Data Collection with RTMaps (IMU+Biopac+Clicker+AV)

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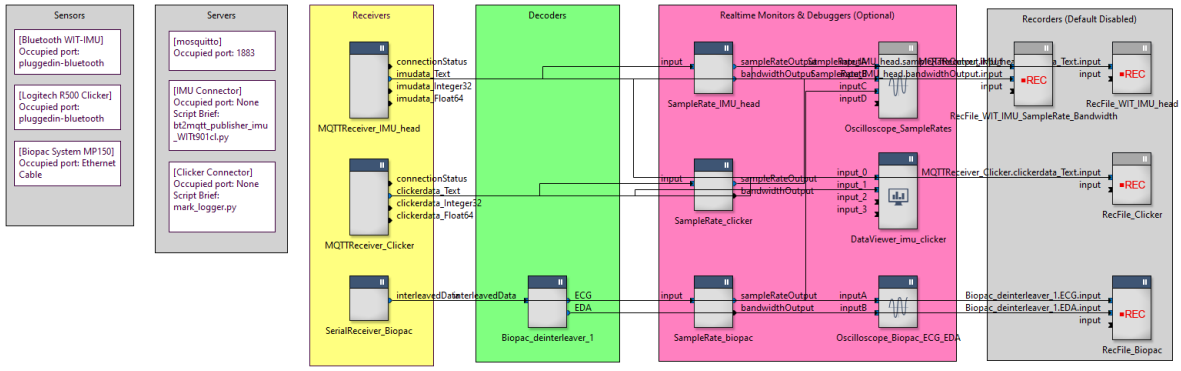
The RTMaps Diagram



This diagram includes data collection for a Bluetooth IMU, a Logitech presenter (left & right arrow listener), and an ECG/EDA Biopac physiological data collection system.

- **Sensors**: Physical devices required for the collection process (hardware + physical ports).
- **Servers**: Software servers required to run on the data collection computer for collecting/capturing signals from the DIY apparatus.
- **Receiver**: Data receiver components.
- **Decoders**: Data decoder components.
- **Monitors & Debuggers**: Development environment components for real-time visualization of monitoring data quality and their sample rates. Please disable these during the final data collection.
- **Recorders**: File recording for piloting studies and testing. Disable them and only record .rts files for final data collection.

The Environment Set-up in the Automated Vehicle with RTMaps

Main Components:

- Head movement IMU
- Biopac
- Clicker/Presenter
- Wizard of Oz Conversational Agent with Node.js (optional)

Environment Requirements:

- Anaconda (recommended)
- Python 3
- Mosquitto MQTT server
- Port listeners:

    - Bluetooth (head movement IMU)
    - 1 LAN port (Biopac)
    - Port 1883 (MQTT)
    - (WIP) Port 8080 (optional WoZ demo of Node.js environment, can be modified) -- *NOT IN THIS VERSION*
- (WIP) Node.js -- *NOT IN THIS VERSION*

The Process of Setting Up in a New Computer/Existing Automated Vehicle Environment (for Windows)

1. RTMaps Configuration

1. Install RTMaps 4.9.0

   [Folder location: `External Disk:\Installation\`]

2. Copy the license files (.lic) to the RTMaps license folder (e.g., `C:\Program Files\Intempora\RTMaps 4\license`)

   [Folder location: Copy license files from `External Disk:\Seeing Machines Test-track Development\Program Files_Intempora_RTMaps\license\`]

2. Connect All the Sensors

- A Bluetooth dongle for WIT-IMU
- A Bluetooth dongle for Logitech Clicker
- The system of RTMaps MP150

3. Run the Required Servers

1. Ensure Anaconda/Miniconda is installed correctly.
2. Activate the Python environment `SM2024_Biopac_IMU_Clicker` with Anaconda/Miniconda:
    - **Navigate to the Directory**
      Open the Conda terminal and navigate to the directory where the `./2.Anaconda Envs/SM2024_Biopac_IMU_Clicker.yaml` file is located.
    - **Create the Environment from the env.yaml File**

      ```
      conda env create -f SM2024_Biopac_IMU_Clicker.yaml
      ```

    - **Activate the Python Environment**

      ```
      conda activate SM2024_Biopac_IMU_Clicker
      ```

3. Turn on the data capturing server (MQTT):
    - Ensure the correct configuration of Mosquitto (see here).
    - Turn on WIT-IMU power, then run the Python script in the Conda terminal for the IMU:

      ```
      python ./Zoe_IMUs-main/WIT_BWT901CL/bt2mqtt_publisher_imu_WITt901cl.py
      ```

- Check the clicker default control of the keyboard here (left&right arrow), then run the Python script in the Conda terminal for the clicker:

  ```
  python ./Zoe_IMUs-main/Clicker/mark_logger.py
  ```

- Make sure scripts are running and signals are sending through MQTT protocal (recommand testing with MQTTbox).

  ```
  IMU topic = "imu/wit/all"
  Clicker topic = "clicker/all"
  ```

4. Run the RTMaps diagram for data collection!