Detecting carried objects from Video Sequences

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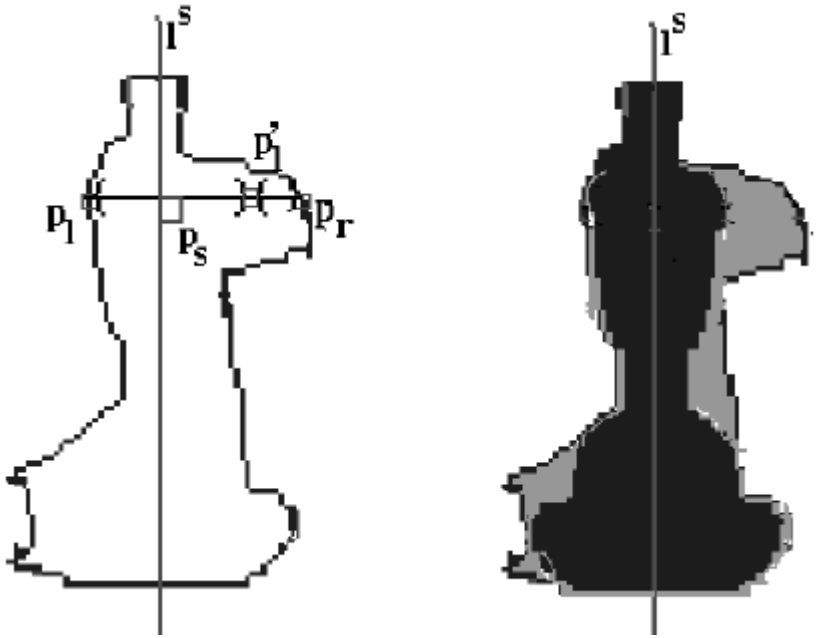
Computer Vision Group

Detecting carried objects from Silhouettes

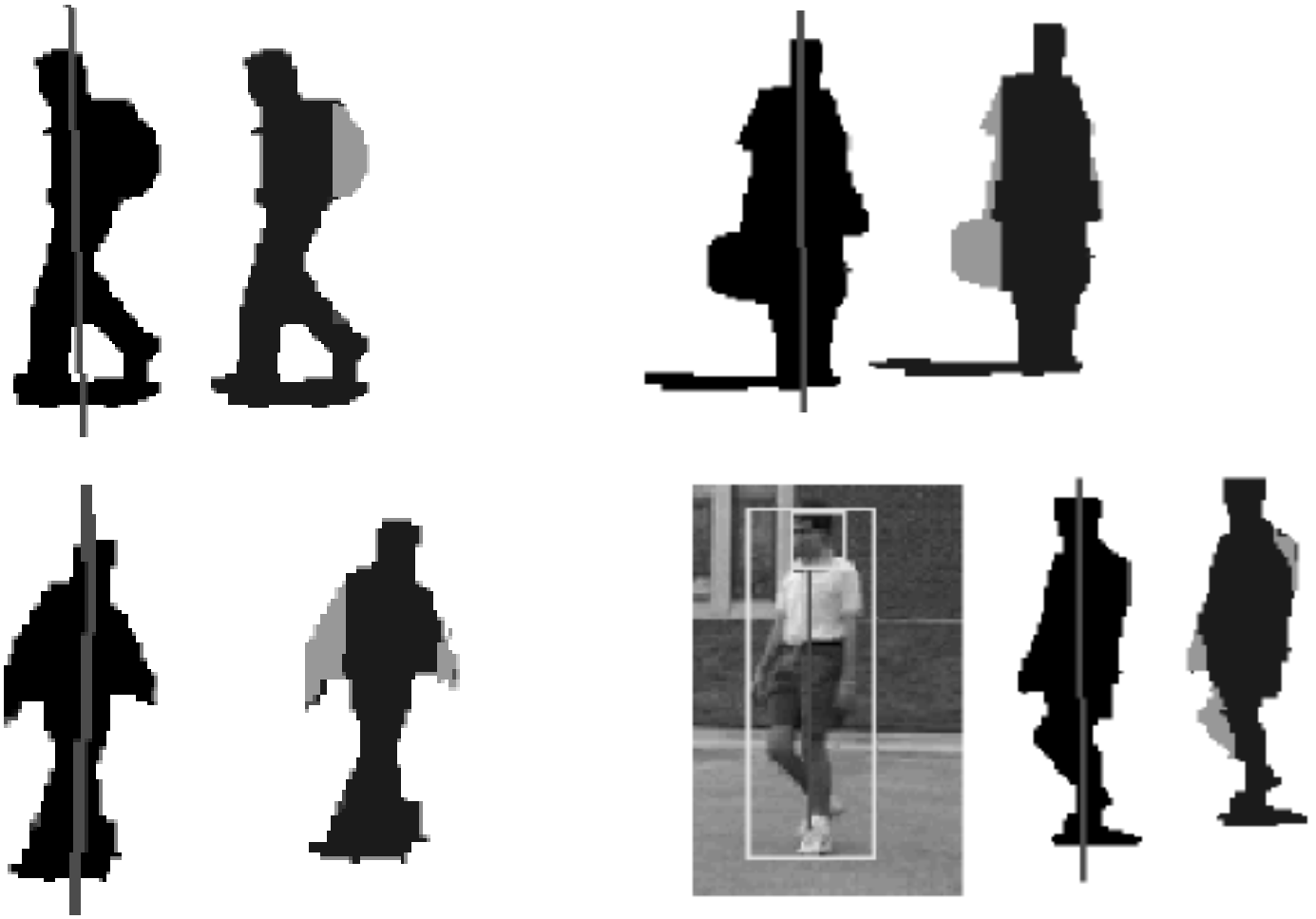
I. Haritaoglu, R. Cutler, D. Harwood, and L. S. Davis. **Backpack: detection of people carrying objects using silhouettes**. In *Proc. Int. Conf. on Computer Vision (ICCV)*, volume 1, pages 102–107, 1999.

