Matrix Studio User Manual

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1. Prerequisites

System Requirements

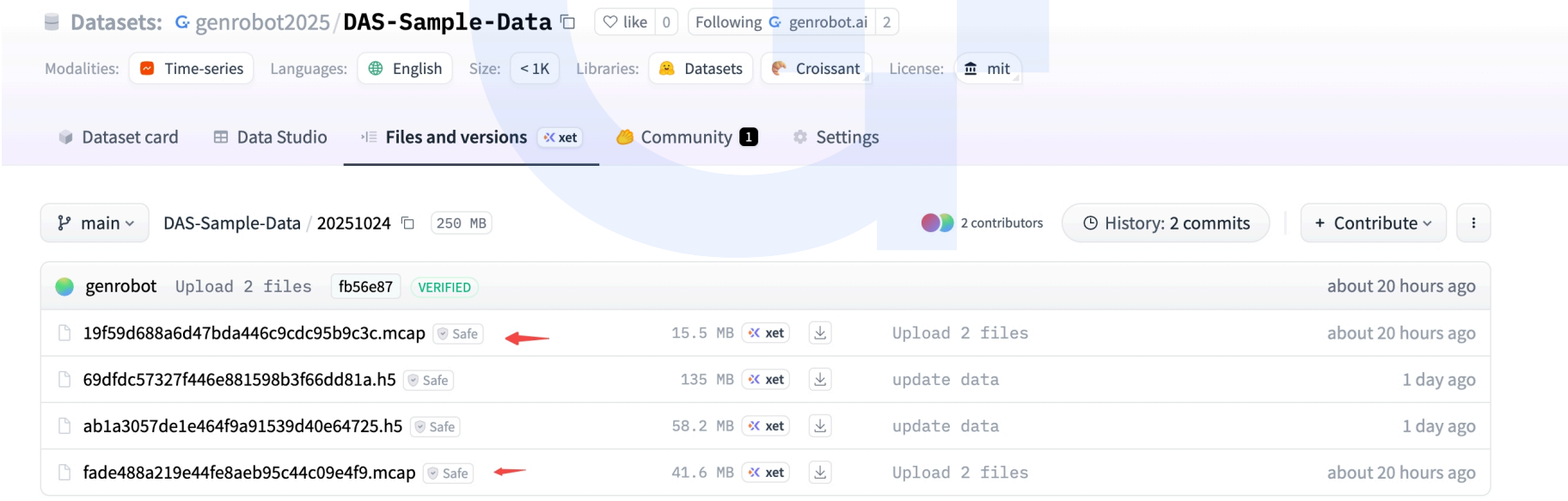
- **Operating System**: Linux
- **Docker**: Version 20.10+
- **Memory**: Minimum 4GB RAM (8GB recommended)
- **Storage**: 2GB available space

Network Requirements

- HTTPS access required for web interface

Sample Data Requirements

- Recommended Sample Mcap Data: Data Link



2. Certificate Installation

Step-by-Step Guide

2.1 Download Certificate File

Download the certificate file to your local machine.

```
wget https://huggingface.co/datasets/genrobot2025/cert/resolve/main/arnold.crt
```

2.2 Create Certificate

```
sudo mkdir -p /usr/local/share/ca-certificates/extra
sudo cp arnold.crt /usr/local/share/ca-certificates/extra/
sudo update-ca-certificates
```

3. Docker Image Setup

3.1 Pull Docker Image

```
docker pull genrobot/matrix-studio:0.1.10 #latest version
```

3.2 Verify Image Download

```
docker images | grep matrix-studio
Expected output:genrobot/matrix-studio 0.1.10 a1b2c3d4e5f6 2 weeks ago 1.2GB
```

3.3 Launch Container

```
docker run -it --rm --name studio -p 5501:5501 genrobot/matrix-studio:0.1.10
```

Parameters Explanation:

- `-it` Interactive mode with terminal access
- `--name studio_viz` Container name (will auto-generate if omitted)
- `-p 5501:5501` Port mapping (host*port:container*port)
- `genrobot/matrix-studio:0.1.7` Image name and version tag

