

## 1 Feature Extraction

- [1] “Textural Features for Image Classification”, 1973  
Haralick, Shanmugam, and Dinstein describe an easily computable feature set for texture analysis called gray level co-occurrence matrices (GLCM). GLCM shows the distribution of co-occurring pixel pairs given a certain distance and direction. Their results show that the method can be generally applicable for image classification and especially for texture analysis.
- [2] “Multiresolution gray-scale and rotation invariant texture classification with local binary patterns”, 2002  
Ojala, Pietikainen, and Maenpaa propose a feature extraction method that uses gray-scale pixel values and is shown to be rotation invariant for classification purposes. The proposed method (LBP) is also computationally efficient and can be used for texture analysis. The method is grayscale invariant because the neighboring pixels are scaled based on the center pixel value without losing any information. The method is also rotation invariant because the neighboring pixels are related to the center pixel by a rotation-based relationship.
- [3] “Local, semi-local and global models for texture, object and scene recognition”, 2006  
Lazebnik
- [4] “Local Features and Kernels for Classification of Texture and Object Categories”, 2007  
Zhang et al.
- [5] “Integrating local feature and global statistics for texture analysis”, 2009  
Xu, Huang, and Ji propose a texture descriptor based on [3] and [4]. They integrate the local-affine feature descriptors from [3] and [4] along with a global statistical feature called multi-fractal spectrum (MFS). By combining the two features, they create a feature descriptor that is robust to both illumination and affine transforms.
- [6] “Mean distance local binary pattern”, 2021  
Bedi and Sunkaria propose Mean distance LBP (MDLBP) that extends [2]. Their method changes the relationship between the neighboring pixels and the center pixels such that the nearest pixels are given a higher weight than farther pixels and therefore have a stronger influence on the output pattern.

## 2 Algorithms

- [7] “Paper Dating Analysis Based on Paper Texture Image Feature”, 2021  
Lu et al. propose a method of texture analysis to date paper from ancient books. They describe using a CNN to first extract global texture features

and using a hybrid attention model to extract local texture features. Then, they combine the features as input to a GRU (Gated Recurrent Unit) to train a paper dating time-series model. Their results show comparisons of different loss functions when training their model.

## References

- [1] Robert M. Haralick, K. Shanmugam, and Its'Hak Dinstein. "Textural Features for Image Classification". In: *IEEE Transactions on Systems, Man, and Cybernetics* SMC-3.6 (Nov. 1973), pp. 610–621. ISSN: 2168-2909. DOI: 10.1109/TSMC.1973.4309314.
- [2] T. Ojala, M. Pietikainen, and T. Maenpaa. "Multiresolution gray-scale and rotation invariant texture classification with local binary patterns". In: *IEEE Transactions on Pattern Analysis and Machine Intelligence* 24.7 (July 2002), pp. 971–987. ISSN: 1939-3539. DOI: 10.1109/TPAMI.2002.1017623.
- [3] Svetlana Lazebnik. "Local, semi-local and global models for texture, object and scene recognition". English. OCLC: 155253399. PhD thesis. 2006. ISBN: 9780542774850.
- [4] J. Zhang et al. "Local Features and Kernels for Classification of Texture and Object Categories: A Comprehensive Study". en. In: *International Journal of Computer Vision* 73.2 (June 2007), pp. 213–238. ISSN: 0920-5691, 1573-1405. DOI: 10.1007/s11263-006-9794-4. URL: <http://link.springer.com/10.1007/s11263-006-9794-4> (visited on 09/28/2021).
- [5] Yong Xu, SiBin Huang, and Hui Ji. "Integrating local feature and global statistics for texture analysis". In: *2009 16th IEEE International Conference on Image Processing (ICIP)*. ISSN: 2381-8549. Nov. 2009, pp. 1377–1380. DOI: 10.1109/ICIP.2009.5413361.
- [6] Anterpreet Kaur Bedi and Ramesh Kumar Sunkaria. "Mean distance local binary pattern: a novel technique for color and texture image retrieval for liver ultrasound images". en. In: *Multimedia Tools and Applications* 80.14 (June 2021), pp. 20773–20802. ISSN: 1380-7501, 1573-7721. DOI: 10.1007/s11042-021-10758-7. URL: <https://link.springer.com/10.1007/s11042-021-10758-7> (visited on 09/28/2021).
- [7] Qi Lu et al. "Paper Dating Analysis Based on Paper Texture Image Feature". In: *2021 4th International Conference on Intelligent Autonomous Systems (ICoIAS)*. May 2021, pp. 13–17. DOI: 10.1109/ICoIAS53694.2021.00010.