人的重识别

郭琦鹏

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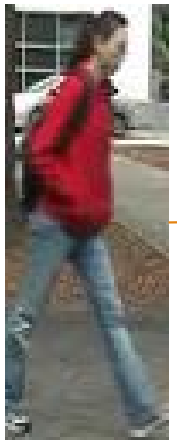
重识别是一个怎样的问题？



身份匹配

目标检索

跨摄像头跟踪

zero-shot one-shot multi-shot

zero-shot： 没有目标的照片，只有描述信息（戴帽子，戴眼镜，身材，性别等）

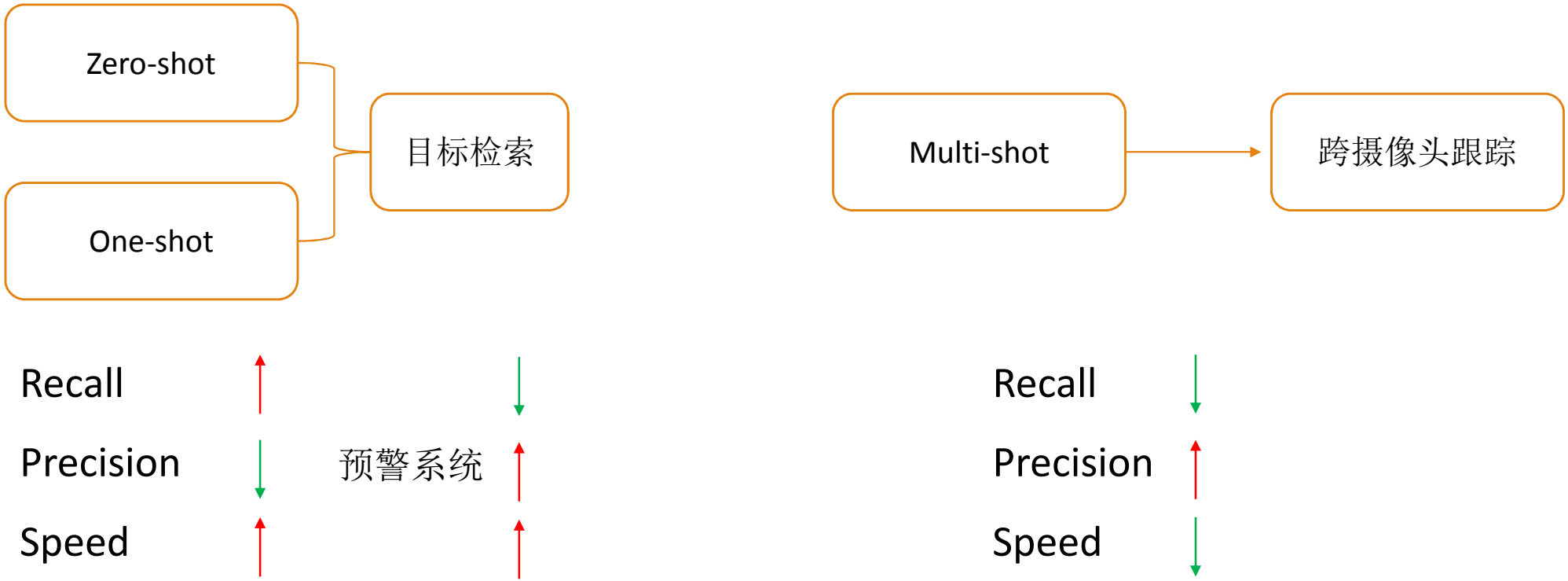
- 目标检索

one-shot： 只有一张目标的照片

- 目标检索

multi-shot： 拥有多张目标照片

- 跨摄像头跟踪


Zero-shot
One-shot
目标检索
Multi-shot
跨摄像头跟踪
Recall
Precision
Speed
预警系统
Recall
Precision
Speed

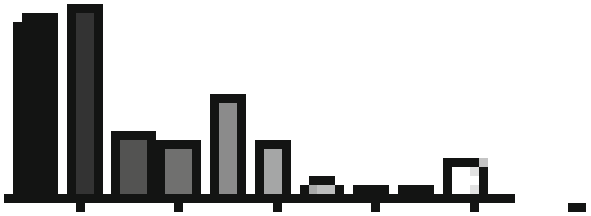
最基本的问题——身份匹配

=?

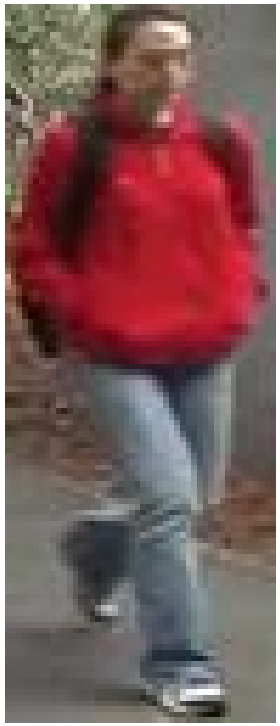
人是如何来判断同一个人的？

- 衣服颜色　底层的视觉特征
- 身材，性别 形状及与生物学相关的特征
- 背包，眼镜，帽子，手提包 具有强烈先验知识的中层特征
- 衣服的细节 纹理特征.....
- 走路的姿势 步态特征

