STORYLINE RECONSTRUCTION FROM UNORDERED IMAGE SEQUENCES

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Motivation

Increasing number of unstructured image streams uploaded on web !!

flickr 5.26 billion public images until

40 million images uploaded daily

You Tube 400 hours of video per day

Problem
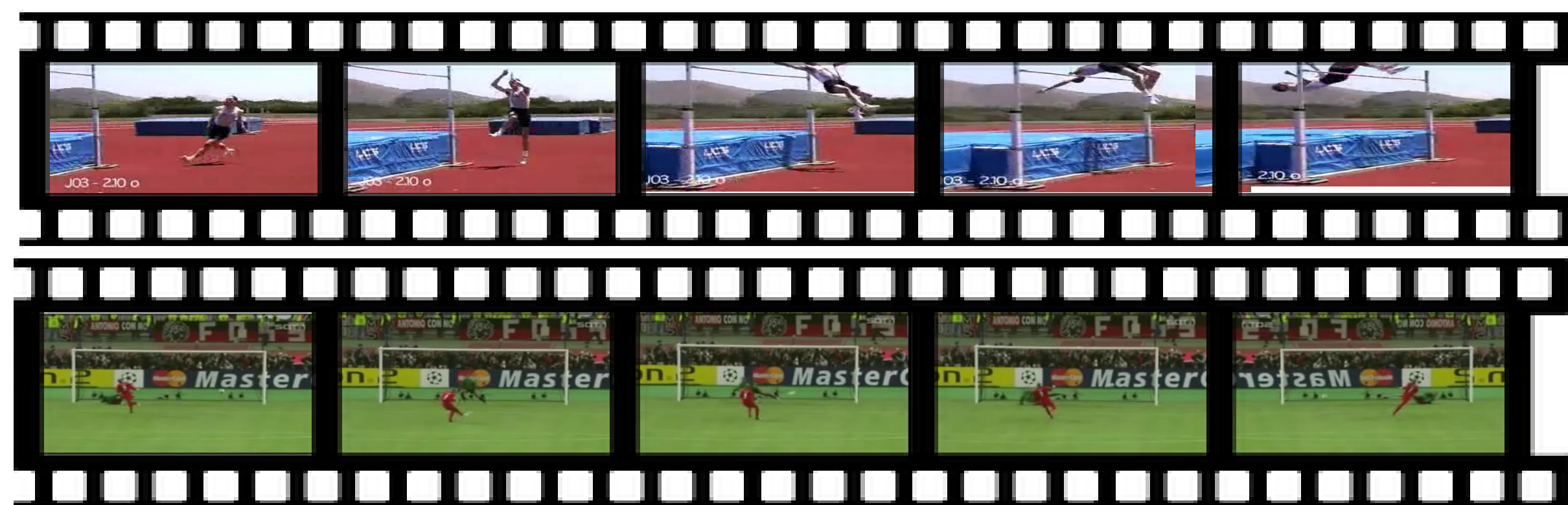
Input : Photostream – P {P1, P2, P3, P4}

Output: Chronological Sequence – P' {P3, P2, P1, P4}

Idea :

1. Cluster the keyframes generated from videos.
2. Image matching with all images in ordered cluster to get voting for correct order.

Dataset

- UCF101 action recognition dataset collected from YouTube videos (Sports category).
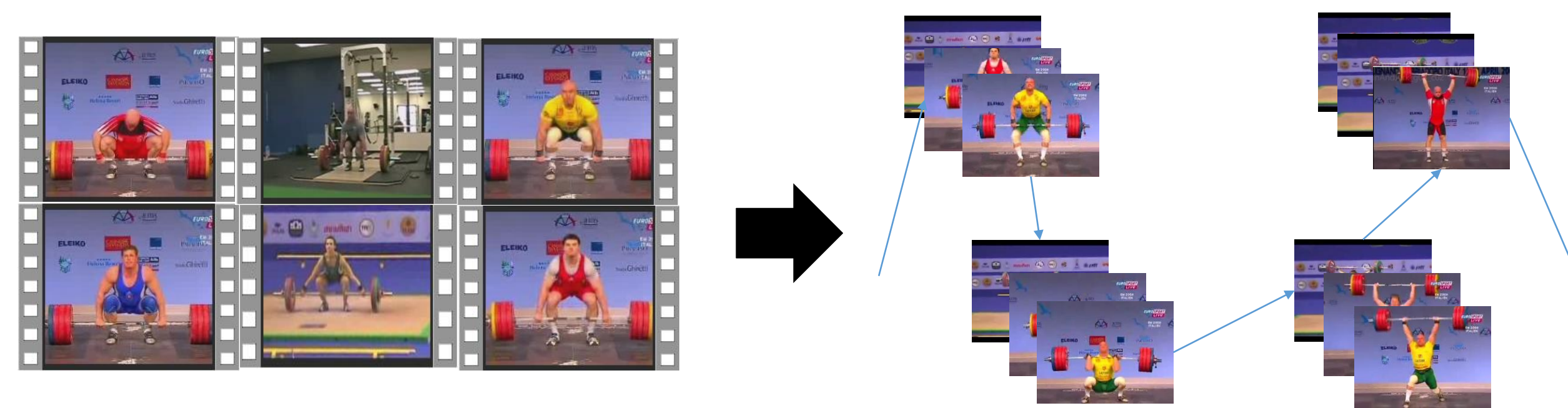- Ten categories with 70 videos in each.

