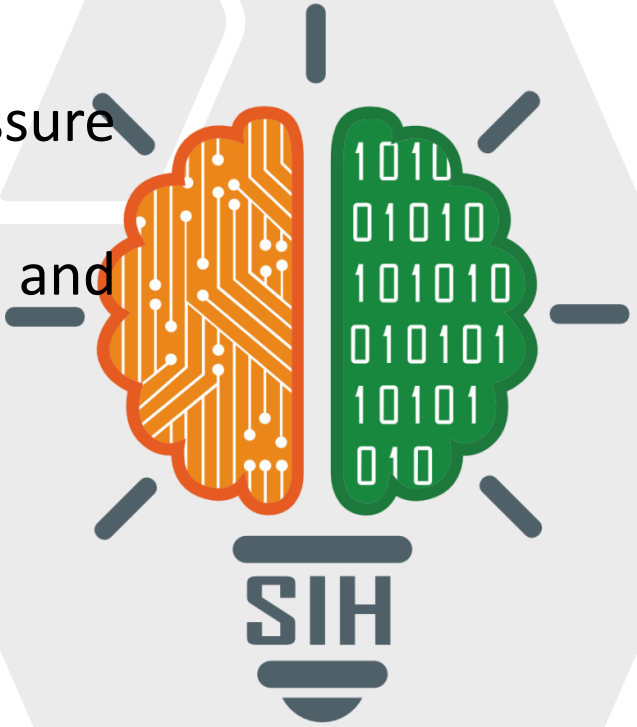
SMART INDIA HACKATHON 2025

TITLE PAGE

- **Problem Statement ID – SIH25143**
- **Problem Statement Title-**Real-time based pressure measurement device to optimize orthotic design and patient outcomes.
- **Theme-**MedTech / BioTech / HealthTech
- **PS Category- Hardware**
- **Team ID- 94888**
- **Team Name (Registered on portal) – ZETA1**



ZETA1

IDEA TITLE

OrthoSense – Real-Time Pressure Mapping System for Orthotic Optimization

SMART INDIA HACKATHON 2025

DETAILED SOLUTION - A smart AI-powered orthotic system that continuously measures foot pressure in real time and automatically adjusts support using adaptive sensors and actuators.

