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Abstract

The local binary pattern (LBP) provides a simple and efficient approach to gray-scale and rotation invariant texture classification. However, the LBP operator thresholds P neighbors at the value of the center pixel in a local neighborhood and employs a P-bit binary pattern to encode only the signs of the differences between the gray values. Thus, the LBP operator

discards some important texture information. In this paper, we have proposed the compound local binary pattern (CLBP), an extension of the LBP texture operator for rotation invariant texture classification. The CLBP operator exploits 2P bits to encode the information of a local neighborhood of P neighbors, where the extra P bits are used to express the magnitude information of the differences between the center and the neighbor gray values. A feature representation method based on CLBP codes is presented. Experimental results show that, the classification rate of the proposed method is appreciable.

Reference

- Z. Guo, L. Zhang and D. Zhang, "Rotation invariant texture classification using LBP variance (LBPV) with global matching," *Pattern Recognition*, vol. 43, pp.706–719, 2010.
- T. Ojala, M. Pietikainen and T. Maenpaa, "Multiresolution Gray-Scale and Rotation Invariant Texture Classification with Local Binary Patterns," *IEEE Transaction on Pattern Analysis and Machine Intelligence*, vol. 24, no. 7, pp.971–987, 2002.
- U.S.N. Raju, A.S. Kumar, B. Mahesh and B.E. Reddy, "Texture Classification with High Order Local Pattern Descriptor: Local Derivative Pattern," *Global Journal of Computer Science and Technology*, vol. 10, issue 8, pp. 72–76, 2010.
- L.S. Davis, S.A. Johns and J.K. Aggarwal, "Texture Analysis Using Generalized Cooccurrence Matrices," *IEEE Transaction on Pattern Analysis and Machine Intelligence*, vol. 1, pp.251–259, 1979.
- D. Chetverikov, "Experiments in the Rotation-Invariant Texture Discrimination Using Anisotropy Features," *Proceedings of the Sixth International Conference on Pattern Recognition*, pp.1071–1073, 1982.
- R.L. Kashyap and A. Khotanzed, "A model-based method for rotation invariant texture classification," *IEEE Transaction on Pattern Analysis and Machine Intelligence*, vol. 8, no. 4, pp.472–481, 1986.
- W.R. Wu and S.C. Wei, "Rotation and gray-scale transform-invariant texture classification using spiral resampling, subband decomposition, and hidden Markov model," *IEEE Transactions on Image Processing*, vol. 5, no. 10, pp.1423–1434, 1996.
- H. Deng and D.A. Clausi, "Gaussian MRF rotation-invariant features for image classification," *IEEE Transaction on Pattern Analysis and Machine Intelligence*, vol. 26, no. 7, pp.951–955, 2004.
- P. Campisi, A. Neri, C. Panci and G. Scarano, "Robust rotation-invariant texture classification using a model based approach," *IEEE Transaction on Image Processing*, vol. 13, no. 6, pp.782–791, 2004.
- V. Manian and R. Vasquez, "Scaled and Rotated Texture Classification Using a Class of Basis Functions," *Pattern Recognition*, vol. 31, pp.1937–1948, 1998.
- N. Kim and S. Udpa, "Texture classification using rotated wavelet filters," *IEEE Transactions on Systems, Man and Cybernetics, Part A: Systems and Humans*, vol. 30, no. 6, pp.847–852, 2000.
- M. Kokare, P.K. Biswas and B.N. Chatterji, "Rotation-invariant Texture Image Retrieval using Rotated Complex Wavelet Filters," *IEEE Transactions on Systems, Man and Cybernetics, Part B: Cybernetics*, vol. 36, no.6, pp.1273–1282, 2006.
- H. Zhou, R. Wang and C. Wang, "A Novel Extended Local Binary Pattern Operator for Texture Analysis," *Information Sciences*, vol. 178, no. 22, pp.4314–4325, 2008.

- A. Hafiane, G. Seetharaman, and B. Zavidovique, "Median binary pattern for textures classification," *Image Analysis and Recognition*, pp. 387–398, 2007.
- X. Tan and B. Triggs, "Enhanced Local Texture Feature Sets for Face Recognition under Difficult Lighting Conditions," *IEEE International Workshop on Analysis and Modeling of Faces and Gestures, LNCS 4778*, pp.168-182, 2007.
- D. He and N. Cercone, "Local Triplet Pattern for content-based image retrieval," *Image Analysis and Recognition*, pp. 229–238, 2009.
- P. Brodatz, "Textures: A Photographic Album for Artists and Designers," Dover Publications, New York, 1966.
- C.W. Hsu and C.J. Lin, "A Comparison on Methods for Multiclass Support Vector Machines," *IEEE Transaction on Neural Networks*, vol. 13, no. 2, pp.415-425, 2002.

Index Terms

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