衣服的颜色



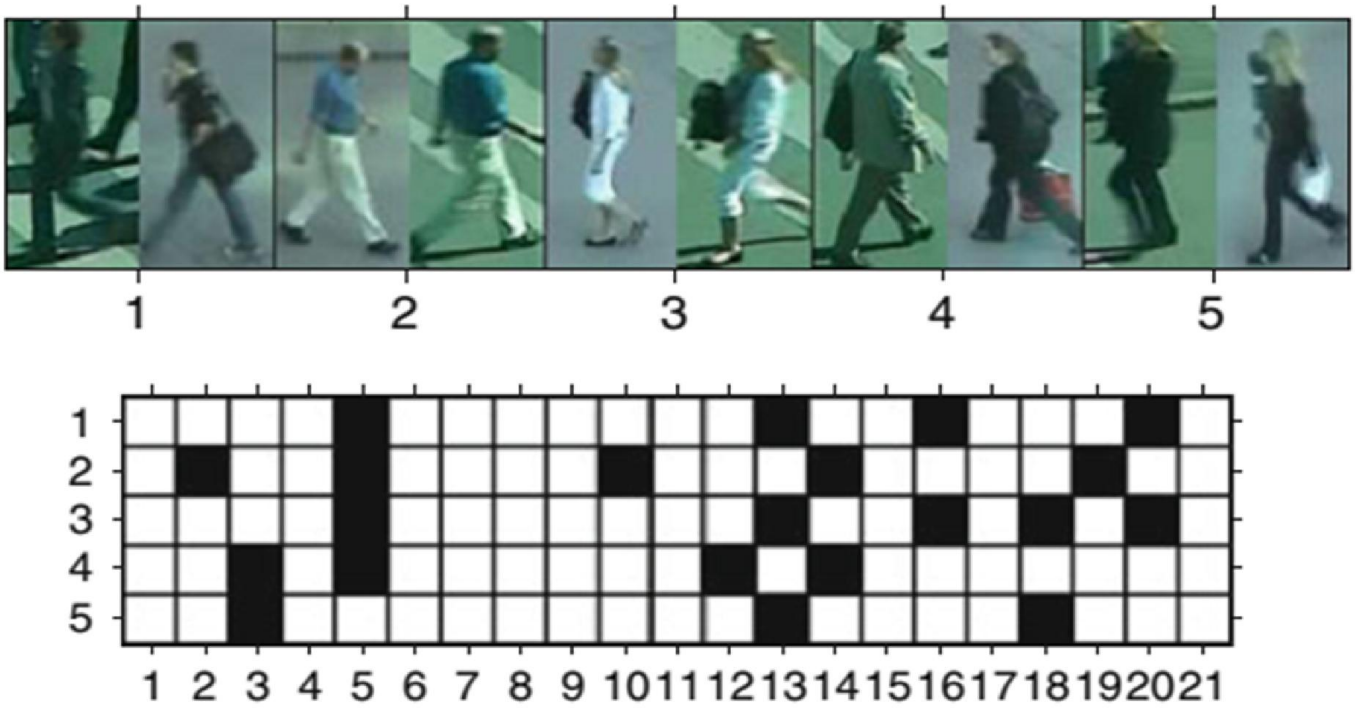
Color histogram



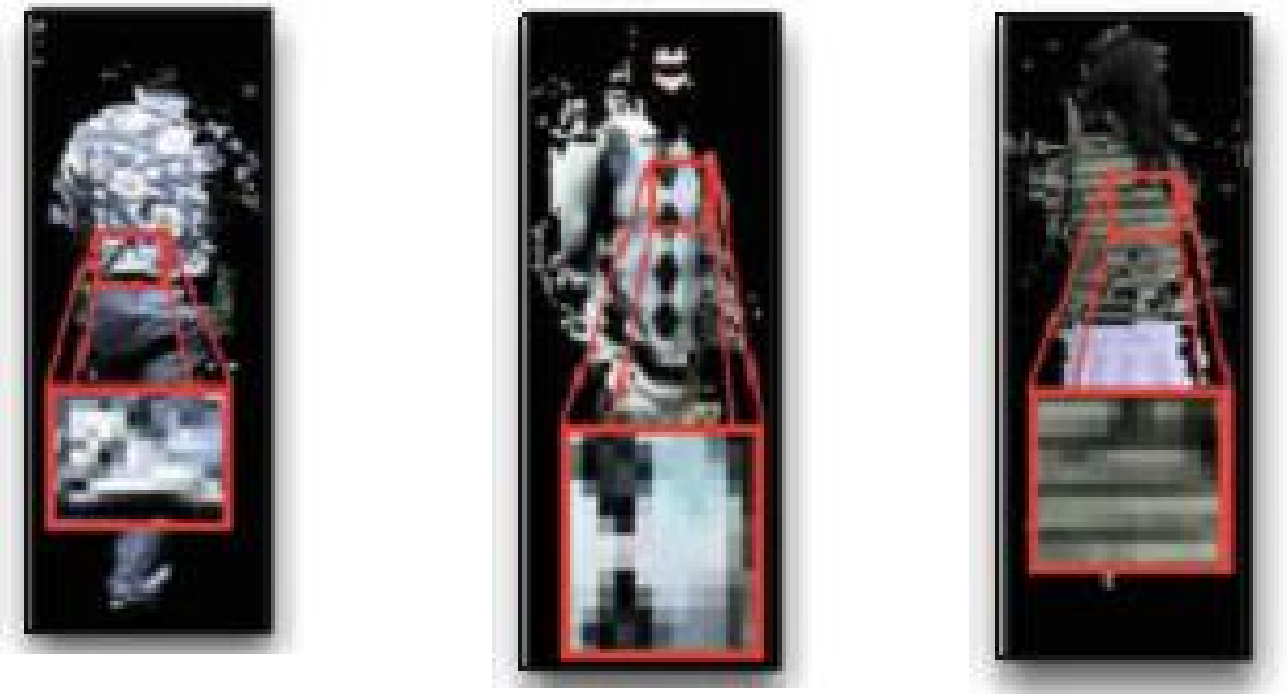
身材

$Hog \neq$ 身材

中层特征



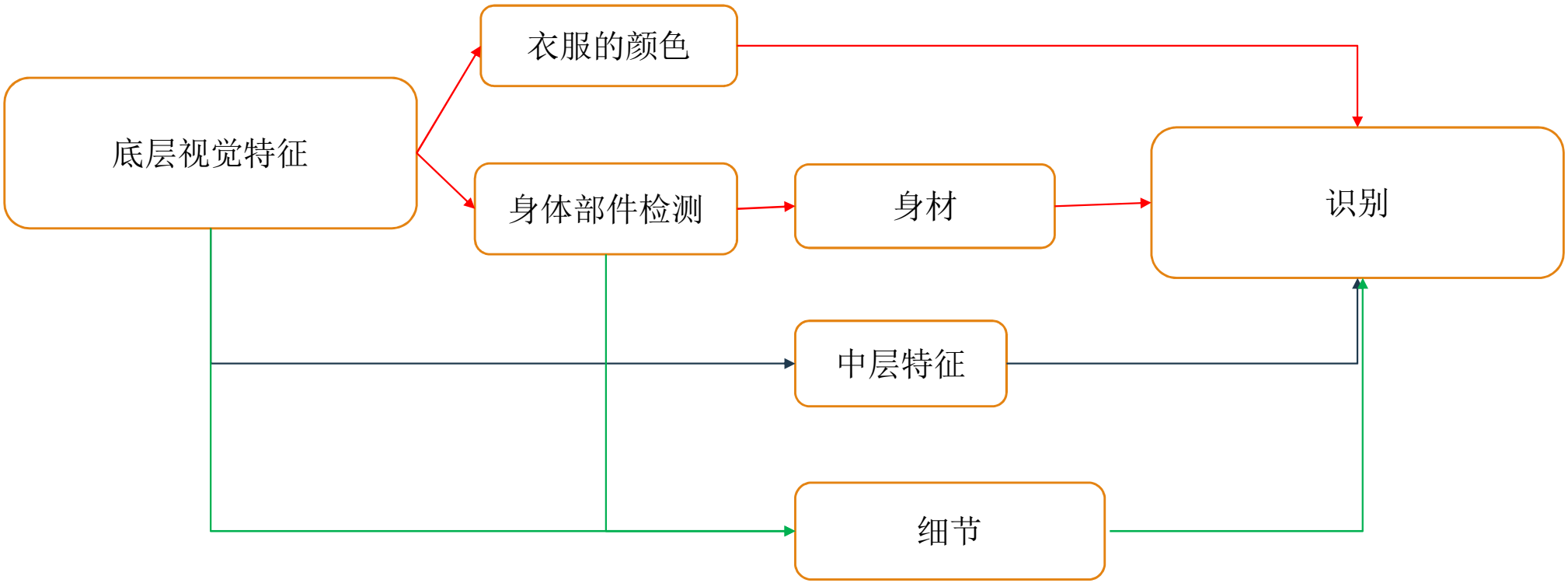
细节



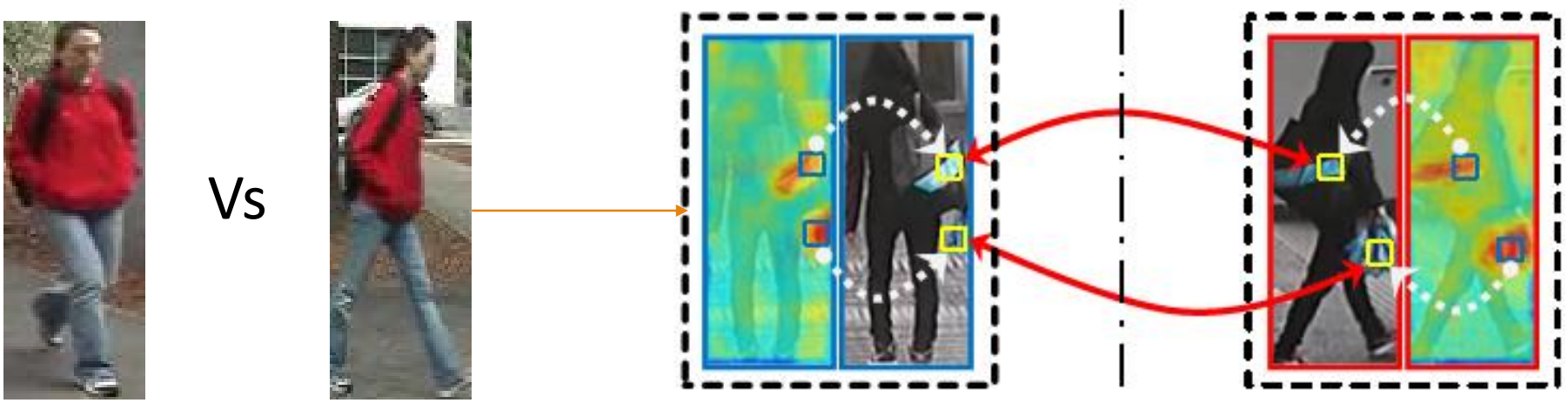
细节 Vs. 中层特征

鸟 或 赤红山椒鸟？

流程



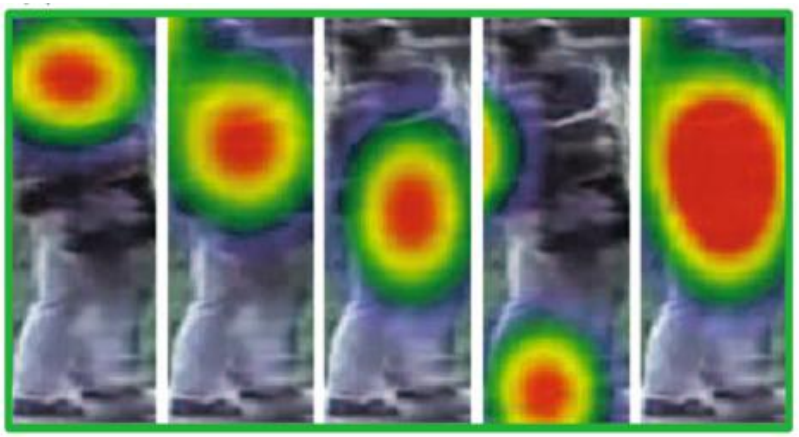
最简单的方法



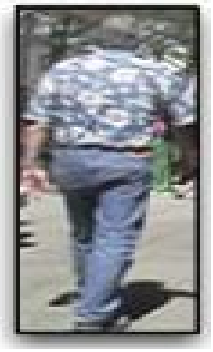
