



National Textile University

Department of Computer Science

Group ID 24-FYP-203 (BSSE-A)

Supervisor Mr. Abdul Qadeer

Co-Supervisor Ms. Sana Ikram

Group Members

Fasih Ahmad Khan 21-NTU-CS-1307

Hashim Bin Hafeez 21-NTU-CS-1333

Ali Hasan 21-NTU-CS-1297

2nd Priority

Project Proposal: Enhanced Smart Baby Monitoring System

Executive Summary

This project aims to develop an advanced IoT-based system to monitor the safety and well-being of infants within their cradles. By leveraging pressure sensors, temperature sensors, a camera, an ESP32 micro-controller, and a mobile app, the system will provide real-time monitoring of the baby's presence, temperature, and visual observations.

Introduction and Background

The safety and comfort of infants are of paramount importance to parents and caregivers. Traditional methods of monitoring babies can be time-consuming and prone to human error. This project proposes a technological solution that utilizes IoT to provide a reliable, convenient, and comprehensive way to monitor infants while they sleep.

Project Rationale

The development of a smart baby monitoring system is crucial for addressing the following concerns:

- **Infant safety:** Accidents can occur while infants are sleeping, and early detection can prevent serious injuries.
- **Parental peace of mind:** The system can provide parents with reassurance and reduce anxiety about their baby's safety.
- **Convenience and efficiency:** The system can eliminate the need for constant supervision and provide real-time updates.

- **Technological advancement:** This project leverages IoT technology to provide a modern and innovative solution to a longstanding challenge.
- **Health monitoring:** By tracking temperature, the system can help identify potential health issues early on.
- **Visual observation:** The camera component allows parents to see their baby remotely, providing additional peace of mind and the ability to intervene if necessary.

Objectives

- Develop an IoT-based system capable of detecting an infant's presence.
- Implement a real-time temperature monitoring system to ensure the baby's comfort and health.
- Integrate a camera for visual observation of the baby.
- Integrate a mobile app for remote access, notifications, and video streaming.
- Create a user-friendly interface for easy operation and understanding of alerts.
- Detect a baby's crying or unusual movement. This can trigger alerts to the mobile app when certain noise levels or movements are detected.
- Incorporate humidity sensors to detect when the diaper is wet and send an alert to the mobile app.
- Include a feature to play soothing sounds or lullabies remotely from the mobile app to calm the baby.
- Monitor indoor air quality parameters like temperature, humidity, and CO2 levels, providing alerts if any exceed safe limits.

Scope of the Project

The project will focus on the design, development, and implementation of a comprehensive IoT-based baby monitoring system. Key components will include:

- **Hardware:** Pressure sensors (e.g., capacitive or resistive), temperature sensors (e.g., thermistor or infrared), camera, ESP32 micro-controller, power supply, and necessary peripherals.
- **Software:** Firmware for the ESP32, back-end server for data processing, and a mobile app for user interaction.
- **Integration:** Connecting the hardware and software components to ensure seamless operation.
- **Testing:** Rigorous testing of the system to verify its accuracy, reliability, and functionality.

Target Audience

The primary target audience for this project includes:

- **Parents:** Individuals who want to ensure the safety and well-being of their infants.
- **Caregivers:** Those responsible for monitoring and caring for infants.
- **Healthcare professionals:** Individuals working in the field of child health and safety.

Existing Materials and Tools

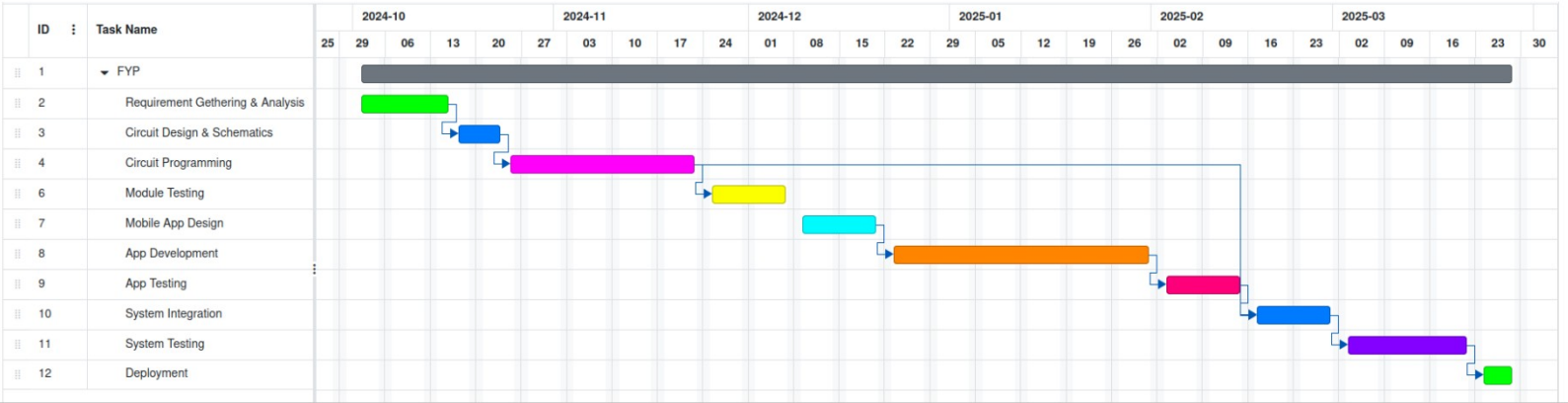
- **ESP32:** A powerful and versatile platform for IoT applications.
- **Pressure sensors:** Capacitive or resistive pressure sensors to detect the presence of an infant in the cradle.
- **Temperature sensors:** Thermistor or infrared sensors to measure the baby's temperature.
- **Camera:** A low-power, high-resolution camera for visual monitoring.
- **Power supply:** A reliable source of power for the system.
- **Development tools:** Integrated development environment (IDE) for programming the ESP32 and creating the mobile app.


- **Network infrastructure:** Internet connectivity for remote access and data transmission.

Tools and Technologies

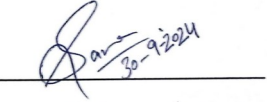
- **ESP32:** A low-power, high-performance micro-controller.
- **Web server:** A back-end platform for data processing and storage.
- **Mobile app development framework:** (e.g. React Native) for creating a user-friendly mobile app.
- **IoT protocols:** MQTT or HTTP for communication between devices.
- **Cloud platform:** (Optional) A cloud-based solution for data storage and analysis.

Gantt Chart





Supervisor



Co-Supervisor