

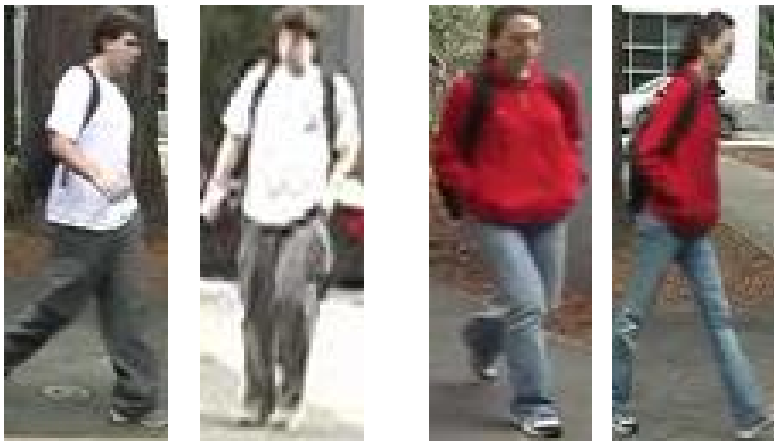
# Person Re-Identification

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Qipeng Guo

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# What is Person Re-Identification ?



Discrimination

Search

Inter-camera  
tracking

# zero-shot one-shot multi-shot

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zero-shot: No image, only description

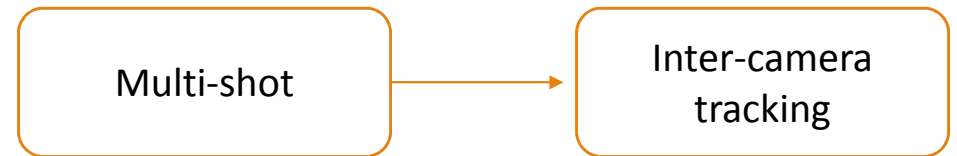
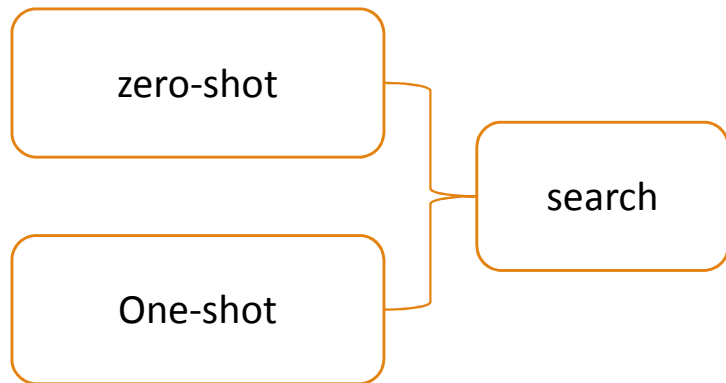
- Search

one-shot: One image of target

- Search

multi-shot: Multiple images of target

- Inter-camera tracking



Recall	↑		↓
Precision	↓	Warning system	↑
Speed	↑		↑

Recall	↓
Precision	↑
Speed	↓

# Basic issue——discrimination

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= ?

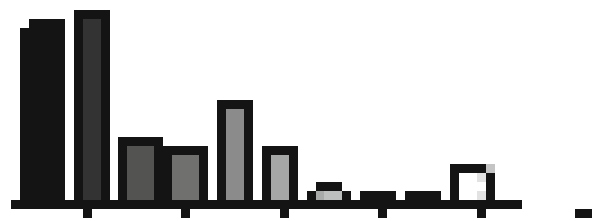


## How do we solve this?

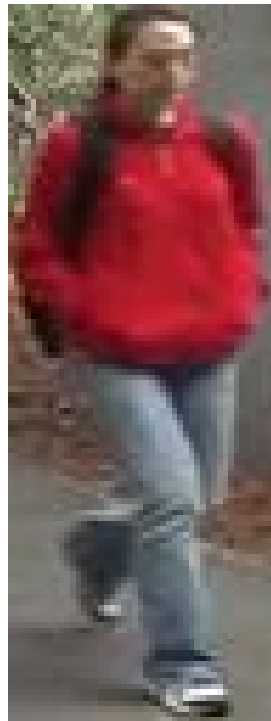
- Color of clothes low-level visual feature
- Gender, Stature shape and biologically inspired features
- backpack, glasses ,hat, handbag  
mid-level features with prior knowledge
- Details of clothes textural features.....
- Gait motion features

# Color of clothes

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Color histogram



# Stature

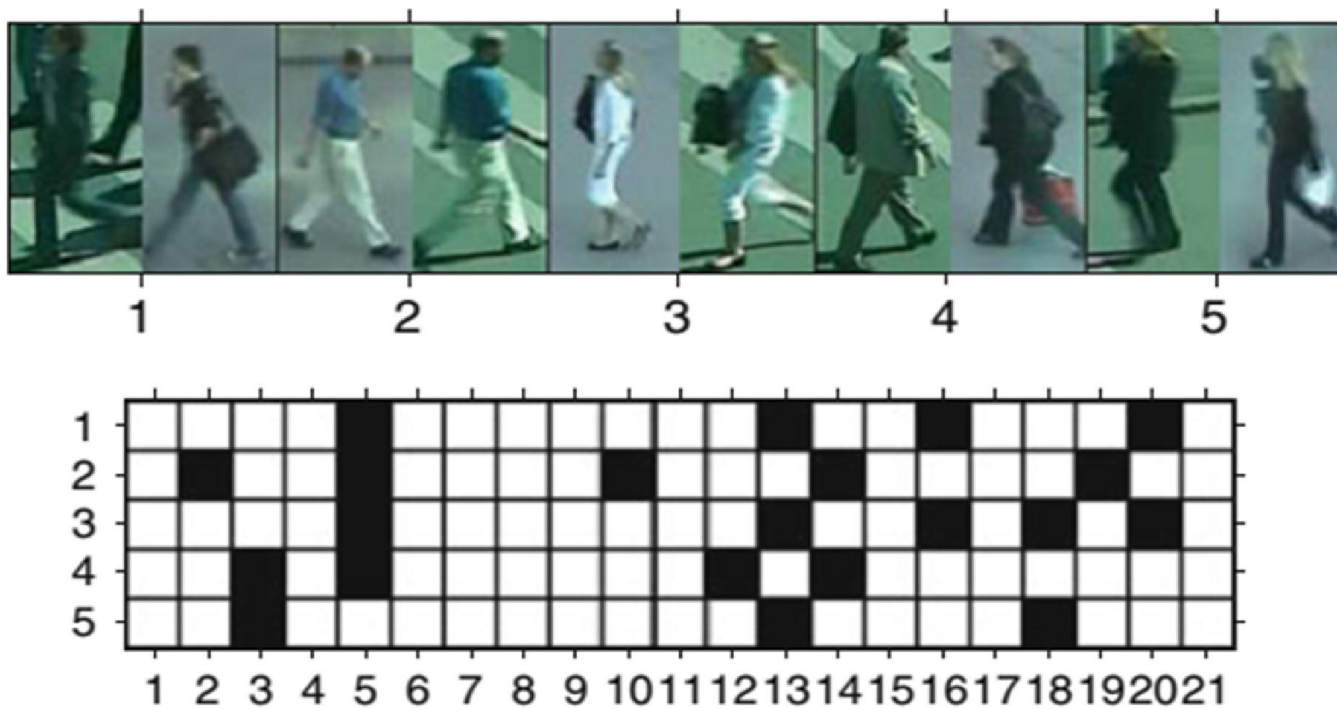
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*Hog  $\neq$  Stature*

