Study of higher order image descriptors
Article overview

Malte Stær Nissen
tgq958@alumni.ku.dk

Benjamin Michael Braithwaite
cpg608@alumni.ku.dk

Supervisor: Kim Steenstrup Pedersen, kimstp@diku.dk
Co-supervisor: Sune Darkner, darkner@diku.dk

February 8, 2014

This is an overview of the types of descriptors used in various articles.

Lowe 2004 [Low04]

SIFT descriptor for 4x4 cell blocks of 4x4 pixel cells. Each cell has a histogram of unsigned gradient orientations divided into 8 bins. ($16 \times 8 = 128$ dimensions)

Dalal 2005 [DT05]

HOG descriptor for 3x3 cell blocks of 6x6 pixel cells used for pedestrian detection. Each cell has a histogram of unsigned gradient orientations divided into 9 bins. ($9 \times 9 = 81$ dimensions)

Felzenszwalb 2008 [FMR08]

Descriptor for 2x2 cell blocks of 8x8 pixel cells used for general object detection, used in a deformable parts model (DPM). Each cell has a histogram of unsigned gradient orientations divided into 9 bins.

Crosier 2010 [CG10]

Descriptor for 200x200 pixel texture regions. Consists of a histogram of 6 Basic Image Features (BIFs) built from 2-jet information at 4 different scales. ($6^4 = 1296$ bins/dimensions)

Larsen 2012 [LDDP12]

$\mathcal{J}_4$-grid2 descriptor for generic 2x2 pixel regions. Consists of 4-jet information at each pixel. ($4 \times 14 = 56$ dimensions)

Pedersen 2013 [PSSZI]

Descriptor for 100x100 pixel regions of galaxies used to estimate specific star formation rate (sSFR). Consists of histograms of gradient orientation in 8 bins and shape index in 9 bins, at 8 different scale levels.

References

[CG10]   Michael Crosier and Lewis D Griffin. Using basic image features for texture classification. *International Journal of Computer Vision*, 88(3):447–460, 2010.

[DT05]   Navneet Dalal and Bill Triggs. Histograms of oriented gradients for human detection. In *Computer Vision and Pattern Recognition, 2005. CVPR 2005. IEEE Computer Society Conference on*, volume 1, pages 886–893. IEEE, 2005.

[FMR08]   Pedro Felzenszwalb, David McAllester, and Deva Ramanan. A discriminatively trained, multiscale, deformable part model. In *Computer Vision and Pattern Recognition, 2008. CVPR 2008. IEEE Conference on*, pages 1–8. IEEE, 2008.

[LDDP12] Anders Boesen Lindbo Larsen, Sune Darkner, Anders Lindbjerg Dahl, and Kim Steenstrup Pedersen. Jet-based local image descriptors. In *Computer Vision–ECCV 2012*, pages 638–650. Springer, 2012.

[Low04]   David G Lowe. Distinctive image features from scale-invariant keypoints. *International journal of computer vision*, 60(2):91–110, 2004.

[PSSZI]   Kim Steenstrup Pedersen, Kristoffer Stensbo-Smidt, Andrew Zirm, and Christian Igel. Shape index descriptors applied to texture-based galaxy analysis.