

Automating Basketball Highlights Using

Object Tracking

Motivation

Find **Inexpensive, Basic**,
alternative for cutting up
game film and extracting
important game
information



Example Use Cases

1

Television Networks

Quickly Uploading Game Highlights To
Youtube/Social Media

2

Basketball Teams

Saving man hours from manually chopping
footage

3

Fantasy Sports

Automate player specific highlight reels

How To Identify a Basketball?





It Is Not Trivial!

The image is a collage of basketball game scenes. At the top, two panels show a game in progress with players on the court and spectators in the stands. The bottom panel shows a wider view of the court during a game between UCF and Duke, with the scoreboard indicating it's the 1st round. A large black rectangular box with orange text is centered over the middle of the bottom panel. In the bottom right corner of the main image, there is a small inset showing a close-up of a player's hand holding a basketball.

Neural Networks

Trained a YOLO Model On ~1000
images of Basketballs and “Made
Baskets”

Problems...

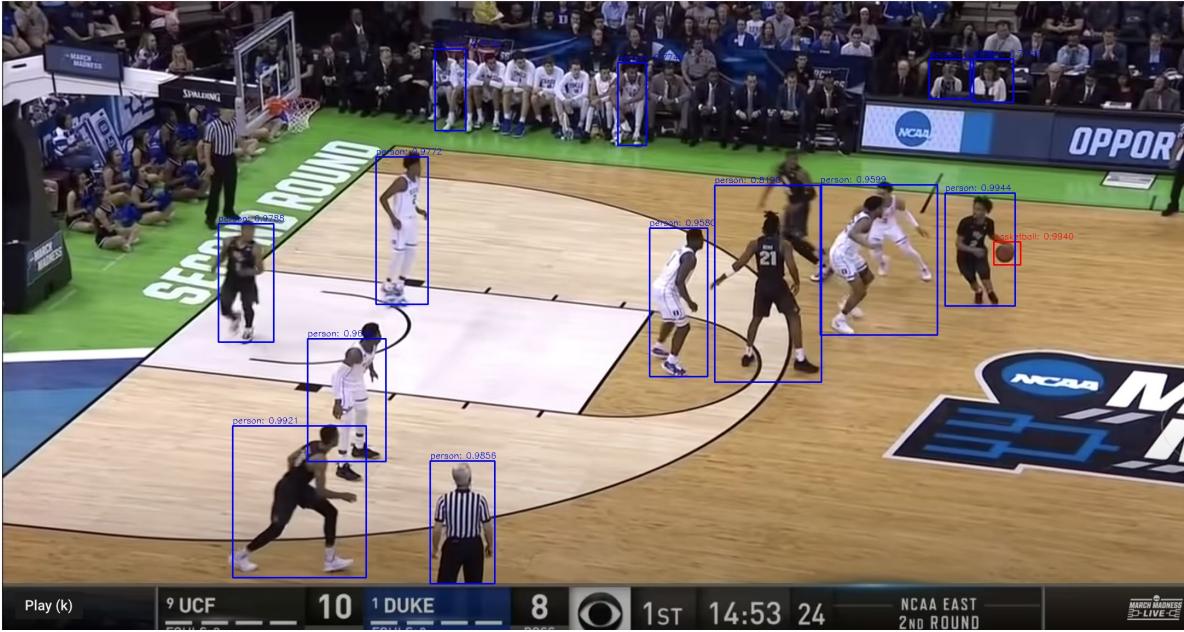


Misidentification (“False positives”)

Now We Add Some Logic

- Set confidence thresholds high (.9 and above)
- Need to see 3 consecutive “Made Basket” Frames
- Set “Cool Down” after made basket was identified

