

Coach Michael's Video Clipper

Complete Operational Reference & System Guide — Edition 2026.4

Fast Lossless FFmpeg Engine6 AI Detection PipelinesReal-Time Progress RenderingDirect Parameter Tuner

1. Overview & Architecture

Coach Michael's Video Clipper is an ultra-low-latency desktop workstation engineered for table tennis coaches, video analysts, and competitors. It eliminates hours of manual indexing by coupling frame-accurate keyboard shortcuts, dynamic acceleration scrubbing, interactive waveform exploration, paused filmstrip trimming, and automated multi-modal AI detection (acoustics, optical motion, player court presence, and temporal ball tracking).

All exports leverage direct stream concatenation via FFmpeg, compiling full-match highlights in 2–3 seconds without generational compression loss.

2. Quick Start & Workflow

- **Launching:** Run `CoachMichaelClipper.exe` or execute `python live_rally_tagger.py`.
- **Opening Video:** The native system dialog prompts you to choose any match file (`.mp4`, `.mov`, `.avi`, `.mkv`, `.ts`).
- **Playback:** Starts paused at `00:00`. Default scanning speed is set to **Speed 5 (1.50x)** for rapid match skimming.

3. Controls & Hotkey Reference

Action / Deck Button	Shortcut Key	Operational Description
START [S]	S	Starts marking a rally point. Automatically inserts the pre-roll buffer (default: 1.2s) to capture serve preparation.
END [E]	E	Concludes rally marking. Appends the post-roll buffer (default: 0.6s) to ensure full ball death and player reactions are captured.
SNAP -1.5s	W	Late reaction shortcut: retroactively snaps the rally start point 1.5 seconds into the past without pausing video.
PLAY / PAUSE	Space	Toggles playback. Entering paused mode unlocks the filmstrip inspector, rally looping, and fine-trimming controls.
Scrub << / >>	Hold < / >	Accelerating scrub: dynamically scales from 1.5x to 8.0x based on button hold duration.
Jump Start / End	Home / End	Instantly jumps the video playhead to the beginning (<code> <</code>) or end (<code>> </code>) of the match.
Playback Speeds	↑ / ↓	Cycles between 8 calibrated playback speeds: 0.5x, 0.75x, 1.0x, 1.25x, 1.5x, 1.75x, 2.0x, 2.25x.
UNDO [U]	U	Removes the most recently marked rally from the active point list.
EXPORT	Enter	Opens the export compilation modal to choose between 2-second Lossless Cut or Standard Re-encode.
EXIT	Esc or EXIT	Exit with unsaved-work guardrail: warns if rallies have been tagged without being exported.

4. Filmstrip Review & Nudge Trimming (Paused Mode)

Interactive Point Selection

Clicking any thumbnail card in the filmstrip jumps the video playhead directly to that rally's starting frame.

Loop Review Mode

Toggle **LOOP: ON** to replay the selected point continuously while inspecting bounce margins and stroke contact.

Frame-Accurate Boundary Nudging

Press **[** / **]** to nudge the rally start earlier/later by the configured step size. Press **;** / **'** to trim or extend the end.

Individual Card Deletion

Press **D** or click **DELETE [D]** to delete the active card. Use **<** and **>** to scroll through matches.

5. AI Automated Rally Detection (AI Assist)

Clicking **AI ASSIST** pauses playback and opens the comprehensive computer vision/acoustic engine. All detection passes feature a **real-time progress bar** displaying active frame count, stage description, and percentage complete.

1. Audio Transients (Impact Energy)

Scans high-frequency envelope differentials to locate ball-on-rubber and ball-on-table sound spikes. Groups impact cadence into rallies. Best for quiet venues with clear court audio.

2. Table Motion (MOG2)

Employs Gaussian Mixture background subtraction to isolate optical player activity across the table. Ideal for loud gymnasiums where audio cannot be isolated.

3. Hybrid (Audio + Motion Gate)

Prompts for a table bounding box. Audio hits are accepted only if concurrent motion occurs within your court zone, filtering out ambient adjacent table noise.

4. Ball Flight Arcs (3-Frame Diff)

Calculates 3-frame temporal differentials and filters pixel trajectories between 4 and 75 px/frame to track continuous ball flight arcs.

5. YOLO Court Presence

Tracks player court occupancy and active engagement in the table playing area. Distinguishes live points from dead-ball downtime.

6. TTNNet Ball Tracking (Deep Heatmap)

Generates 5-frame sequence acceleration heatmaps on downscaled temporal frames, identifying discrete bounce and paddle strike events.

Interactive AI Parameter Controls

- **Retention Toggle:** Check to clear existing points before scanning; uncheck to keep and append newly detected rallies.
- **YOLO Parameters:** Configure Sample Stride (Every 1–6 frames) and Court Confidence threshold (0.15–0.85).
- **TTNet Parameters:** Adjust Minimum Bounces per Rally (1–6 hits) and Maximum Trajectory Gap (0.6s–3.0s).

6. Configuration Modal (CONFIG)

- **Pre-Roll Buffer (0.2s – 5.0s):** Lead-in margin prepended to rally starts (accommodates server prep, toss, and serve windup).
- **Post-Roll Buffer (0.2s – 5.0s):** Trailing margin appended after rally finish (captures ball death and emotional reactions).
- **Nudge Step Size (0.1s – 2.0s):** Time adjustment increment for the **[**, **]**, **;**, and **'** micro-trim keys.

7. Export & Compilation Pipeline

- **LOSSLESS CUT (2s) [Recommended]:** Executes direct stream copying (`-c copy`) via FFmpeg. Concatenates all tagged points into an output file in 2–3 seconds with zero quality degradation.
- **STANDARD ENCODE:** Re-encodes using MoviePy (libx264/aac) for clips requiring timestamp normalization.
- **Export Destination:** Files are saved automatically beside your source video as `[OriginalName]_highlights.mp4`.

Support Ongoing Development

Coach Michael's Video Clipper is free software continually maintained for the community. If this tool enhances your training and analysis workflow, contributions are gratefully accepted via PayPal:

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