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| Re: |  |
| Abstract | This contribution proposes syntaxes, semantics, and examples for representing haptic related actuator information in the physical world in a standardized data format. |
| Purpose | To start discussion on purpose of the standard |
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# Introduction

This contribution proposes actuator command types which can generate haptic related effect. It contains syntaxes, semantics, and examples for representing sight related actuator information in the physical world in a standardized data format. Haptic related actuators include heating actuator, cooling actuator, vibration actuator.

2 Data formats for interfacing actuator command

* 1. Heating actuator
     1. General

This Subclause specifies the actuator command type which can generate a heating effect.

Syntax

|  |
| --- |
| "heatingCommandData": {  "type": "object",  "properties": {  "intensity": {  "type": "integer",  "minimum": 0,  "maximum": 100,  "default": 100  }  },  "additionalProperties": false  }, |

* + 1. Semantics

Semantics of the heatingCommandData:

| *Name* | *Definition* |
| --- | --- |
| heatingCommandData | Provide a structure for describing a command for a heating actuator. |
| intensity | Describes the intensity of the temperature effect of heating in percentage with respect to the capable range of temperature control. If the intensity is not specified, this command shall be interpreted as turning on at the maximum intensity.  Example: If the heating actuator can control temperature between 20 and 40 degrees Celsius, intensity of 20 percent means the intensity of 24 degrees Celsius. |

* + 1. Examples

This example shows the description of an actuator command of heating effect with the following semantics. This heating actuator is commanded to perform the intensity of 70% of the maximum intensity.

|  |
| --- |
| {  "commandInfoBaseAttributes": {},  "heatingCommandData": {  "intensity": 70  }  } |

* 1. Cooling actuator
     1. General

This Subclause specifies the actuator command type which can generate a cooling effect.

* + 1. Syntax

|  |
| --- |
| "coolingCommandData": {  "type": "object",  "properties": {  "intensity": {  "type": "integer",  "minimum": 0,  "maximum": 100,  "default": 100  }  },  "additionalProperties": false  } |

* + 1. Semantics

Semantics of the coolingCommandData:

| *Name* | *Definition* |
| --- | --- |
| coolingCommandData | Provide a structure for describing a command for a cooling actuator. |
| intensity | Describes the intensity of the temperature effect of cooling in percentage with respect to the capable range of temperature control. If the intensity is not specified, this command shall be interpreted as turning on at the maximum intensity.  Example: If the device can create cooling effect from 30 to 10 degrees Celsius, intensity of 20 percent means the intensity of 26 degrees Celsius. |

* + 1. Example

This example shows the description of an actuator command of heating effect with the following semantics. This cooling actuator is commanded to perform the intensity of 30% of the maximum intensity.

|  |
| --- |
| {  "commandInfoBaseAttributes": {},  "coolingCommandData": {  "intensity": 30,  }  } |

* 1. Vibration actuator
     1. General

This Subclause specifies the actuator command type which can generate a vibration effect.

* + 1. Syntax

|  |
| --- |
| "vibrationCommandData": {  "type": "object",  "properties": {  "intensity": {  "type": "integer",  "minimum": 0,  "maximum": 100,  "default": 100  },  "frequency": {  "type": "integer",  "minimum": 0,  "maximum": 100,  "default": 100  }  },  "additionalProperties": false,  "anyOf": [  {  "required": [  "intensity"  ]  },  {  "required": [  "frequency"  ]  }  ]  } |

* + 1. Semantics

Semantics of the vibrationCommandData:

| *Name* | *Definition* |
| --- | --- |
| vibrationCommandData | Provide a structure for describing a command for a vibration actuator. |
| intensity | Describes the intensity of the vibration effect in terms of strength in percentage with respect to the maximum intensity of the specified actuator. If the intensity is not specified, this command shall be interpreted as turning on at the maximum intensity. |
| frequency | Describes the frequency of the vibration effect in terms of number of vibrations in percentage with respect to the maximum frequency of the specified actuator. If the frequency is not specified, this command shall be interpreted as turning on at the maximum frequency. |

* + 1. Example

This example shows the description of an actuator command of vibration effect with the following semantics. This vibration actuator is commanded to perform the frequency is 50% of the maximum frequency.

|  |
| --- |
| {  "commandInfoBaseAttributes": {},  "vibrationCommandData": {  "frequency": 50  }  } |