# Mid-level features

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# Details of clothes

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# Details Vs. Mid-level

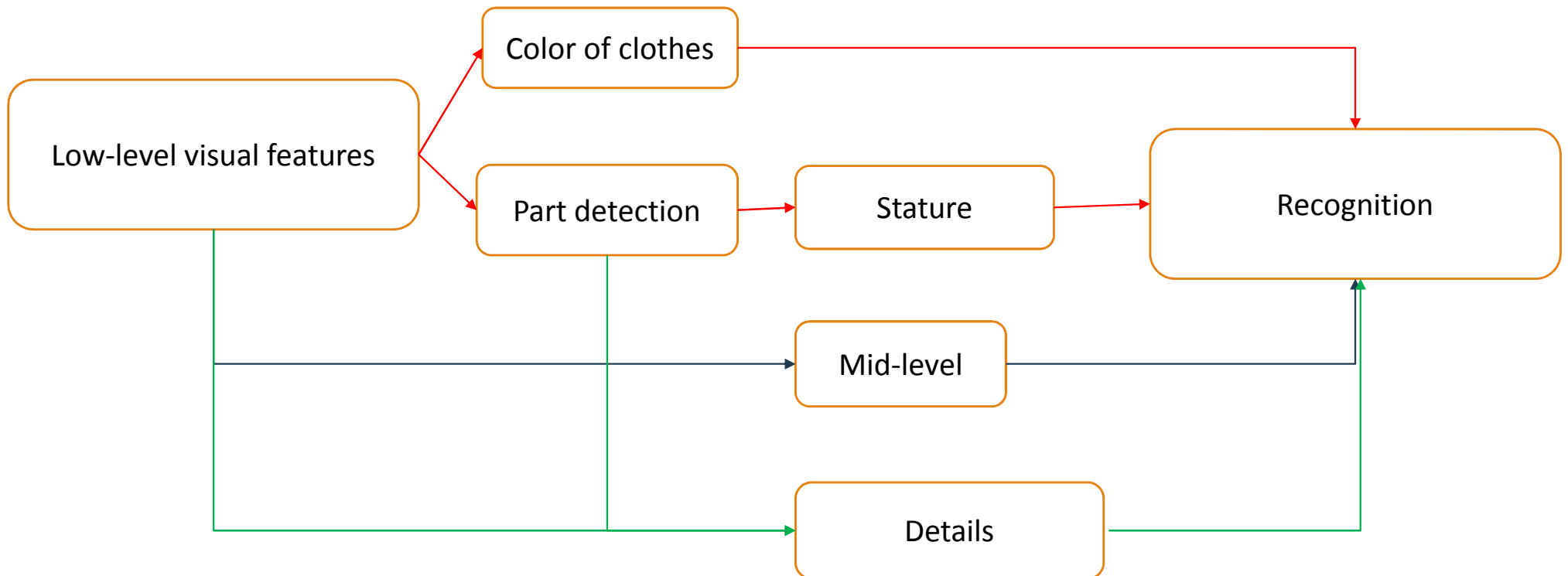
---



A bird or *Pericrocotus flammeus*?

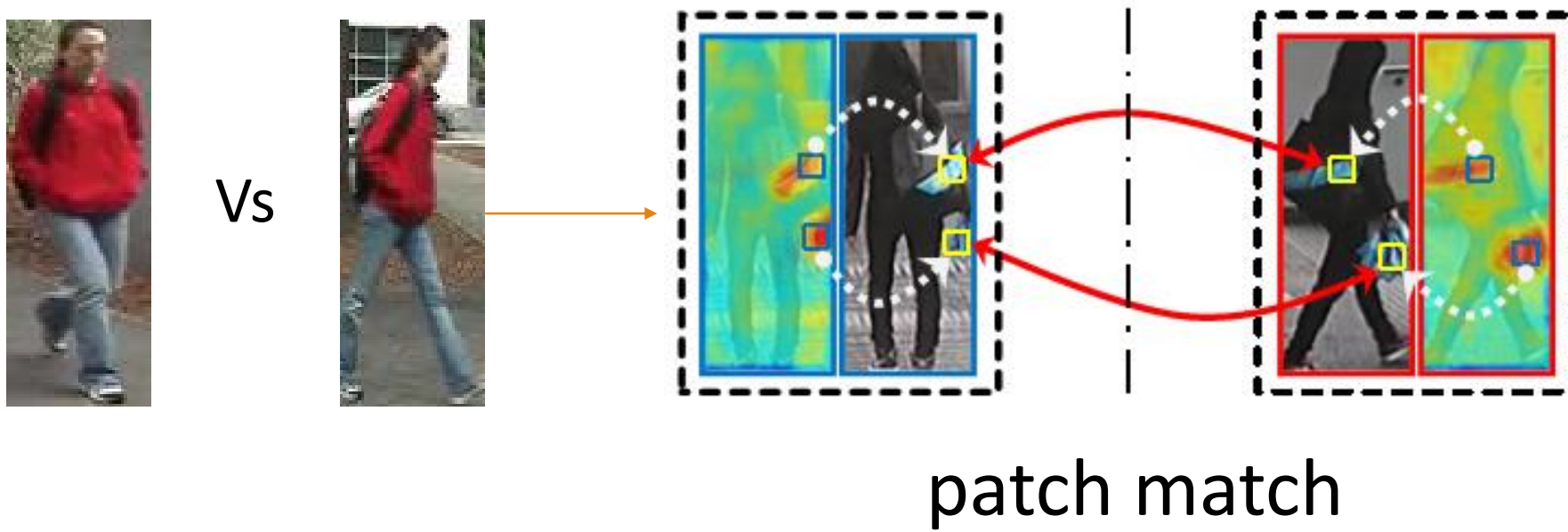
# Pipeline

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# Baseline

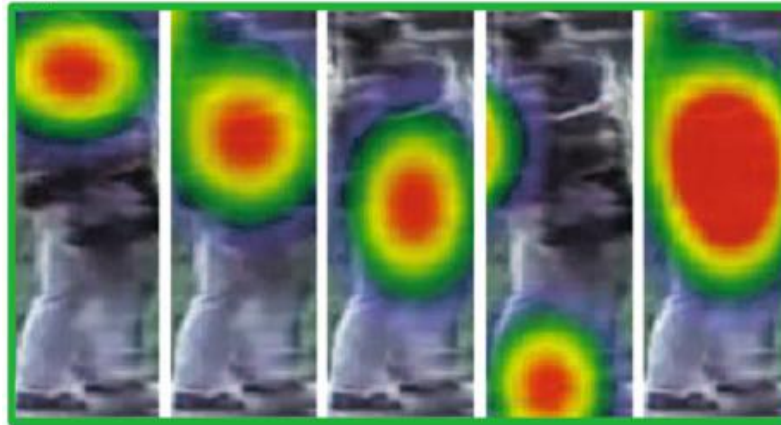
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# Two approaches

