Chopped: Audio Driven Video Segmentation

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Introduction

High school baseball coaches often spend significant time manually reviewing and editing game footage to analyze player performance. This process is time consuming and inefficient when working with full-length game recordings.

To address this challenge, Chopped is a web application designed to automatically sort and segment game film. The system utilizes multimedia data processing, incorporating both audio and structured data files to identify and organize key moments within a game. The system is hardware-independent, requiring only recorded video and audio input.

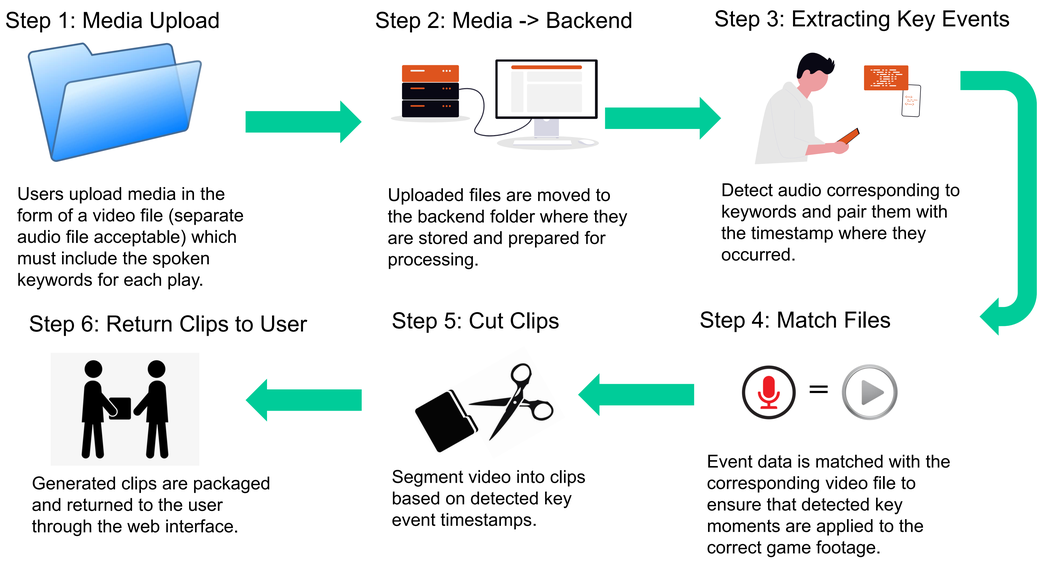
Methods

- Web application developed using Python, HTML, and CSS with a Flask-based backend.
- Utilizes integrated libraries for video processing and speech-to-text transcription.
- Users verbally mark key events during recording (e.g. “strikeout”, “double”, “E6”, etc.).
- Spoken keywords are transcribed and mapped to timestamps.
- Uploaded video and audio files are processed together to generate segmented game footage

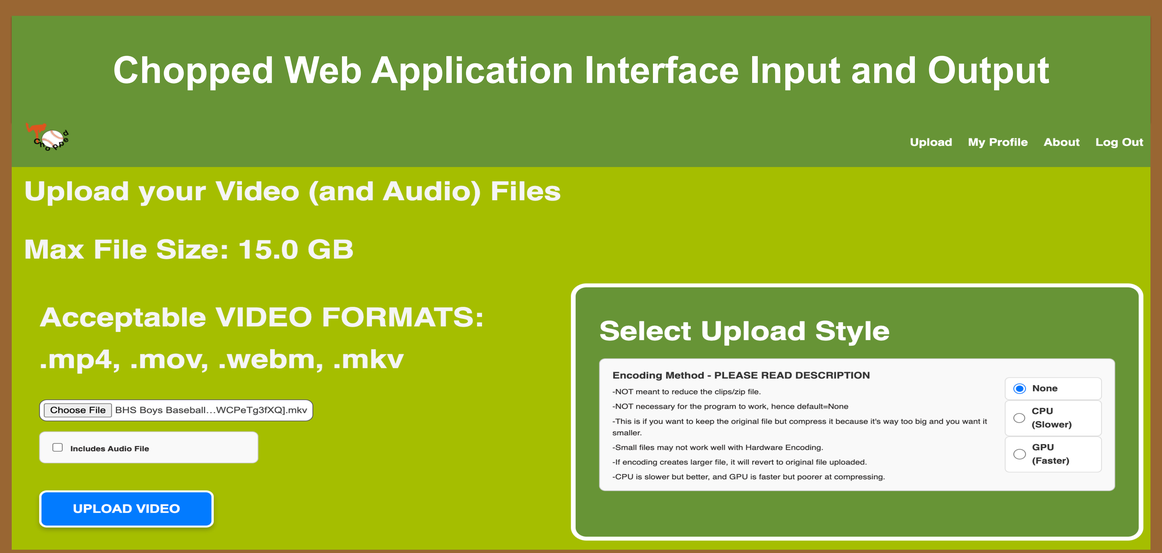
System Metrics/Summary

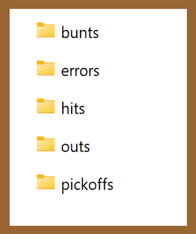
- Input: ~2 hour game recording with the option for an additional audio file
- Output: Multiple organized 25-second video clips of key events
- Processing: Fully automated after user upload
- Accuracy: High when keywords are clearly spoken

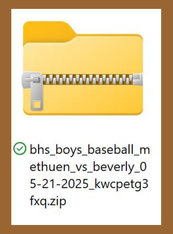
Data Flow



Chopped Web Application Interface Input and Output







Results

- Tested on full-length (~2 hour) baseball game recordings with live announcer audio.
- System successfully detected and generated clips when relevant keywords (e.g. “double”, “strikeout”) were clearly spoken.
- Performance depended on consistency of spoken cues, with extra clips generated when announcers did not follow expected phrasing.
- Simulated ideal usage by manually creating event data, confirming that clips were generated at correct timestamps.
- Background noise had minimal impact, as the system selectively detects target keywords rather than general speech.
- Repeated keywords at different timestamps result in multiple clips, reflecting direct mapping between detected events and generated segments.

Future Steps/Implications

- Transition to a hybrid architecture, where video processing runs locally while a web platform stores and organizes generated clips.
- Improve system robustness to background noise and inconsistent spoken input.
- Enable real-time or near real-time clip generation, accounting for hardware and streaming constraints.
- Expand keyword detection to support a broader range of events and sports.
- Develop an interactive interface for reviewing, searching, and organizing clips.