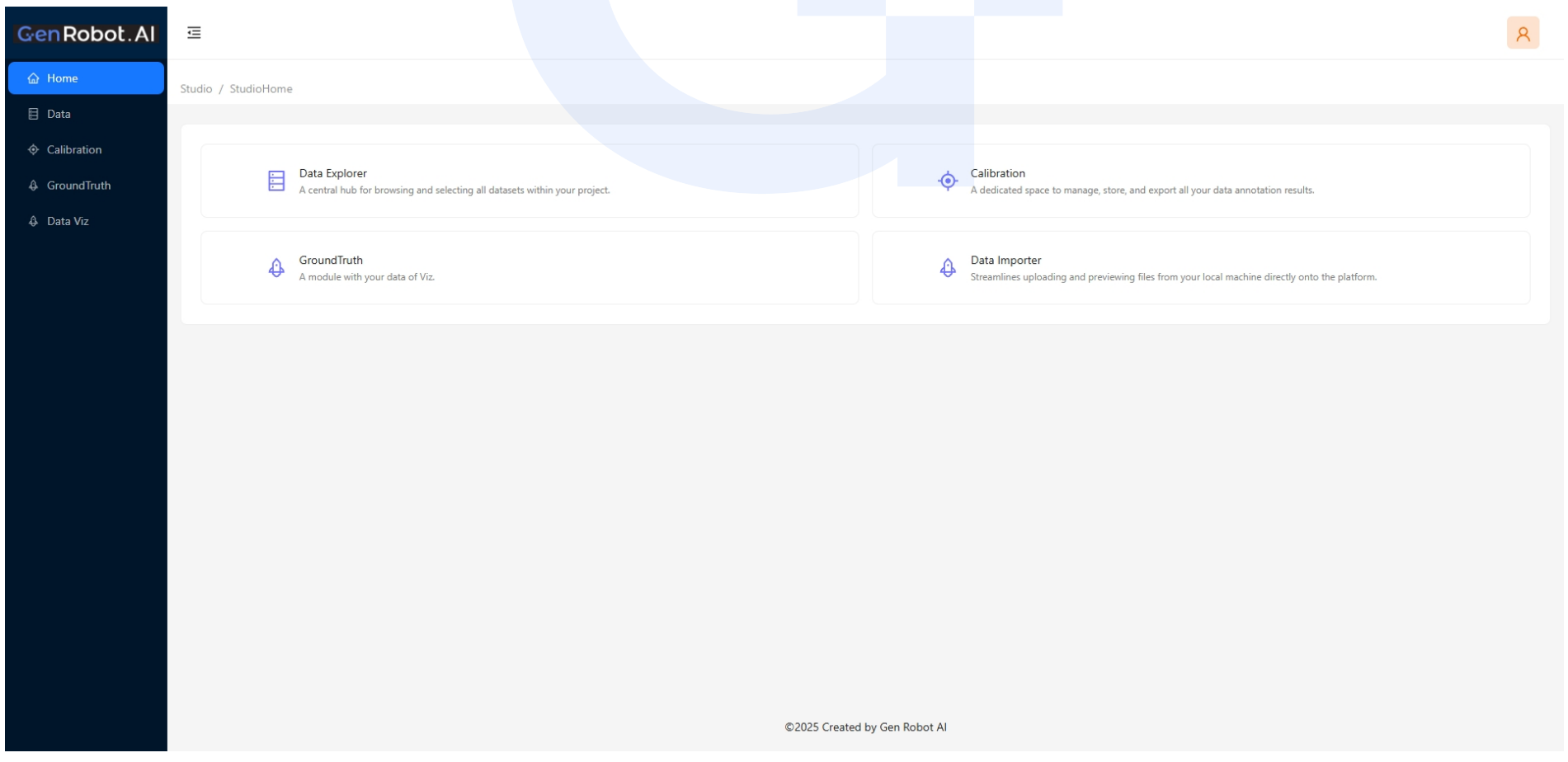
3.4 Access Web Interface

Open below link in your local browser

```
https://[host_ip]:[host_port] // Example:https://192.168.1.27:5501;
```

