AI powered Neo-natal Vital monitoring

Nature of Challenge: **Product Related**

Domain / Discipline of Challenge: **Tech**

This project aims to create an AI-driven system for monitoring the vital signs of newborns in neonatal intensive care units (NICUs). It involves designing a wearable device with non-invasive sensors that continuously track key health indicators like heart rate, breathing, oxygen saturation, and temperature. The data collected is analysed by AI algorithms in real-time to detect any abnormalities or early signs of potential health issues, such as respiratory distress or infection. This system tracks real-time vital signs, sleep, and activity patterns of infants in the NICU. It uses machine learning algorithms to detect abnormalities, predict potential health risks, and provide real-time alerts to healthcare staff.

The AI algorithms not only monitors the current status but also use predictive analytics to forecast potential complications, helping healthcare providers intervene before conditions worsen. To minimize unnecessary disruptions, the system is designed to reduce false alarms by distinguishing between normal and concerning patterns. Alerts are then sent to NICU staff only when needed, allowing them to focus on the most critical cases and enables early intervention, enhances treatment effectiveness, and improves overall care

ST Microelectronics' STM32 microcontroller and Nano Edge AI tool is used for neural network processing, Industrial sensors feed data to the AI for analysis. The past data is integrated to the model with machine learning for predictions and comparative analysis. The system is designed in a way that it is more comfortable for the infant and Non-invasive in data abstraction.

It is designed in such a way that, It posses Low-power consumption for prolonged monitoring without frequent battery changes. Soft, hypoallergenic material for comfort and minimal disturbance. Data storage for long-term historical data analysis. Real-time data stream processing for immediate alert generation. Integrate with electronic health records (EHR) for enriched patient context. Real-time anomaly detection in heart rate, respiratory patterns, or oxygen levels. Analysis of sleep patterns, movement frequency, and activity to assess neonatal health. Ability to differentiate between normal and concerning trends to reduce false alerts.

A comprehensive AI-based neonatal monitoring system deployed in a NICU setting, featuring a wearable device, cloud-based data integration, AI-powered analytics, predictive modelling, and a real-time alert dashboard. The system will enable faster, data-driven decision-making and promote proactive care for neonates, ultimately improving health outcomes.