

Badminton Action Recognition for Video-Based Performance Analysis

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OBJECTIVES & MOTIVATION

- Coaches and players watch videos to spot mistakes and improve strokes, but reviewing footage manually takes a lot of time.
- Any useful solution must work reliably across different camera angles, and environments—without requiring extra equipment like wearable sensors.
- **Goal:** System that automatically processes raw match or training video, detects the active player, identifies and segments their actions.

DESIGN OF THE SOLUTION

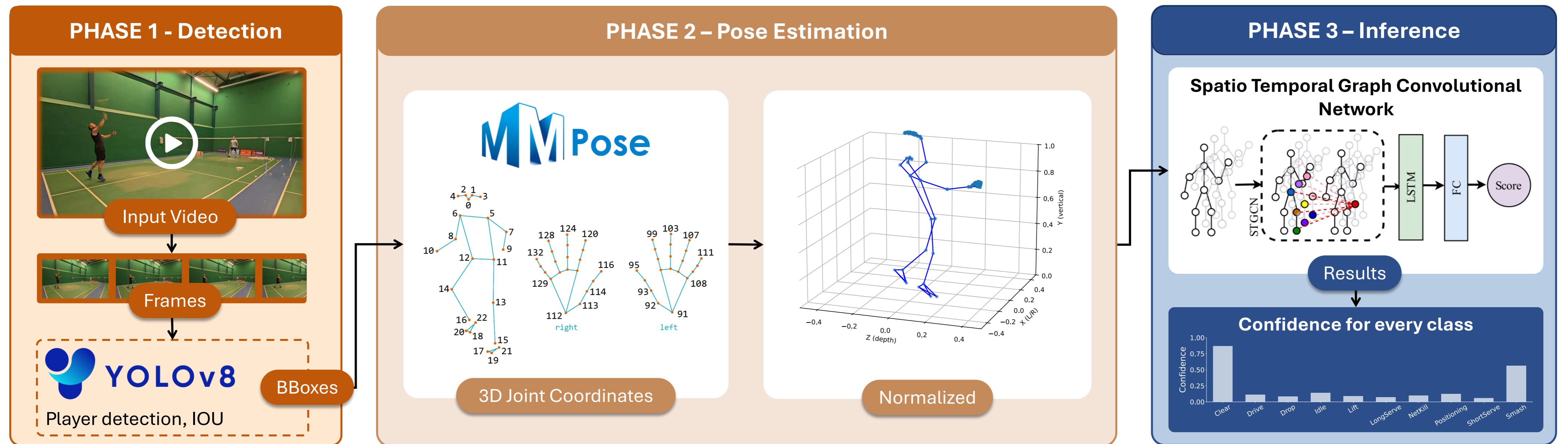


Figure 1: System pipeline

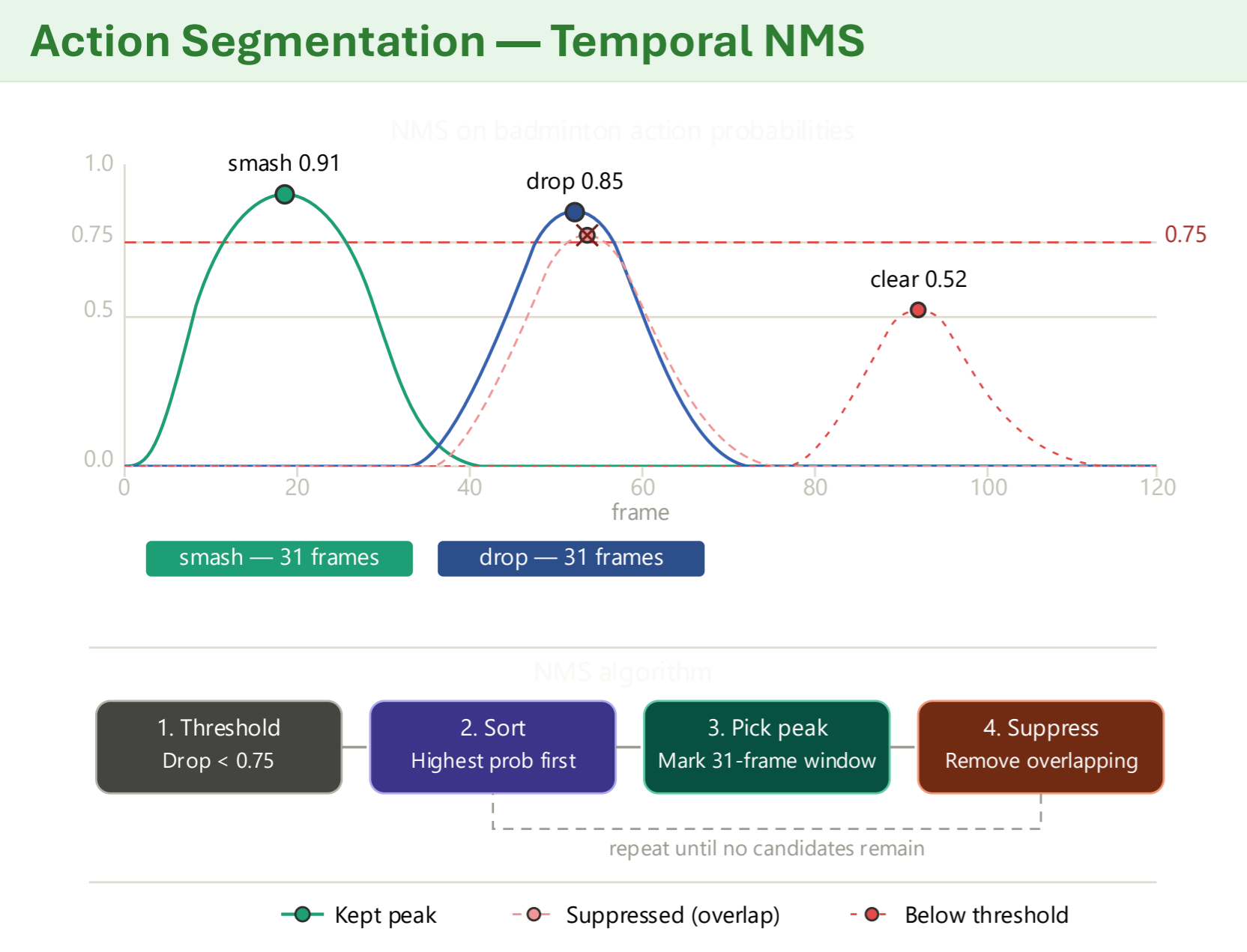


Figure 2: Converting confidences into action segments

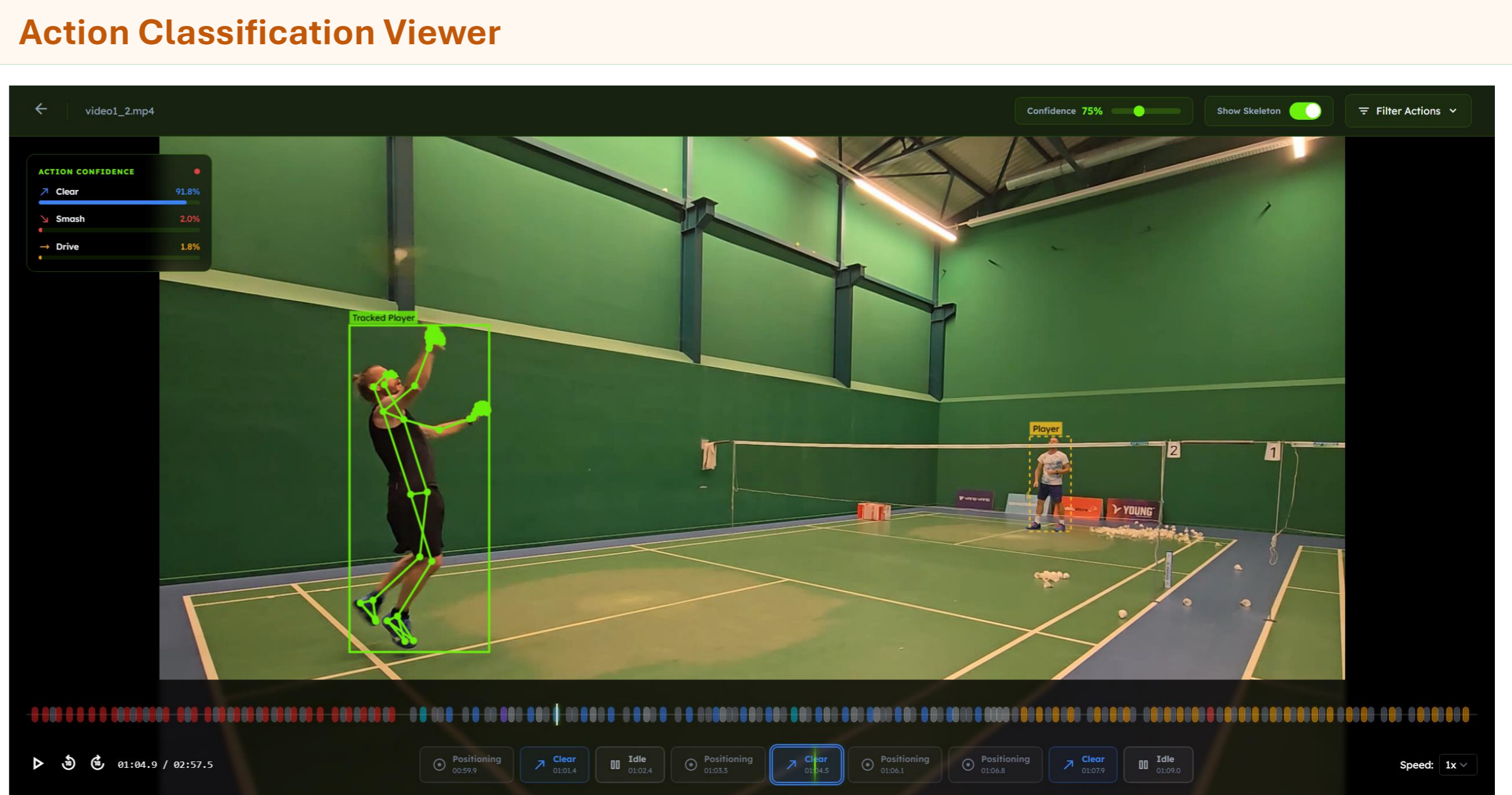


Figure 3: Custom video player displaying action segments

RESULTS

89.5%

Test Set Accuracy

0.894

Weighted F1 Score

10

Action Classes

Model	Set of Joints	Dropout (%)	Epoch	Accuracy (%)	Loss	F1 Score	Training Time (m)	Inference (ms)	
Custom	Body	0	0	67	89.0	0.49	0.889	11	3.7
Reference	Body	0	0	71	88.9	0.43	0.888	11	11.4
Custom	Body	40	15	98	89.2	0.42	0.891	17	3.6
Reference	Body	40	15	71	88.6	0.46	0.885	15	12.9
Custom	Body + Feet	0	0	39	87.7	0.48	0.876	11	4.0
Reference	Body + Feet	0	0	74	88.3	0.39	0.882	14	12.2
Custom	Body + Feet	40	15	58	88.0	0.46	0.878	17	3.6
Reference	Body + Feet	40	15	33	89.6	0.39	0.895	15	12.8
Custom	Whole Body	0	0	103	89.1	0.42	0.891	24	4
Reference	Whole Body	0	0	73	87.6	0.49	0.875	89	9.8
Custom	Whole Body	40	15	64	89.5	0.41	0.894	33	3.7
Reference	Whole Body	40	15	26	86.3	0.46	0.869	47	11.3

