



Figure 7: Most significant segments associated with each of three shared, global visual categories (rows) for hierarchical PY-Edge models trained with 200 images of *mountain* (left) or *tallbuilding* (right) scenes.

- [4] L. Cao and L. Fei-Fei. Spatially coherent latent topic model for concurrent object segmentation and classification. In *ICCV*, 2007.
- [5] B. C. Russell, A. A. Efros, J. Sivic, W. T. Freeman, and A. Zisserman. Using multiple segmentations to discover objects and their extent in image collections. In *CVPR*, volume 2, pages 1605–1614, 2006.
- [6] S. Todorovic and N. Ahuja. Learning the taxonomy and models of categories present in arbitrary images. In *ICCV*, 2007.
- [7] X. He, R. S. Zemel, and M. A. Carreira-Perpiñán. Multiscale conditional random fields for image labeling. In *CVPR*, volume 2, pages 695–702, 2004.
- [8] J. Verbeek and B. Triggs. Region classification with Markov field aspect models. In *CVPR*, 2007.
- [9] C. Rother, V. Kolmogorov, T. Minka, and A. Blake. Cosegmentation of image pairs by histogram matching: Incorporating a global constraint into MRFs. In *CVPR*, volume 1, pages 993–1000, 2006.
- [10] M. Andreetto, L. Zelnik-Manor, and P. Perona. Non-parametric probabilistic image segmentation. In *ICCV*, 2007.
- [11] J. Pitman and M. Yor. The two-parameter Poisson–Dirichlet distribution derived from a stable subordinator. *Ann. Prob.*, 25(2):855–900, 1997.
- [12] Y. W. Teh, M. I. Jordan, M. J. Beal, and D. M. Blei. Hierarchical Dirichlet processes. *J. Amer. Stat. Assoc.*, 101(476):1566–1581, December 2006.
- [13] C. Fowlkes, D. Martin, and J. Malik. Learning affinity functions for image segmentation: Combining patch-based and gradient-based approaches. In *CVPR*, volume 2, pages 54–61, 2003.
- [14] B. C. Russell, A. Torralba, K. P. Murphy, and W. T. Freeman. LabelMe: A database and web-based tool for image annotation. *IJCV*, 77:157–173, 2008.
- [15] S. Goldwater, T. L. Griffiths, and M. Johnson. Interpolating between types and tokens by estimating power-law generators. In *NIPS 18*, pages 459–466. MIT Press, 2006.
- [16] Y. W. Teh. A hierarchical Bayesian language model based on Pitman–Yor processes. In *Coling/ACL*, 2006.
- [17] E. B. Sudderth and M. I. Jordan. Shared segmentation of natural scenes using dependent Pitman–Yor processes. Technical report, Dept. of Statistics, University of California, Berkeley. In preparation, 2009.
- [18] X. Ren and J. Malik. Learning a classification model for segmentation. In *ICCV*, 2003.
- [19] Z. Tu and S. C. Zhu. Image segmentation by data-driven Markov chain Monte Carlo. *IEEE Trans. PAMI*, 24(5):657–673, May 2002.
- [20] D. R. Martin, C. C. Fowlkes, and J. Malik. Learning to detect natural image boundaries using local brightness, color, and texture cues. *IEEE Trans. PAMI*, 26(5):530–549, May 2004.
- [21] D. M. Blei and M. I. Jordan. Variational inference for Dirichlet process mixtures. *Bayes. Anal.*, 1(1):121–144, 2006.
- [22] K. Kurihara, M. Welling, and Y. W. Teh. Collapsed variational Dirichlet process mixture models. In *IJCAI 20*, pages 2796–2801, 2007.
- [23] J. Y. A. Wang and E. H. Adelson. Representing moving images with layers. *IEEE Trans. IP*, 3(5):625–638, September 1994.
- [24] J. A. Duan, M. Guindani, and A. E. Gelfand. Generalized spatial Dirichlet process models. *Biometrika*, 94(4):809–825, 2007.
- [25] C. Fernández and P. J. Green. Modelling spatially correlated data via mixtures: A Bayesian approach. *J. R. Stat. Soc. B*, 64(4):805–826, 2002.
- [26] M. A. T. Figueiredo. Bayesian image segmentation using Gaussian field priors. In *CVPR Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition*, 2005.
- [27] M. W. Woolrich and T. E. Behrens. Variational Bayes inference of spatial mixture models for segmentation. *IEEE Trans. MI*, 25(10):1380–1391, October 2006.
- [28] P. Orbanz and J. M. Buhmann. Smooth image segmentation by nonparametric Bayesian inference. In *ECCV*, volume 1, pages 444–457, 2006.
- [29] R. D. Morris, X. Descombes, and J. Zerubia. The Ising/Potts model is not well suited to segmentation tasks. In *IEEE DSP Workshop*, 1996.
- [30] R. Unnikrishnan, C. Pantofaru, and M. Hebert. Toward objective evaluation of image segmentation algorithms. *IEEE Trans. PAMI*, 29(6):929–944, June 2007.