像素块匹配法

两种思路

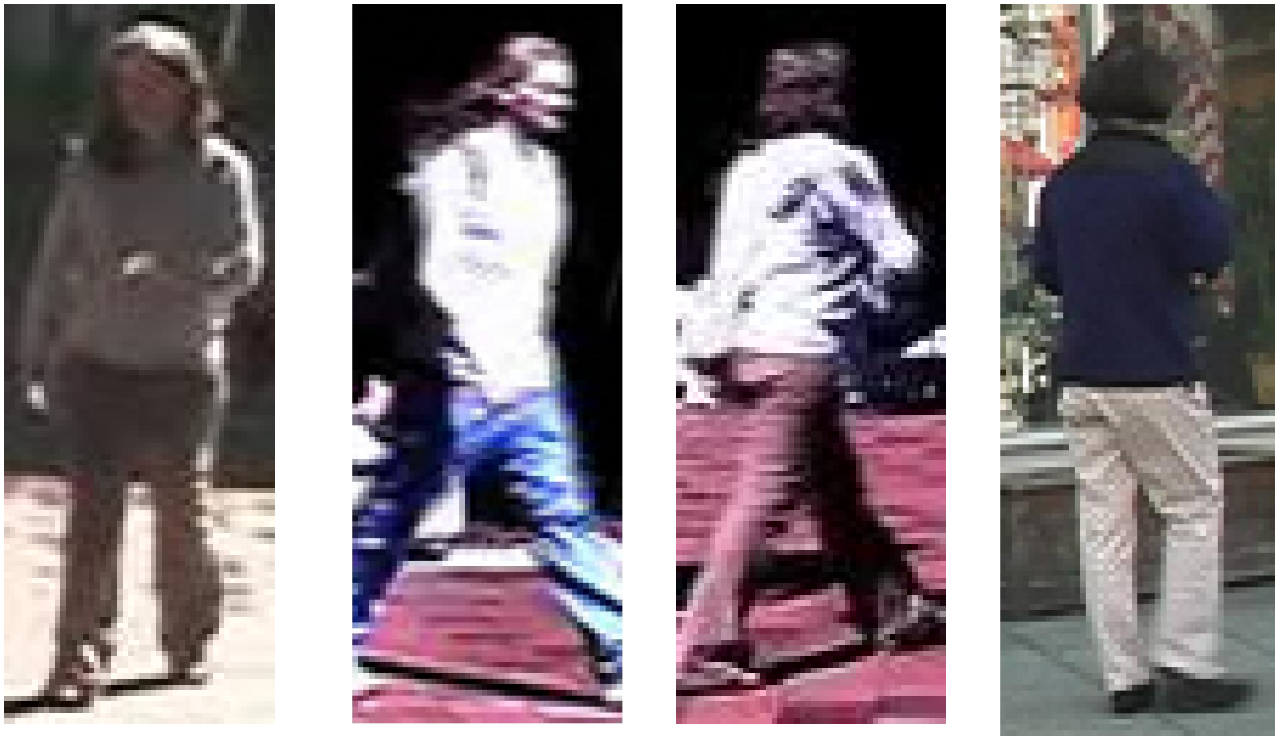
- 寻找关键的区域（找重点）



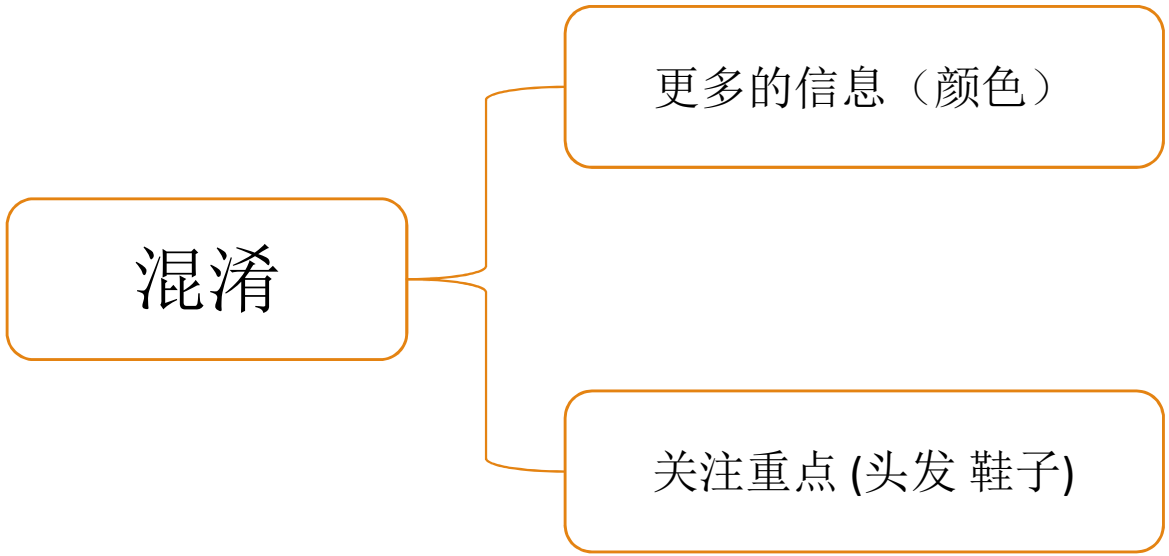
- 从特征入手（提高表达能力）



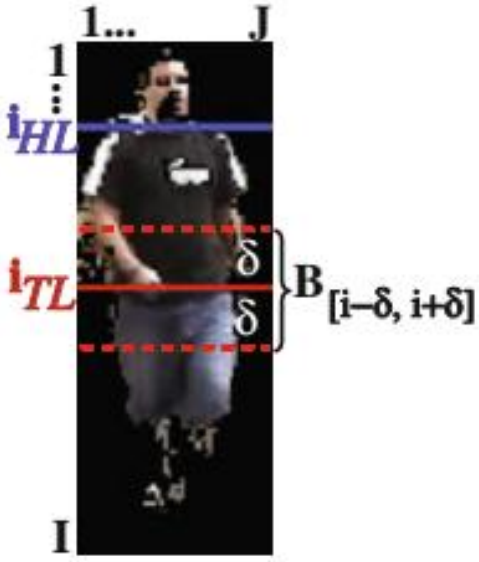
4个人？

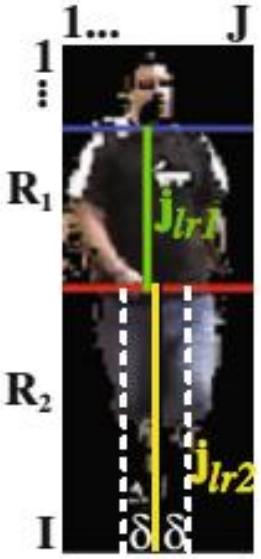


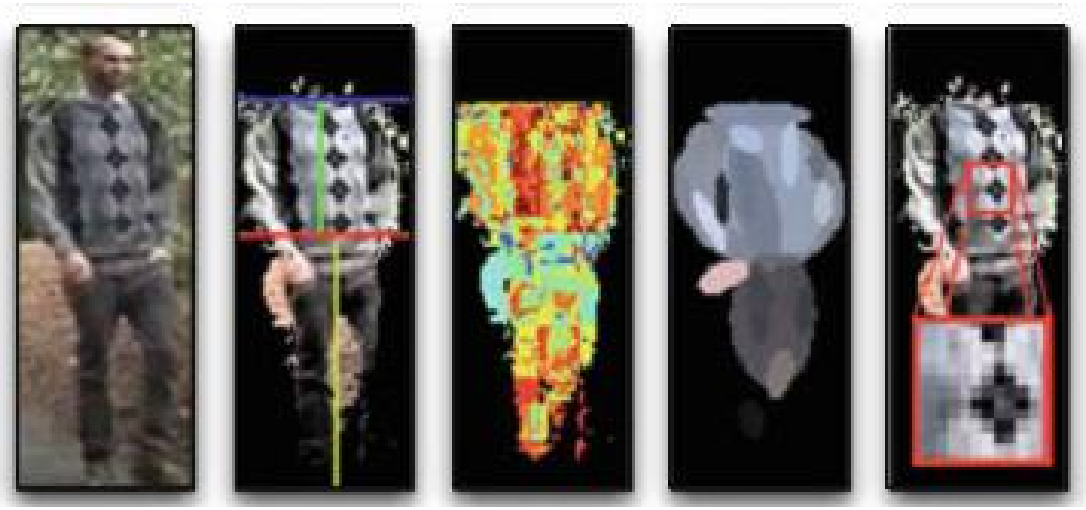
只有3个


混淆
更多的信息（颜色）
关注重点 (头发 鞋子)

symmetry-driven accumulation of local features (SDALF)