Figure 4: Training results across different configurations

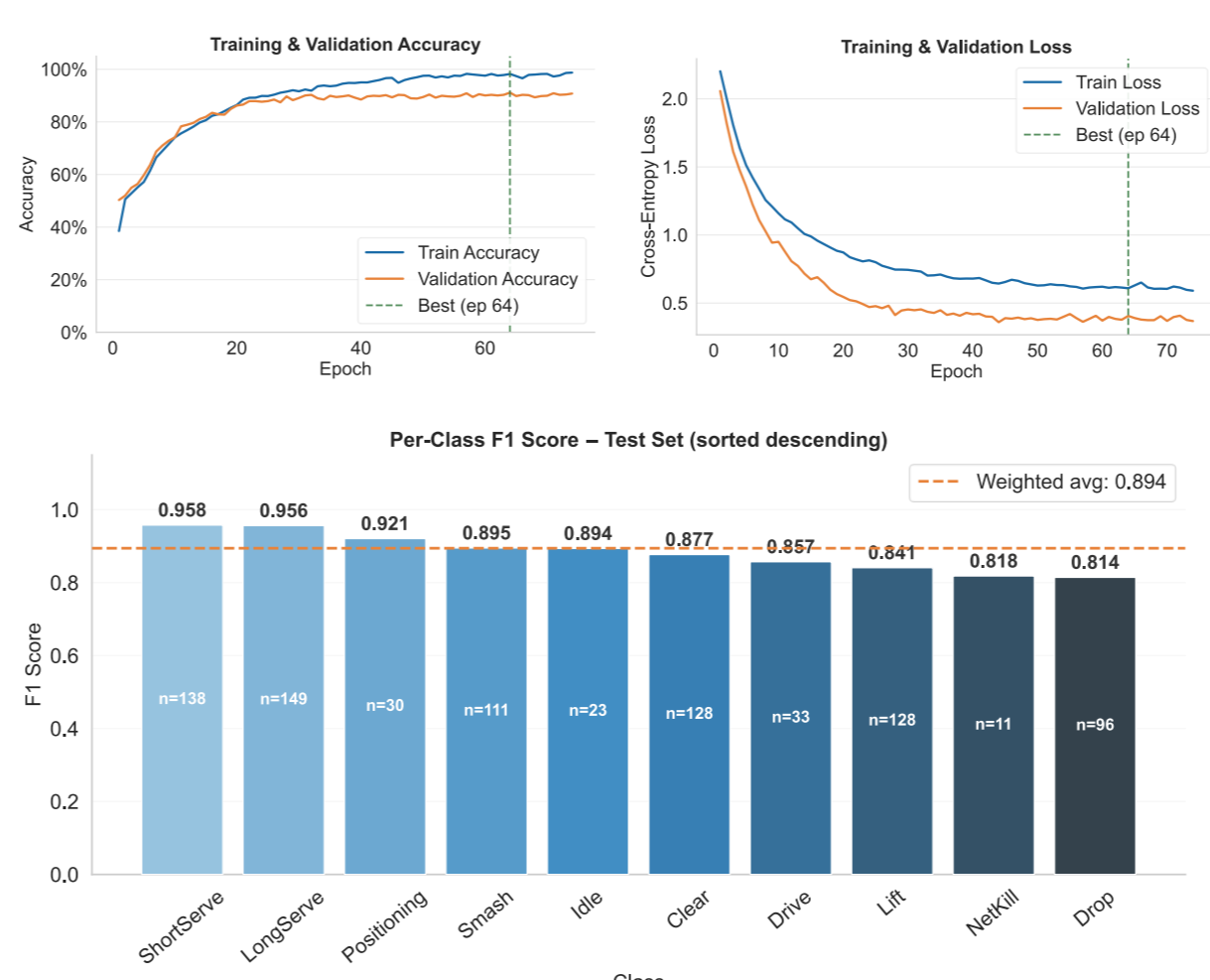