4. Web Interface Guide

4.1 Main Dashboard

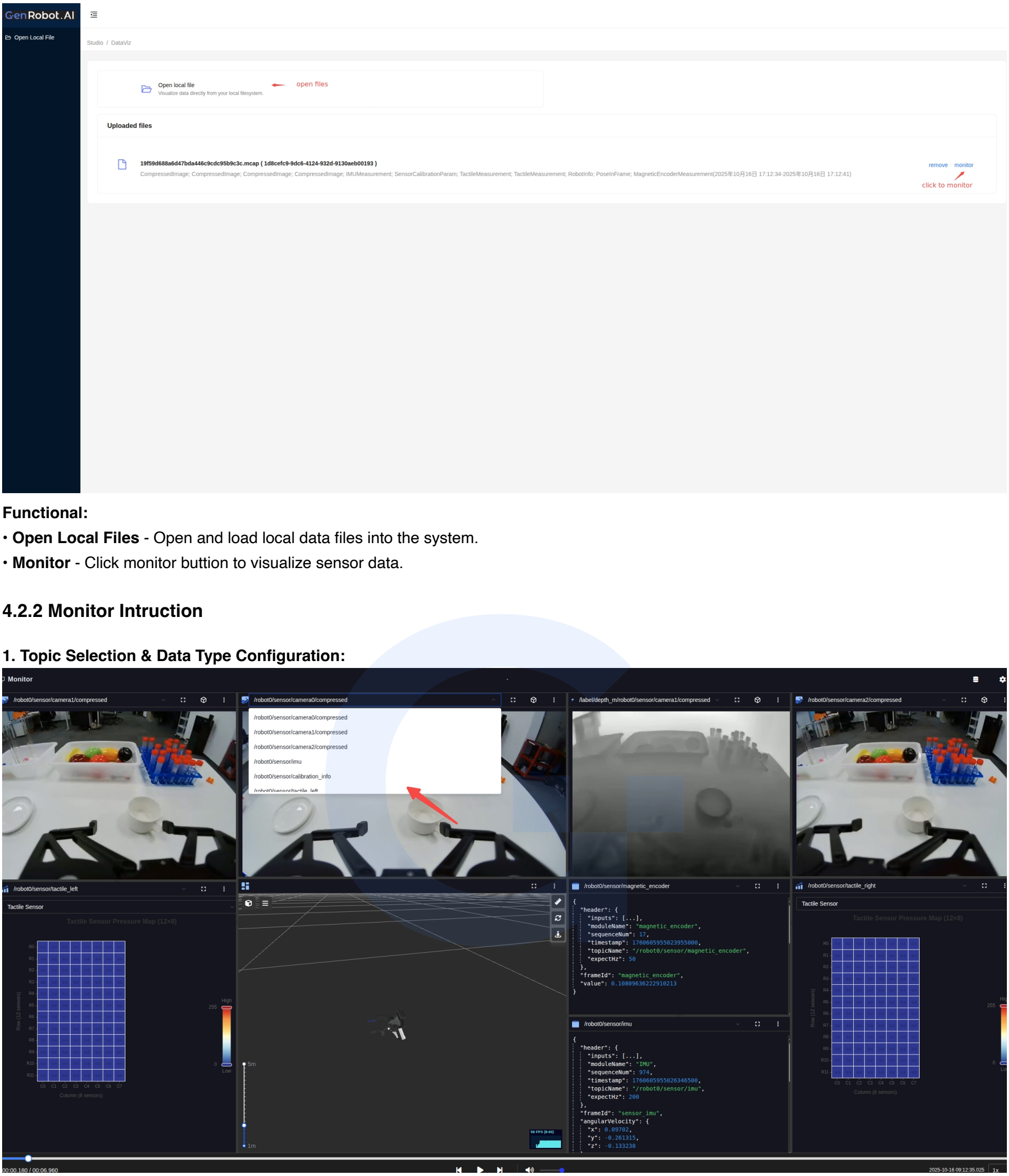


Core Functional Modules:

• **Data Viz Visualization** - Data exploration and interactive chart analysis
• **Sensor Calibration** - Multi-source sensor parameter calibration (*Upcoming*)
• **Ground Truth Production** - High-quality annotation and dataset generation (*Upcoming*)

4.2 Data viz Features

4.2.1 Main Dashboard

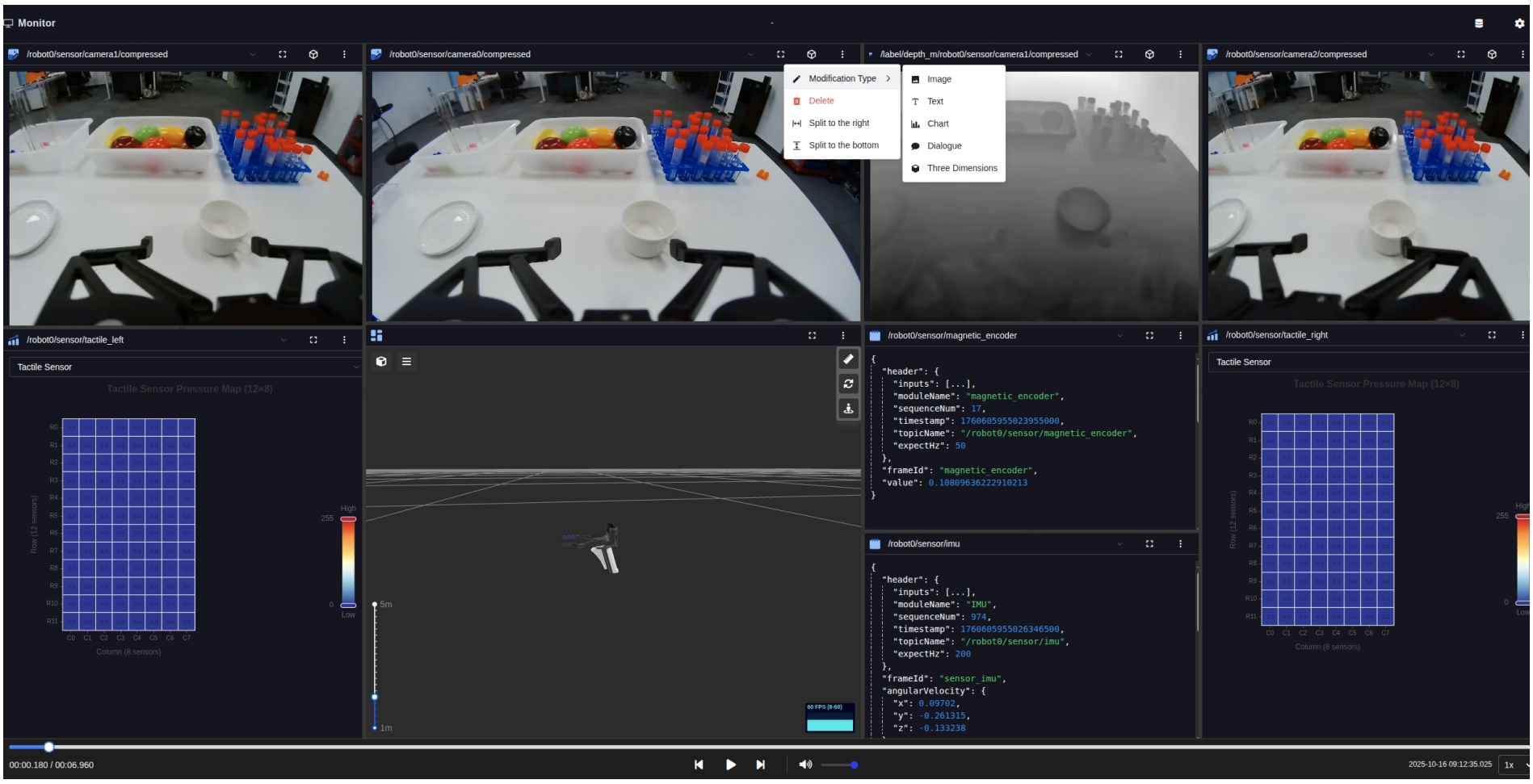


Functional:

- **Open Local Files** - Open and load local data files into the system.
- **Monitor** - Click monitor buttion to visualize sensor data.

