BRILLIANT BHARAT HACKATHON 2025_UTHTHAR
Tamil Nadu

- **Problem Statements Title :** Smart Thermoregulation Bracelet

- **Theme :** Wearable Health Devices

- **Category – Software/Hardware :** Hardware/Software

- **Team Name :** Smart Priders

- **University Name :** Anna University (Kongunadu College of Engineering and Technology)

PROPOSED SOLUTION

General Occurrence of Brain Tumors

❑   Wearable devices are widely used for tracking health, but they often miss critical conditions like strokes.

❑   Detecting small changes in body temperature, such as a 2% drop, can help prevent strokes with early action.

Problems

❑   Most wearables cannot detect small temperature drops or provide real-time alerts for stroke risks.

❑   They also lack of proper connection to healthcare systems for quick medical responses.

Solution

❑   The Smart Thermoregulation Bracelet uses accurate sensors to monitor temperature changes, detects a 2% drop linked to stroke, and sends instant alerts.

❑   It also regulates body temperature and shares data with healthcare providers for timely intervention.

TECHNICAL STRATEGY

Hardware Components:

❑ **Sensors :-** PTC thermistors and MLX90614 for accurate temperature monitoring.

❑ **Thermal Regulation :-** Peltier module (TEC1-12706) with a heat sink and fan.

❑ **Microcontroller :-** ARM Cortex or ESP32 for data processing and control.

❑ **Power :-** Rechargeable Li-Po battery with Battery Management System (BMS).

❑ **Connectivity :-** BLE(Bluetooth Low Energy) module for communication.

Software Components:

❑ **Languages :-** Python for AI and C/C++ for microcontroller programming.

❑ **Frameworks :-** TensorFlow Lite for AI and FreeRTOS for system control.

❑ **Mobile App :-** BLE SDKs for alerts and data visualization.

FEASIBILITY

Technical Feasibility:

❑ Sensors, microcontrollers, and thermal modules are readily available and integrable.

Developmental Feasibility:

❑ AI, embedded systems, and app development are achievable within a clear timeline.

VIABILITY

Market Viability:

❑ High market demand for health monitoring wearables ensures value.

Cost Viability:

❑ Affordable components make the device cost-effective and accessible.

IMPACTS

Improved Stroke Prevention:

❑ Early detection of small temperature drops reduces stroke risks by enabling timely intervention.

Enhanced Remote Healthcare:

❑ Seamless data sharing allows healthcare providers to monitor patients in real-time and provide faster responses.
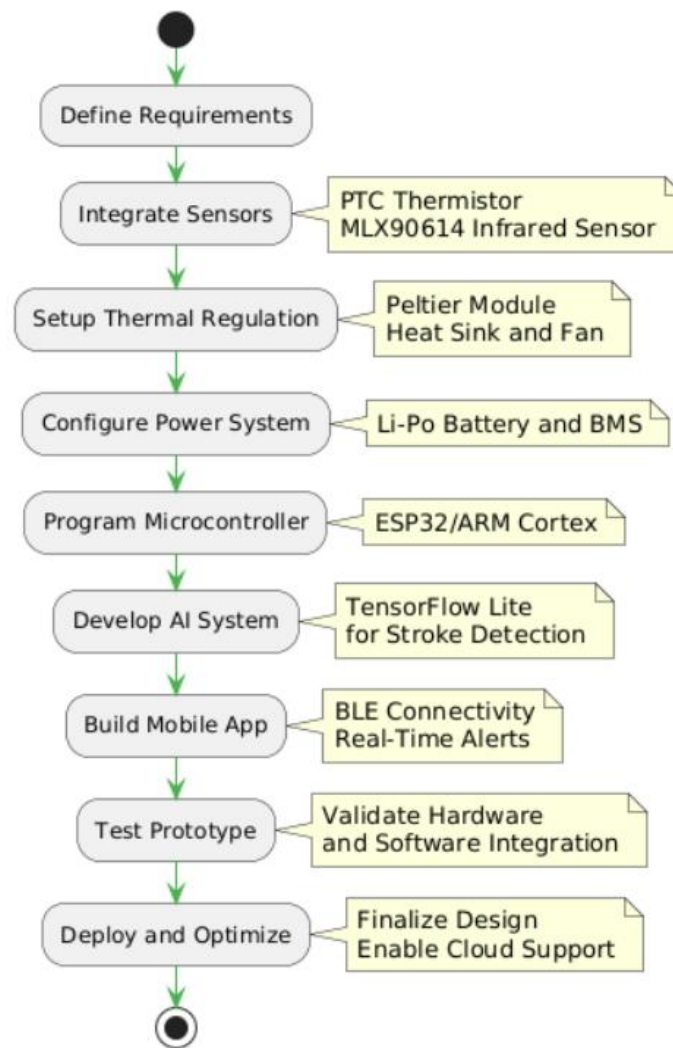
BENEFITS

