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
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
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

- **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.
Action Recognition

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