Haritaoglu's work

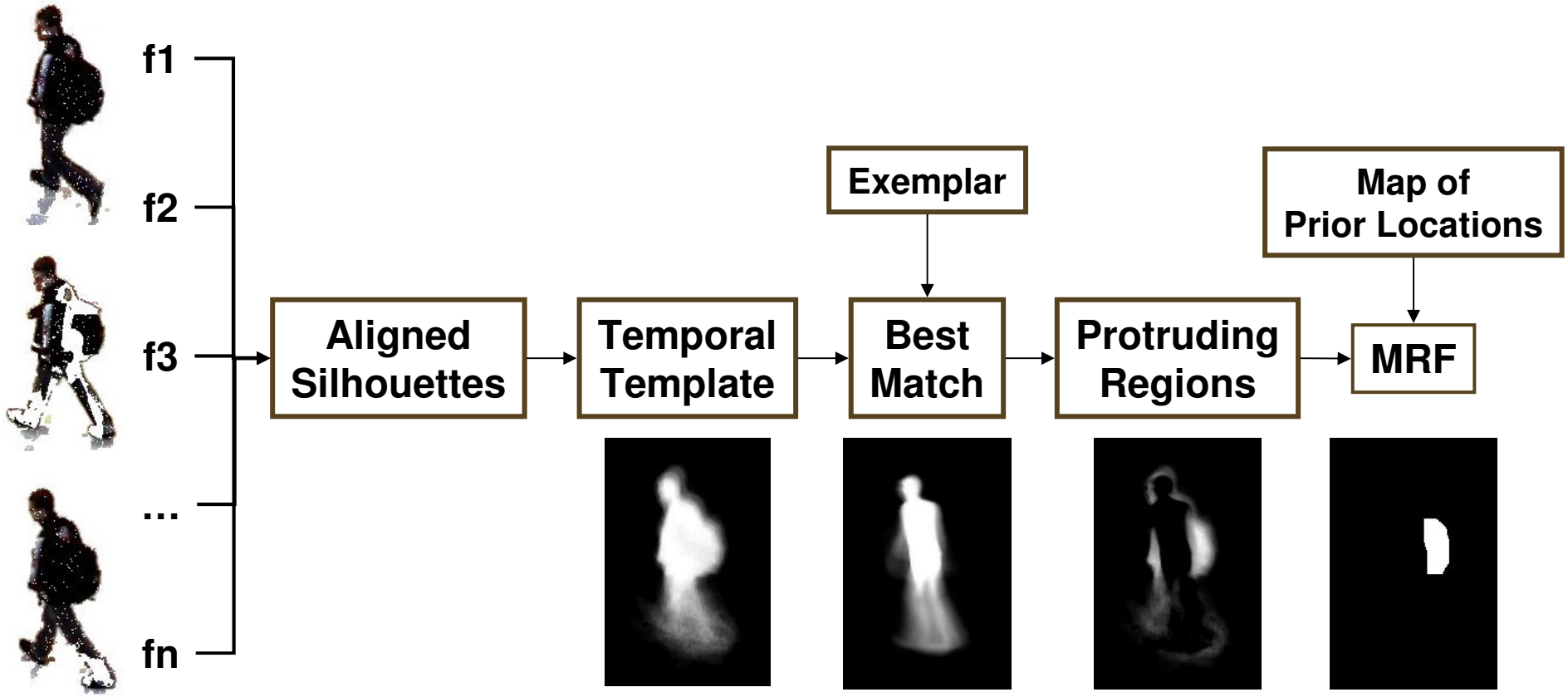


$$x = \begin{cases} \text{Non-Symmetric} & if\, q_s^x > min\{q_s^l, q_s^r\} + \varepsilon \\ \text{Symmetric} & otherwise \end{cases}$$