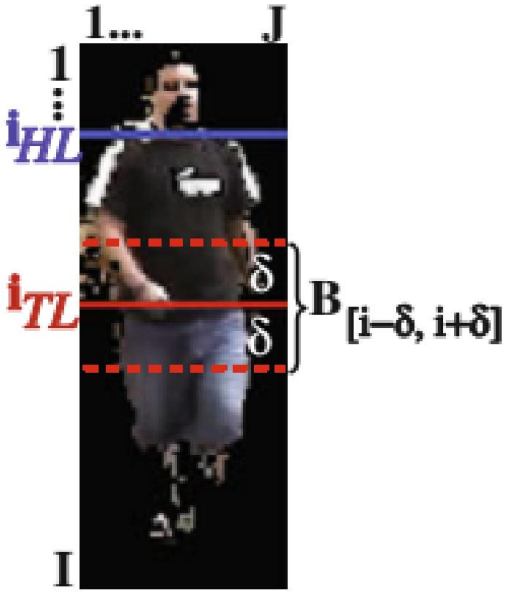


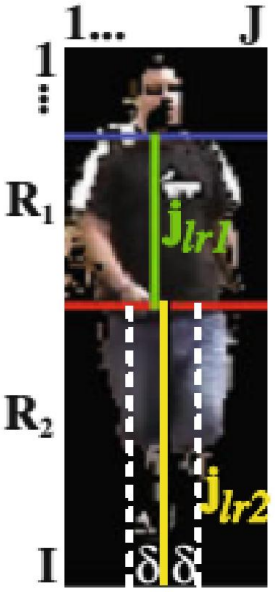




补充内容:WCH(Weighted Color Histograms) MSCR(Maximally Stable Color Regions) RHSP(Recurrent High-Structured Patches)

symmetry-driven accumulation of local features (SDALF)



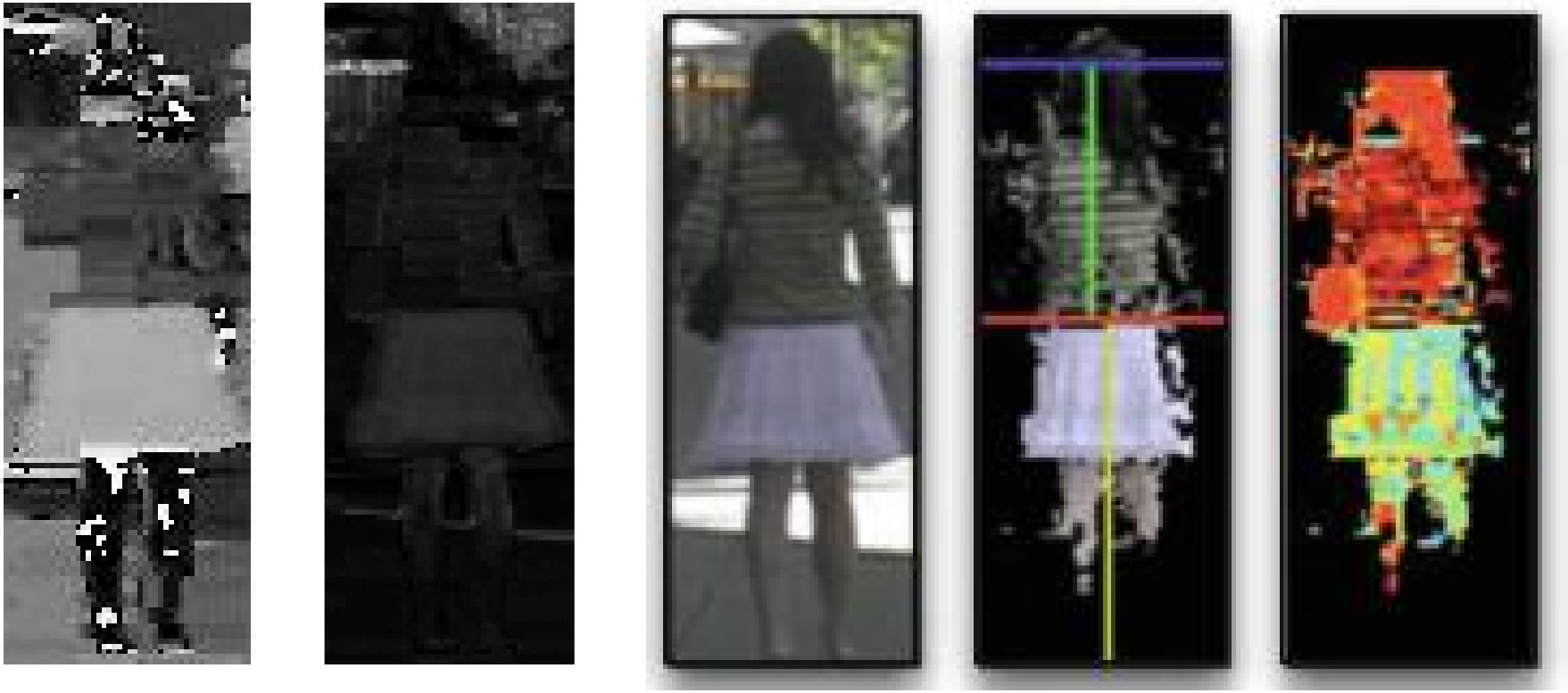


$$i_{TL} = \underset{i}{\operatorname{argmin}} \, (1 - C(i, \delta)) + S(i, \delta)$$

$$i_{HT} = \underset{i}{\operatorname{argmin}} \, (-S(i, \delta))$$

C pixel level *S region level*

Weighted Color Histograms(WCH)



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Maximally Stable Color Regions (MSCR)

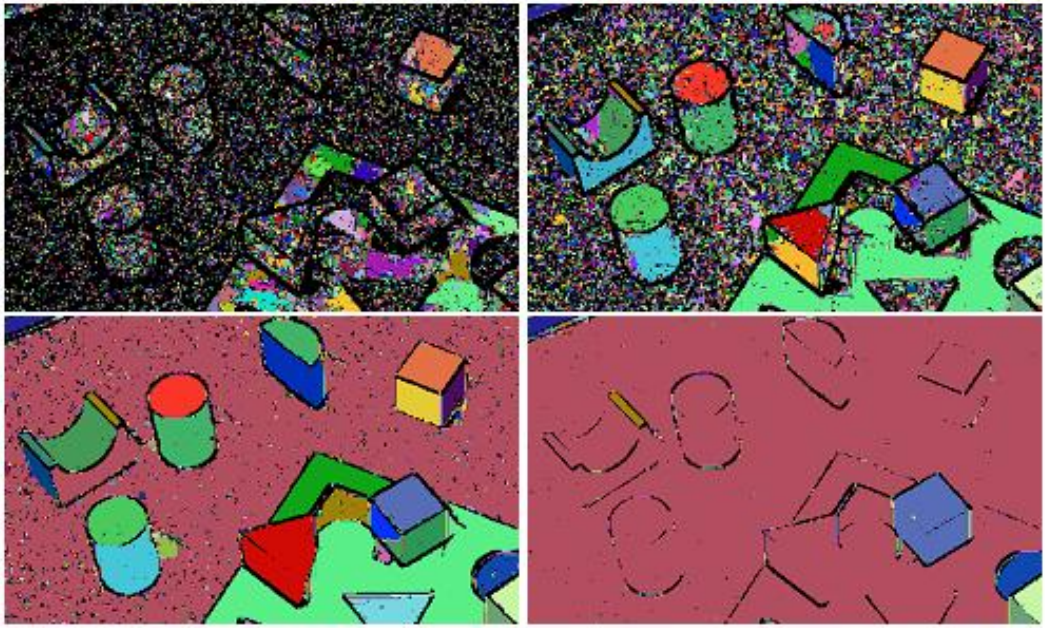

Figure 3. Illustration of evolution used in colour MSER detector. Left to right, top to bottom: $d_{\text{thr}} = 0.0065, 0.011, 0.023, 0.038$. Each region is painted in a different, random colour.