User Comfort:

❑ Thermal regulation ensures users remain comfortable in varying environmental conditions.
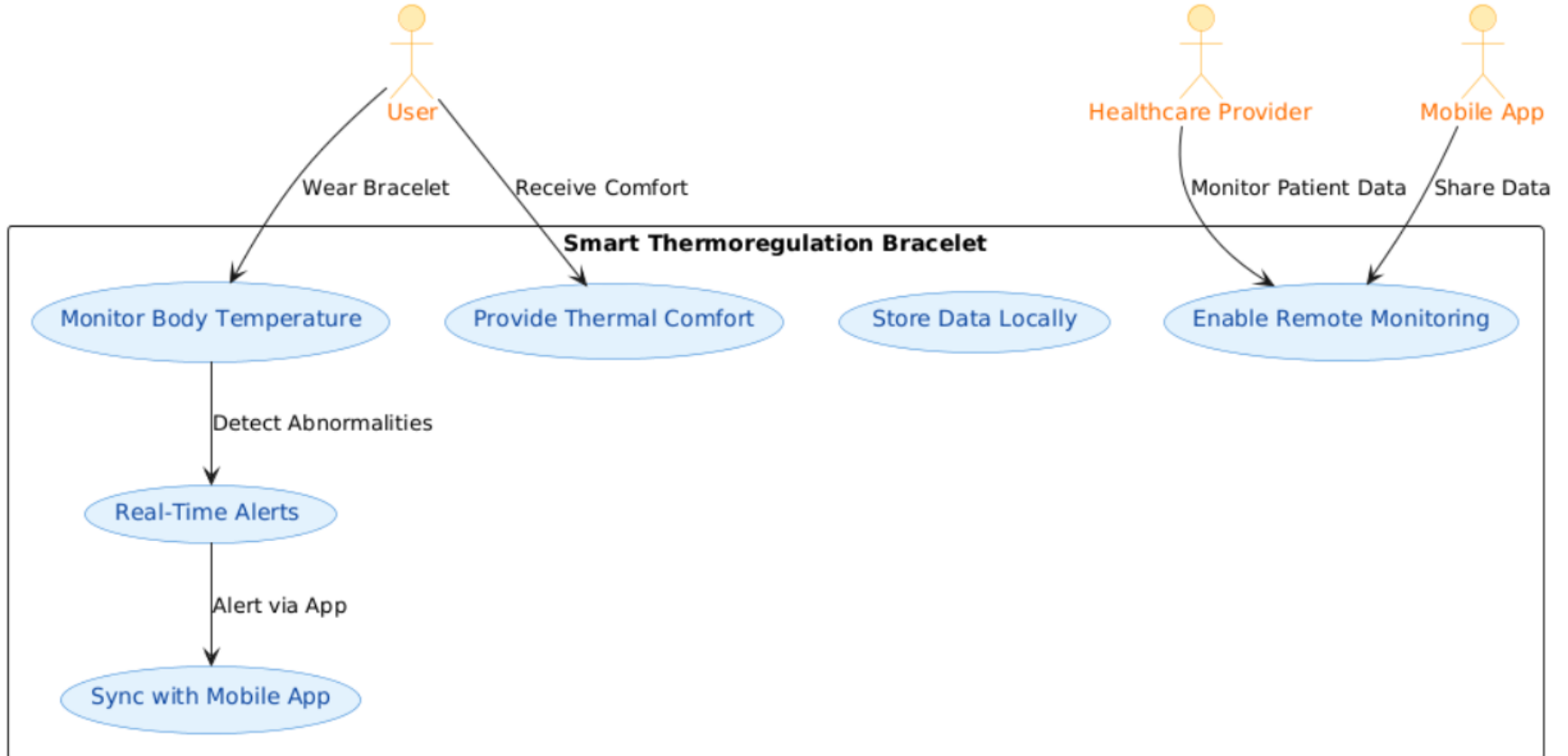
Versatile Use Cases:

❑ Suitable for Mining and Industrial Workers, outdoor workers, athletes, and individuals with chronic conditions, expanding its applicability.

FLOW OF IMPLEMENTATION

ARCHITECTURE DIAGRAM

EXPECTED RESULT

❏ The **Smart Thermoregulation Bracelet** monitors temperature, shows stroke risk, provides alerts, and offers cooling/heating.

❏ It connects to an app for easy health tracking and is comfortable for daily use.

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