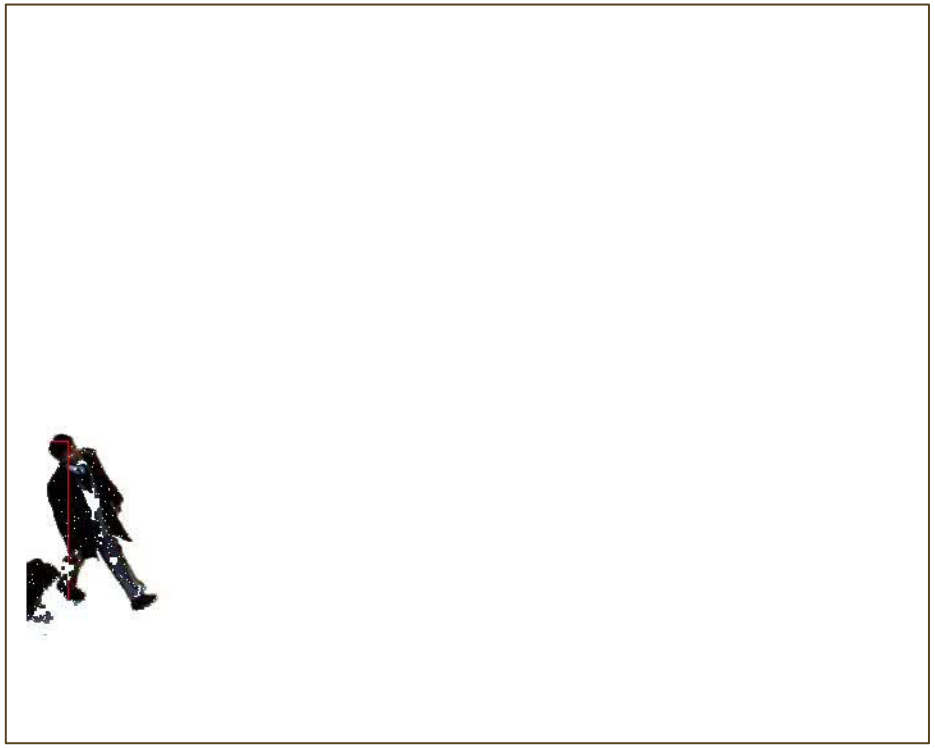
Haritaoglu's work

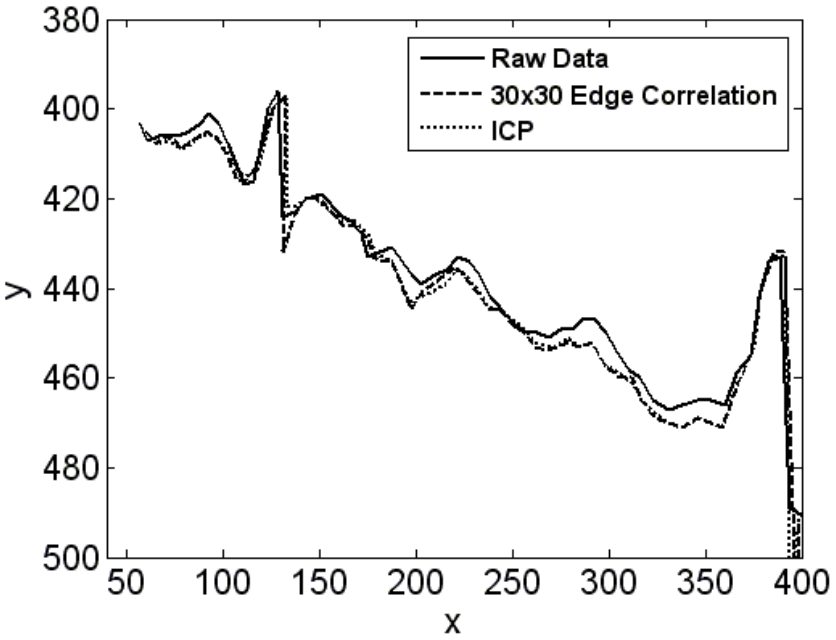


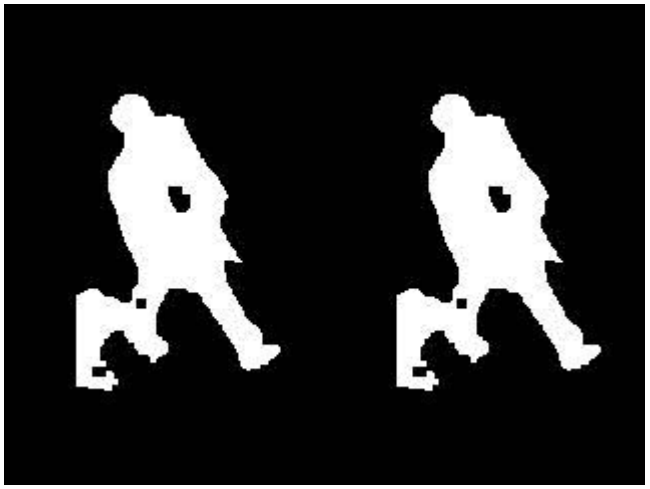
Detecting carried objects from Silhouettes



