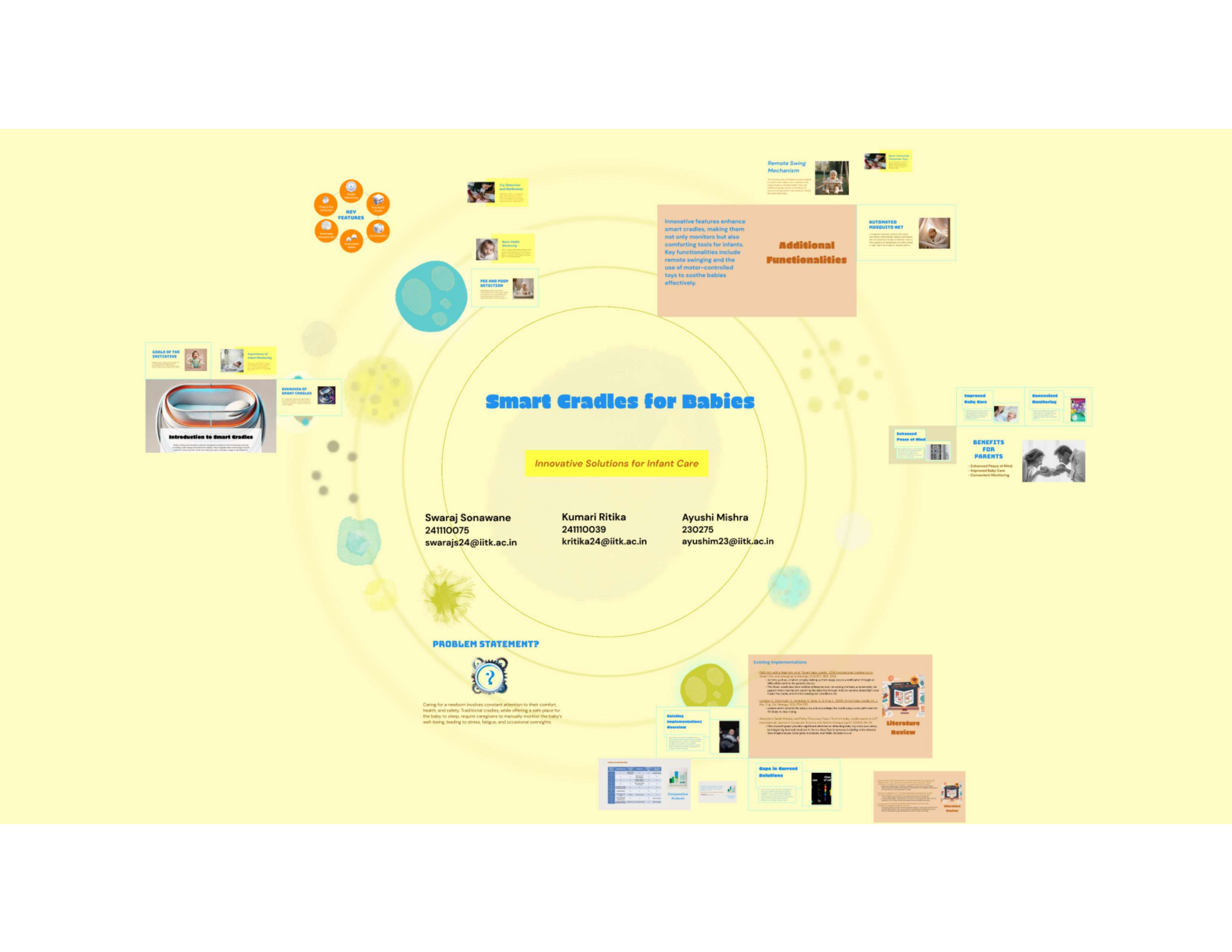
Smart Cradles for Babies
Innovative Solutions for Infant Care
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PROBLEM STATEMENT?
Caring for a newborn involves constant attention to their comfort, health, and safety. Traditional cradles, while offering a safe place for the baby to sleep, require caregivers to manually monitor the baby's well-being, leading to stress, fatigue, and occasional oversights.
KEY FEATURES
Cry Detection and Notification
Basic Health Monitoring
PEE AND POOP DETECTION
Remote Swing Mechanism
Additional Functionalities
Innovative features enhance smart cradles, making them not only monitors but also comforting tools for infants. Key functionalities include remote swinging and the use of motor-controlled toys to soothe babies effectively.
AUTOMATED MOSQUITO NET
GOALS OF THE INITIATIVE
Importance of Infant Monitoring
OVERVIEW OF SMART CRADLES
Introduction to Smart Cradles
Improved Baby Care
Convenient Monitoring
Enhanced Peace of Mind
BENEFITS FOR PARENTS
- Enhanced Peace of Mind
- Improved Baby Care
- Convenient Monitoring
Existing Implementations
Literature Review
Existing Implementations Overview
Comparative Analysis
Gaps in Current Solutions

