HASAN KALYONCU UNIVERSITY
Electrical-Electronics Engineering Department
EEE 499 Project Proposal Form

Part I. Project Proposer

Name Last name		E-mail	
		Date	

Part II. Project Information

Title of the Project	Smart Baby Monitoring System with AI-Based Sound and Image Analysis				
Maximum Cost of implementation (TL)	5000 TL	Conceptual Design Dead Line	in 5 weeks	Prototype Production Deadline	in 13 weeks
Standards and licenses to be used in the project. example; IP65, IEEE, APACHE, MIT, etc.	IEEE standards, Apache License (for open-source libraries)				

Project Description

This project aims to design and implement a smart baby monitoring system that integrates sound recognition, image processing, and IoT connectivity. The system will capture real-time audio and video from the baby's environment, detect crying or abnormal sounds using deep learning models, and identify unsafe movements or risky situations through computer vision. Notifications and live monitoring will be delivered to parents' smartphones via a secure mobile application.

Project Justification

Traditional baby monitors mainly rely on simple audio or video feeds without intelligent event detection. This project leverages artificial intelligence to provide more reliable and proactive monitoring, enhancing safety and peace of mind for parents. By combining sound and image analysis with real-time alerts, the system addresses gaps in conventional monitoring solutions.

New aspects	Integration of cry detection and activity recognition using AI. IoT-enabled alerts via mobile applications. Real-time edge processing on embedded hardware (e.g., Raspberry Pi + camera + microphone). Application of computer vision and deep learning models for baby posture and motion analysis.

Complexity : The project involves implementing multiple AI models (sound classification and image-based posture detection), optimizing them for embedded hardware, and ensuring reliable real-time communication. Balancing computational efficiency with accuracy is a key challenge.

Challenging problem and issues	Training reliable sound and image recognition models with limited labeled datasets.Managing hardware limitations (memory, processing power).Ensuring real-time response and low false alarm rates.Secure and stable communication between device and mobile app.
Related electrical-electronics science	Embedded Systems, Signal and Image Processing, Machine Learning and Deep Learning,Internet of Things (IoT) , Wireless Communication
Tools	Python, TensorFlow, PyTorch Raspberry Pi, camera, microphone, sensors, Android/iOS mobile application framework (Flutter, React Native, or similar), Cloud/IoT communication services (MQTT, Firebase)

Risk involved

Potential problems and alternative solutions	
Minimum work required	20 hours per week for 14 weeks