

AI-Powered NBA Event Detection & Clipping

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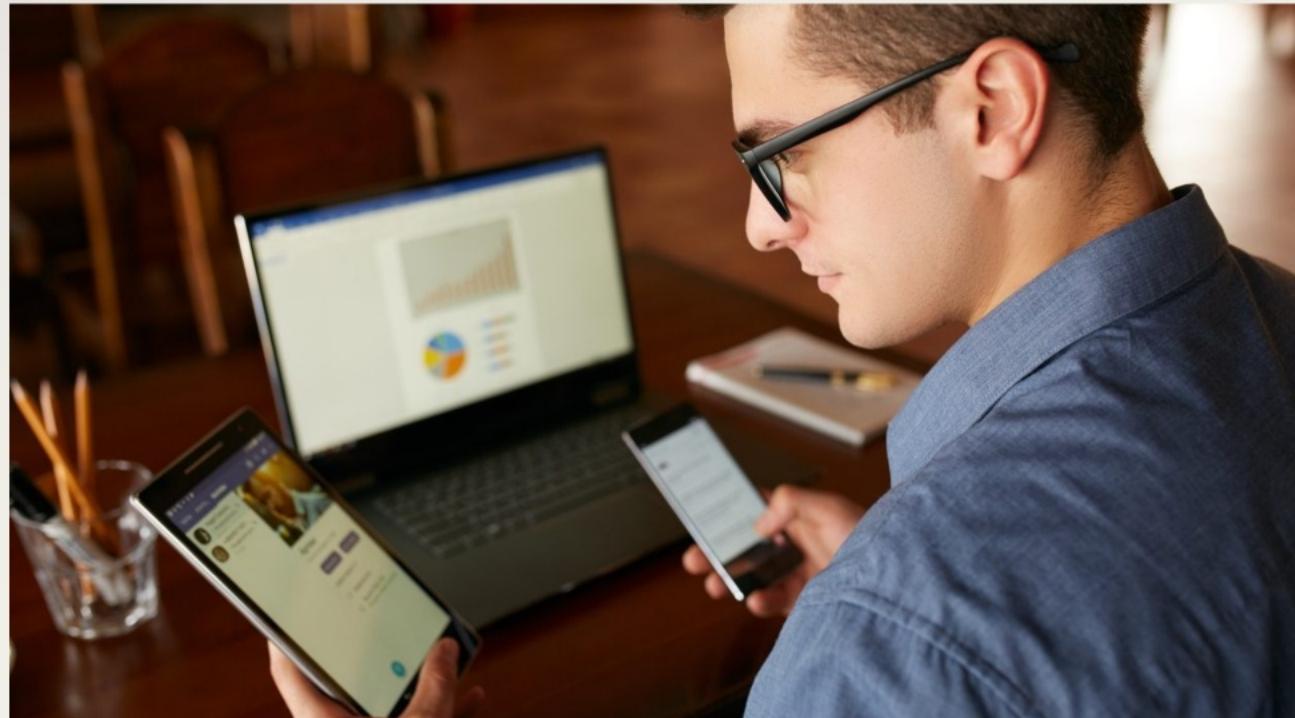
Our Problem

Lack of Visibility for Lesser-Known Leagues & Women's Sports

Limited Coverage: Traditional sports broadcasting prioritizes popular leagues, significantly underrepresenting women's sports and smaller, emerging leagues.

Untapped Potential: Lesser-known leagues struggle to attract audiences, sponsorships, and media attention, leaving valuable content unseen by potential fans.

Gen Z Disconnect: Traditional, lengthy broadcasts fail to match Gen Z's preferences for short, engaging, and easily shareable content.



Relevance

Gen Z Consumption Habits:

- 48% prefer highlights over full games.
- Predominantly consume sports via social media platforms.

Opportunity:

- Deliver engaging short-form content to reach younger audiences directly.
- Increase exposure for underrepresented sports leagues and women's sports.





Dataset Selection & Justification

Publicly Available Footage: Diverse range of scoreboard designs from multiple sports and broadcast styles for robust training.

Proprietary Footage from Leagues: Direct collaboration ensures accuracy tailored specifically to league needs.

Historical & New Footage:

A robust sample dataset of key phrases and words commonly used by commentators in various basketball matches was collected and analyzed.



DEMO!

