CRAM: Compact Representation of Action in Movies

CRAM
Soccer Video Summarization
Analysis using DBN
Rare Event Detection
Next

- Project optical flow field into Clifford-Fourier domain
- Isolate worms, or regions of spatio-temporal interest
- Compare to previously defined set of action templates
- Not good for group events

Automatic Soccer Video Analysis and Summarization

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Features:

- Dominant Color Detection
- Goal Detection
- Shot Classification

Problems

- Rely on broadcast template rather than player actions
- Doesn't recognize enough, focuses on slow motion segments and goals

Semantic Analysis of Soccer Video Using Dynamic Bayesian Network

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- Build a Bayesian Network of 3 layers - event nodes (goals, cards, etc), hidden nodes (replay, gate, etc), and evidence nodes (texture density, parallel lines, etc)
- Apply probabilities to each of the edges based on co-occurrence
- Median recall rate for goal events was 100%

A Unified Framework for Event Summarization and Rare Event Detection

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- Spatial and Temporal Segmentation of Videos
  - Create a graph of nodes for each segment, temporal or spatial, of the video
  - Connect each node to its neighbors
  - Weight edges using properties such as causality, frequency, and significance
- Do an energy minimization over the graph using the Data-Driven Markov Chain Monte Carlo method.
- Detect rare events by finding events that have high causality but low frequency.
- Compared to SARM and DDP-HMM.

Next

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Action Recognition

- Manually isolate highlights from videos
  - Goals, shots, cards, injuries, etc
- Classify highlight actions/events using MBH
- Train SVM classifier on highlights