Mobility-Support Robot for Relaxation

Background

In Japan, there were 30,5196 traffic accidents in 2021. 16% of novice drivers meet with an accident within less than a year. We think one of the causes is driver's **NERVOUSNESS**.

We **developed Mobility-Support Robot for Relaxation**. We adopted **RoBoHoN** as our support robot model. The model of RoBoHoN is five a year-old boy, so RoBoHoN talks and moves in a lovely relaxing way.

Relax   Nervous

Features

Our robot monitors two types of driver data

Driver's operation data (Steering, Throttle, and Brake)

Driver's biological data (EMG: ElectroMyoGraphy)

Our robot with a cute voice and motions advises drivers to make them relax.

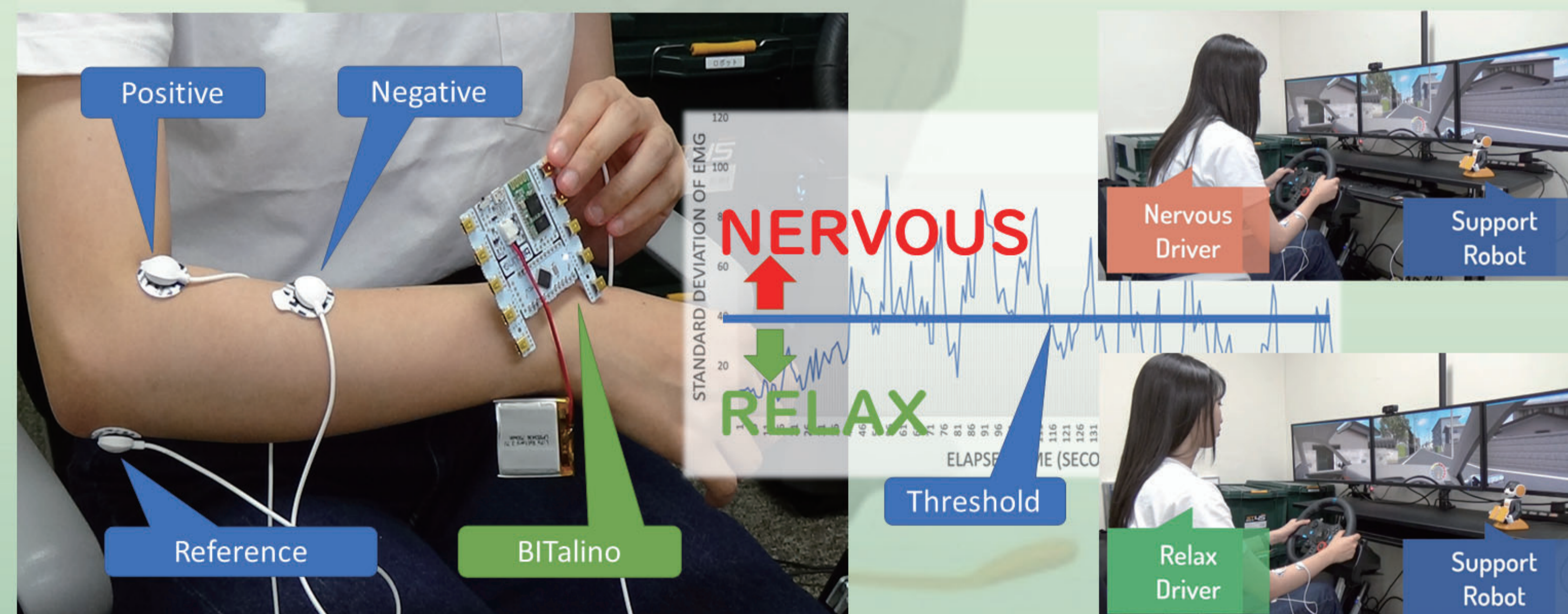Our RoBoHoN's program includes 34 commands to RoBoHoN.

This program is implemented by Robrick of service of SHARP Corporation.

Each command is corresponded to a key that is a trigger to a specific speech.

EMG: ElectroMyoGraphy

EMG is a biological data to measure nervousness levels. Three electrodes are placed on the arm of the driver. A driver is considered as nervous when the standard deviation of **EMG exceeds 40.**

Positive   Negative

NERVOUS

RELAX

Reference   BITalino

Nervous Driver   Support Robot

Relax Driver   Support Robot

Threshold

STANDARD DEVIATION OF EMG

ELAPSED TIME (SECO

Framework

Driving Simulator : set the driving Simulator in UC-winRoad.

Biological Sensor : set the sensor device on the arm of the driver to measure nervousness levels.