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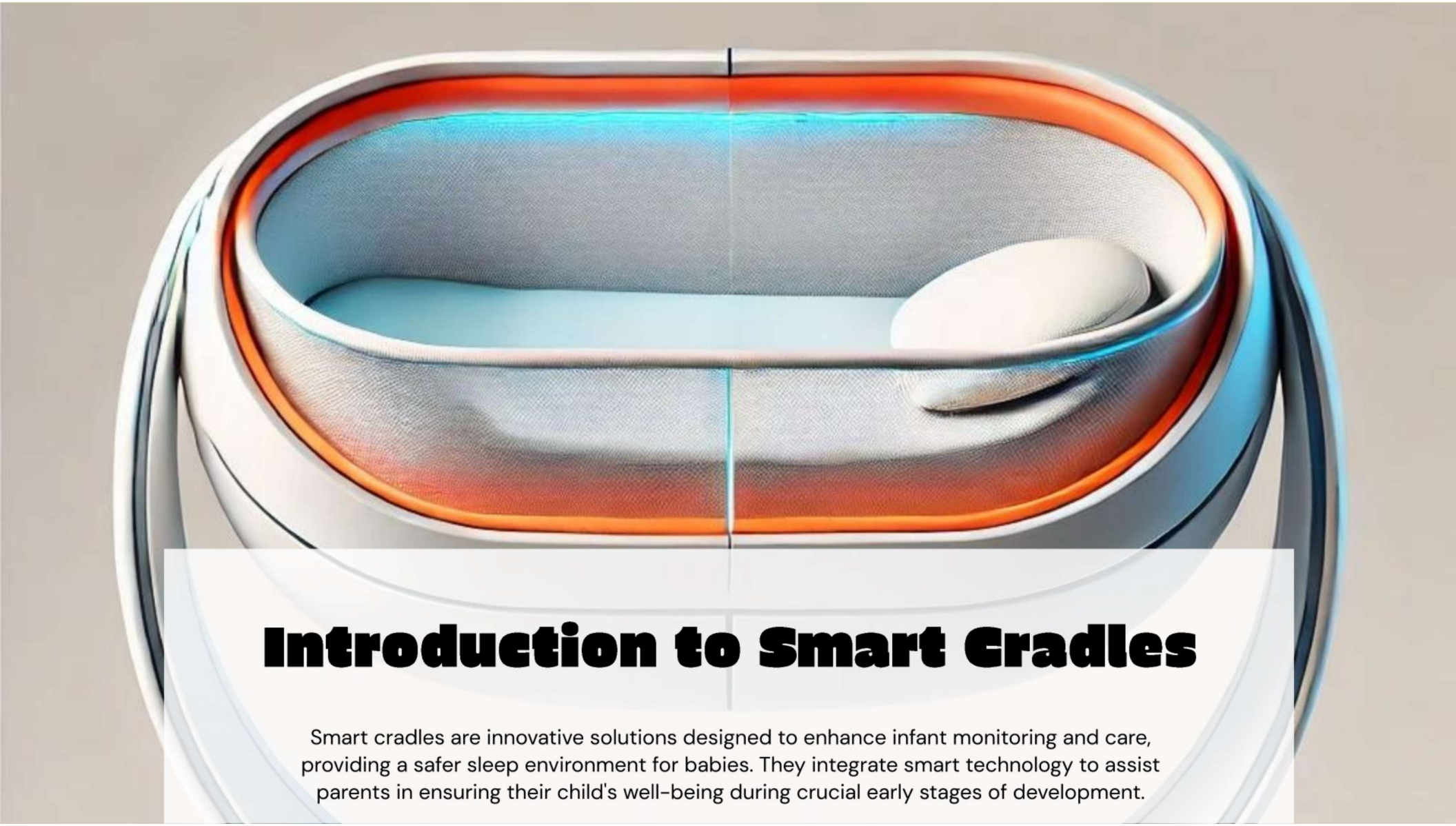