Identifying Players With Pre-Trained NN



Apply “Masks” Using Computer Vision



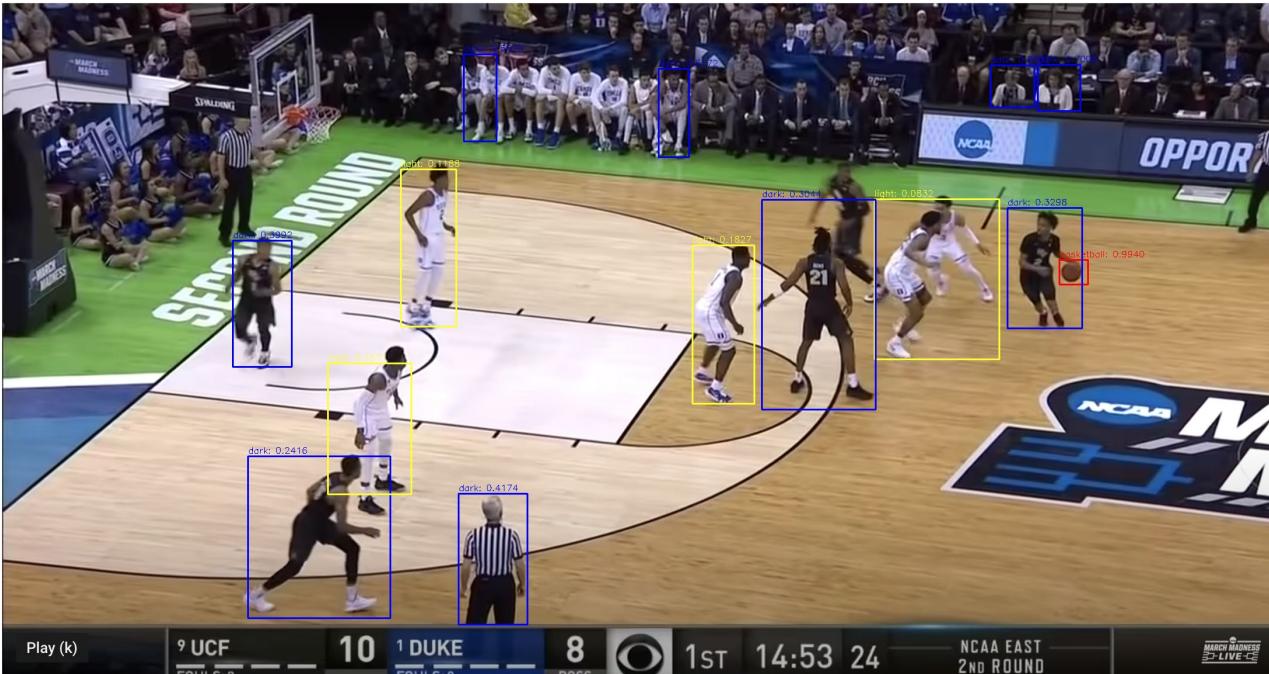
Light Team - Ratio: .03



Dark Team - Ratio: .35

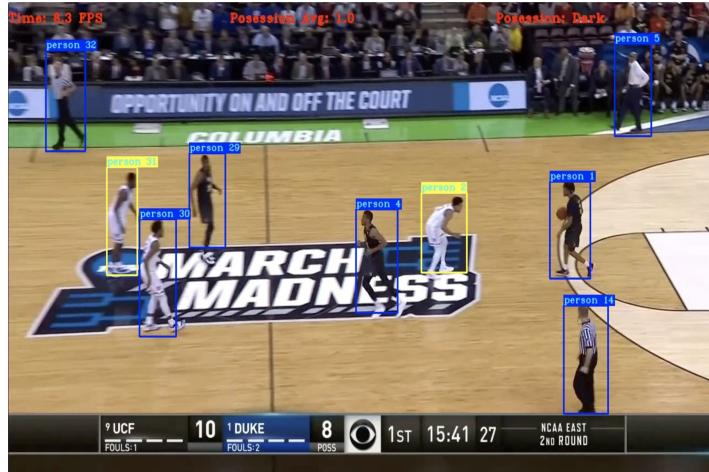
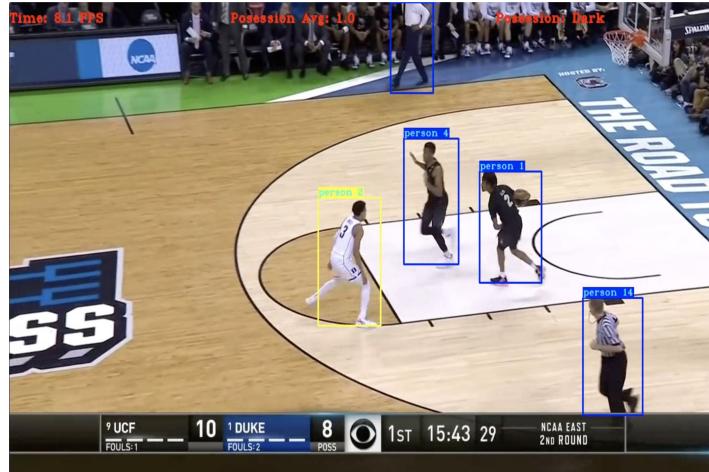