Figure 5: Training Curves and Per-Class F1

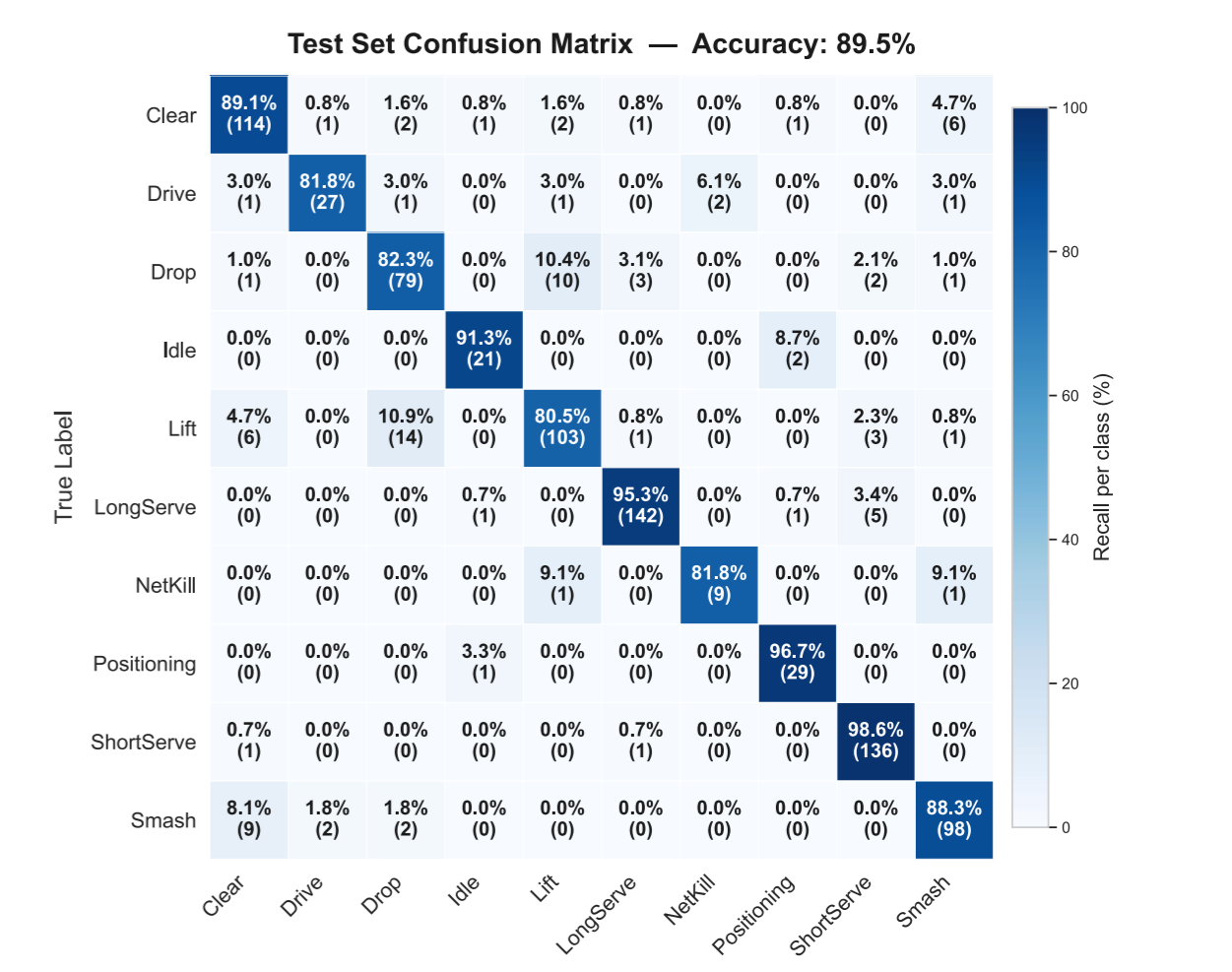


Figure 6: Normalized confusion matrix