Summary – Driver Actions Dataset Preparation

1. Understanding the Original Dataset

The dataset initially provided contained over 990 columns of raw Rokoko motion capture data, including positions, velocities, accelerations, and rotations for nearly every joint. While comprehensive, this dataset was not directly usable for driver action training. It served mainly to help us understand the structure, naming conventions, and types of signals available.

2. Selecting Relevant Features

Since our first milestone was steering wheel turns (left, right, neutral), we narrowed the dataset to signals related to wrist and hand movements. Relevant columns were identified using keyword searches and statistical analysis (standard deviation and range). We retained high-variance wrist rotation and velocity signals (e.g., RightWrist_flexion, RightWrist_adduction) and dropped noisy or static columns.

3. Building a Steering Proxy Angle

From the selected wrist features, we created a steering proxy angle by combining RightWrist_flexion and RightWrist_adduction. This single value increases when turning right and decreases when turning left. The signal was centered using a neutral baseline, and thresholds were applied to generate labels: turn_right (> +10°), turn_left (< –10°), and neutral (otherwise).

4. Expanding Beyond Steering

While steering is our first use case, the same methodology will apply to other driver actions such as looking left/right, pressing and releasing the brake, accelerating, and gear shifting. Each action will require clear proxy signals, consistent labeling, and at least 30 repetitions per movement to ensure balanced datasets.

5. Standardizing the Data Generation Process

The original dataset highlighted the need for a standardized collection process. Moving forward, data should be generated per movement type, with at least 30 repetitions of each action (e.g., steering left/right, looking left/right, brake press/depress, accelerator press/depress). Each take should begin and end in neutral, and variations in speed and amplitude should be included. Data must always be recorded at 60 FPS with the same column structure for consistency.

6. Final Output

The resulting dataset (steering_signals.csv) now includes timestamps, selected wrist features, a proxy steering angle, and labeled movements. This clean, interpretable dataset is ready for training AI models. Going forward, the same approach will allow us to create high-quality datasets for all driver actions.

7. Statistical Summary of Steering Dataset

The following table summarizes the main statistics (count, mean, std, min, max, and quartiles) for the numeric columns in steering_signals.csv. This provides an overview of the data distribution and validates that the selected features are properly captured for modeling.

Column	count	mean	std	min	25%	50%	75%	max
Timestamp	4466.0	37208.33	21489.46	0.0	18604.25	37208.5	55812.75	74417.0
RightWrist_flexion	4466.0	5.51	12.13	-50.22	-6.15	7.48	16.06	31.22
RightWrist_adduction	4466.0	7.13	7.1	-37.23	4.93	7.94	10.24	22.59
RightWrist_flexion_velocity	4466.0	-0.13	23.94	-744.47	-0.98	0.3	1.78	192.87
RightWrist_adduction_velocity	4466.0	0.34	16.49	-138.04	-1.01	0.18	1.45	596.85
LeftWrist_flexion	4466.0	-4.3	11.16	-49.72	-9.07	-5.86	-0.78	52.01
LeftWrist_adduction	4466.0	-2.35	9.36	-40.08	-6.31	-3.4	3.89	15.51
LeftWrist_flexion_velocity	4466.0	-0.27	26.86	-176.67	-2.07	-0.41	0.97	1278.86
LeftWrist_adduction_velocity	4466.0	-0.07	28.51	-1084.24	-1.51	0.02	1.78	1170.41
steer_proxy	4466.0	13.11	9.01	-29.07	5.21	14.69	22.07	30.72

In summary, we reduced a noisy 991-column dataset to a focused, labeled dataset centered on steering movements. By standardizing how data is captured and extending the process to all driver actions, we now have a repeatable pipeline for generating high-quality datasets that will support the full range of driver behaviors needed for our project.