Proposed Method

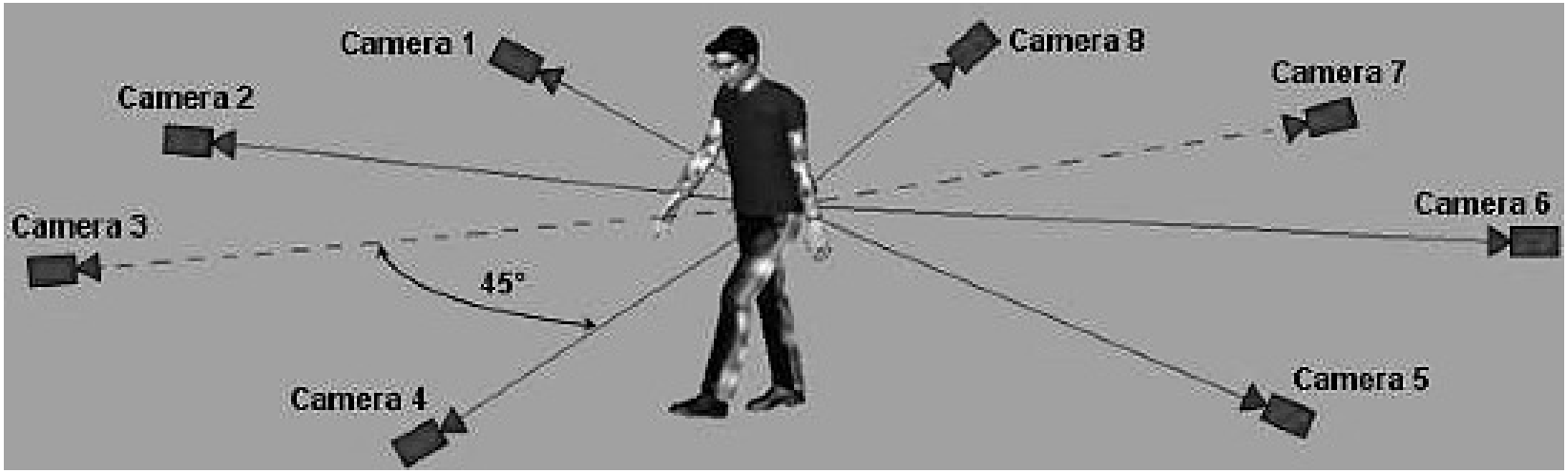




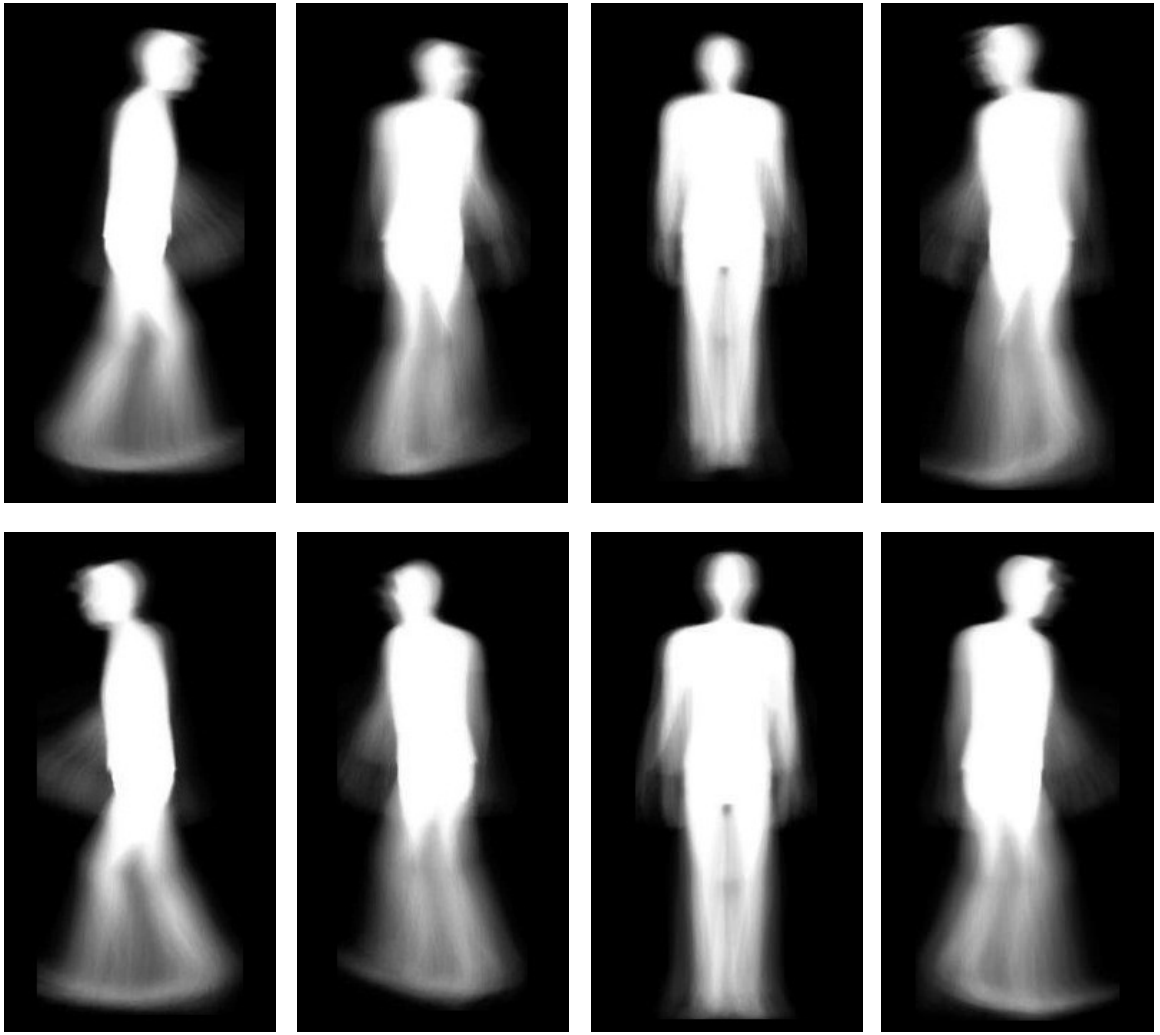


Camera-Specific General Temporal Templates

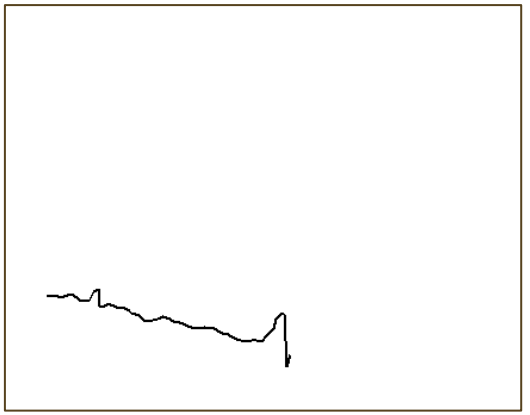
- Swiss Federal Institute of Technology (EPFL)