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- Find important regions

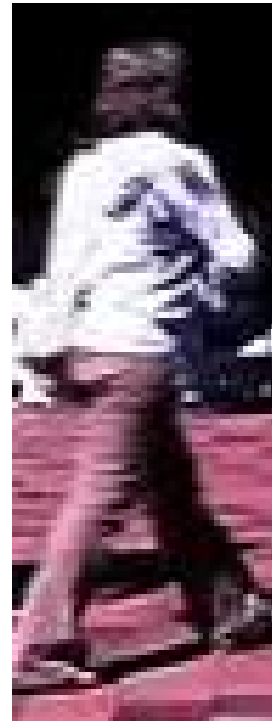


- Find better features

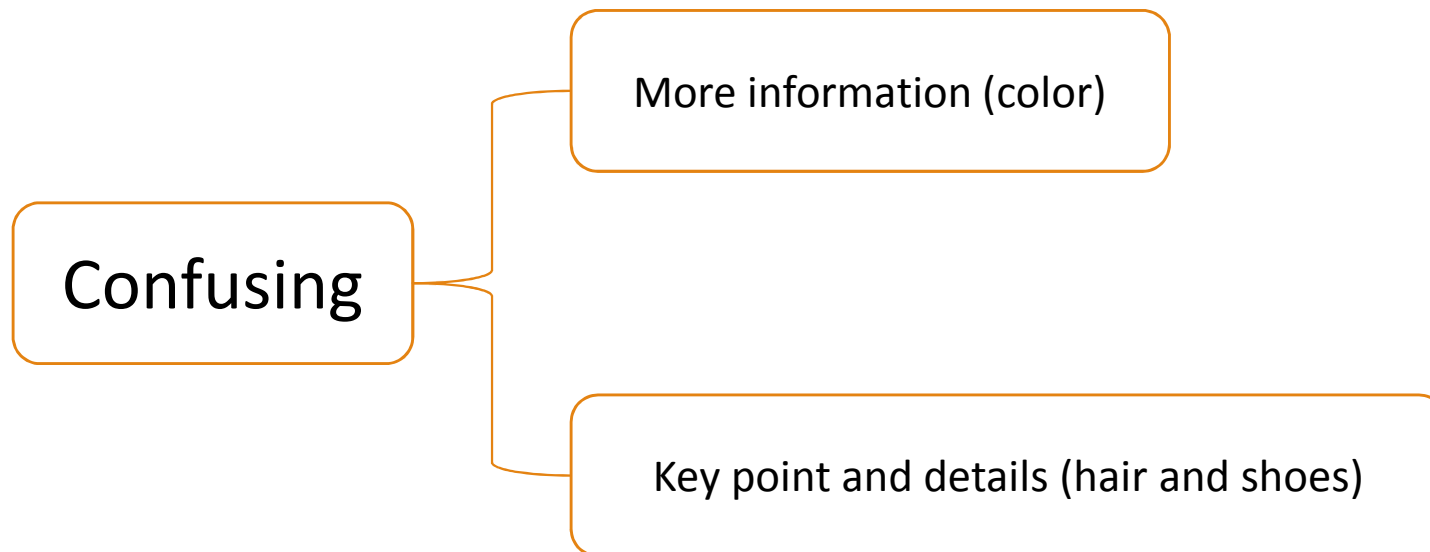




4 person or less ?



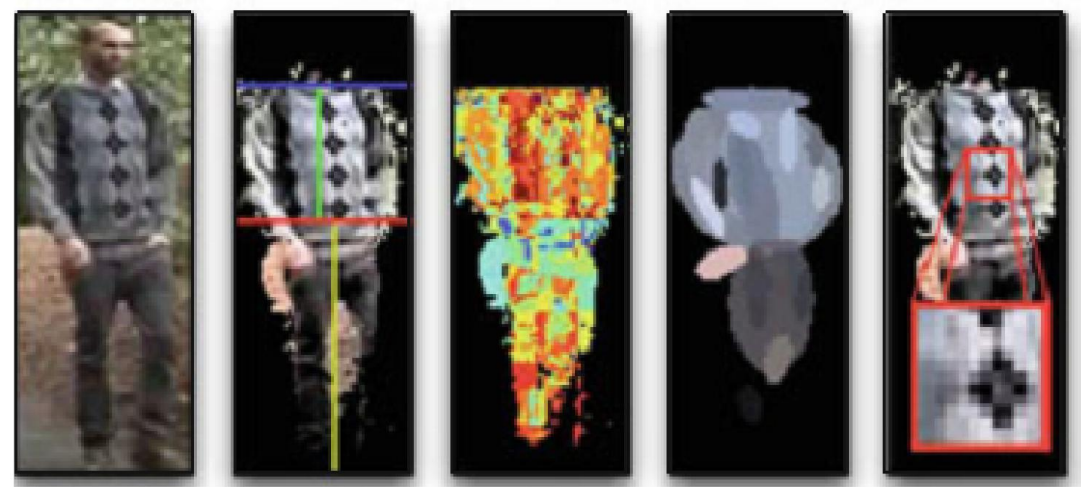
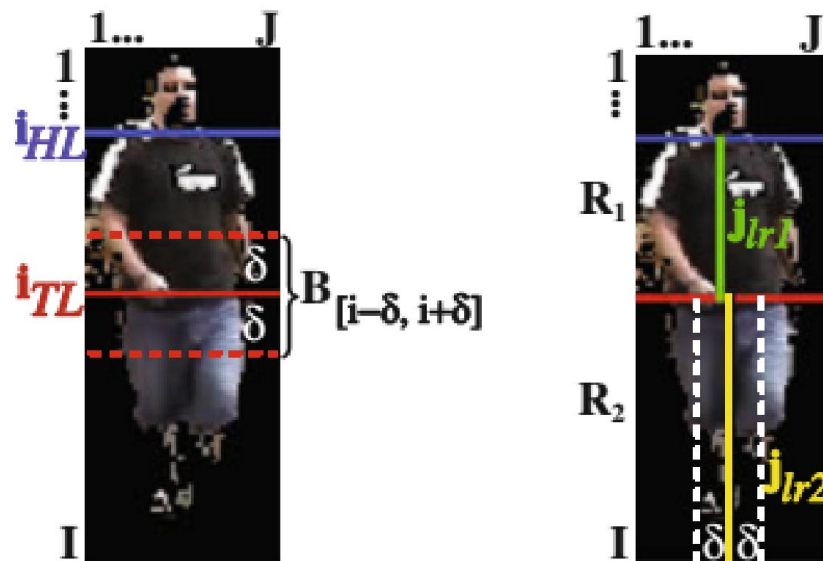
Only 3 person





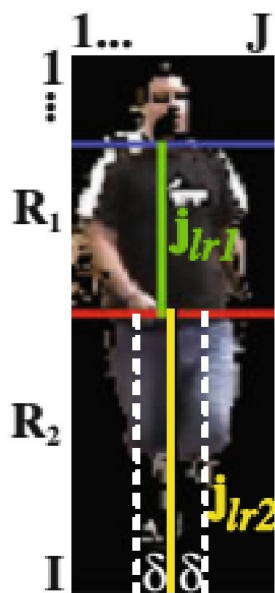
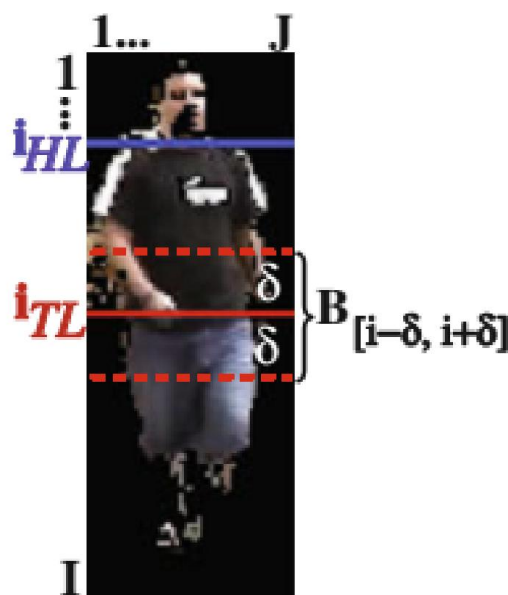
# symmetry-driven accumulation of local features (SDALF)