Flexible Pressure Sensor Array

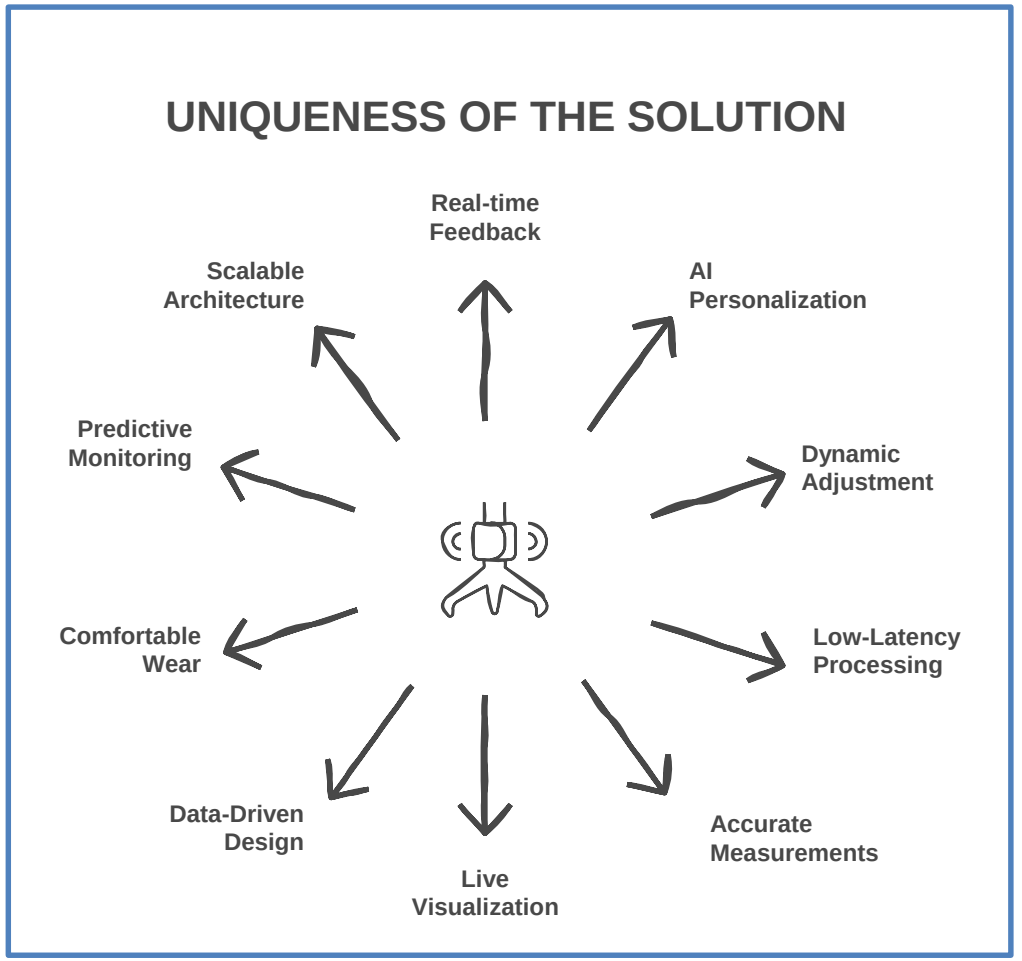
Adaptive Feedback Layer

On-Device Processing

AI/ML-Based Pattern Analysis

User Interface (Mobile or Tablet)