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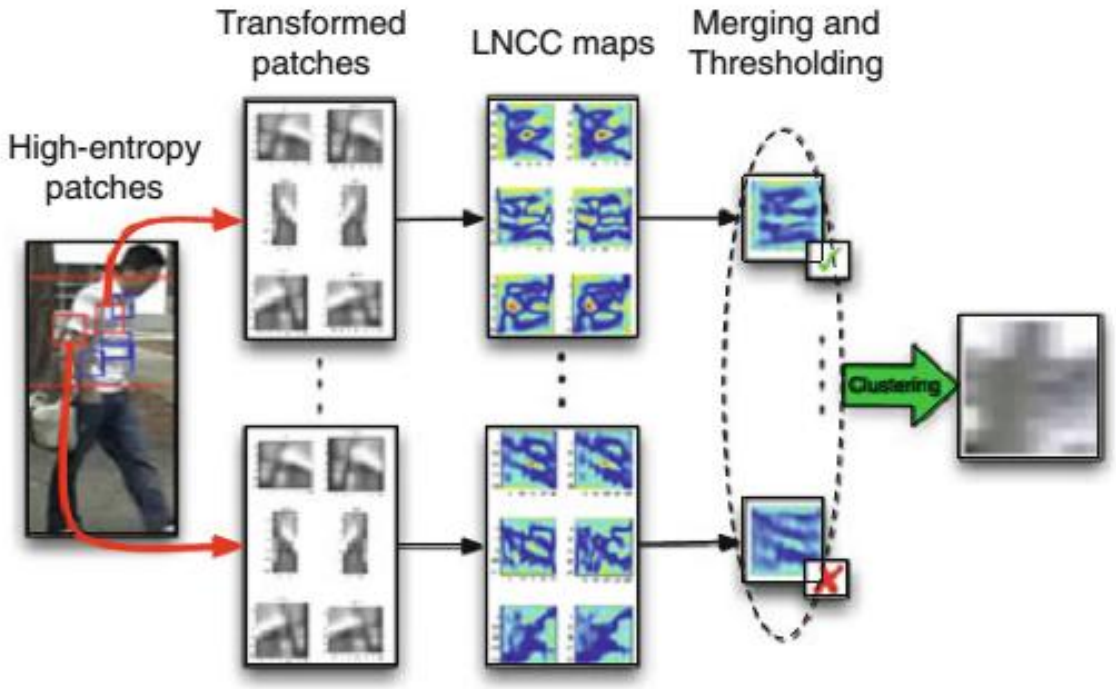
Recurrent High-Structured Patches(RHSP)



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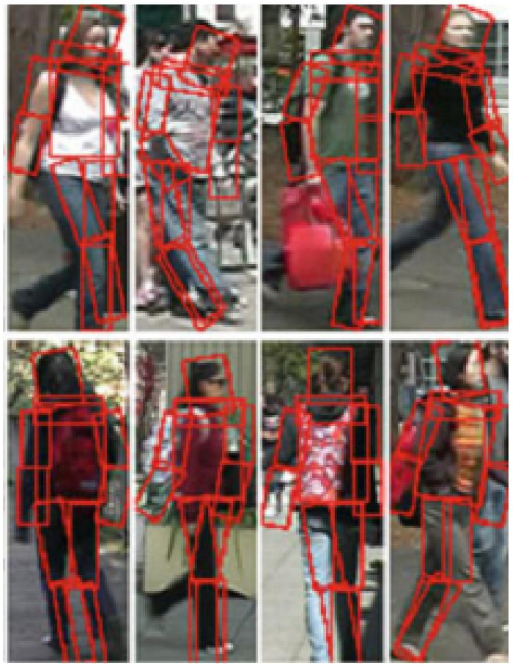
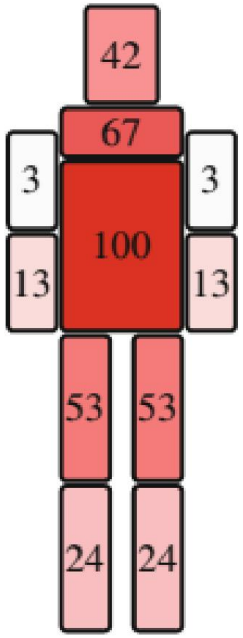
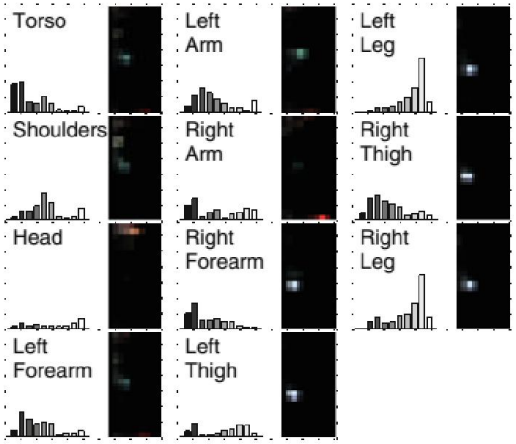
Articulated Appearance Matching

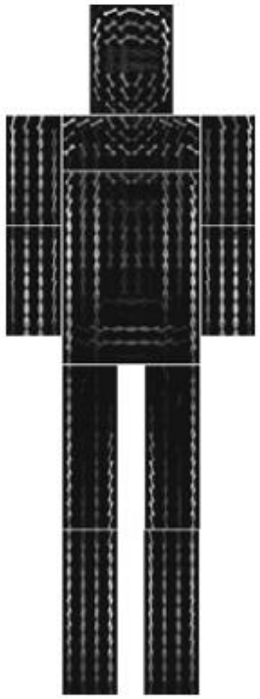


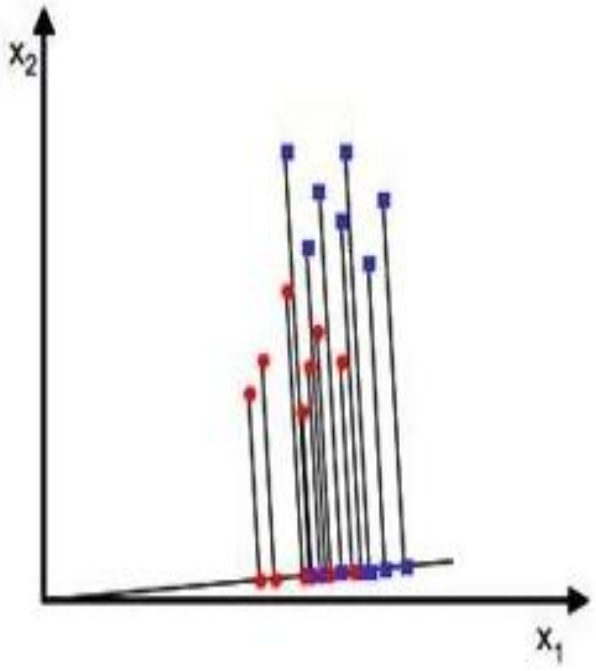


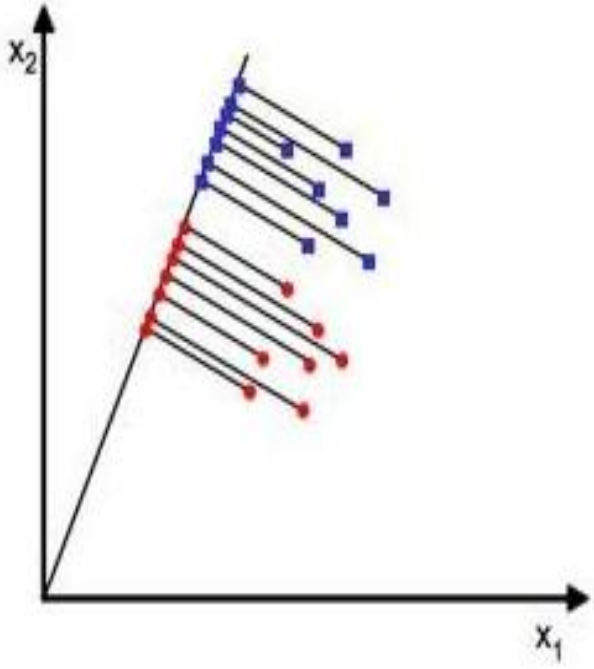


补充内容:HOG+LDA, PS(Pose Estimation)