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# symmetry-driven accumulation of local features (SDALF)

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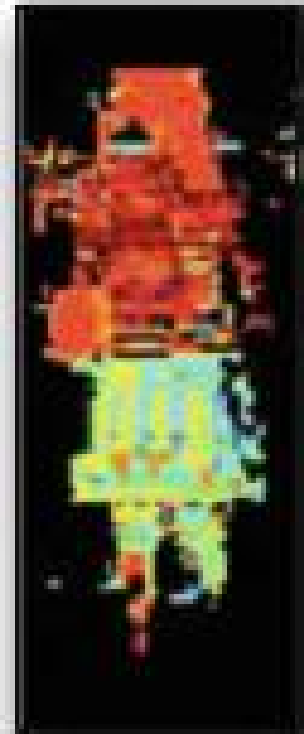
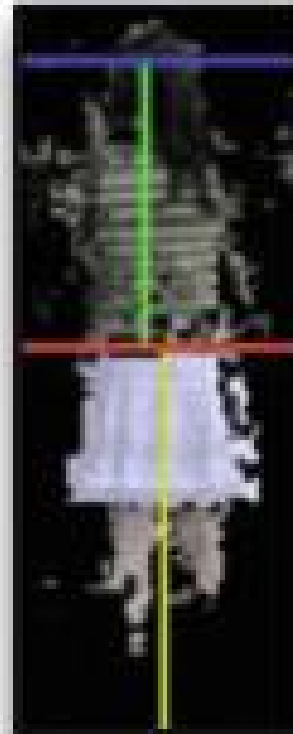
$$i_{TL} = \operatorname{argmin}_i (1 - C(i, \delta)) + S(i, \delta)$$

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

$C$  pixel level     $S$  region level

# Weighted Color Histograms(WCH)

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# Maximally Stable Color Regions (MSCR)

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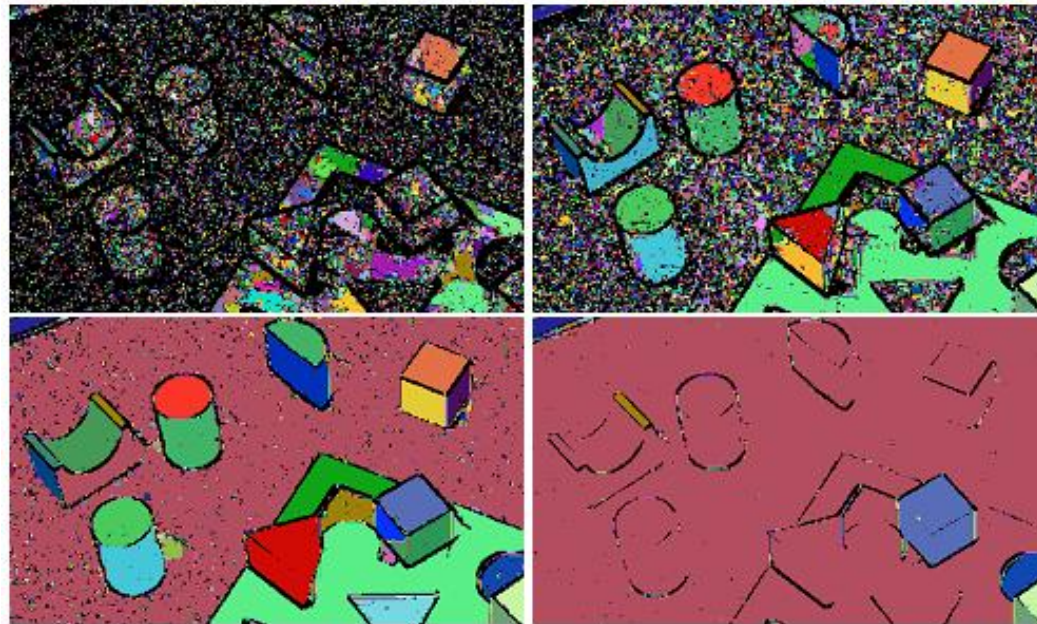
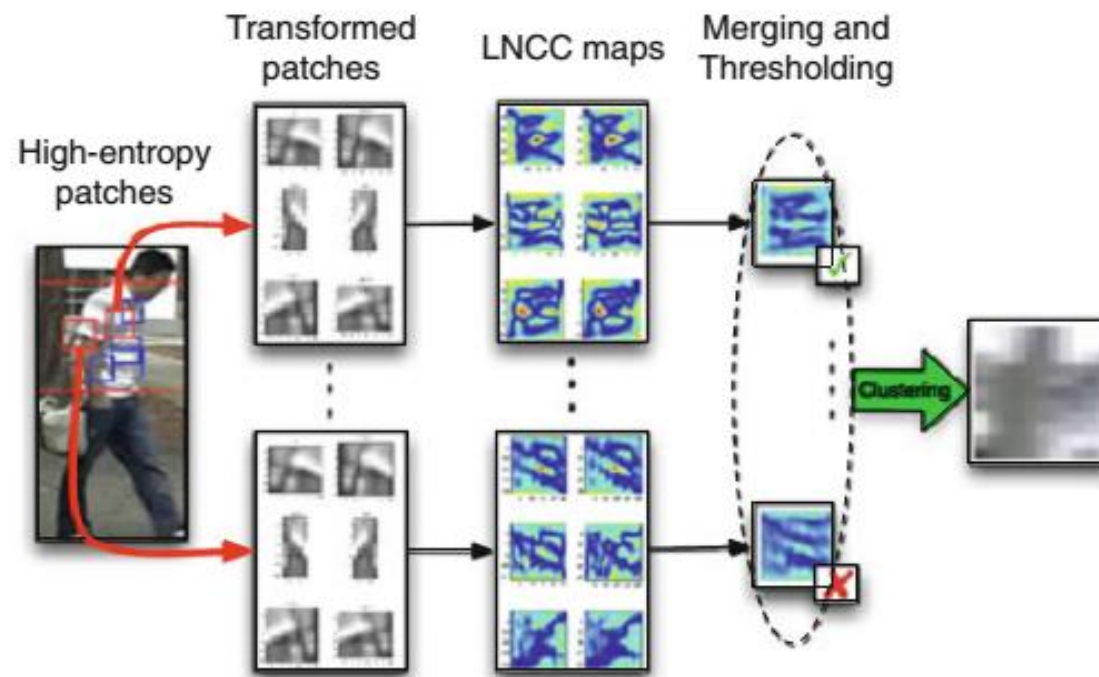