Our Solution Overview

Our solution processes sports videos automatically using advanced technologies like OpenCV, PyTesseract, FFmpeg, and NLP.

Instantly extracts scoreboard data, tracks scores in real-time, and identifies key game moments.

Ranks clips using commentary analysis, ensuring viewers see the most exciting content first.



Commentary Analysis & Clip Ranking

Uses NLP (NeMo, NVIDIA) to transcribe and analyze commentary for excitement levels.

Employs FAISS vector database for rapid clip search and ranking based on commentary significance.

Converts videos to audio format using FFmpeg.





Video Processing & Scoreboard Detection



Opens video files frame-by-frame using OpenCV (cv.VideoCapture).

Locates scoreboard using edge detection and accurately extracts scoreboard region for OCR.

Optical Character Recognition (OCR)

Extracts numeric scores using PyTesseract (accuracy threshold set at 75%).

Converts scores to absolute coordinates, tracking real-time game score changes.

Parallel Processing & Efficiency

- Video format conversion (MP4 to WAV) optimized with FFmpeg.
- Parallel processing accelerates analysis and content creation.
- Significantly reduces manual editing efforts, saving time and operational costs.

Business Impact

Increased Engagement:

- Social Media Consumption: Over 90% of Gen Z sports fans utilize social media platforms to consume sports content, including game clips and highlights.
- Shift from Traditional Viewing: Only 40% of Gen Zers watch live sports on cable TV, indicating a preference for digital and on-the-go content.





Business Impact (Count.)



Cost Savings:

- Time Efficiency: AI-powered video editing tools can save up to 14 hours per project, streamlining production workflows.
- Financial Efficiency: Incorporating AI into video workflows has led to cost reductions, with 85% of marketers reporting savings.



Other Avenues we tried

Pre-Trained Model: TensorFlow YOLO v8 and custom Keras video classification.

Custom Model: LSTM + CNN-based approach for sequential event classification.

Expected Outcome: AI model reads event types with high accuracy.



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"Made_Shot-Driving_Bank_Hook_Shot",
"Made_Shot-Driving_Dunk_Shot",
"Made_Shot-Driving_Finger_Roll_Layup_Shot",
"Made_Shot-Driving_Floating_Bank_Jump_Shot",
"Made_Shot-Driving_Floating_Jump_Shot",
"Made_Shot-Driving_Hook_Shot",
"Made_Shot-Driving_Layup_Shot",
"Made_Shot-Driving_Reverse_Dunk_Shot",
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"Made_Shot-Dunk_Shot",
"Made_Shot-Fadeaway_Jump_Shot",
"Made_Shot-Finger_Roll_Layup_Shot",
"Made_Shot-Floating_Jump_shot",
"Made_Shot-Hook_Bank_Shot",
"Made_Shot-Hook_Shot",
"Made_Shot-Jump_Bank_Shot",
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"Made_Shot-Pullup_Jump_shot",
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"Made_Shot-Running_Alley_Oop_Layup_Shot",
"Made_Shot-Running_Dunk_Shot",
"Made_Shot-Running_Finger_Roll_Layup_Shot",
"Made_Shot-Running_Jump_Shot",
"Made_Shot-Running_Layup_Shot",
"Made_Shot-Running_Pull-Up_Jump_Shot",
"Made_Shot-Running_Reverse_Dunk_Shot",
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Challenges Encountered:

The AI model occasionally misclassified similar events due to ambiguity.

Some events lacked clear visual distinctions, making detection harder.

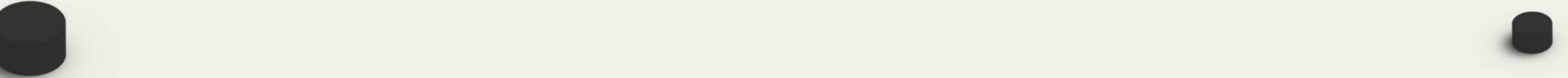
JSON captions were not perfectly structured, requiring additional filtering.

Future Enhancements:

Improve model accuracy by expanding training data with more diverse events.

Enhance event recognition using pose detection and object tracking (e.g., tracking ball trajectory and player movements).

Increase scope beyond scoring plays (include assists, rebounds, steals, and defensive actions).



Thank you!

Special thanks to the GOAT, Shivam Garg!



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