KEY FEATURES

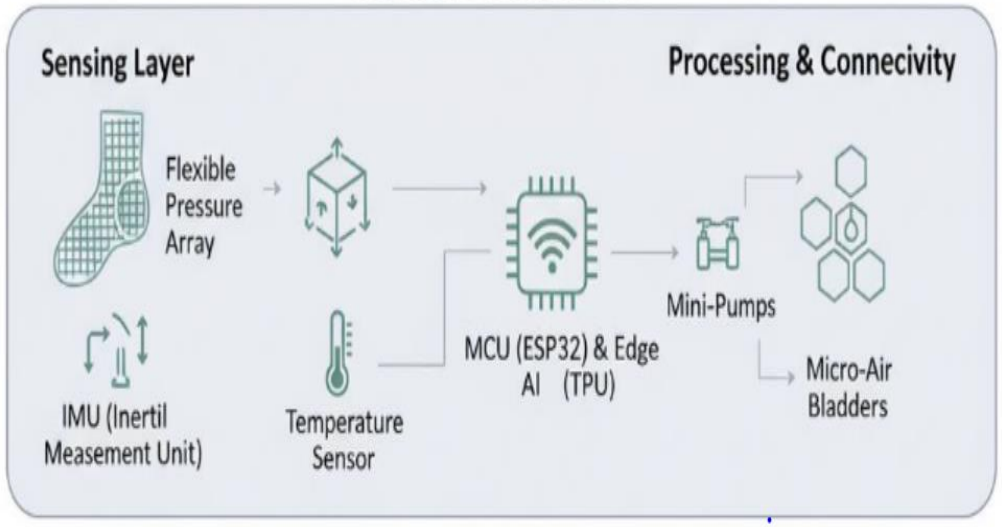


ZETA1

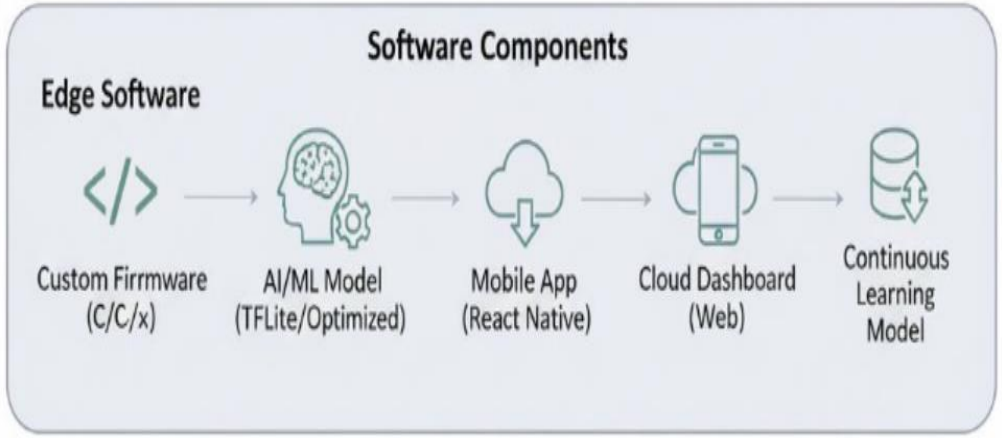
TECHNICAL APPROACH

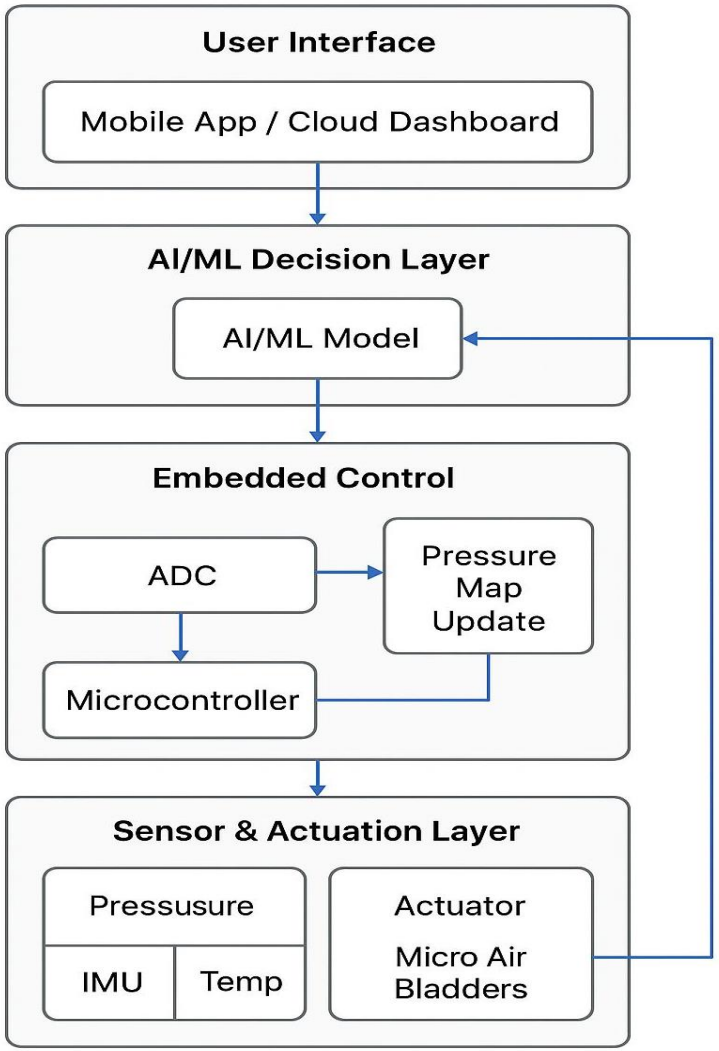
SMART INDIA HACKATHON 2025

Hardware Components



Software Components



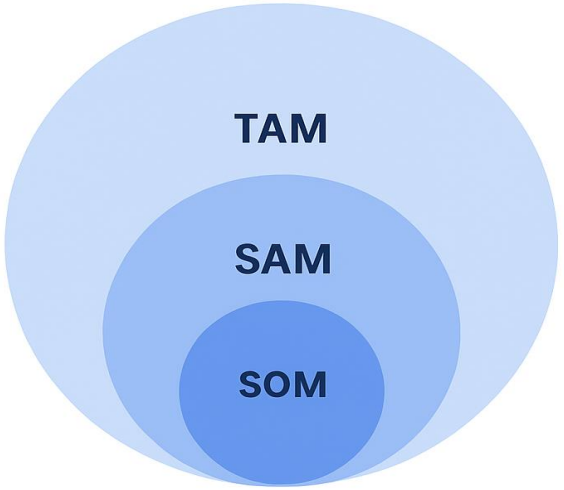


ZETA1

FEASIBILITY AND VIABILITY

SMART INDIA HACKATHON 2025

Feasibility of the Idea	Potential Challenges and Risks	Strategies for overcoming challenges
Technical Feasibility (AI/ML, Edge Computing)	Hardware Durability (Continous Flexing)	Rugged, Flexible Design
Communication Feasibility (Data Transmission)	Connecivity Issues (In-Shoe Signal Loss)	Robust Local Storage & Offline AI
Operational Feasibility (Daily Use/Wearable)	Battery Life/Charging	Optimized Power Management
Economic Feasibility (Low-Cost Components)	Regulatory Approval (Medical Device)	Targeted Clinical Trials



₹5,000 Cr
GLOBAL ORTHOTIC, PROSTHETIC DEVICES MARKET

₹800 Cr
INDIAN ORTHOTIC & REHABILITATION DEVICE MARKET

₹40 Cr
TARGETED CLINICS & PATIENTS IN 3–5 YEARS

Cost Structure & Revenue Streams

Cost Structure: Initial hardware and microcontrollers software development and AI model training ,IoT connectivity marketing and distribution expenses.
Revenue Streams: Direct sales of the smart rover to farmers and agricultural companies , service and maintenance contracts; partnerships with agri-tech firms for data and insights monetization.

ZETA1

IMPACT AND BENEFITS

SMART INDIA HACKATHON 2025

Potential Impact on the Target Audience (Patients & Clinicians)

- ✓ Prevents Ulcers & Tissue Injury Reduces Chronic Pain
- ✓ Predices Chronic Pain treatment Empowers patients with custom-fit orthotics for improved comfort.
- ✓ Enhances rehabilitation outcomes through real-time pressure data.
- ✓ Promotes data-driven healthcare decisions for doctors

Benefits of the Solution

Social

Enhances patient comfort and mobility
Promotes inclusive healthcare with affordable wearable tech.

