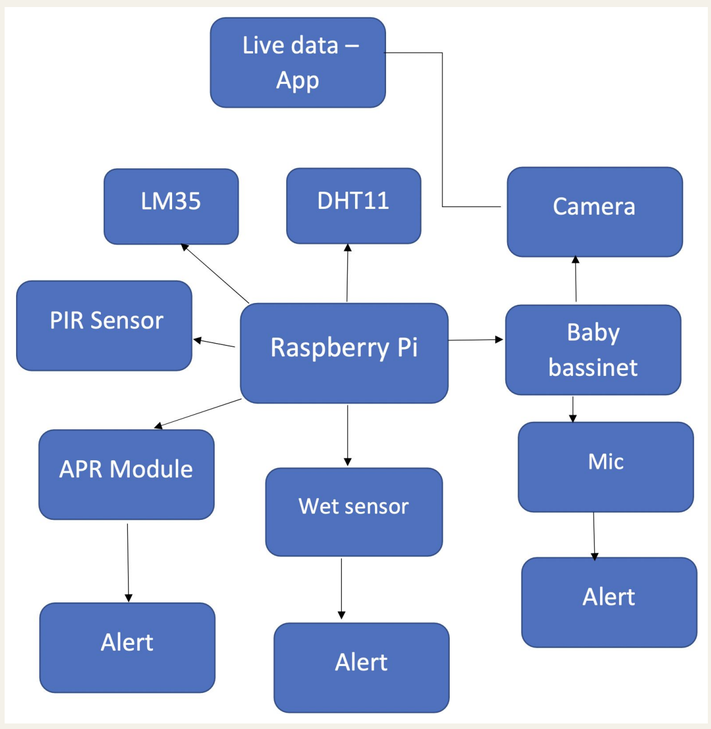
The audio sensor will detect if the baby is crying or not, the cameras will capture the baby's movements as well as the visitors entering the room. The temperature sensor and humidity sensor will help the parent know the current health condition of the child.

Objectives

To help the working parents to monitor their child via a mobile application.

To use an audio and video data to soothe/relax the crying baby when required.

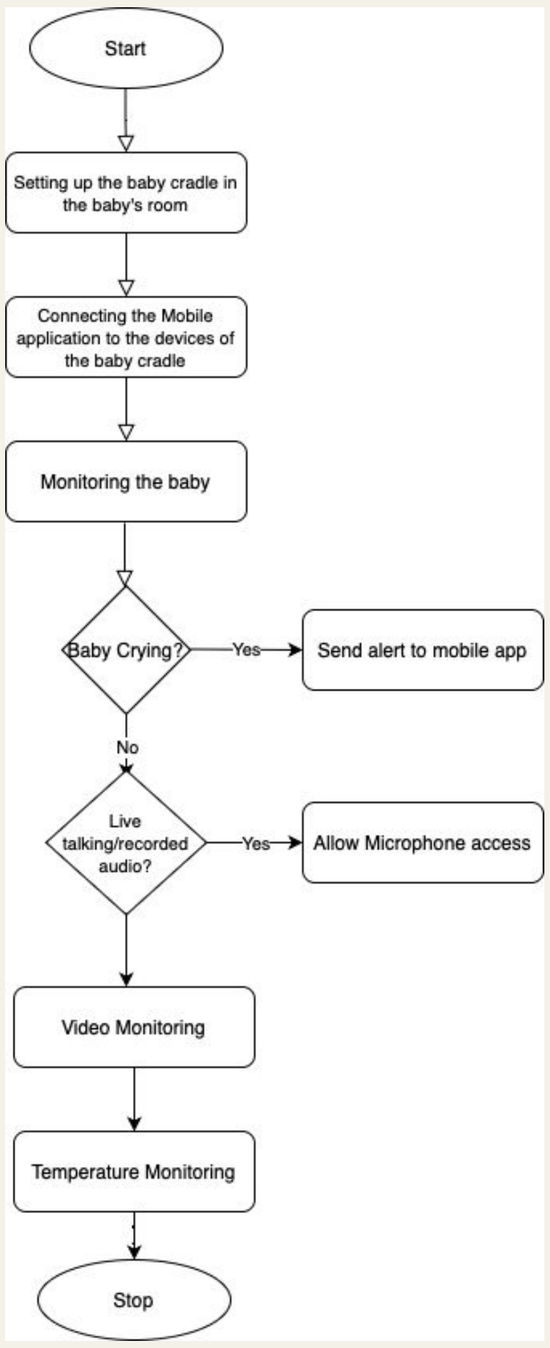
System Model - Block Diagram



Hardware Requirements

- Node MCU controls the whole system. The MCU uses an Arduino platform. The MCU comes with an inbuilt Wi-Fi and uses embedded C.
- A motion detection PIR sensor is used to check the presence of a baby in the cradle. It alerts the parents when the baby is not found in the cradle, by sending SMS to parents.
- Raspberry pi 3 present near the child has a Zebronica mic plugged with it, which is connected to a 7 channel USB sound card ,This will record the audio signals and these audio signals are stored in the form of buffers in the raspberry pi.

Working Methdology



Expected Results

The target beneficiaries are working parents who cannot monitor their children whenever required.

Hence, the expected result is an IoT based Real-Time Infant Monitoring and Cry Detection with Infant Cradle Monitoring System that detects a crying infant and sends alert messages to the end user (parent).

With special focus on the mobile application which updates the necessary information to the parents.

To help working parents, especially mothers to monitor their child and work without any distractions.

Enabling live updation of the baby continuously.

Alerting parents via the mobile app whenever required.

Advantages

- Real time live updates sent to parents using mobile application
- Video monitoring
- Audio monitoring : playing of mother's recorded audio when baby cries
- Audio monitoring : being able to talk to the baby
- Detects wetness of the baby, alerts if beyond the range
- Alerts the parents if the temperature of the baby rises

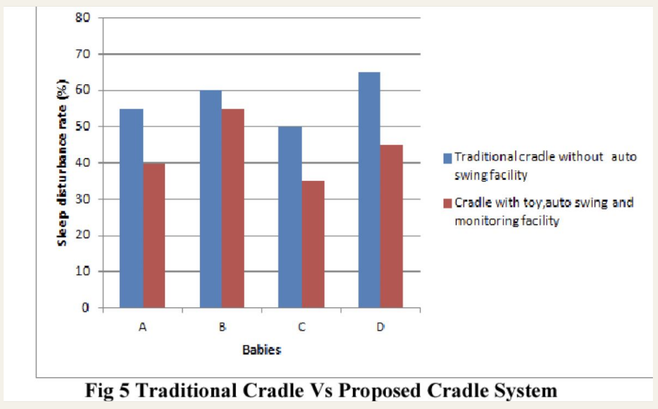


Fig 5 Traditional Cradle Vs Proposed Cradle System

Fig. Traditional Cradle vs Proposed Cradle System Sleep Disturbance Rate

Limitations

- System is not portable, the baby cradle cannot be moved to any place
- It fails to contain the rocking motion and rotary motion to soothe the baby
- There might be a suffocation risk
- The baby can get injured by falling out of the cradle

Conclusion

The proposed system is a novel system which integrates various hardware components to build a detailed and efficient system for monitoring babies.

It will be very useful for working parents who constantly worry about their babies.

Constant updates to the mobile application of the parent to keep track of the baby.

The implementation cost is moderately high, but a efficient system to solve one of the biggest problem for working parents.