A Sketch Based Approach to Video Retrieval Using Qualitative Features

Koustav Ghosal, Anoop Namboodiri

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1 Paper

This is the implementation of the system that we propose in the above mentioned paper. If you are using our features, data or code please cite the paper.

@article{ghosal2014sketch,
title={A Sketch-Based Approach To Video Retrieval Using Qualitative Features},
author={Ghosal, Koustav and Namboodiri, Anoop},
year={2014}
}

2 Dataset Videos

Our dataset, IIIT Motion Dataset, is available for download at the following link.
Download Dataset

It contains 2 folders **PoolVideos** and **Synthetic**. The Pool videos are divided into 9 classes and the Synthetic videos are divided into 5 classes as mentioned in the paper.

3 Trajectories

The *Trajectories* folder contains two sub-folders **Pool** and **Synthetic**, which contain the trajectories extracted from the Pool and Synthetic videos, respectively. The trajectories were extracted using functions available in the OpenCV Library and an open-source version of the Hungarian Algorithm. The trajectories from each video are stored in separate files and are provided in the following format —
Trajectory Index # Starting Frame # X_1 Y_1 X_2 Y_2 ... X_nY_n.

4 User Input

The *UserInput* folder contains 2 sub-folders **Pool** and **Synthetic** each of which contain the online sketches collected from 25 different users. The data was collected using a Nexus tablet. Each user was shown 10 Pool and 10 Synthetic videos and then asked to sketch the most salient motions from the video which she/he could remember. Each file in Pool/Synthetic folder corresponds to one user containing all the trajectories from all the videos that she/he could remember. The data is stored in the following format —
Video Label # T_1 # T_2 # X_1 Y_1 P_1 X_2 Y_2 P_2 ... X_n Y_n P_n.
where T_1 and T_2 are approximate starting and ending points of the trajectory as remembered by the user normalized to $[0, 100]$. (X, Y) and P are the coordinates and pressure values for the sketch respectively.

5 Features

This folder contains 2 sub-folders **Pool** and **Synthetic**, which contain the different sets of features described in the paper. In each file the features are stored

File	Specifications
Features_level_0.txt	It contains the raw (X,Y) points from the trajectories.
Features_level_1.txt	It contains the circle-based histograms for the trajectories.
Features_level_2.txt	It contains ordered circle-based representations.
Features_level_3.txt	It contains the change of directions for each trajectory.[1]
Features_level_4.txt	It contains the sine value of the direction of each segment.
Features_level_5.txt	It contains the ordered scale-change information.
UserFeatures_level_0.txt	It contains the raw (X,Y) points from the sketches.
UserFeatures_level_1.txt	It contains the circle-based histograms for the sketches.
UserFeatures_level_2.txt	It contains ordered circle-based representations.
UserFeatures_level_3.txt	It contains the change of directions for each sketches.[2]
UserFeatures_level_4.txt	It contains the sine value of the direction of each segment.
UserFeatures_level_5.txt	It contains the ordered scale-change information.

in the following format.
For Trajectories, Video Name # Trajectory Label # Starting Frame # Feature String.
For User Sketches, User Name # Video Label # Flag # Feature String.
Please refer to our paper for a detailed description of the features.

6 Code

6.1 Dependencies

Please install the following libraries/softwares before running the code

- Python 2.7
- Matplotlib
- Numpy and Scipy
- Sklearn
- Mlpy

6.2 Running the code

The script RunRetrieval.py needs to be called from the terminal as

python RunRetrieval.py Path_To_Features

Replace 'Path_To_Features' with *../Features/Pool/* or *../Features/Synthetic/*, accordingly.
The code prints the Mean Reciprocal Rank at the terminal and displays three plots for Precision-Recall, Top-k Accuracy and histogram of reciprocal ranks.