Economic

Enables data-driven orthotic manufacturing, saving design time.
Supports remote patient monitoring, reducing frequent hospital visits.

Healthcare & Environmental

Promotes sustainable, reusable orthotic design with minimal material waste.

ZETA1

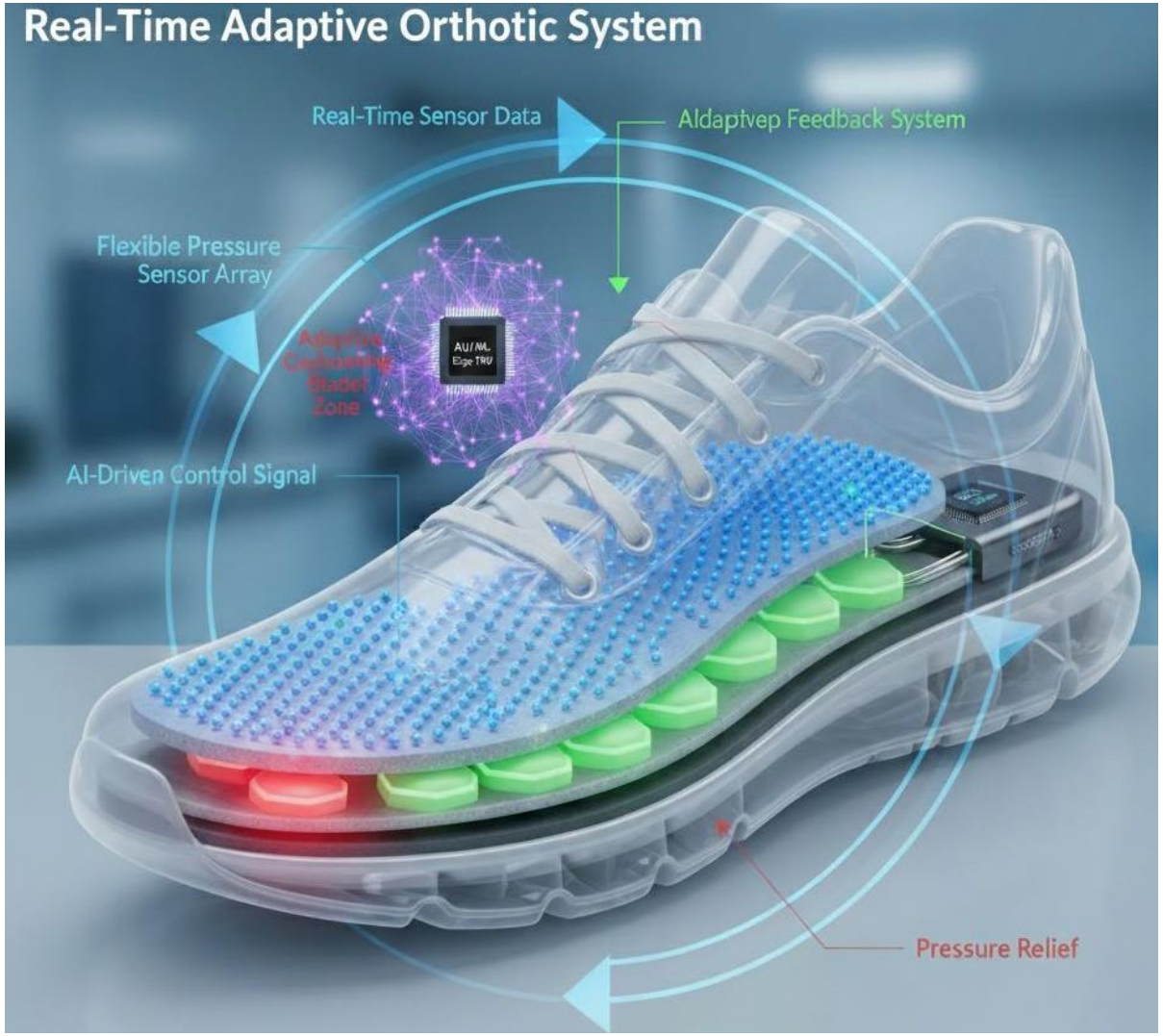
RESEARCH AND REFERENCES

SMART INDIA HACKATHON 2025

https://pmc.ncbi.nlm.nih.gov/articles/PMC12371697/

https://www.mdpi.com/2076-0825/14/8/408

https://www.researchgate.net/publication/393751697_Engineering_Smart_Orthotics_Improving_Mobility_and_Comfort

https://www.researchgate.net/publication/375896232_Deep-learning_enabled_smart_insole_system_aiming_for_multifunctional_foot-healthcare_applications

https://www.researchgate.net/publication/377941766_AI-based_Task_Classification_with_Pressure_Insoles_for_Occupational_Safety