Still Frame Results

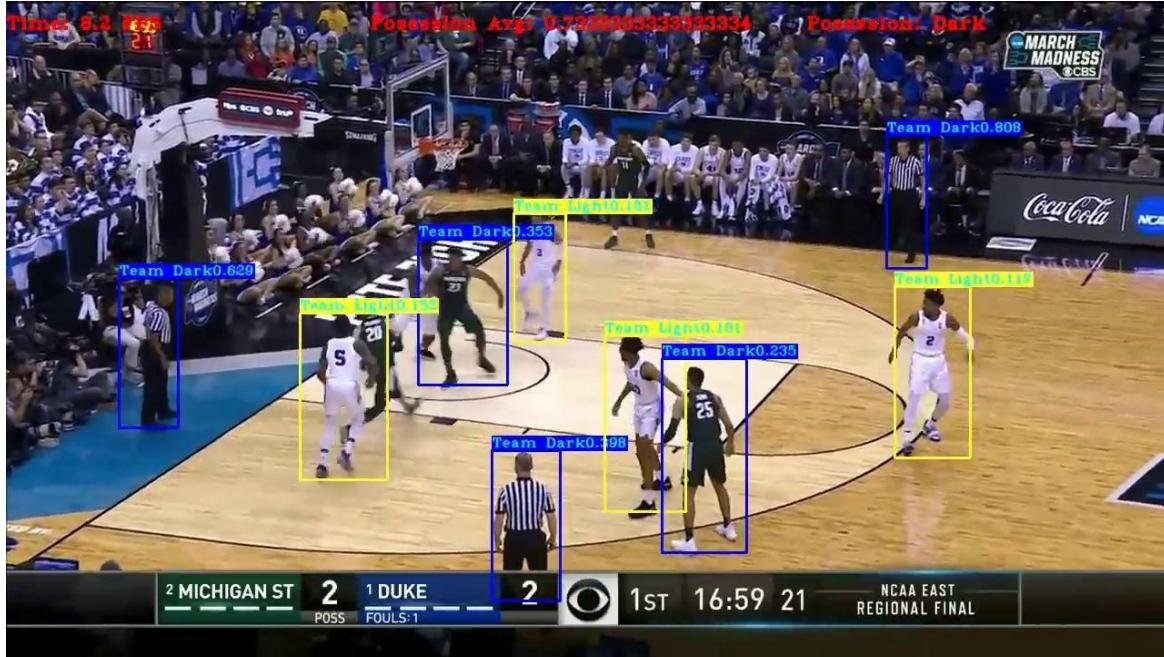


Player Tracking with Deep Flow

- With detection each Frame is independent
- Tracking creates “objects” from detections
- Connects detections across frames



Final Results



What's Next

- More Training!
- Utilize jersey numbers
- 3pt vs 2pt vs Free Throws
- Turnovers, Blocks, Rebounds, Etc.



Thanks!

Does anyone have any questions?

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Creating a Program That “Understands” The Game

Return key moments: made baskets,
turnovers etc.

What Is A Basketball Anyways?

—Someone famous

Results

