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# Cloud Classification-Based Fine KNN Using Texture Feature and Opponent Color Features

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## Abstract

Weather forecasting and alerts are issued by the meteorological department to alert citizens. Cloud image classification is a challenging task for the research community of meteorology and machine learning. Most of the researches for cloud classification are based on histogram and machine learning using texture features. In this manuscript, the opponent color feature and fine KNN are used to classify the 11 types of cloud images and achieved an accuracy of 99.5% and AUC of 1.0.

## Keywords

**Cloud classification** **Opponent color feature** **Meteorology** **Fine KNN**

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## References

- Stephens, G.L.: Cloud feedbacks in the climate system: a critical review. *J. Clim.* **18**(2), 237–273 (2005)
 

[CrossRef](#) [Google Scholar](#)
- A.J. Teuling, C.M. Taylor, J.F. Meirink, et al.: Observational evidence for cloud cover enhancement over western European forests. *Nat. Commun.* **8**, 14065 (2017)
 

[Google Scholar](#)
- B.A. Baum, P.F. Soulen, K.I. Strabala, et al.: Remote sensing of cloud properties using MODIS airborne simulator imagery during SUCCESS: 2. cloud thermodynamic phase. *J. Geophys. Res.-Atmosp.* **105**(9), 11767–11780 (2000)
 

[Google Scholar](#)
- Houghton, J.T., Ding, Y., Griggs, D.J., et al.: *Climate Change 2001: Scientific Basis*. Cambridge University Press, Cambridge (2001)
 

[Google Scholar](#)
- Calb'o, J., Sabburg, J.: Feature extraction from whole-sky ground-based images for cloud-type recognition. *J. Atmos. Oceanic Tech.* **25**(1), 3–14 (2008)
 

[CrossRef](#) [Google Scholar](#)
- Zhang, J.L., Liu, P., Zhang, F., Song, Q.Q.: CloudNet: Ground-based cloud classification with deep convolutional neural network. *Geophys. Res. Lett.* **45**, 8665–8672 (2018). <https://doi.org/10.1029/2018GL077787>

[CrossRef](#) [Google Scholar](#)
- Buch, K.A.J., Sun, C.H., Orne, L.R.: Cloud classification using whole-sky imager data. In: *Proceedings of the fifth Atmospheric Radiation Measurement (ARM), Science Team Meeting*, San Diego, CA, USA (1995)
 

[Google Scholar](#)
- Singh, M., Glennen, M.: Automated ground-based cloud recognition. *Pattern Anal. Appl.* **8**(3), 258–271 (2005)
 

[CrossRef](#) [MathSciNet](#) [Google Scholar](#)
- Heinle, A., Macke, A., Srivastav, A.: Automatic cloud classification of whole sky images. *Atmosp. Meas. Tech.* **3**(3), 557–567 (2010)
 

[CrossRef](#) [Google Scholar](#)
- Liu, R., Yang, W.: A novel method using the Gabor-based multiple feature and ensemble SVMs for ground-based cloud classification. In: *Proceedings of Seventh International Symposium on Multispectral Image Processing and Pattern Recognition (MIPPR2011)*, Guilin, China (2011)
 

[Google Scholar](#)
- Liu, S., Zhang, Z., Mei, X.: Ground-based cloud classification using weighted local binary patterns. *J. Appl. Remote Sens.* **9**(1), 095062 (2015)
 

[Google Scholar](#)
- Cheng, H.Y., Yu, C.C.: Block-based cloud classification with statistical features and distribution of local texture features. *Atmosp. Meas. Tech.* **8**(3), 1173–1182 (2015)
 

[CrossRef](#) [MathSciNet](#) [Google Scholar](#)
- Liu, L., Sun, X., Chen, F., Zhao, S., Gao, T.: Cloud classification based on structural features of infrared images. *J. Atmosp. Oceanic Technol.* **28**(3), 410–417 (2011)
 

[Google Scholar](#)
- Zhuo, W., Cao, Z., Xiao, Y.: Cloud classification of ground-based images using texture-structure features. *J. Atmosp. Oceanic Technol.* **31**(1), 79–92 (2014)
 

[Google Scholar](#)
- Xiao, Y., Cao, Z., Zhuo, W., Ye, L., Zhu, L.: mCLOUD: a Multiview visual feature extraction mechanism for ground-based cloud image categorization. *J. Atmos. Oceanic Tech.* **33**(4), 789–801 (2016)
 

[CrossRef](#) [Google Scholar](#)
- Kazantzidis, A., Tzoumanikas, P., Bais, A.F., Fotopoulos, S., Economou, G.: Cloud detection and classification with the use of whole-sky ground-based images. *Atmosp. Res.* **113**(1), 80–88 (2012)
 

[Google Scholar](#)
- Tato, J.H., Benítez, F.J.R., Barrena, C.A., Mur, R.A., Leon, I.G., Vazquez, D.P.: Automatic cloud-type classification based on the combined use of a sky camera and a ceilometer. *J. Geophys. Res.: Atmosp.* **122**(20), 11045–11061 (2017)
 

[Google Scholar](#)
- Li, Q., Zhang, Z., Lu, W., Yang, J., Ma, Y., Yao, W.: Frompixels to patches: a cloud classification method based on a bag of micro-structures. *Atmosp. Meas. Tech.* **9**(2), 753–764 (2016)
 

[CrossRef](#) [Google Scholar](#)
- Gan, J., Lu, W., Li, Q., et al.: Cloud type classification of total sky images using duplex norm-bounded sparse coding. *IEEE J. Sel. Top. Appl. Earth Obs. Remote Sens.* **10**(7), 3360–3372 (2017)
 

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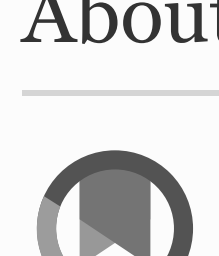
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