|  |  |
| --- | --- |
| Project | **Specification of Sensor Interface for Cyber and Physical World**<https://sagroups.ieee.org/2888/ > |
| Title | **Biosensor data formats** |
| DCN | **2888-20-0012-01-0001** |
| Date Submitted | **Feb. 23, 2020**  |
| Source(s) | Sang-Kyun Kim, goldmunt@gmail.com (Myongji University)Kyoungro Yoon, yoonk@konkuk.ac.kr (Konkuk University)Sangkwon Jeong, ceo@joyfun.kr (Joyfun) |
| Re: |  |
| Abstract | Biosensors measure signals from a living body. They are the sensors for acquiring the bio-information of the physical world beings, and the data through them are important information for determining the biological characteristics of cyber beings. This contribution proposes a schema for defining sensor data input from biosensors. |
| Purpose | To start discussion on purpose of the standard |
| Notice | This document has been prepared to assist the IEEE 2888 Working Group. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. |
| Release | The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE’s name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE’s sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that IEEE 3079 may make this contribution public. |
| Patent Policy | The contributor is familiar with IEEE patent policy, as stated in [Section 6 of the IEEE-SA Standards Board bylaws](http://standards.ieee.org/guides/opman/sect6.html#6.3) <[http://standards.ieee.org/guides/bylaws/sect6-7.html#6](http://127.0.0.1:4664/cache?event_id=757737&schema_id=1&s=5X0vID10lu_E6yrIkWkNd4Wz2H8&q=hancock)> and in *Understanding Patent Issues During IEEE Standards Development* <http://standards.ieee.org/board/pat/faq.pdf> |

# Introduction

Biosensors measure signals from a living body. They are the sensors for acquiring the bio-information of the physical world beings, and the data through them are important information for determining the biological characteristics of cyber beings. This contribution proposes a schema for defining sensor data input from biosensors.

# Schema for biosensor data

## Blood pressure sensor

### Syntax of blood pressure sensor data format

    "bloodPressureSensorType": {

      "type": "object",

      "properties": {

        "systolicBP": {

          "type": "number"

        },

        "diastolicBP": {

          "type": "number"

        },

        "MAP": {

          "type": "number"

        },

        "unit": {

          "$ref": "#/definitions/unitType"

        }

      }

    },

figrue 1. Schema for blood pressure sensor

Figure 1 shows the data schema of the bloodPressureSensor. This sensor includes *systolicBP*, *diastolicBP*, *MAP* and *unit*. The *systolicBP* and *diastolicBP* represent systolic blood pressure and diastolic blood pressure, respectively, and the *unit* uses millimeters of mercury (mmHg). The *MAP* stands for mean arterial pressure and the unit is mmHg.

### Example of blood pressure sensor data instance



figure 2. Example of blood pressure JSON instance

Figure 2 shows the JSON instance of the bloodPressureSensor. The systolic blood pressure measured by the blood pressure sensor is 121, the diastolic blood pressure is 83, and the mean arterial pressure is 100.

## Heart rate sensor

### Syntax of heart rate sensor data format

    "heartRateSensorType": {

      "type": "object",

      "properties": {

        "value": {

          "type": "number"

        },

        "unit": {

          "$ref": "#/definitions/unitType"

        }

      },

      "required": [

        "value"

      ]

    },

figure 3. Schema for heart rate sensor

Figure 3 shows the data schema of the hearRateSensor. This sensor contains *value* and *unit*. If no unit is specified, BPM (beat per minute) is used.

### Example of heart rate sensor data instance



figure 4. Example of heart rate sensor JSON instance

Figure 4 shows the JSON instance of the heartRateSensor. The heart beat value measured by the heart rate sensor is 98 BPM.

# Conclusion

It is recommended to adopt the JSON-based schema proposed in this contribution as the biosensor data schema of IEEE 2888.1. In addition, it is recommended to improve the data schema in the future by adding biosensor data information actually used in the industry.