**Sensor data combining well-being data and data from IoT sensors**

This data set collected at University of Jyväskylä contains measurements of heart rate, sleep quality and environmental factors in three subjects at home and at work. The environment is sensed by building an IoT network that has measured ambient temperature, humidity, carbon dioxide level and the amount of light. Heart rate and respiratory rate has been measured by the Firstbeat and Emfit devices. The former measures vital functions around the clock, and the latter is a sensor placed in the bed.

The data is available in JSON format and each measurement contains a timestamp, the payload (type and actual measurement value) and source identifying both the sensor and the person being measured.

The JSON schema for all the data is available below. It is worth describing the payload types in detail.

We used Long Range wireless data network (sensordata-lora) to collect data about the CO2 level (co2) and light. We used an IoT network based on MQTT protocol (sensordata-mqtt) to collect data about humidity, temperature and whether our subject were at home or at work (presence).

Emfit sensors collected data about heartrate, respitory rate, movement (activity) and whether the subject was in bed (bedpresence).

From Firstbeat sensors we were able to get subjects' heartrate, proportional intensity of oxygen consumption (METMaxPercentage), oxygen consumption in ml/kg/min (VO2), EPOC in ml/kg (EPOC), Respiration rate per min (RespR), ventilation in liters/min (Ventilation), energy expentidure in kcal/min (EE), energy expentidure from fat (EEpFat), momentary level of heart rate variability in ms^2 (VLF, LF, HF, HF2) and respiratory sinus arrhytmia in milliseconds (RSAAmplitude).

JSON Schema:

{

"$schema": "http://json-schema.org/draft-06/schema#",

"properties": {

"@timestamp": {

"description": "Timestamp in ISO 8601 format.",

"examples": ["2017-10-05T21:11:45.776Z"],

"type": "string"

},

"mb-topic": {

"description": "A property identifying the general type of data. Either sensor data

collected using Long Range wireless data network (LoRa), or sensors using message queue

telemetry transport (mqtt) protocol, or sensor collecting heart rate data.",

"examples": ["sensordata-lora", "sensordata-mqtt", "heartratedata"],

"type": "string"

},

"payload": {

"properties": {

"payload": {

"description": "A property identifying the actual measurement value.",

"examples": ["12", "50.00"],

"type": "float"

},

"type": {

"description": "A property identifying the type of the measurement. For instance, a LoRa

sensor collected data about CO2 level in a room, an MQTT sensor collected data about

humidity of the room, and heartrate sensor collected data about heartrate.",

"examples": ["humidity", "temperature", "presence", "co2", "light", "heartrate",

"respitoryrate", "activity", "bedpresence", "HRState", "HeartRate", "METMaxPercentage", "VO2", "EPOC", "RespR", "Ventilation", "EE", "EEpFat", "VLF", "LF", "HF", "HF2", "RSAAmplitude" ],

"type": "string"

}

},

"type": "object"

},

"source": {

"id": "/properties/source",

"properties": {

"personid": {

"description": "A property identifying the person measured, or his environment being

measure. There are three persons in the data.",

"examples": ["person-1", "person-2", "person-3"],

"type": "string"

},

"type": {

"description": "A property identifying the type and id of a sensor or a measuring

device.",

"examples": ["bletemphumisensor", "FBSensor", "BedSensor" ...],

"type": "string"

},

“sensorid” {

“description”: “A property identifying individual sensor device”,

“examples”: [“C0:77:0C:9F:60:32”, “001252” …],

“required”: false

},

"type": "object"

}

},

"type": "object"

}

Example:

{

{"timestamp": "2017-10-02T19:12:57",

"mb-topic": "heartratedata",

"payload": {

"type": " RSAAmplitude ",

"payload": 39.98

},

"source": {

"type": "FBSensor",

"personid": "person-1"

}

}