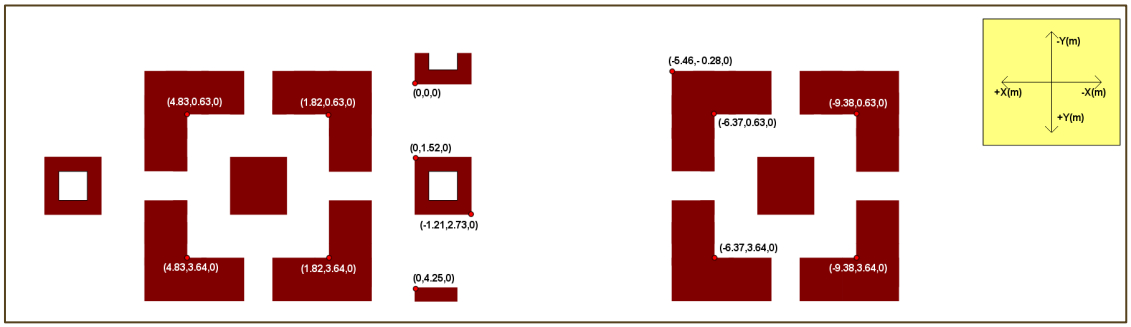


Camera-Specific General Temporal Templates



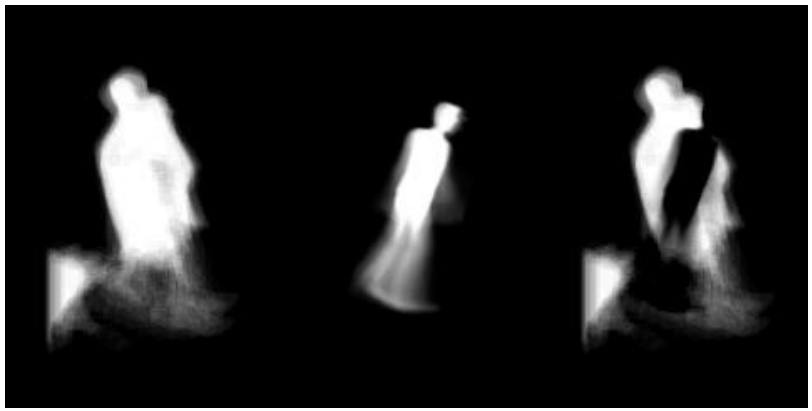
Selecting General Template

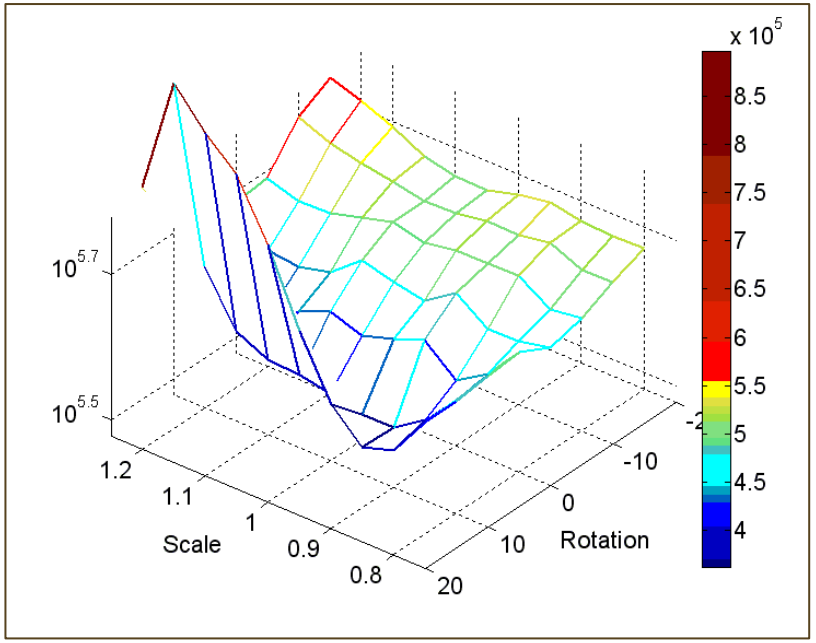




Proposed Method

$$d(M_T, P) = \sum_{x,y} |M_T(x,y) - P(x,y)|(2h - y)$$





Proposed Method

Temporal Template

Camera Template

Protruding (Person,Model)

