Monitor Pods

In an increasingly connected world, many facilities and organizations rely on environmental sensors to automatically monitor and control their equipment. This information can be utilized for early detection of hazards, faulty equipment, and alerting someone when something is wrong. Xena Monitor Pods improves on existing systems by providing a real-time industrial environmental monitoring solution that is completely wireless, autonomous, scalable, secure, and easy to use.

**System Design**

**Hardware**

- Monitor Hub (Raspberry Pi)
- FruityMesh 1.0
- Monitor Pods

**Cloud**

- Database
- MySQL
- Amazon RDS
- Grafana
- Flask

**Web Application**

- Easily view system status and data collected in real-time.
- Enroll Monitor Pods using the Camera, NFC, and GPS sensors of an Android smartphone.
- View the location of Monitor Pods via a map UI.
- Configure alert notifications for potentially hazardous environmental conditions.

**Main Features**

- E-Paper Display
  Low-power, tri-color, easily readable.
  Upon initial boot, a QR code is displayed for enrolling pods into the system. After that, real-time environmental data collected from the Monitor Pod is displayed.

- BME 680 + LIS2DTW12
  Environmental Sensor Suite
  Real-time temperature, humidity, pressure, air quality, and vibration data collection. All of the data collected is securely stored in a cloud database, and is accessible via our web application.

- Bluetooth 5.1 Antenna
  Using the FruityMesh networking protocol, Monitor Pods wirelessly and efficiently communicate with each other.

- NFC Antenna
  Automatically localizes data based on pre-placed NFC location tags.

- NRF52833 SoC
  Robust I2C, UART, USB, processing power, and other computational features make this SoC the heart of every Monitor Pod. On-chip data encryption ensures private and secure data handling.

- Ultra-Low Power Architecture
  Able to operate for months between replacing two AA batteries.