Computer Vision: Detecting Scene Changes

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Scene Changes

- What is a scene change? How do we define it?
  - We can define a *scene change* as a time in a video where two consecutive frames (or matrices) are non-continuous.
    That is, the two images differ by a certain amount that we will call a *threshold*.

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- What is a scene change? How do we define it?
  - We can define a *scene change* as a time in a video where two consecutive frames (or matrices) are non-continuous.
    That is, the two images differ by a certain amount that we will call a *threshold*.
- What can we use to detect or determine a scene change?
  - Simple answer: We can use a *metric*.

What is a Metric?

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Basic Idea (Metric)

A **metric** *is a "system or standard of measurement."*[2]
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We have created 6 unique metrics to determine scene changes in short videos.

1. Sum
2. Trace
3. Random
4. Lines
5. Hue
6. Fourier Transform

Naive Metrics

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Sum Takes 2 consecutive frames and compares the sums of all the pixels in their matrices.

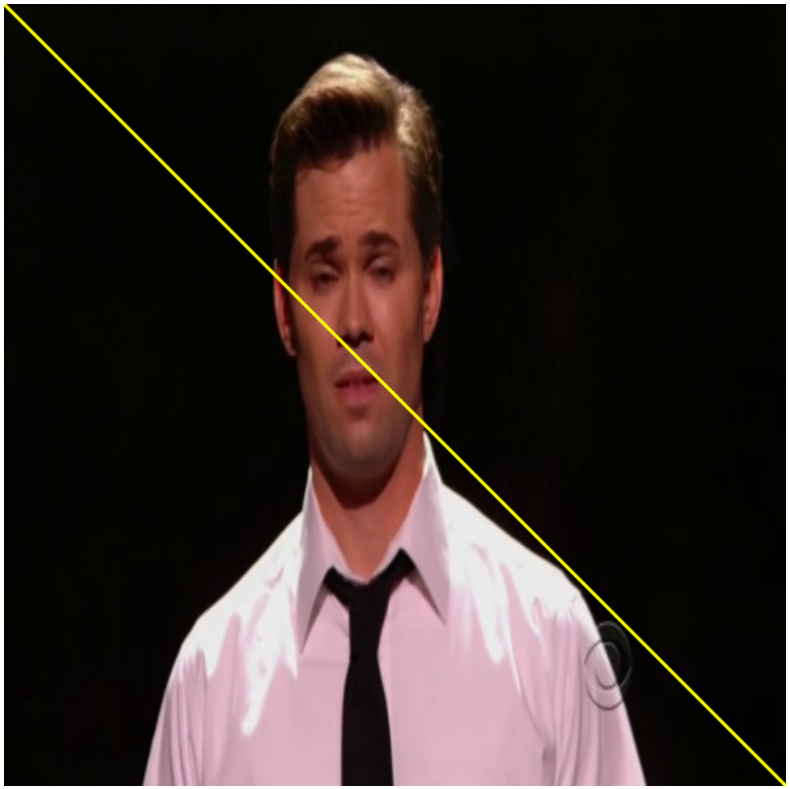
Trace Takes 2 consecutive frames and compares the traces of their matrices.

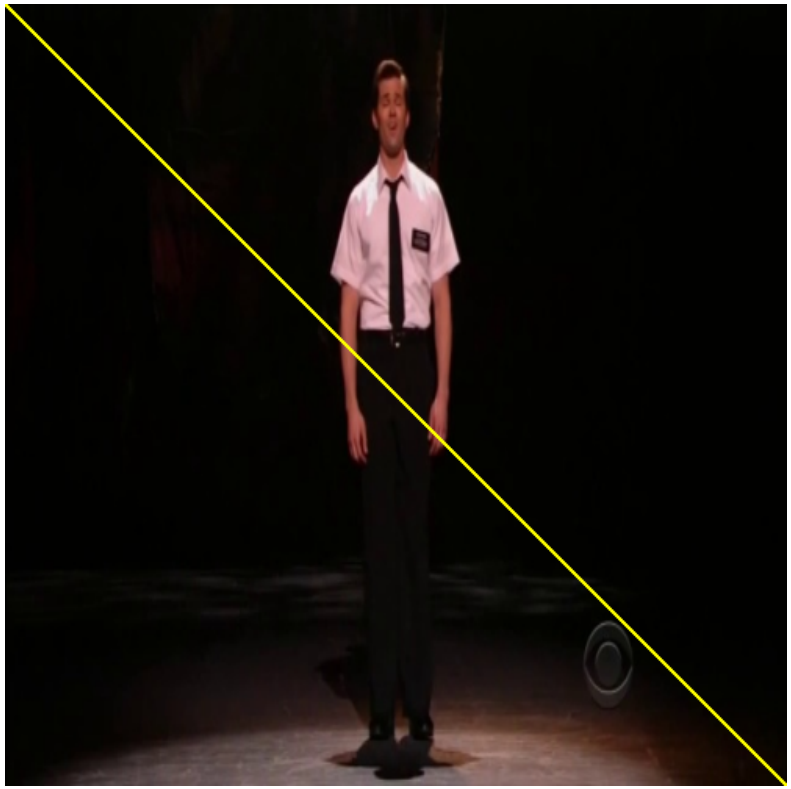
Random Takes 2 consecutive frames and compares the values of randomly chosen pixels in their matrices.

Trace Metric

Trace Metric

Consecutive frames with their traces outlined in yellow.





Random Pixel Metric

Random Pixel Metric

Consecutive frames with randomly chosen pixels outlined in yellow.

Threshold

Threshold

What determines a scene change is a very specific value called a *threshold*, as metioned before. The threshold will be the minimun difference the values can have to be considered a scene change. If the difference is below this minimum (threshold), then it is just a continuous shot.
For the 3 previously discussed metrics, this threshold is extremely sensitive, so we need better, more sophisticated ways to detect scene changes.

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