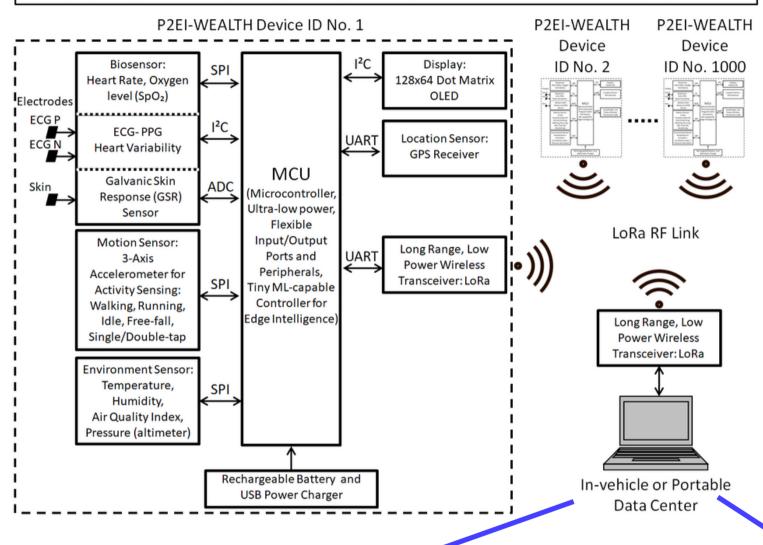# P2EI-WEALTH (Physiological and Psychological Edge Intelligence WEArable LoRa HealTH) System for Remote Indigenous Community and Disaster Recovery Operations

INTRODUCTION:

In the era of IoT and beyond, the urban and suburban population health monitoring transitions to use of wearables and intelligent health support systems. Unfortunately, the indigenous people and search and rescue operators who are often in remote and dangerous vicinities cannot benefit from the advantages due to limited connectivity, often caused by the lack of infrastructure. Furthermore, current wearables have only provided physiological measurements but not psychological which is a growing concern worldwide. In this project, a novel integrated IoT wrist-wearable with physiological and psychological biosensors are proposed with complementary activity, environmental, and position sensors to provide alerting situations and localization data relevant to the indigenous people and disaster recovery operations. The system will be empowered by edge intelligence and wireless LoRa-link to an in-vehicle or stationary data center. With this solution, the medic or emergency medical service (EMS) personnel will be able to know the real-time condition and able to decide of any intervention.

P2EI-WEALTH (Physiological and Psychological Edge Intelligence WEArable LoRa HealTH) System

P2EI-WEALTH Device ID No. 1

- Biosensor: Heart Rate, Oxygen level (SpO$_2$) — SPI
- ECG-PPG Heart Variability — I^{2}C
- Galvanic Skin Response (GSR) Sensor — ADC
- Motion Sensor: 3-Axis Accelerometer for Activity Sensing: Walking, Running, Idle, Free-fall, Single/Double-tap — SPI
- Environment Sensor: Temperature, Humidity, Air Quality Index, Pressure (altimeter) — SPI
- Electrodes: ECG P, ECG N, Skin

MCU (Microcontroller, Ultra-low power, Flexible Input/Output Ports and Peripherals, Tiny ML-capable Controller for Edge Intelligence)

- Display: 128x64 Dot Matrix OLED — I^{2}C
- Location Sensor: GPS Receiver — UART
- Long Range, Low Power Wireless Transceiver: LoRa — UART
- Rechargeable Battery and USB Power Charger

P2EI-WEALTH Device ID No. 2 ... P2EI-WEALTH Device ID No. 1000

LoRa RF Link

Long Range, Low Power Wireless Transceiver: LoRa

In-vehicle or Portable Data Center

Tasik Chini Malaysia Vicinity

Quezon City Disaster Management

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