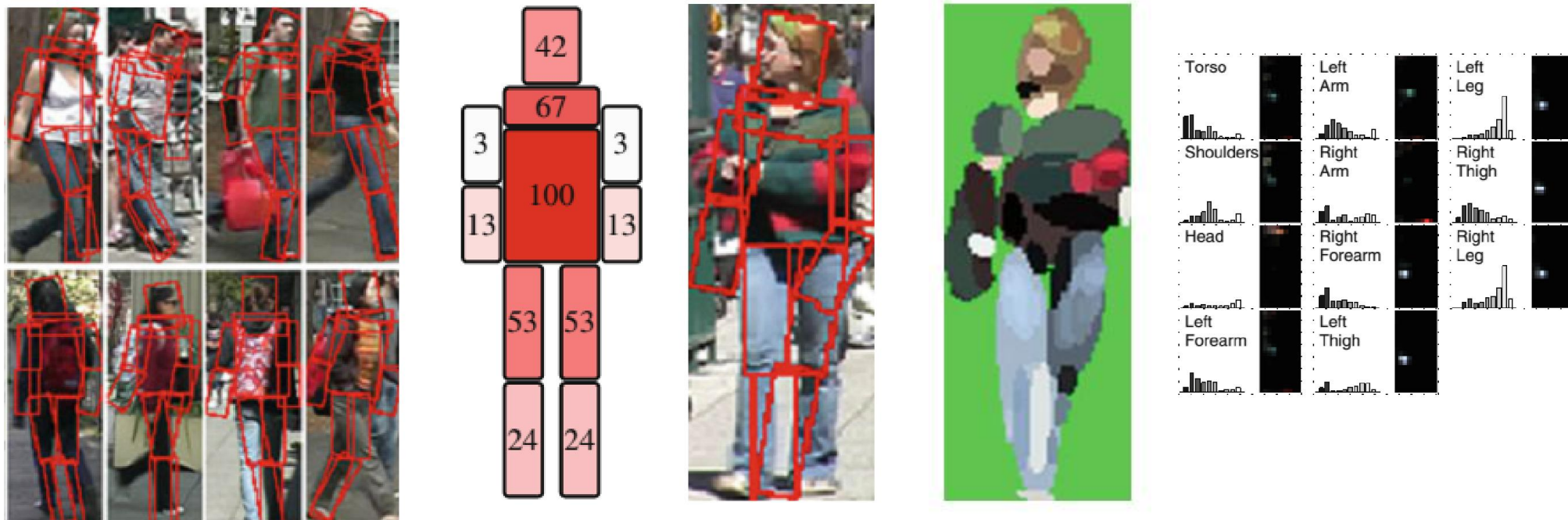
Figure 3. Illustration of evolution used in colour MSER detector.  
Left to right, top to bottom:  $d_{\text{thr}} = 0.0065, 0.011, 0.023, 0.038$ .  
Each region is painted in a different, random colour.

# Recurrent High-Structured Patches(RHSP)





# Articulated Appearance Matching

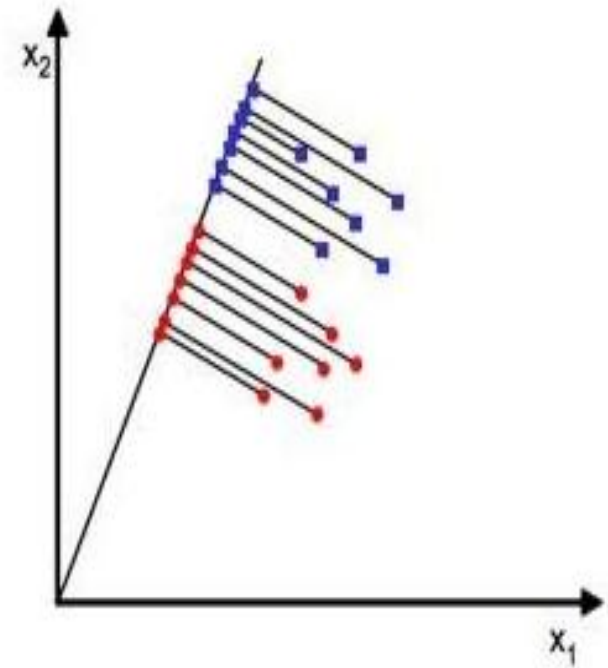
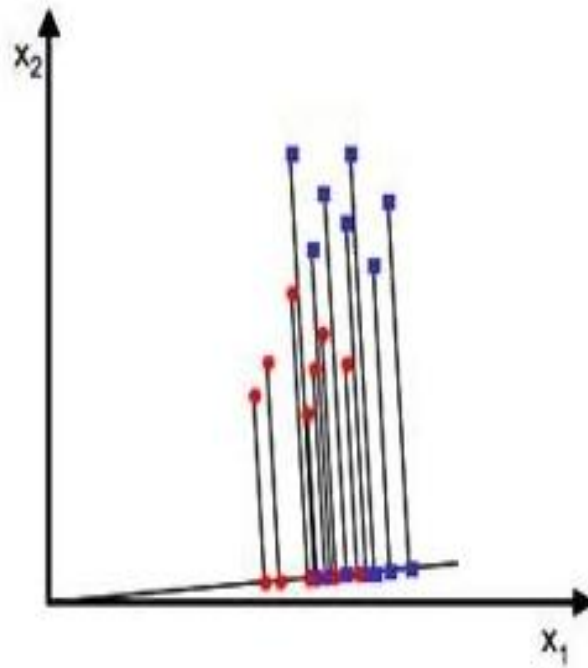
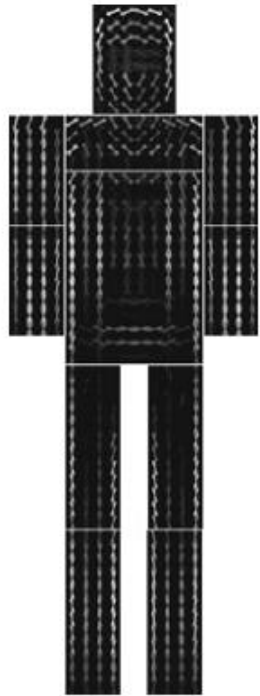


