Here’s a description of each issue along with the solution for the Smart Cradle System:

1. Issue: Real-Time Notification

Description: Parents and caregivers need to be immediately alerted if there are any abnormalities in the baby's environment or behavior. Delays in receiving notifications can prevent timely responses to potential issues, such as the baby waking up or changes in temperature.

Sensors: ESP8266, ESP32

Solution: Implement a real-time notification system using ESP8266 and ESP32. The system will send alerts via email, app notifications, and record the situation with a camera if abnormalities are detected. The notifications will be displayed on a dashboard, allowing parents to monitor the situation remotely and respond quickly.

2. Issue: Data Logging

Description: Continuous monitoring and recording of the baby’s environment and behavior are essential for understanding patterns and making informed decisions. Without data logging, parents lack the historical data needed to track the baby's conditions over time.

Sensors: ESP32

Solution: Use ESP32 to log data continuously from sensors monitoring temperature, humidity, and the baby’s movements. This data will be stored and displayed on a dashboard in the form of graphs and charts, allowing parents to review past data and observe trends over time

3. Issue: Environmental Monitoring

Description: The baby's comfort and safety depend on maintaining optimal environmental conditions, such as the right temperature and humidity levels. If these conditions are not monitored, the baby’s health could be at risk.

Sensors: ESP32

Solution: Deploy ESP32 to monitor environmental conditions like temperature and humidity in real-time. The data will be shown on a dashboard, where parents can view the current conditions and access historical trends. If necessary, the system can adjust environmental settings remotely to maintain a safe and comfortable environment.

4. Issue: Sound and Movement Detection

Description: Detecting sounds and movements is crucial to ensure the baby’s safety and comfort. Unnoticed disturbances can lead to prolonged crying or discomfort. Parents need to be aware of these changes to intervene promptly.

Sensors: Speed Studio XIAO ESP32S3

Audio: Audio Playback Module

Solution: Use the Speed Studio XIAO ESP32S3 to detect and log sound and movement events in the cradle. The system will send alerts to the dashboard, and parents can remotely activate audio playback through the Audio Playback Module to soothe the baby. The system also allows manual activation of the camera to check the situation in real-time.