HOG+LDA
Histogram of oriented gradients
Linear discriminant analysis







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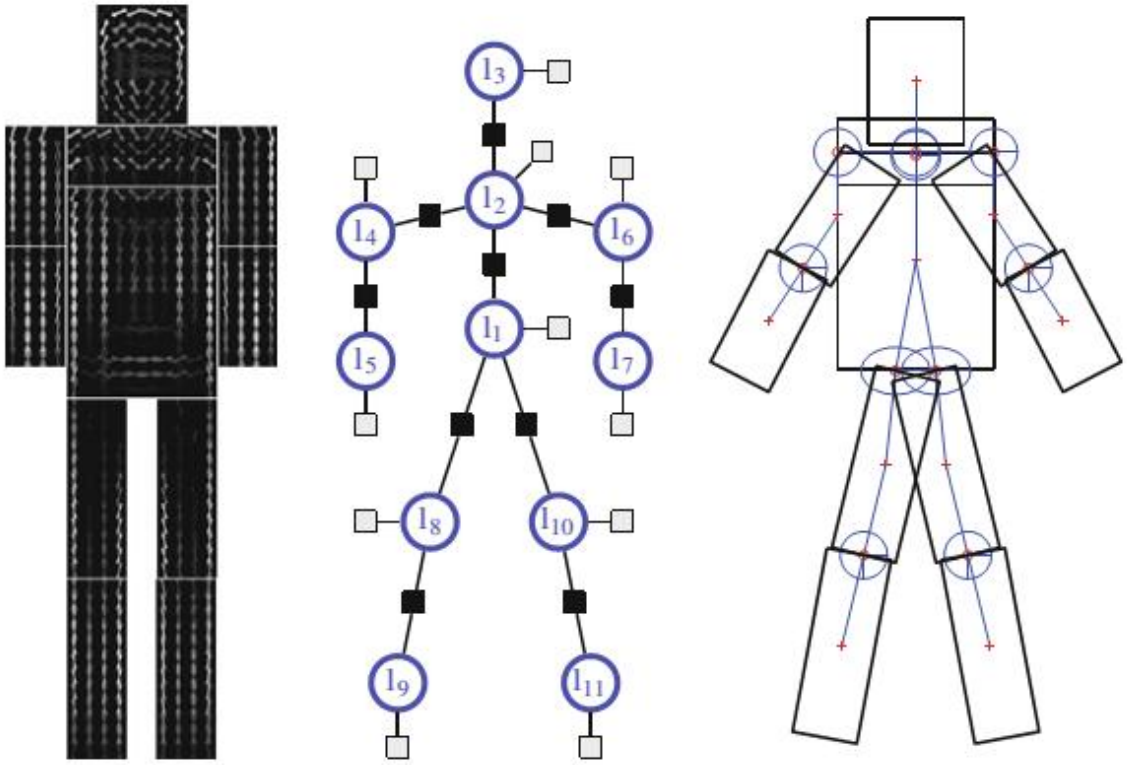
Pose Estimation(PS)



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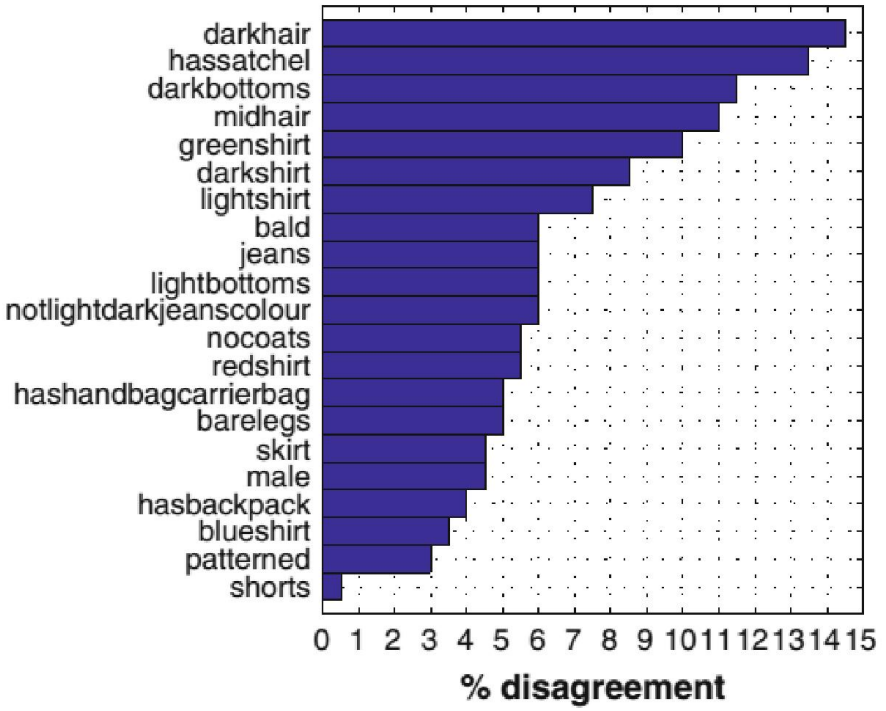
Attributes-Based Re-identification

Table 5.1 Our attribute ontology for re-identification

Redshirt	Blueshirt	Lightshirt
Darkshirt	Greenshirt	Nocoats
Not light dark jeans colour	Dark bottoms	Light bottoms
Hassatchel	Barelegs	Shorts
Jeans	Male	Skirt
Patterned	Midhair	Darkhair
Bald	Has handbag carrier bag	Has backpack

补充内容:SVM(Support vector machine)

Attributes-Based Re-identification

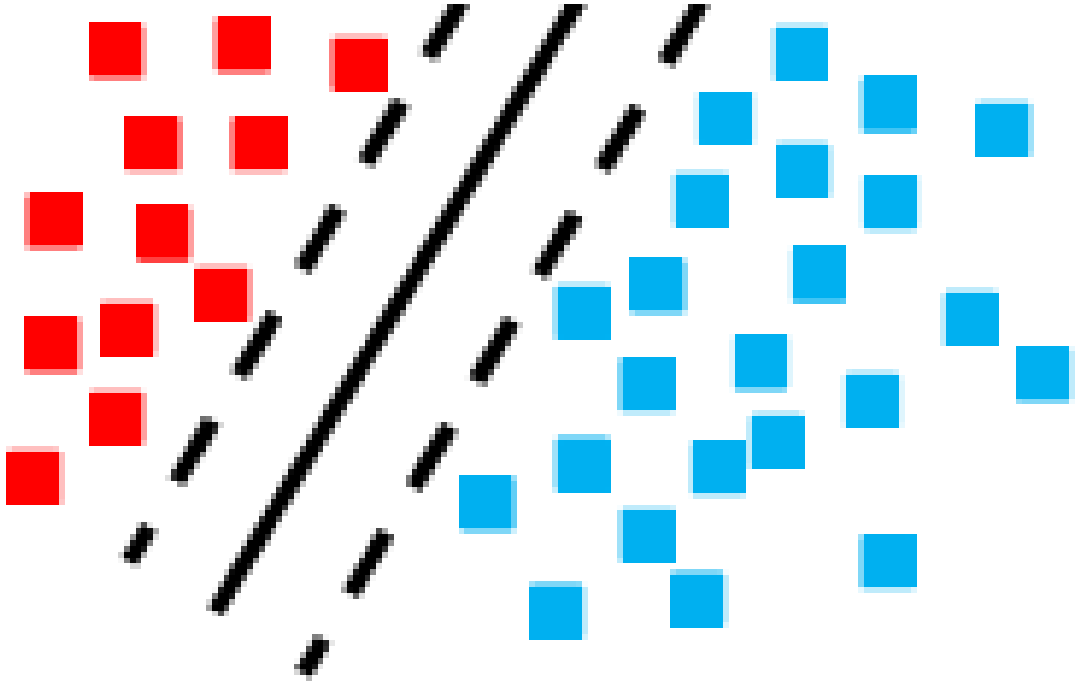


Attributes-Based Re-identification

train

SVM

Support vector machine (SVM)