# HOG+LDA

Histogram of oriented gradients

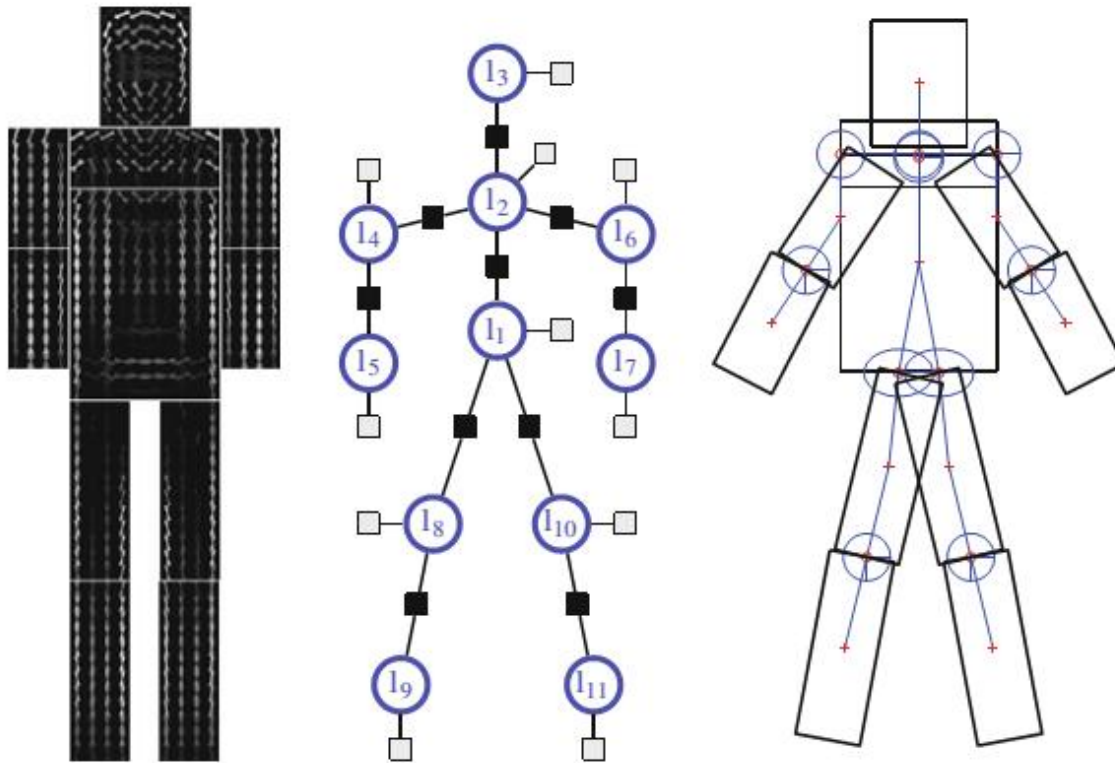
Linear discriminant analysis

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# Pose Estimation(PS)

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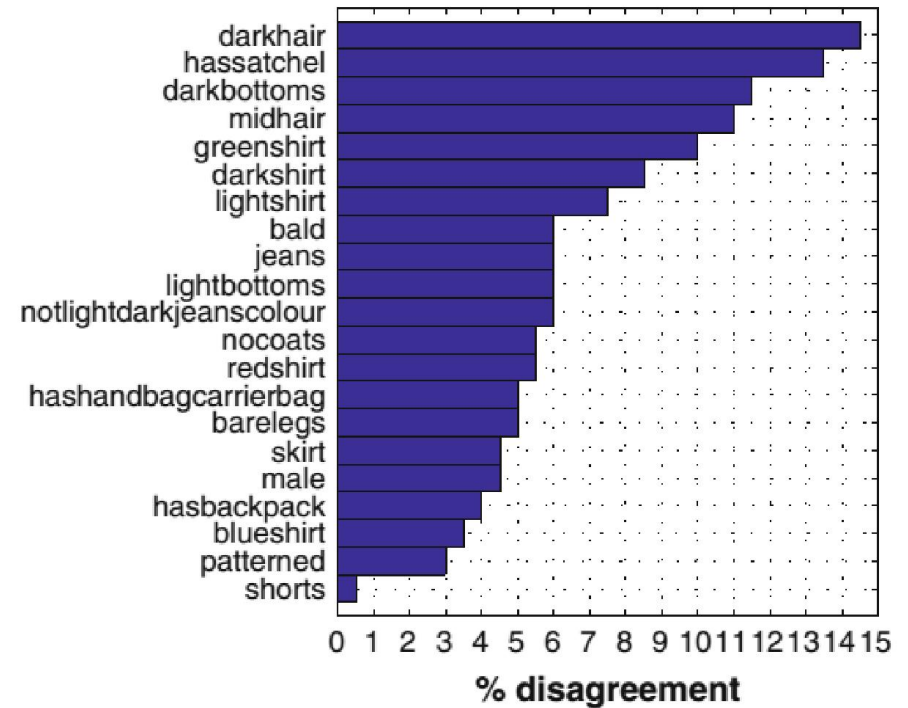
# Attributes-Based Re-identification

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**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