Introduction to Smart Cradles

Smart cradles are innovative solutions designed to enhance infant monitoring and care, providing a safer sleep environment for babies. They integrate smart technology to assist parents in ensuring their child's well-being during crucial early stages of development.

OVERVIEW OF SMART CRADLES

Smart cradles utilize advanced technology to monitor babies' health and comfort. They support features such as contactless temperature measurement and remote functionalities, making infant care more convenient and effective for parents.

Importance of Infant Monitoring

Monitoring an infant's health is vital for early detection of potential issues. Smart cradles provide parents with real-time insights, reducing anxiety and enhancing proactive care measures during the infant's vulnerable early months.

GOALS OF THE INITIATIVE

The initiative aims to revolutionize infant care through smart technology, focusing on improving safety, enhancing monitoring capabilities, and offering a supportive environment for both infants and parents. Key goals include innovation in health monitoring and parent-child interaction.

KEY FEATURES

Health Monitoring

Automatic Cradle

Cry Detection

Automated Rattle

Automatic Mosquito Net

Poop & Pee Detection

Basic Health Monitoring

Using infrared sensors, smart cradles can measure a baby's temperature without direct contact, eliminating discomfort and safety concerns. We can also try monitoring the sleep pattern of infants by placing appropriate sensors in their pillow. We could also explore the possibility monitoring the weight of the baby in the cradle itslef.

PEE AND POOP DETECTION

By leveraging various sensors and connectivity options, these smart cradles provide timely alerts and valuable data, enhancing caregiving efficiency and ensuring the baby's comfort and health.

Cry Detection and Notification

Advanced sound detection algorithms allow smart cradles to identify a baby's cries and notify parents via smartphone alerts. This feature ensures that parents are immediately informed, fostering quick responses to a baby's needs and enhancing the parent-child bond.

Remote Swing Mechanism

The remote swing mechanism allows parents to soothe their babies from a distance. By using an app or remote control, they can initiate swinging motions, mimicking the natural rocking motion that comforts infants and promotes sleep.

Motor Controlled Distraction Toys

Motor-controlled distraction toys attached to the cradle can effectively engage babies' attention. These toys can move, light up, or make sounds, helping to calm a fussy infant and keep them entertained when parents are temporarily unavailable.

AUTOMATED MOSQUITO NET

It integrates sensors, motors, and smart controls to automatically deploy and retract the net based on certain conditions, such as the presence of mosquitoes, the time of day, or user input via an app or remote control.

BENEFITS FOR PARENTS

- Enhanced Peace of Mind
- Improved Baby Care
- Convenient Monitoring

Existing Implementations

- Patil, Aniruddha Rajendra, et al. "Smart baby cradle." 2018 international conference on Smart City and emerging technology (ICSCET). IEEE, 2018.
    - Activity such as urination or baby waking up from sleep occurs a notification through an SMS will be sent to the parent's device.
    - The Smart cradle also have additional features such as rocking the baby automatically via geared motor mechanism, watching the baby live through Arduino camera, detect light level inside the cradle, and PCB for sensing wet conditions etc.

- Lohekar, K., Deshmukh, S., Ambekar, S., Gole, N., & Vina, L. (2019). Smart baby cradle. Int. J. Res. Eng., Sci. Manage, 2(3), 574-575.
    - system which detects the baby's cry and accordingly the cradle plays some soft music for the baby to stop crying.

