TEAM 011

Automated Triage Assessment and Response Interface (ATARI)

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ICS | ME | EE | MSE | 4

Problem Statement

Classification of patients take a long time in Emergency Departments (ED) in Saudi Arabia, so the Ministry of Health (MOH) introduces the Canadian Triage and Acuity Scale (CTAS) to its EDs to solve the issue. However, the solution wasn't.
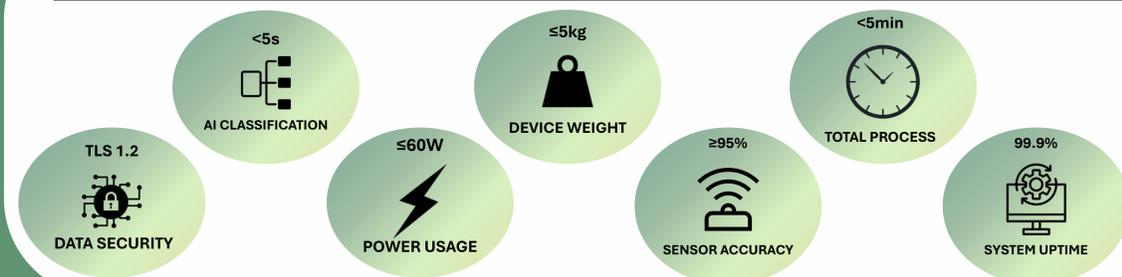
Objectives

Our project Automate the classification of patients to reduce their waiting time and allow the triage nurse to focus on classifying patients into level one using their eyes.

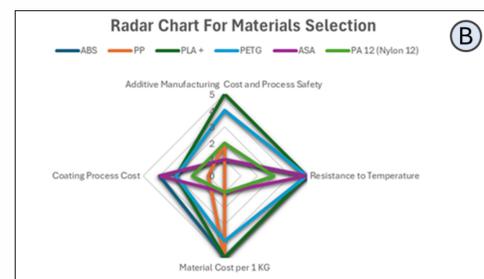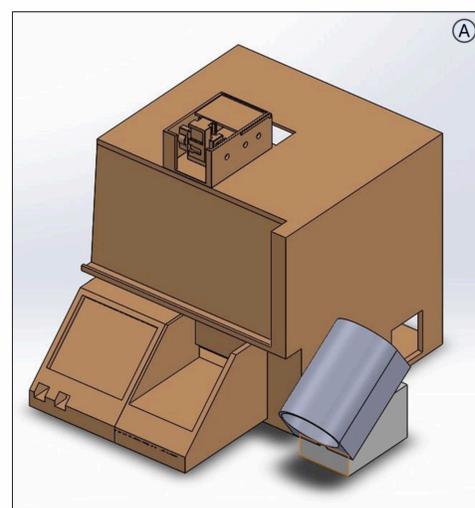|	
1. Resuscitation 👁	2. Emergent
3. Urgent	4. Less Urgent
5. Non-Urgent	

Constraints

- The microcontroller provides a maximum voltage of 5V
- Glass transmission temperature > 30°C
- Hospital Emergency Department API
- Minimum Raspberry Pi RAM 8GB
- Limited Dynamic Display (Video/Animation)
- Minimum heat dissipation 50 W/cm^2
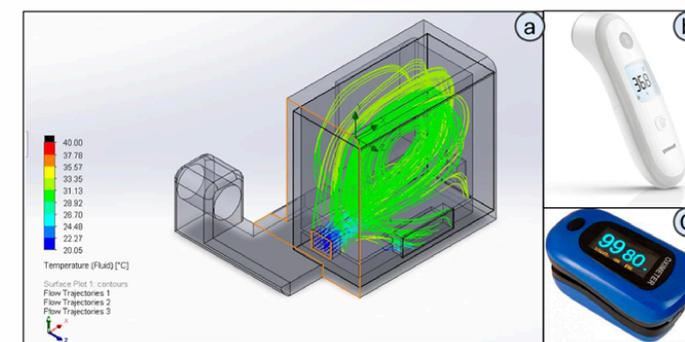
Specifications

- **<5s** — AI CLASSIFICATION
- **≤5kg** — DEVICE WEIGHT
- **<5min** — TOTAL PROCESS
- **TLS 1.2** — DATA SECURITY
- **≤60W** — POWER USAGE
- **≥95%** — SENSOR ACCURACY
- **99.9%** — SYSTEM UPTIME

Prototype Design

A) ATARI Structure
B) Materials Selection
C) Vital Signs Module Schematic
D) System Architecture

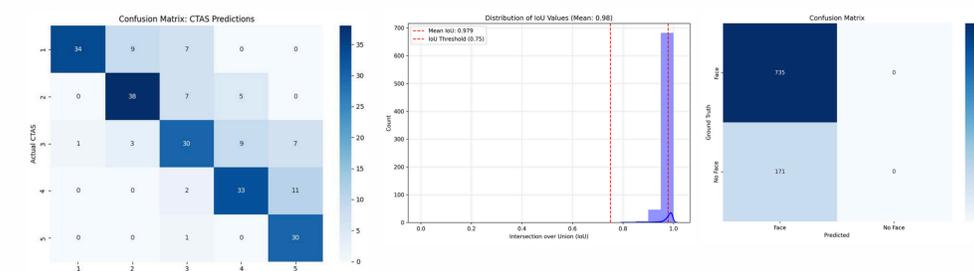Radar Chart For Materials Selection
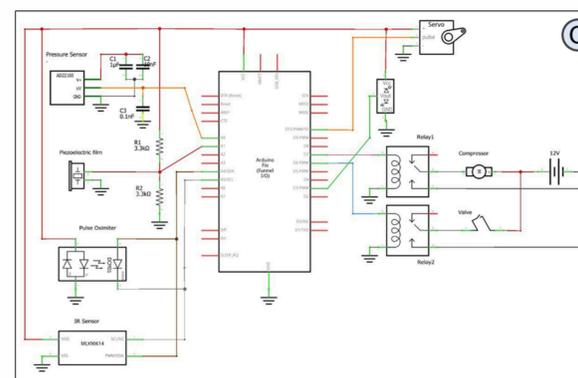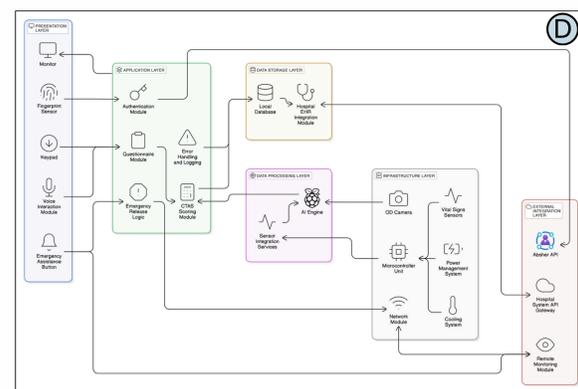
Testing & Validation

a) Heat transfer simulation by SolidWorks   b) YUWELL YT-2 Infrared Forehead Thermometer
c) Creative PC-60B1 Fingertip Pulse Oximeter

CTAS Triage & Forehead Detection

For our LLM, we used GPT-4 Turbo to handle classifying the patient as it is most consistent in accurate, and allowed us to achieve our below 5 seconds response time mark. The computer vision pipeline demonstrated its performance in detecting the closest forehead, using the intersection over union to evaluate its accuracy.

Conclusion

ATARI is a self-service kiosk that improves emergency department efficiency by automating patient assessment with vital sign sensors and a CTAS-based machine learning model. It features interactive adjustments and aims to ease nurse workload and improve patient flow.