4.2.2 Monitor Intruction

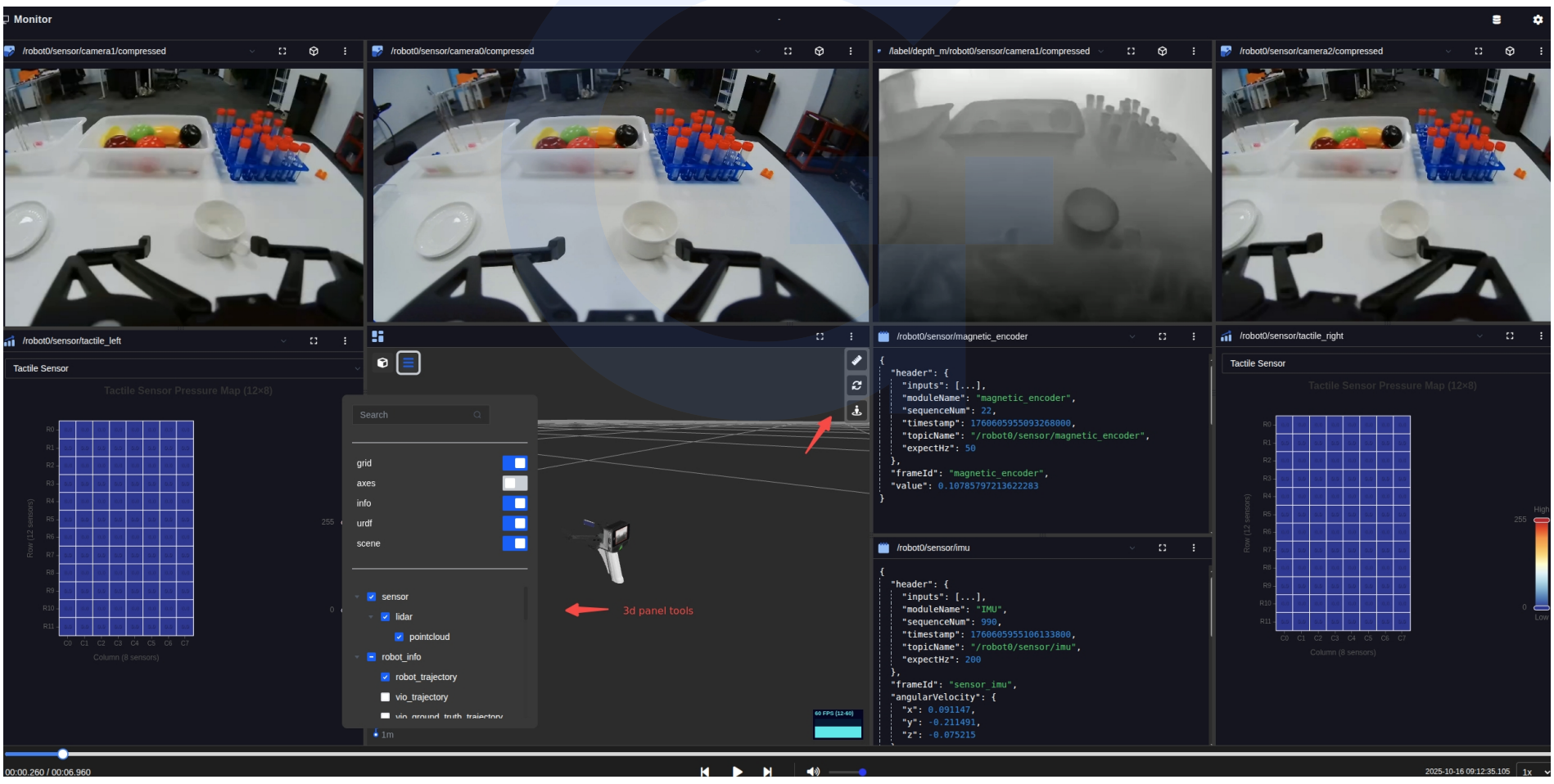
1. Topic Selection & Data Type Configuration:



Functional:

- **Topic Display Type Selection** - Choose from text, image, icon, 3D model, and other visualization formats
- **Flexible Layout Adjustment** - Add new panels to the right or bottom, delete, or reposition them
- **Topic Selection by Name** - Filter and select data streams based on their topic name

2. 3D Visualization Panel:



Functional:

- **URDF Model Rendering** - Display and manipulate robot URDF models
- **Ground Truth Trajectory Visualization** - Visualize reference trajectories and paths
- **Visualization Tools** - Viewpoint Control & Measurement Tools

3. Bag File Detail Interface:

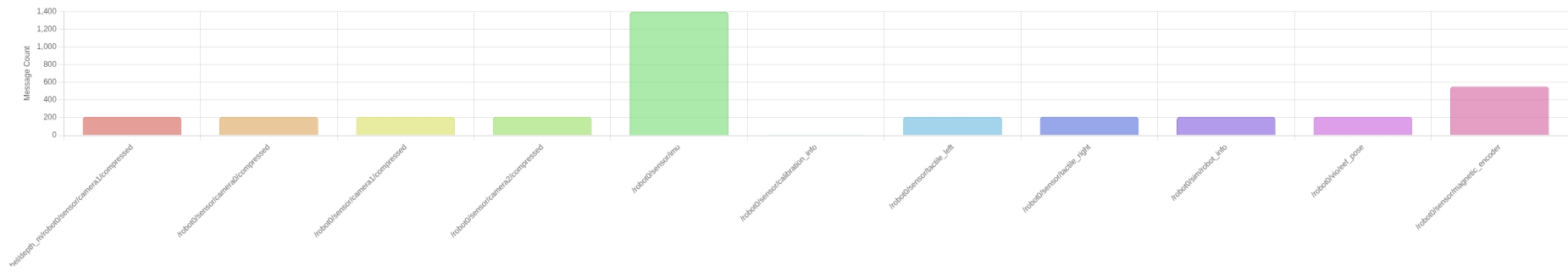
topic meta message

Mcap Data Summary

success (Status: 0)

Channels	Messages	Chunks	Duration	Start Time	End Time
11	3,609	16	6.96 seconds	Oct 16, 2025, 05:12:34.845 PM	Oct 16, 2025, 05:12:41.805 PM