Connected Regions

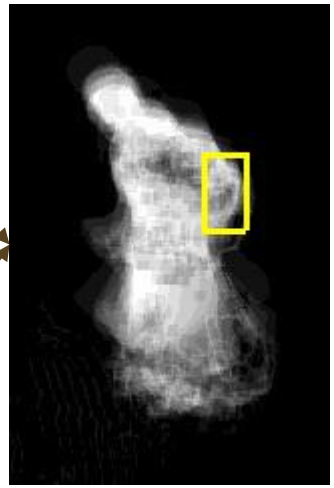
Introducing Priors and Continuity

Temporal Template

Best Match

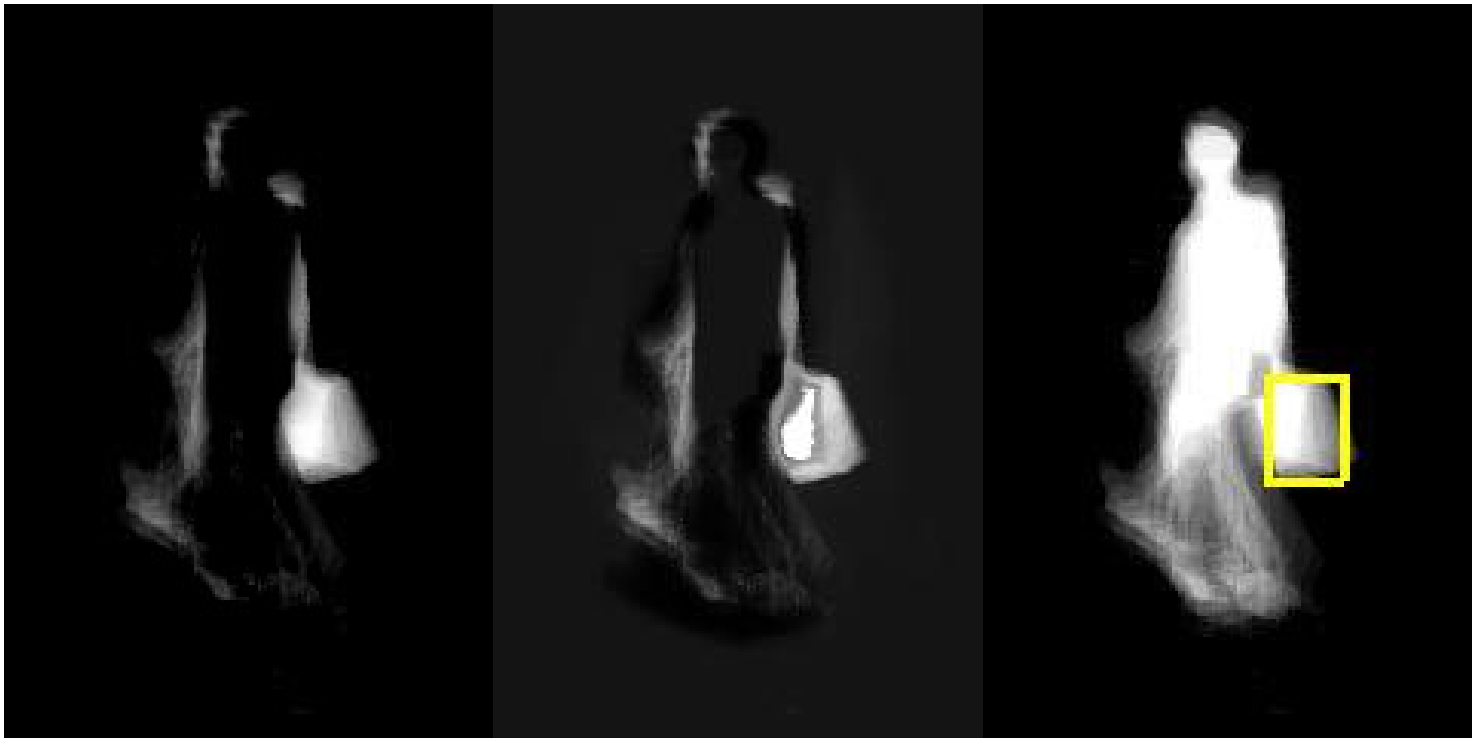
Protruding Regions

Prior Map



MRF Detection

Another Example



Dataset

- PETS2006

Cam1

Cam2

