Action Recognition with Improved Trajectories

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Introduction

● Problem
  ○ Action recognition - Classify a set of frames into a motion.

What is he doing?

[UCF Sport dataset]
Introduction

- Difficulties
  - Motion blur
  - Background trajectories

[UCF Sport dataset]
Introduction

- How do we improve noisy trajectories?
  - Estimate camera motion
  - Human detector
Introduction
Background

- Motion-based Descriptors
  - HOF
  - MBH
  - 3D SIFT
  - Extended SURF
  - HOG3D

[Chaudhry et. al, OpenCV]
Background

- **Approach**
  - Approximate camera
    - SURF
    - Good Features to Track

[Opencv documentation]
Background

- Approach
  - WarpFlow
    - warp optical flow
  - RmTrack
    - remove background

[Hollywood2]
Experiment

- **Datasets**
  - **UCF50**
    - Youtube
    - Semi-cluttered
  - **HMDB51**
    - Most challenging
    - Varies in camera, quality

[UCF101]
Experiment

- Visual Comparison
  - Baseline - Dense Trajectories
  - Camera estimation + human mask
- Demo

[Hollywood2]
Experiment

- How do descriptors do?
  - HOF
  - HOG
  - MBH
Experiment

Baseline

Dense Trajectories Stab

HOF

HOG

MBH
Experiment

Baseline

Dense Trajectories Stab

HOF

HOG

MBH
Experiment

- Failure cases
  - Motion blur
  - Illumination changes
  - Lots of humans

[HMDB51]
Experiment

● Failure cases
  ○ Motion blur
  ○ Illumination changes
  ○ Lots of humans

Why?

Recall how we estimate camera motion - SURF
Demos