Approach

Feature Selection:

- Images are represented as deep features.
- We used overfeat[2] package to generate these features.

Training:

- A set of training videos is taken for each activity.
- Generate Key frames from the video using optical flow features.
- Create clusters from key frames. These clusters ideally represent different stages of the activity.
- Using temporal information from videos, create a graph with clusters as vertices.

Testing:
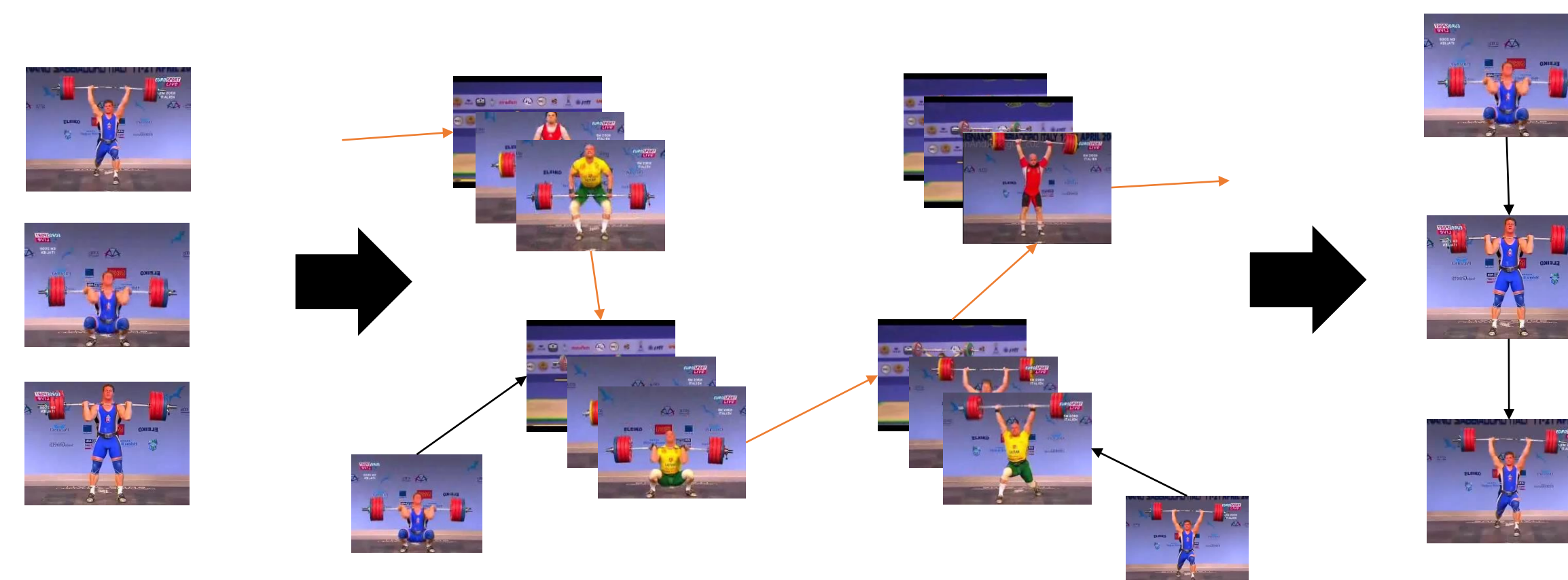
- Take a photo stream as input.
- Compare each new image with each cluster center.
- Assign each image to a cluster.
- Deduce the ordering of images using the graph.

Results

Feature	Accuracy (%)
HOG	14.62
LBP	9.88
Deep	---

Future Work

- Unsupervised clustering
- Conversion as a classification problem.
- Calculate similarity measure by weighing certain important regions.

References

1. Gunhee Kim, Leonid Sigal, and Eric P. Xing *Joint Summarization of Large-scale Collections of Web Images and Videos for Storyline Reconstruction* ,CVPR 2014
2. Pierre Sermanet, David Eigen, Xiang Zhang, Michael Mathieu, Rob Fergus, Yann LeCun: "OverFeat: Integrated Recognition, Localization and Detection using Convolutional Networks", International Conference on Learning Representations (ICLR 2014), April 2014.