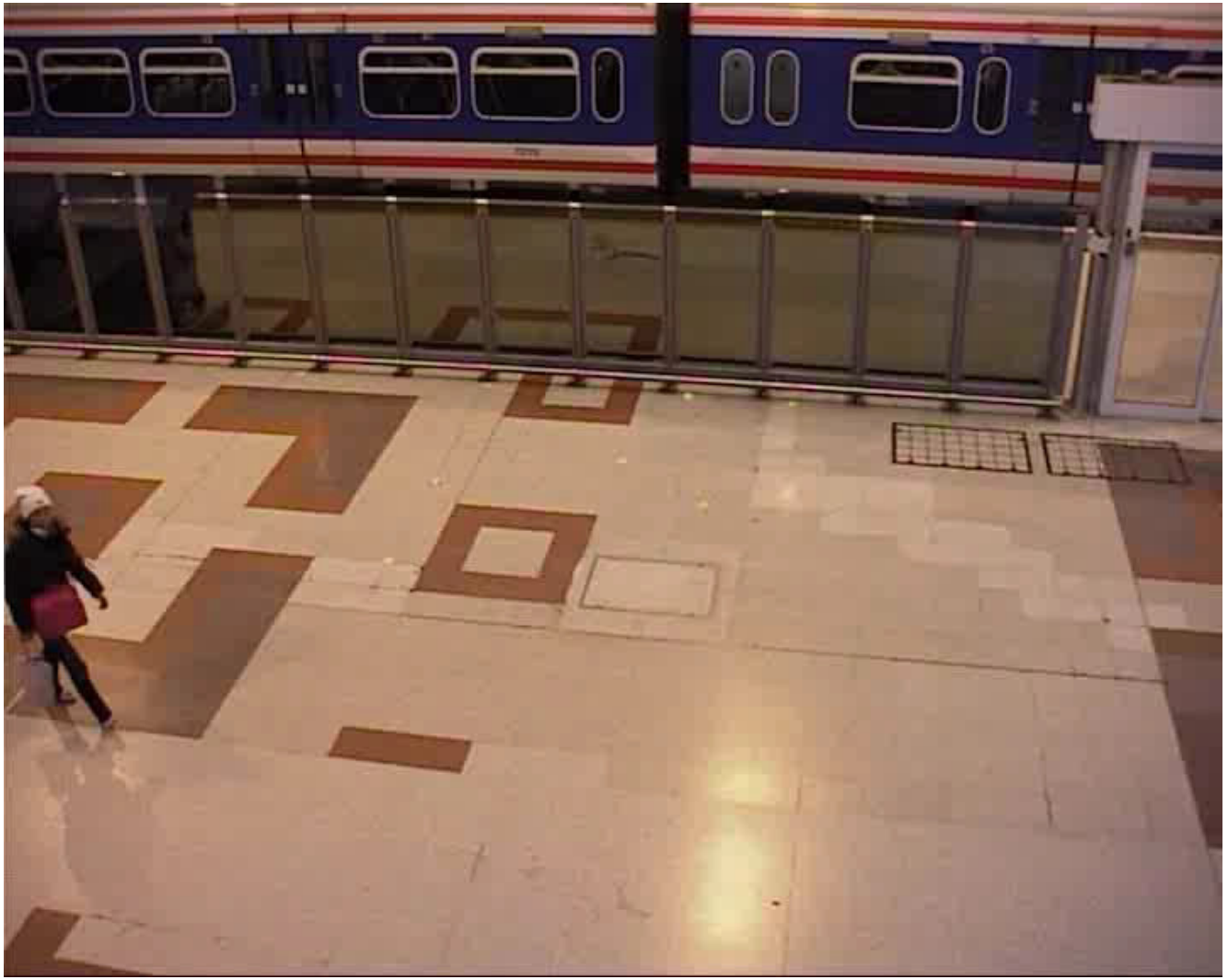
Cam3

Cam4

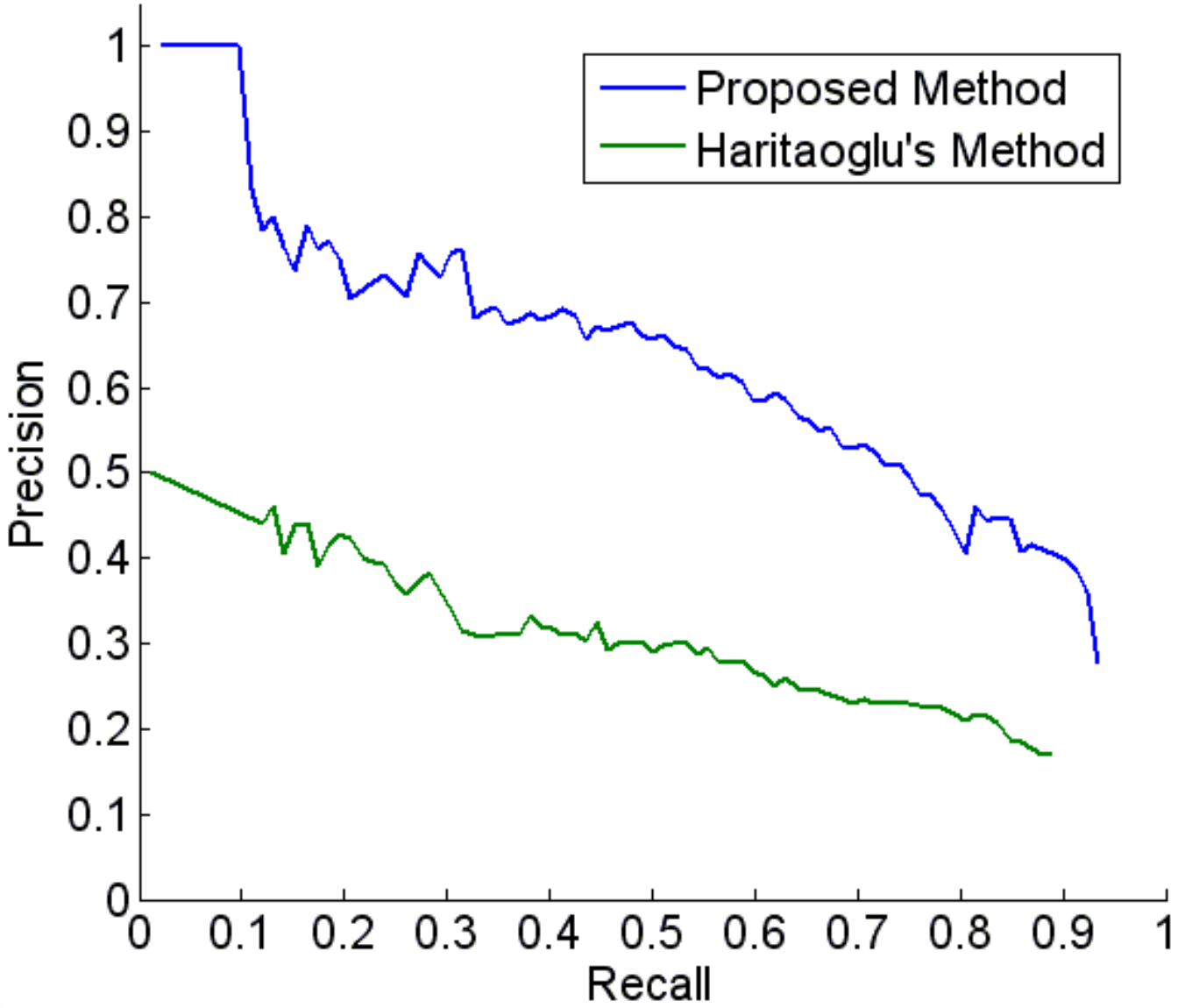
Dataset

- PETS2006
- 106 individually tracked people
  - Groups discarded
  - Tracks < 10 frames discarded
- 83 GT bags

Dataset



Results


Proposed Method
Haritaoglu's Method
Precision
Recall
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

Introducing priors

Results

	Precision	Recall	TP	FP	FN
Thresholding	39.8%	49.4%	41	62	42
MRF - Prior	50.5%	55.4%	46	45	37

Thank you ☺

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