# Attributes-Based Re-identification



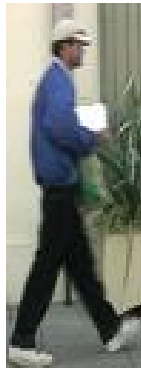
# Attributes-Based Re-identification

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train

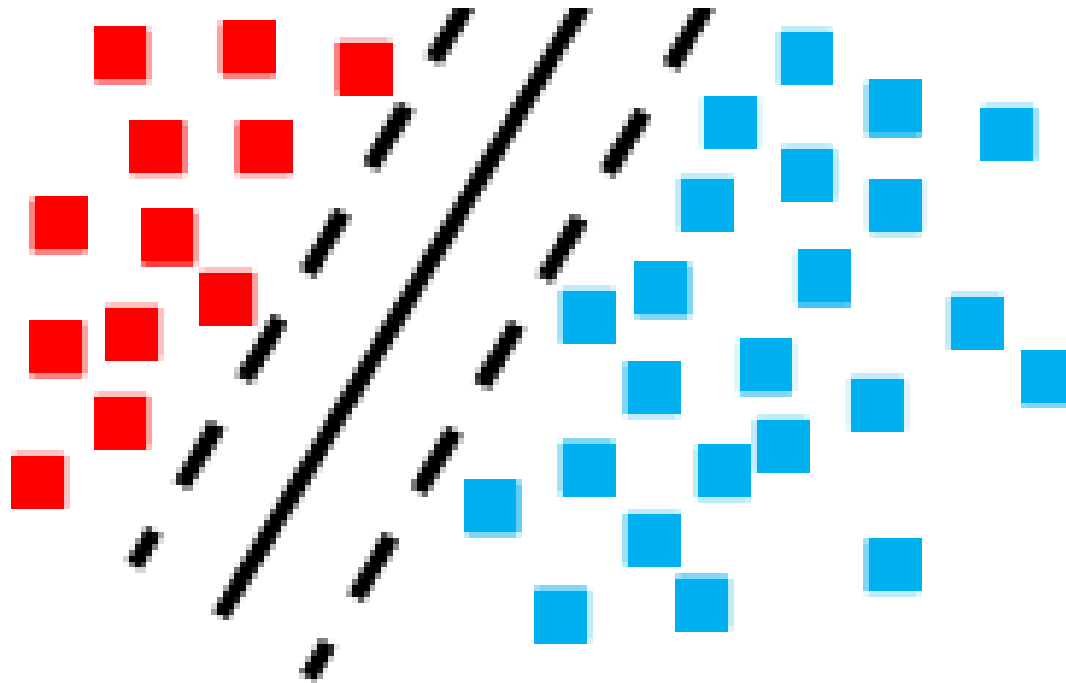
SVM



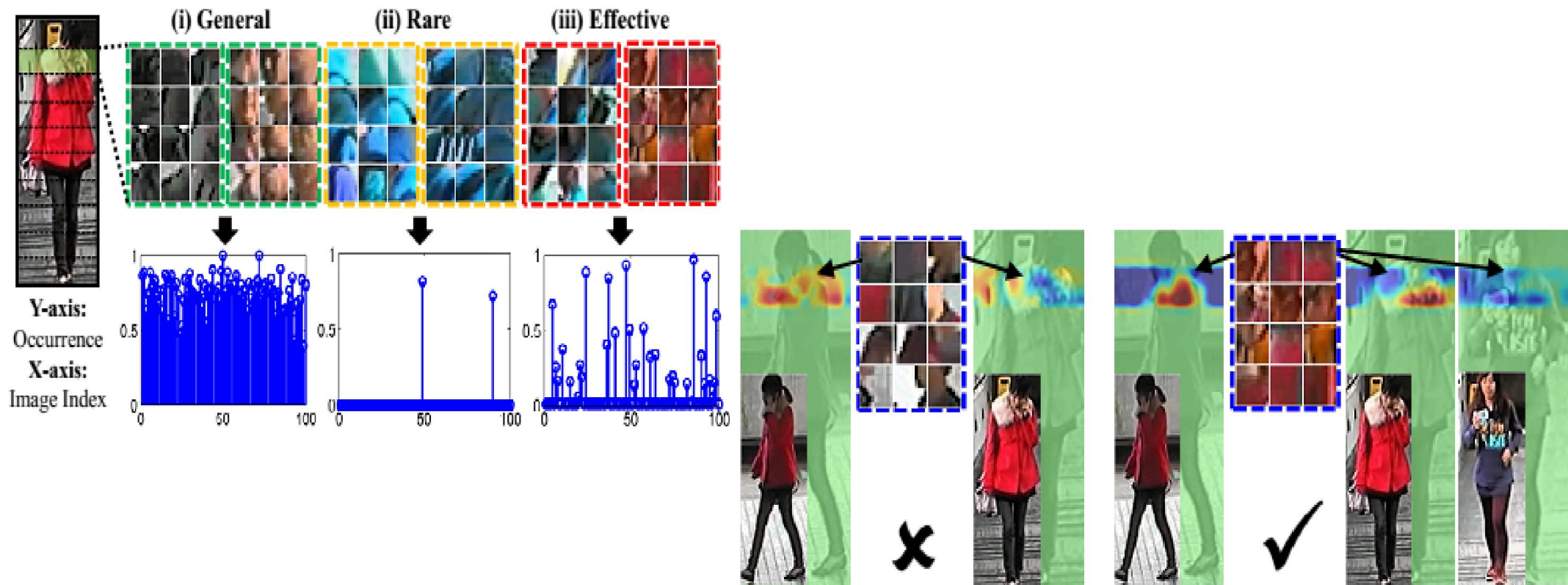
test, has hat?

# Support vector machine (SVM)

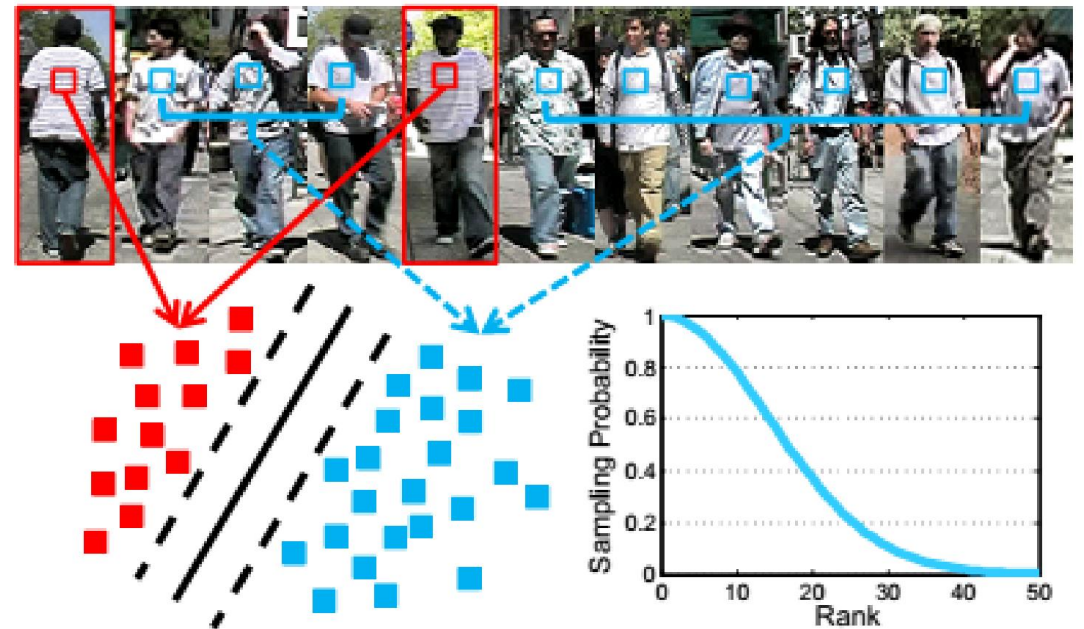
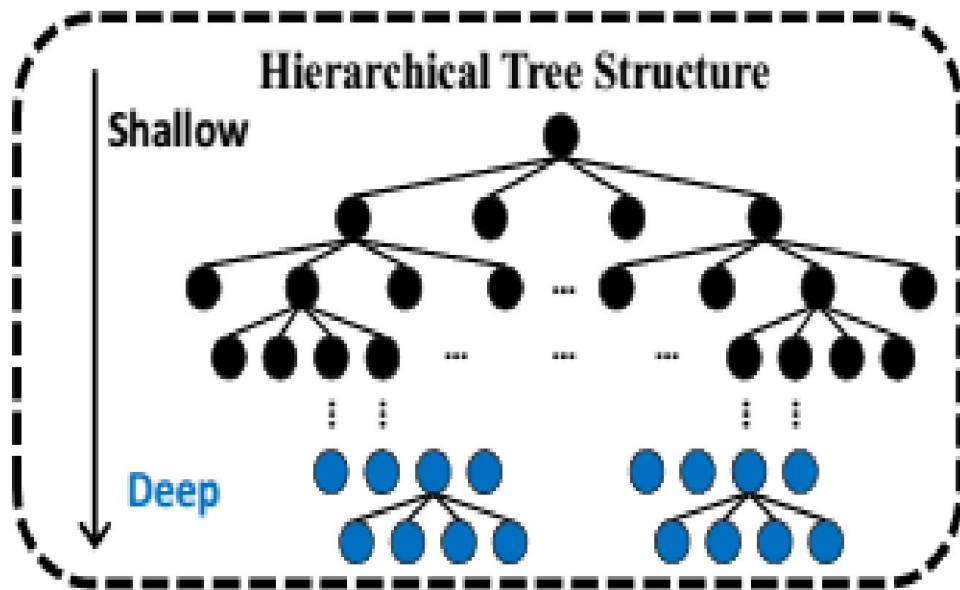
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# Mid-level Filters