Server : we have developed a management server and biological sensor (build in python).
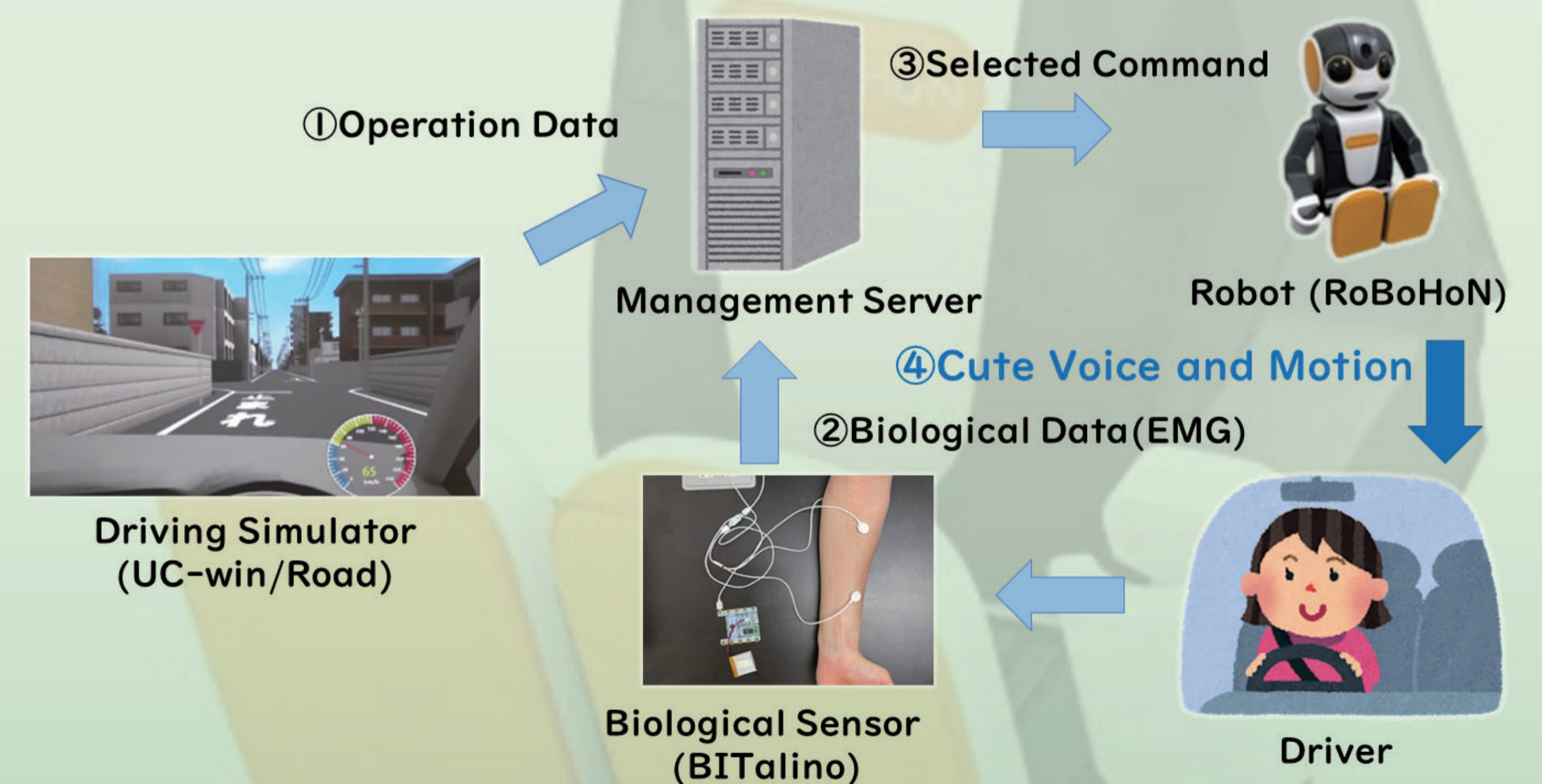
UDP Plugin : our plugin can send 12 types of simulation data from the simulator to the management server via UDP communication.

Plugin Panel : we added a UDP plugin panel on UC-win/road. Use this panel to set IP address, port number and send simulation data to server via UDP communication.

Moreover, there are four buttons on the panel.

1. **First button** displays the content of the transfer data.
2. **Second button** sends the data to the server once.
3. **Third button** sends the data to the server continuously in specified intervals.
4. **Fourth button** stops the communication.

RoBoHoN: Our management server integrates simulation data and biological data and select appropriate RoBoHoN command by the pre-defined rules to relax a driver. The selected command is activated by a virtual keyboard using **USB2BTPlus.**

①Operation Data   ③Selected Command

Management Server   Robot (RoBoHoN)

④Cute Voice and Motion

②Biological Data(EMG)

Driving Simulator (UC-win/Road)

Biological Sensor (BITalino)

Driver

Future Task and Ideas

1. Various types of biological data (e.g., Heart Rate)
2. Experiments using various types of persons (e.g., Age)