Fujitsu is pursuing Human Centric IoT initiatives. Building on the base of its Human Centric Engine, the company is offering UBIQUITOUSWARE as the front-end interface for Human Centric IoT.
About UBIQUITOUSWARE

UBIQUITOUSWARE is a package of core module and sensor algorithm converting sensor data to valuable information.

Features

UBIQUITOUSWARE is an IoT package that, in addition to regular BLE beacon tag functionality, enables the acquisition of data from a wide variety of sensors.

1. About the UBIQUITOUSWARE core module

Sense real-time the environment, motion, location and vital sign.

2. About the Sensor Algorithm

Proprietary algorithms process sensor output into meaningful data.

- Detect abnormalities by analyzing sensor data for longer periods learning both human and animal behavioral patterns.
- Analyze data for multiple services and applications.

- HCE
  - Low Power
  - Consumption
  - Analysis
  - Algorithm

- Sensors
  - Acceleration
  - Temp & Humidity
  - Geomagnetism
  - Barometric
  - Pressure
  - Gyro
  - Mic

- Motion
  - Fall: Detect a fall by sensing changes in movements and barometric pressure
  - Posture: Identify posture (standing, sitting & lying) by sensing movements in 3D
  - Exercise Intensity: Calculate energy consumption from movements & active mass

- Location
  - PDR: Precise positioning by estimating moving direction & distance
  - Location Log: Complement & correct location data as well as stored positioning data *Precise outdoor positioning together with GPS

- Vital
  - Heat Stress: Issue alerts based on the heat stress caused by temperature & humidity *Detect together with heart rate and temp & humidity sensors
  - Physical Load: Issue overload alerts by estimating physical loads from changes in heart rate

- Support various IoT platforms
- Utilize sensor data with customers’ own APIs
- Develop human behavior model
- Detect abnormality from sensor data

- Receive data (sensor)
  - Fujitsu’s proprietary algorithm converts sensor data to valuable information
  - Easy connection with simple settings which auto adjust to customers’ IoT platform environments allow easy integration with minimal changes to settings
  - IoT Sensor Algorithm supports multiple IoT platforms. This allows customer’s specific APIs to be used ongoing basis
  - Analyze sensor data for long periods and learn human behavioral patterns. This allows you to build bespoke behavior models
  - Apply rules to detect any abnormal behavior
Fall Detection
Understand changes in height with the barometer. Detect falls by combining barometric pressure and acceleration then issue an alert.

PDR Positioning (Pedestrian Dead Reckoning)
PDR allows precise positioning/tracking by estimating direction and distance via accelerometer and gyroscope. Barometer data tells us the floor a person is on.

Map Matching
Overlay location information on the map and automatically correct non-existing route.
Fujitsu IoT Solutions | UBIQUITOUSWARE

Embedded Device

**Location Solution**

**Features**
Badges and tags use pedestrian dead reckoning technology based on Fujitsu’s proprietary algorithms to locate people in locations where GPS is hard to use (indoors) and use GPS to locate them outdoors, for precise location monitoring and motion tracking. The system can also detect a person’s posture or whether they have fallen.

**Sample Applications**
In hospitals, commercial facilities and warehouses, badges and tags are worn by staff, customers and objects allowing their positions be tracked in real time. This can be used to reallocate personnel, promote safety by detecting falls in real time, manage goods, reorganize store layouts and product placement.

**Monitoring Solution**

**Features**
Information is captured by a sensor worn on the wrist which includes temperature, humidity, movement and heart rate which can be used to estimate the wearer’s heat stress using proprietary algorithms in the Human-Centric Engine. It can also monitor rapid changes in barometric pressure and motion which could signal a fall.

**Sample Applications**
Worn by workers in construction, manufacturing or agriculture, the Band can be used to prevent heat stress based on data gathered from the surrounding environment as well as, monitoring health status helping to improve the worker’s wellbeing. The Band can be used to detect falls or other accidents, allowing a proactive response and making the workplace safer.

**Remote Monitoring Station**

**Features**
This captures and analyzes live sound including speech, coughs, breathing during sleep and movement using the microphone built into the station and Fujitsu’s proprietary sound-analysis. The captured analysis of the individual’s behavior is then learnt by the system for future optimization. The temperature and humidity sensors can also be used for heat stress prediction.

**Sample Applications**
Placed in a residential facility, this can be used to detect when residents leave and return, for reassurance of their wellbeing and assist with relief in the event of a disaster. This can also include the learning of behavioural patterns to deliver intelligent care solutions.

**Maintenance Solution**

**Features**
Designed for safety, even in challenging environments, water-resistant (IPX5/7) and dust-resistant (IP5X), can survive drops from up to 1.5 meters. The built-in accelerometer detects changes in the operator’s movements and can notify a manager with an alarm if the operator falls.

**Sample Applications**
Used in assembly, maintenance or inspection environments the solution can deliver reductions in paper work, real time reporting and deliver support through the AR solution. For training over the shoulder support and access to supervisor support including real time screen drawing can be delivered helping reduce training times and improve skill set delivery.

**Driver Tiredness Solution**

**Features**
FEELythm is a wearable sensor device that detects when drivers are drowsy based on their pulse. The product, which uses a proprietary algorithm developed by Fujitsu Laboratories, monitors the driver’s pulse via a sensor attached to the earlobe, gauges drowsiness and notifies the driver and their vehicle fleet manager. It can also connect to digital tachographs and other on board devices and link to fleet-management systems so that fleet managers can monitor the conditions of their drivers in real time and provide helpful guidance based on objective data.

**Sample Applications**
Used in logistics or transportation industries the FEELythm can measure levels of drowsiness, helping fleet managers and drivers avoid increased levels of risk by alerting them and assisting in the prevention and proactive management of drivers in the field.

About Fujitsu
Fujitsu is the leading Japanese information and communication technology (ICT) company, offering a full range of technology products, solutions, and services. Approximately 159,000 Fujitsu people support customers in more than 100 countries. We use our experience and the power of ICT to shape the future of society with our customers. Fujitsu Limited (TSE: 6702) reported consolidated revenues of 4.8 trillion yen (US$40 billion) for the fiscal year ended March 31, 2015. For more information, please see http://www.fujitsu.com.

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