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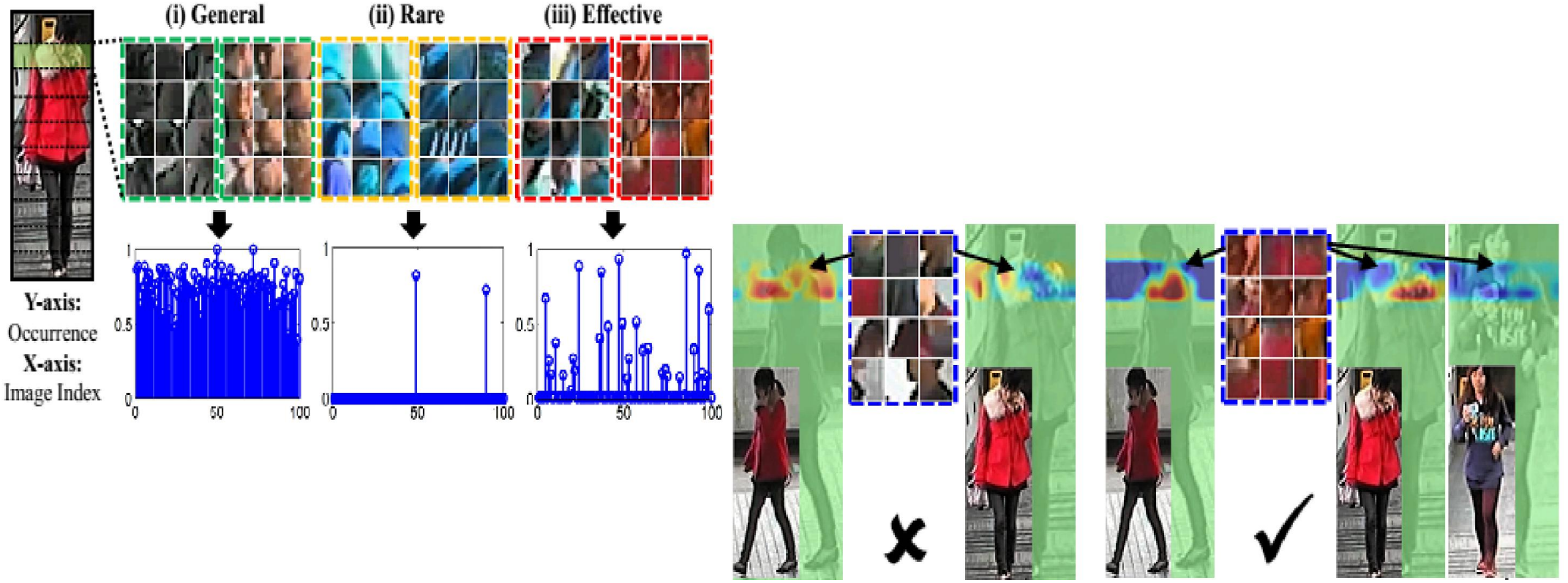
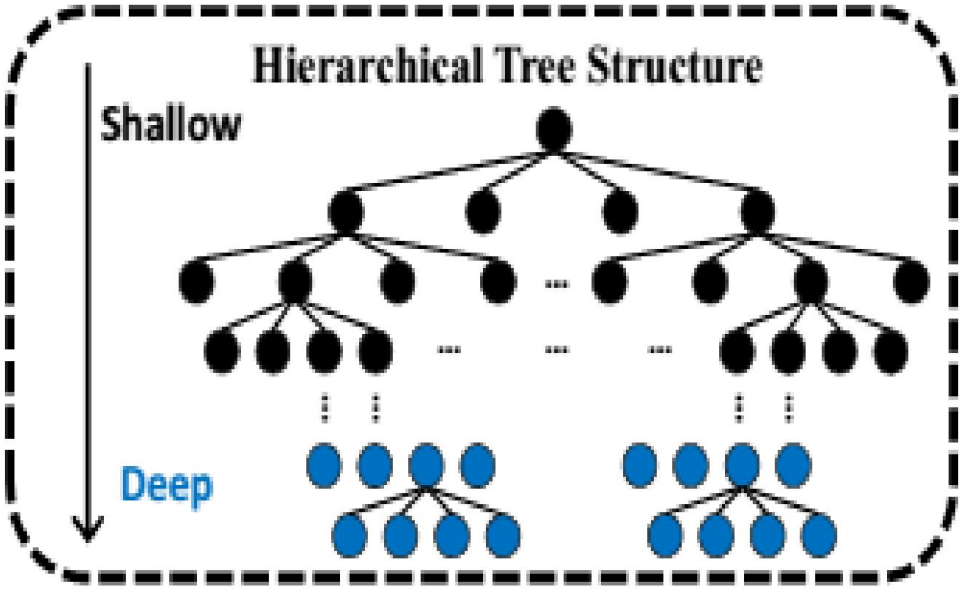
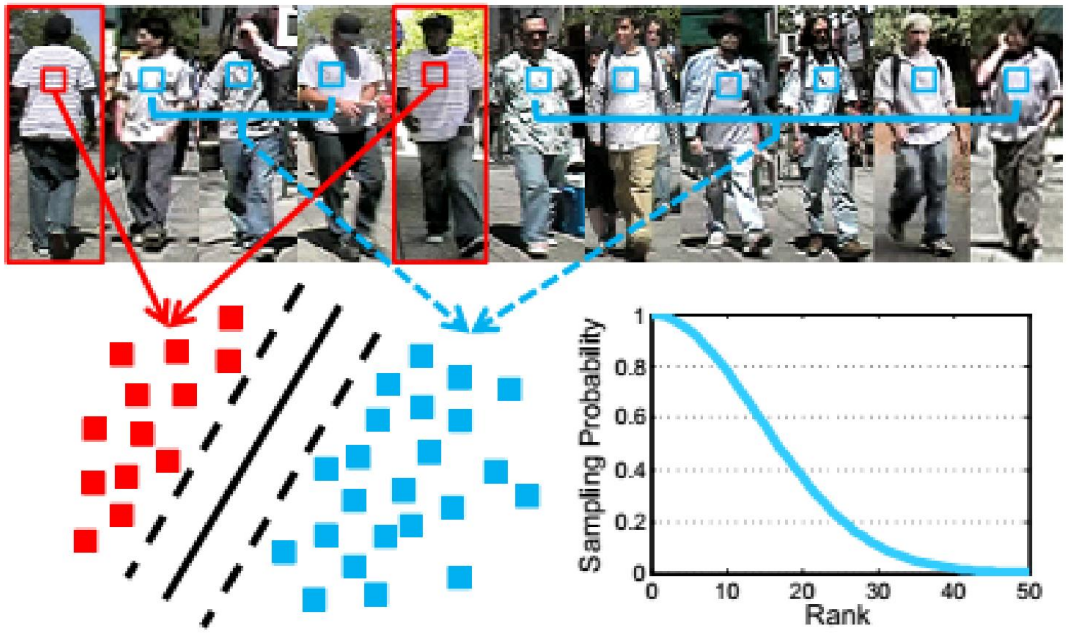
Mid-level Filters



