Report Meeting Week 5
Benjamin Mears

• Week's Progress
• KeyFrame extraction
• Where to next?
Week's Progress

- Implemented SVM
  - Histogram intersection kernel
  - Improved results vs logistic regression
- Keyframe extraction algorithm
  - From "Online, Simultaneous Shot Boundary Detection and Key Frame Extraction For Sports Videos Using Rank Tracing"-Wael Abd-Almageed
Basic Idea of Algorithm

- Step 1: Extract frames and convert to HSV colorspace
- Step 2: Create histogram of HSV values for each frame.
- Step 3: Concatenate into a matrix $X^T$

$$X^T = \begin{bmatrix} x^1 \\ x^2 \\ x^3 \\ \vdots \end{bmatrix} = \begin{bmatrix} \text{histogram for frame 1} \\ \text{histogram for frame 2} \\ \text{histogram for frame 3} \\ \vdots \end{bmatrix}$$
For each frame, take a submatrix of $X^T$, consisting of $x^f$, along with the previous $N-1$ rows:

$$
\begin{bmatrix}
  x^{f-N+1} \\
  \vdots \\
  x^{f-1} \\
  x^f
\end{bmatrix} = 
\begin{bmatrix}
  \text{histogram for frame } f - N + 1 \\
  \vdots \\
  \text{histogram for frame } f - 1 \\
  \text{histogram for frame } f
\end{bmatrix}
$$

Take the singular value decomposition of this matrix and use it to estimate the rank.
The Scanning Window...
From Wael Abd-Almageed
Next Week's Goal Plans

• Finish integrating LIBSVM
• Begin exploring optical flow in OpenCV
• Look for ideas while at CVPR that may help our system
  • Begin brainstorming novel ideas to use