

# Object Detection in Videos

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Can we mine YouTube videos  
for interesting clips?

Can we use them to improve  
an object detection algorithm?

# Main Objectives Completed

1. Analyze 10 hours of video for 30 seconds of testing material
2. Make modifications to slightly improve algorithm (~20x on Akash's computer)

Boat  
Video



Bike  
Video



Car  
Video



10 Hours

1.1 million points

## Data Mining

Boat  
Video



Text file of  
differences



Car  
Video



Text file of  
differences



1 Pandas  
Dataframe



10 second  
clips by  
frame  
location

Bike  
Video



Text file of  
differences



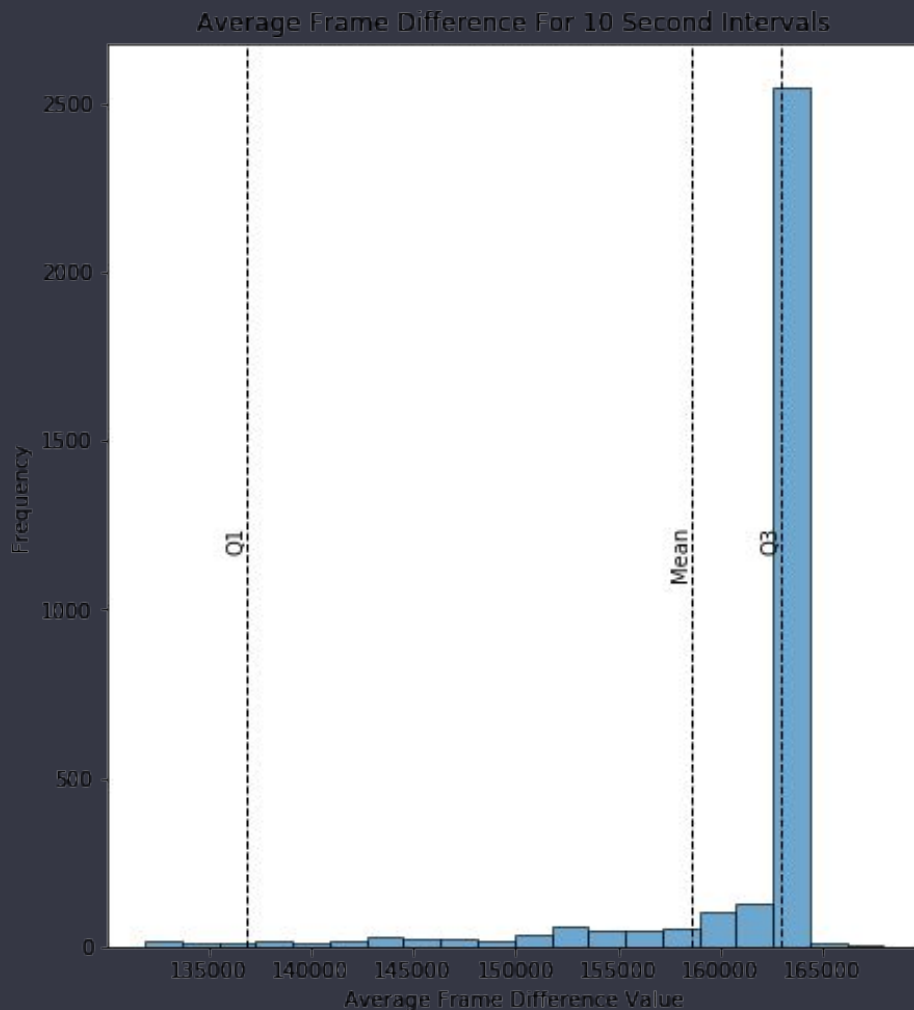
Greyscale Subtraction

Merge + Classify

Analyze

# Data Mining Continued

- Use Q1, Q2, and mean to find data centralization
- Sample from each for varying speeds
- As algorithm improves and handles clips better, increase threshold for faster clips



# The Clips

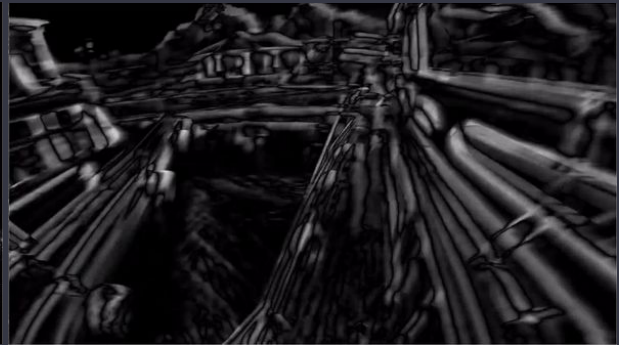
These are the three clips we found and put then through the video difference program to show their variations



Slow



Medium



Fast

# Knowledge Gained

- A video's "score" depends on the amount of movement
  - Low score = Low movement
- Using the distribution of frame differences you can select testing clips that best suit your algorithm

# Knowledge Gained/Algorithm Comparison

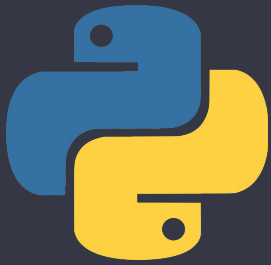
Algorithm	tinyYOLO	YOLO	Cheapo
Classes accurately detected	$\approx 5$	$\approx 30$	$\approx 30$
Speed on Akash's laptop (no GPU)	$\approx 8$ fps	$\approx 0.25$ fps	$\approx 8-15$ fps
Bounding box accuracy	High	High	Medium
Consistency (common detections/adjacent frames)	High	High	Low



# How can the knowledge be applied?

- Using this method of data mining, it becomes much easier to test for algorithm improvements.
- Can measure very slight increases of speed
- Can analyze clips that slow the algorithm down
- Can potentially be used to teach an algorithm to speed itself up by rewarding speed increases

# Thanks to:



Python  
(usual libraries)



Darkflow



OpenCV