补充内容: RankSVM

Mid-level Filters





Rank SVM

Linear SVM

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

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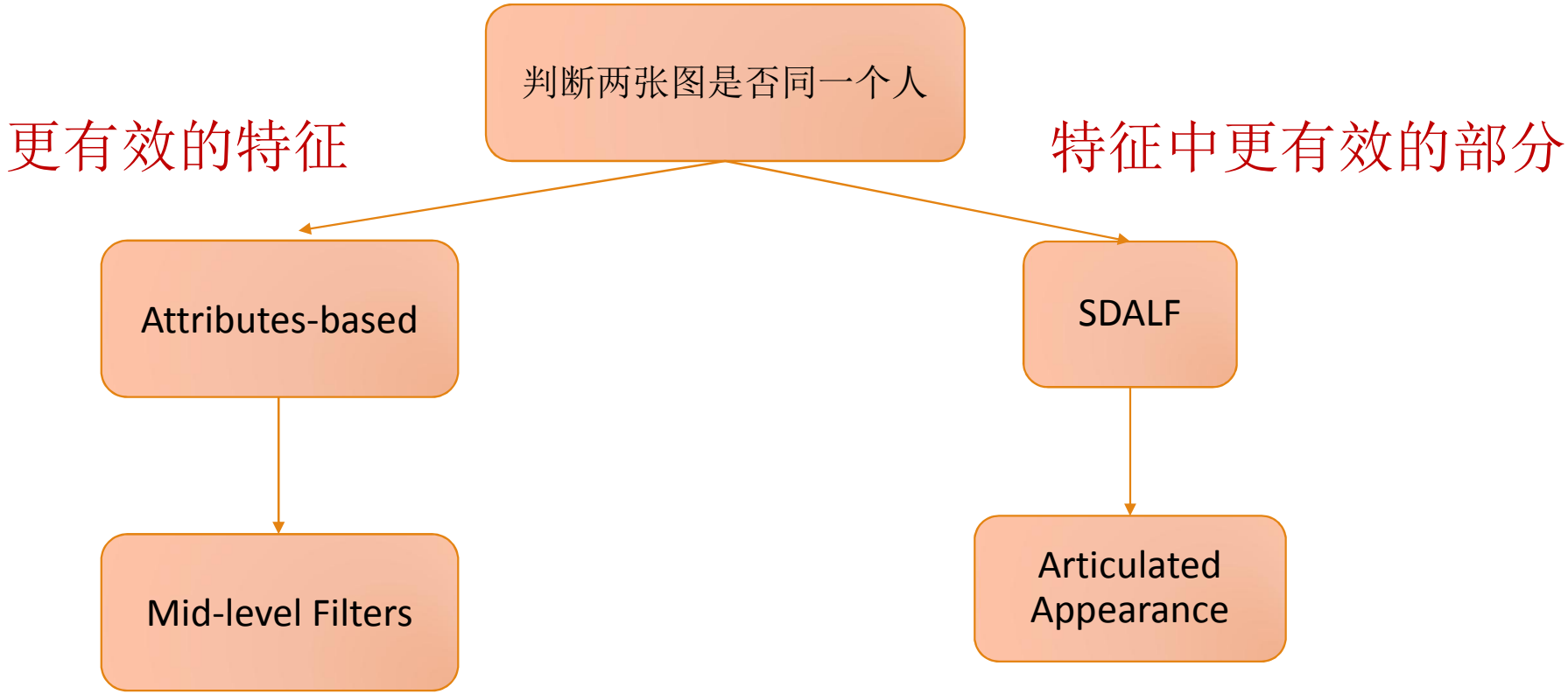
框架梳理


判断两张图是否同一个人
更有效的特征
特征中更有效的部分
Attributes-based
SDALF
Mid-level Filters
Articulated Appearance

总结

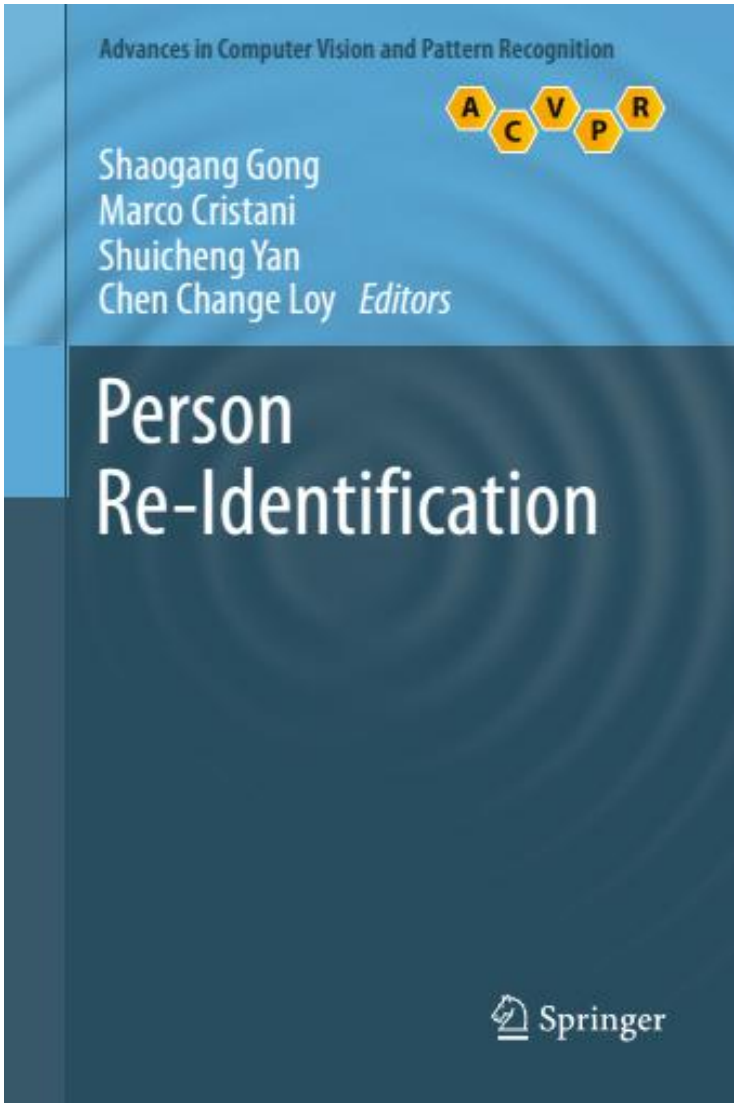
- 人重识别的任务
- 人是如何解决的
- 两种思路（更有效的特征与特征中的更有效的部分）

现有难题

色调相似，细节不同

没有充分利用视频的信息

- 跟踪提供的同一人的多张图像
- 步态信息



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

Learning Mid-level Filters for Person Re-Identfiation,
R. Zhao, W. Ouyang and X. Wang.
IEEE International Conference on Computer Vision and Pattern Recognition (CVPR), 2014.

Unsupervised Salience Learning for Person Re-Identification,
R. Zhao, W. Ouyang and X. Wang.
IEEE International Conference on Computer Vision and Pattern Recognition (CVPR), 2013.

Maximally stable colour regions for recognition and matching.
Forssén, P.E
In: IEEE Conference on Computer Vision and Pattern Recognition (2007)

谢谢！

Our Project

[OMAP] Home Annotation Extraction Image Retrieval Video Video Annotation Crawler Datasets FAQ

Fudan Video Analysis System (FVAS)

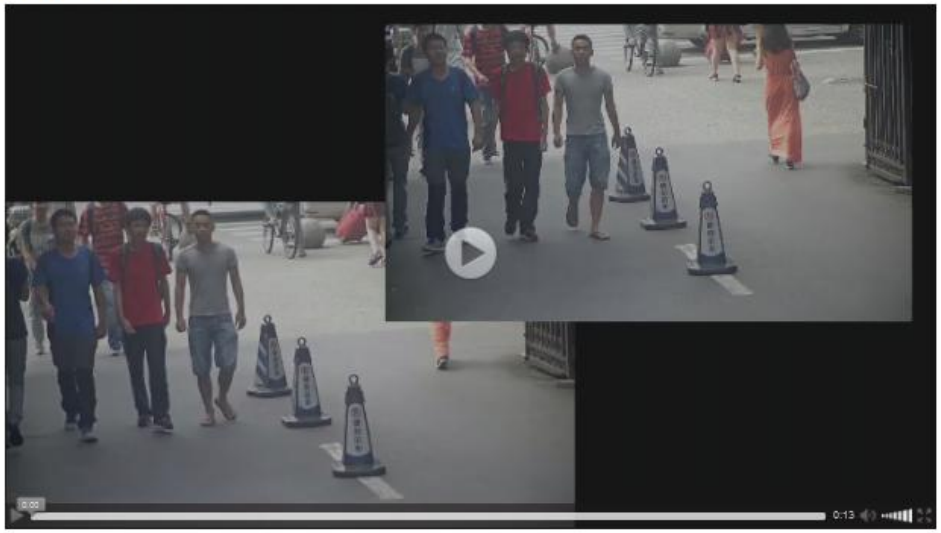
School of Computer Science, Fudan University

FVAS is a C++ open-source 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 him/her.

FVAS is designed to work on monitors' video.

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

Demo Video



If you cannt watch the demo video online,please click here to download.

Quick Start

download data/
$make
$./fudanvideo_demo
Or open our project in QT

FudanVideo / FVAS

Unwatch 1

Description: Short description of this repository

Website: Website for this repository (optional)

Save or Cancel

10 commits | 1 branch | 0 releases | 1 contributor

branch: master | FVAS / +

modify main.cpp

FudanVideo authored a day ago — latest commit 6219a2f404

src	modify main.cpp	a day ago
stasm	prepare for release	3 days ago
.gitignore	prepare for release	3 days ago
LICENSE	modify license	3 days ago
Makefile	prepare for release	3 days ago
README.md	modify readme	2 days ago
fduvideo_light.pro	prepare for release	3 days ago

omap.fudan.edu.cn/fvas