# Mid-level Filters



# Rank SVM

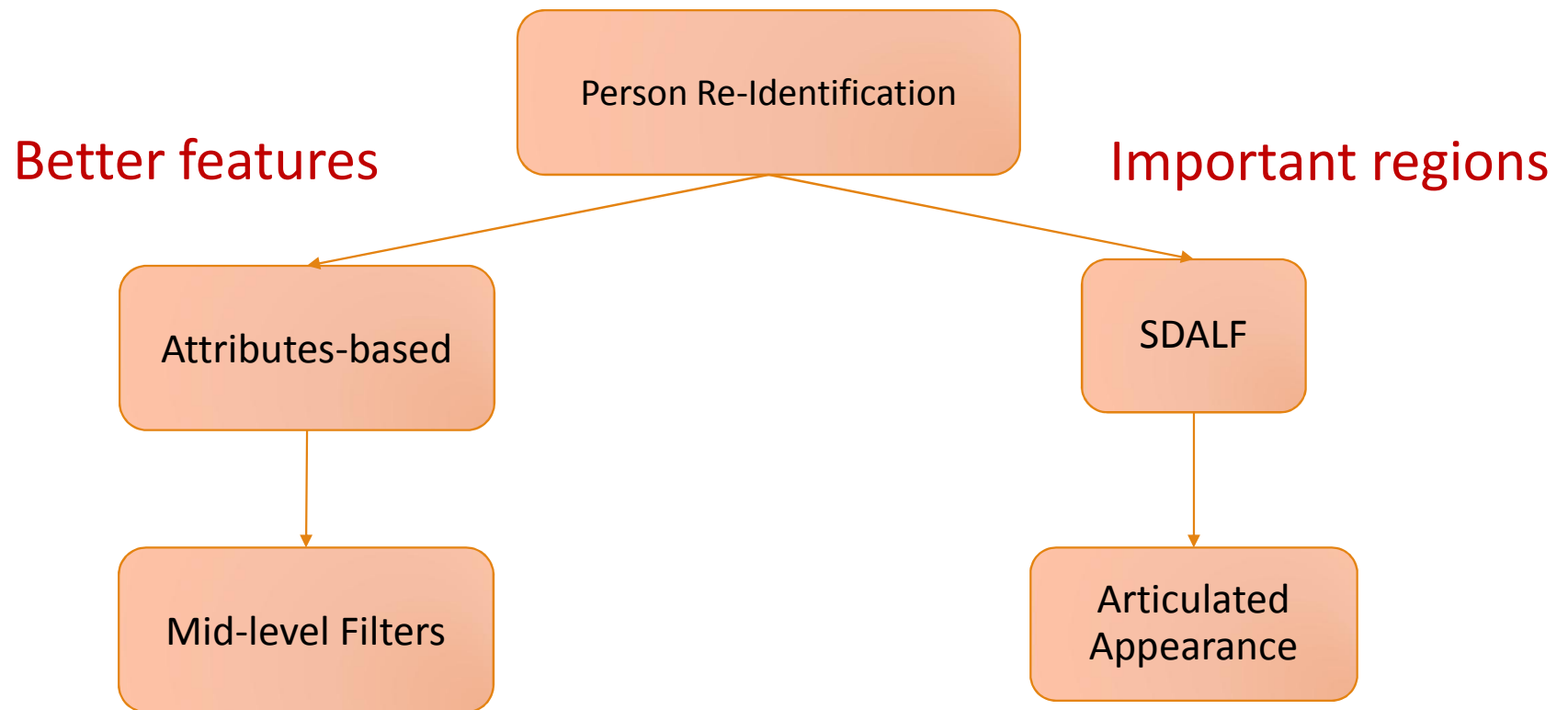
---

## Linear SVM

$a > b \rightarrow a - b > 0, b - a < 0 \rightarrow \text{pos: } a - b \text{ neg: } b - a$

# Framework

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# Summary

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- Task of person re-identification
- How do we solve this
- Two approaches(better features vs important regions)

# Problem

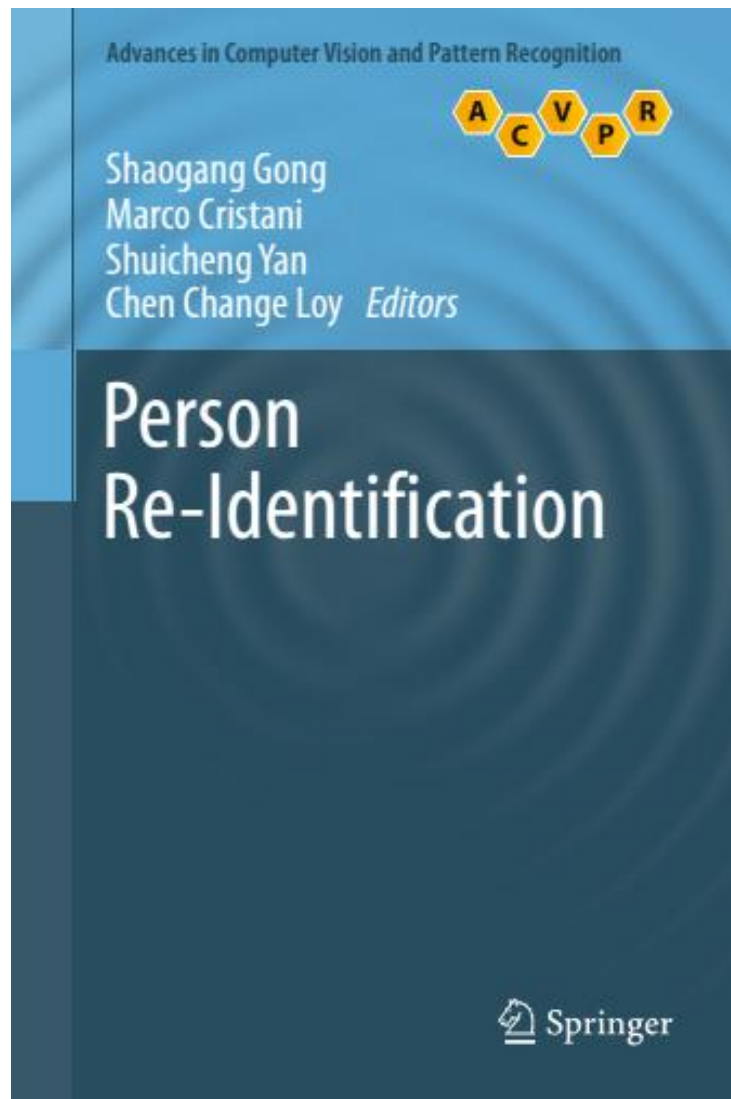
---



Similar color, different details

## Ignore information from video

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



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-Identification,  
R. Zhao, W. Ouyang and X. Wang.  
IEEE International Conference on Computer Vision and Pattern Recognition (CVPR),  
2014.

Unsupervised Saliency 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)

Thank you  
Q&A

# Our Project

## Fudan Video Analysis System (FVAS)

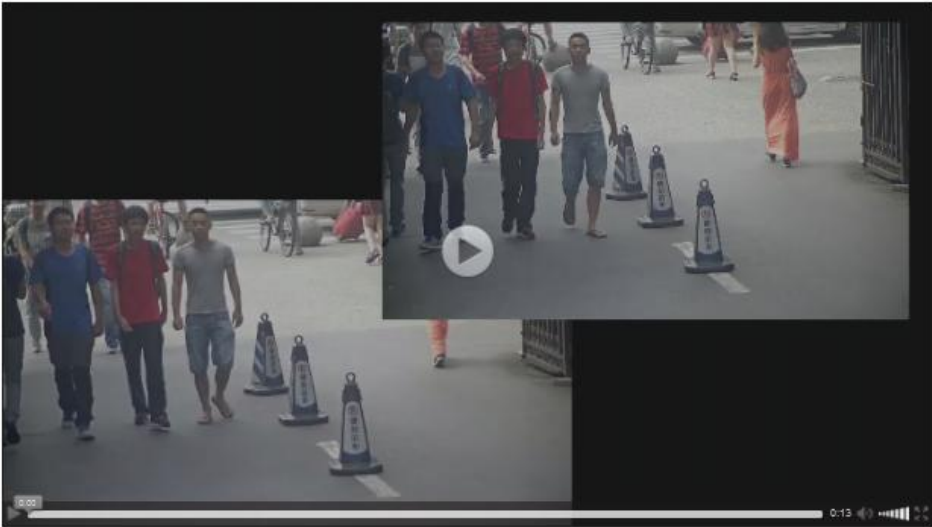
School of Computer Science, Fudan University

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 can't watch the demo video online, please click [here](#) to download.

### Quick Start

```
download data!
$make
$.fudanvideo_demo
Or run our script in C++
```

#### 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