- Alswedani, Sarah Ahmed, and Fathy Elbouraey Eassa. "A smart baby cradle based on IoT." International Journal of Computer Science and Mobile Computing 9.7 (2020): 64-76.
    - This research paper provides significant attention on detecting baby cry, more accurately, by integrating four-sub modules in the cry classification process including voice analysis, face image analysis, body gesture analysis, and finally decision fusion.

Literature Review

- Saude, Natasha, and PA Harsha Vardhini. "IoT based Smart Baby Cradle System using Raspberry Pi B+." 2020 International Conference on Smart Innovations in Design, Environment, Management, Planning and Computing (ICSIDEMPC). IEEE, 2020.
    - Parent can recognize baby's movement, sound like crying and video output of baby's present position and motion will be visible on a screen monitor so the parent or any person can watch the infant even while away from baby

- Sathasivam, Thilagamani, et al. "IOT-Based Smart Baby Cradle: A Review." ICT with Intelligent Applications: Proceedings of ICTIS 2022, Volume 1 (2022): 589-603.
    - A baby cradle contains a camera with a video attachment and a microphone.
    - In the designed gadget, Node ARDUINO Unit Board of control exposed to collect the facts examined aid of using the monitors and updated through needed requirements

- Tursunov, Javlon. "A SMART BABY CRADLE SYSTEM BASED ON IOT." QO 'QON UNIVERSITETI XABARNOMASI (2023): 1231-1233.
    - This paper proposes the idea that diseases are preventable if certain signs are identifies are identified well in advance. This can be reduced by detecting certain parameters such as heart rate, temperature, weight and another factor like and safe surroundings.

Literature Review

- Joseph, Senoj, Akshaya Kumar, and MK Harish Babu. "IOT based baby monitoring system smart cradle." 2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS). Vol. 1. IEEE, 2021.
    - A Camera is fitted in the top Cradle for live video film & sound sensor to break down Cry Patterns. All the information which is being taken from the sensors will be put away in information base & recognized at normal stretches

- Jabbar, Waheb A., et al. "IoT-BBMS: Internet of Things-based baby monitoring system for smart cradle." IEEE Access 7 (2019): 93791-93805.
    - The proposed system exploits sensors to monitor the baby's vital parameters, such as ambient temperature, moisture, and crying.

- Duman, Ülkü, and Erdoğan Aydin. "IOT based baby cradle system with real time data tracking." 2020 5th International Conference on Computer Science and Engineering (UBMK). IEEE, 2020.
    - tracks the real-time temperature, heart rate, wetness and sound of the baby is proposed, and the data received from the sensors will be transferred to a web platform via Wi-Fi and checked in real-time. In the case of crying, the cradle will swing autonomously. The alarm will be activated if crying does not stop or if an abnormal increase in the measured body temperature, heart rate and humidity level is observed.

Literature Review

TABLE OF COMPARISON

Research Paper	Health Monitoring	Automated Cradel	Cry Detection	Automated Rattle and Net	Poop and Pee Detection
1	x	geared motor mechanism	X	X	Using PCB sensor
2	x	X	plays some soft when detected	X	X
3	X	X	significant attention on detect baby cry	X	X
4	X	X	Output video of baby upon detection	X	X
5	Uses pressure, pulse, temperature sensors	X	X	X	X
6	Prevents disease	X	X	X	X
7	Uses Temperature sensor	DC Motor	Uses sound sensor	X	X
8	monitor the baby's vital parameters	X	X	X	Detects moisture
9	tracks the real-time temperature, heart rate.	While crying	alarm will be activated	X	Detects moisture

Comparative Analysis

Comparing major smart cradle technologies reveals variations in functionality and user satisfaction. While some prioritize health monitoring, others emphasize automated soothing methods, highlighting a gap between high-tech solutions and parental expectations for ease of use.

Major properties that make this project different from others:

- **User Friendly GUI**
- **Automatic Cradler and Mosquito net**

Comparative Analysis