Person Re-Identification

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http://fudanimc.github.io/
What is Person Re-Identification?
zero-shot one-shot multi-shot

zero-shot: No image, only description
  ◦ Search

one-shot: One image of target
  ◦ Search

multi-shot: Multiple images of target
  ◦ Inter-camera tracking
Basic issue—disrimination

= ?

How do we solve this?

• Color of clothes  low-level visual feature
• Gender, Stature  shape and biologically inspired features
• backpack, glasses , hat, handbag  mid-level features with prior knowledge
• Details of clothes  textural features......
• Gait  motion features
Color of clothes

Color histogram
Stature

Hog ≠ Stature
Mid-level features
Details of clothes
Details Vs. Mid-level

A bird or *Pericrocotus flammeus*?
Pipeline

Low-level visual features

Color of clothes

Part detection

Stature

Recognition

Mid-level

Details
Baseline

Vs

patch match
Two approaches

• Find important regions

• Find better features
4 person or less?
Only 3 person
Confusing

- More information (color)
- Key point and details (hair and shoes)
symmetry-driven accumulation of local features (SDALF)

Supplemental material: \textbf{WCH} (Weighted Color Histograms) \textbf{MSCR} (Maximally Stable Color Regions) \textbf{RHSP} (Recurrent High-Structured Patches)
symmetry-driven accumulation of local features (SDALF)

$$i_{TL} = \arg\min_{i} (1 - C(i, \delta)) + S(i, \delta)$$

$$i_{HT} = \arg\min_{i} (-S(i, \delta))$$

C pixel level  S region level
Weighted Color Histograms (WCH)
Maximally Stable Color Regions (MSCR)

Figure 3. Illustration of evolution used in colour MSER detector. Left to right, top to bottom: $d_{thr} = 0.0065, 0.011, 0.023, 0.038$. Each region is painted in a different, random colour.
Recurrent High-Structured Patches (RHSP)
Articulated Appearance Matching

Supplemental material: HOG+LDA, PS (Pose Estimation)
HOG+LDA
Histogram of oriented gradients
Linear discriminant analysis
Pose Estimation (PS)
# Attributes-Based Re-identification

Table 5.1: Our attribute ontology for re-identification

<table>
<thead>
<tr>
<th></th>
<th>Redshirt</th>
<th>Blueshirt</th>
<th>Lightshirt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darkshirt</td>
<td></td>
<td>Greenshirt</td>
<td>Nocoats</td>
</tr>
<tr>
<td>Not light dark jeans colour</td>
<td></td>
<td>Dark bottoms</td>
<td>Light bottoms</td>
</tr>
<tr>
<td>Hassatchel</td>
<td></td>
<td>Barelegs</td>
<td>Shorts</td>
</tr>
<tr>
<td>Jeans</td>
<td></td>
<td>Male</td>
<td>Skirt</td>
</tr>
<tr>
<td>Patterned</td>
<td></td>
<td>Midhair</td>
<td>Darkhair</td>
</tr>
<tr>
<td>Bald</td>
<td></td>
<td>Has handbag carrier bag</td>
<td>Has backpack</td>
</tr>
</tbody>
</table>

Supplemental material: SVM (Support vector machine)
Attributes-Based Re-identification
Attributes-Based Re-identification

SVM

train

test, has hat?
Support vector machine (SVM)
Mid-level Filters

Supplemental material: RankSVM
Mid-level Filters
Rank SVM

Linear SVM

a > b → a - b > 0, b - a < 0 → pos: a - b neg: b - a
Framework

Person Re-Identification

Better features
- Attributes-based
- Mid-level Filters

Important regions
- SDALF
- Articulated Appearance
Summary

• Task of person re-identification

• How do we solve this

• Two approaches (better features vs important regions)
Problem

Ignore information from video

- Get multiple images of one person by tracking
- Gait recognition

Similar color, different details
Person Re-Identification Gong, S., Cristani, M., Yan, S., Loy, C.C. (Eds.) 2014, Springer

Chapter 3 SDALF

Chapter 5 Attributes-based

Chapter 7 Articulated Appearance


Thank you
Q&A
Our Project

Fudan Video Analysis System (FVAS)

School of Computer Science, Fudan University.

FVAS is a C++ deep-learning software for detecting, recognizing, and tracking certain people in the video. You give it a face/person dataset and it can find the people in the video and track them.

FVAS is designed to work on monocular videos.

Source code is provided under a BSD-style license. OpenCV with ffmpeg/gstreamer plugins and C++11 are required.

Demo Video

Quick Start

If you cannot watch the demo video online, please click here to download.