Channel Message Counts



Channels List

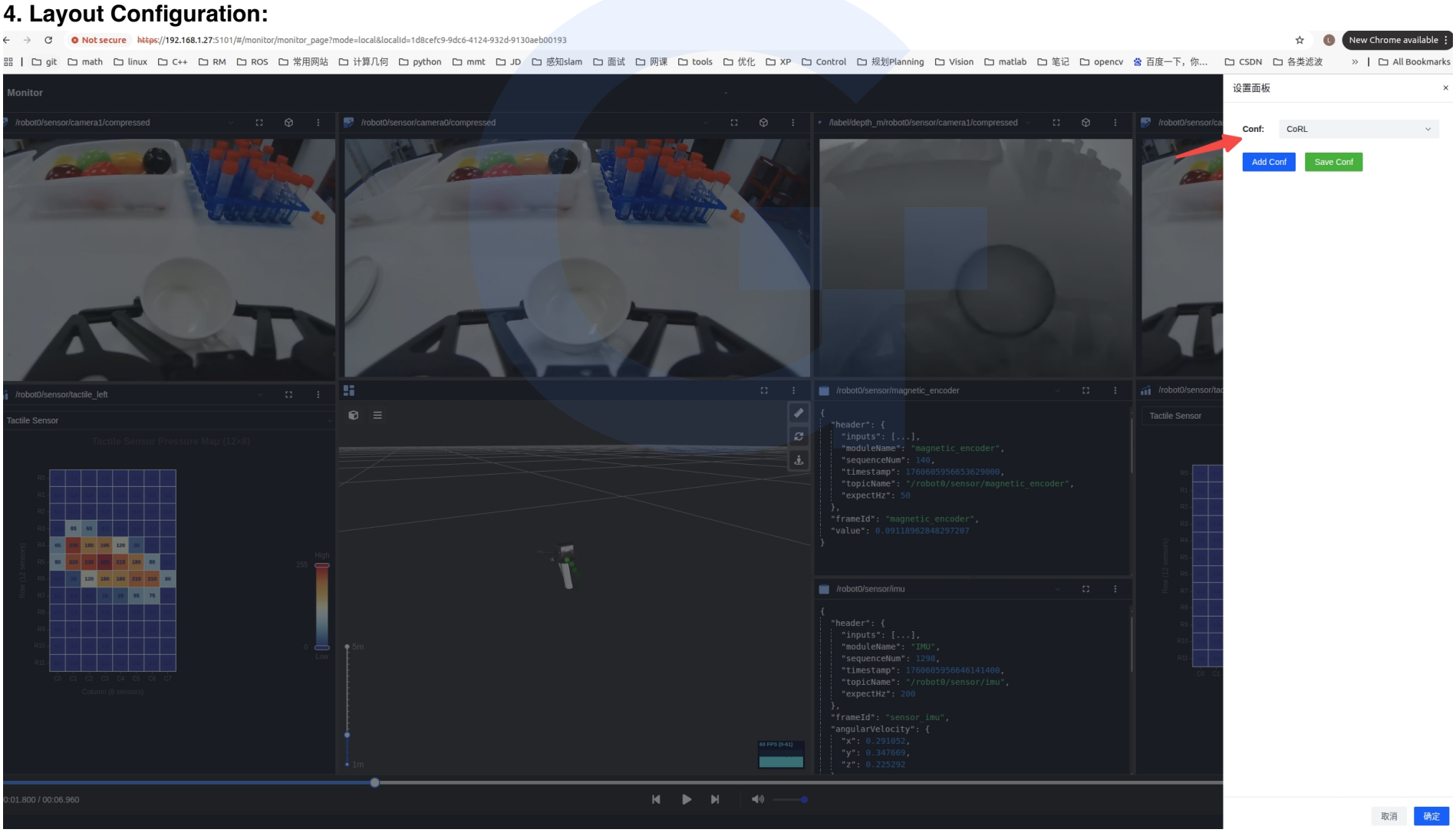
Search channels...

ID	Schema	Topic	Messages
1	CompressedImage	/label/depth_m/robot0/sensor/camera1/compressed	208
2	CompressedImage	/robot0/sensor/camera0/compressed	208
3	CompressedImage	/robot0/sensor/camera1/compressed	208
4	CompressedImage	/robot0/sensor/camera2/compressed	208
5	IMUMeasurement	/robot0/sensor/imu	1393
6	SensorCalibrationParam	/robot0/sensor/calibration_info	1
7	TactileMeasurement	/robot0/sensor/tactile_left	208

Functional:

- **MCAP Data Summary** - Channel lists, message counts, and duration statistics
- **Topic Timing** - Frame rate analysis with timestamp visualization per topic

4. Layout Configuration:



Functional:

- **Layout Configuration** - Save and manage custom layout presets for different workflows.
- **Frame Rate Display** - Support for creating, saving, and loading personalized interface layouts

4.3 Calibaration Features(*Upcoming*)

4.4 GroundTruth Features(*Upcoming*)

5. Troubleshooting

1. port is already allocated

```
(base) yang@yang-Default-string:~/Downloads$ docker run -it --rm --name studio100 -p 5101:5501 genrobot/matrix-studio:0.1.9
docker: Error response from daemon: failed to set up container networking: driver failed programming external connectivity on endpoint studio100 (8d0f1ce1162ad35e4482d350d37b21525d7d67e9530065c21a4d39a251a0401d): Bind for 0.0.0.0:5101 failed: port is already allocated

Run 'docker run --help' for more information
```

Solution: Change useful host_port

```
docker run -it --rm --name studio -p host_port:5501 genrobot/matrix-studio:0.1.10
```