



MSc internship – Engineering school internship

Information theory – Image processing – Texture

Internship code: OtherEnt-20-21-2

We have developed, at the LARIS laboratory (University of Angers, France) in collaboration with other groups abroad, several innovative algorithms for the extraction of texture features from images [1-5]. These methods are based on entropy measures issued from the information theory concept. These measures have given very encouraging results on different kinds of images, especially medical images.

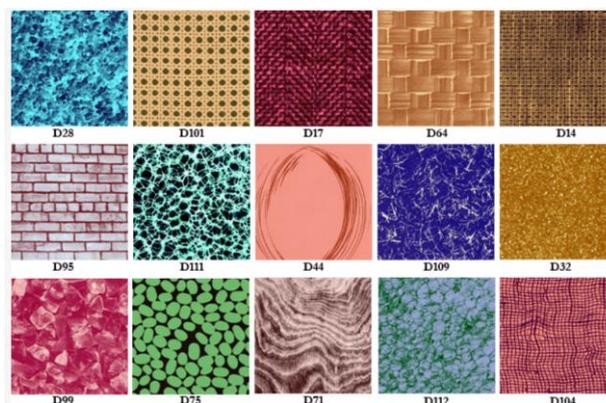
Based on information theory, the objective of the internship will be to design new texture feature extraction algorithms using other entropy-based measures. The trainee will have to analyze the sensitivity of his/her algorithms to parameters and validate the algorithms' behavior with several tests. Moreover, both grayscale and color images will have to be taken into account. A comparison of the features obtained by the trainee's algorithms with those obtained by the existing algorithms will also be performed [6]. The trainee will also have to establish a synthesis of the advantages and disadvantages obtained for each algorithm and image type.

The internship will take place at the LARIS laboratory (University of Angers, France).

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Bibliography:

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- [2] Azami, H., da Silva, L. E. V., Omoto, A. C. M., & Humeau-Heurtier, A. (2019). Two-dimensional dispersion entropy: An information-theoretic method for irregularity analysis of images. Signal Processing: Image Communication, 75, 178-187.
- [3] Humeau-Heurtier, A., Omoto, A. C. M., & Silva, L. E. (2018). Bi-dimensional multiscale entropy: Relation with discrete Fourier transform and biomedical application. Computers in Biology and Medicine, 100, 36-40.
- [4] Silva, L. E., Duque, J. J., Felipe, J. C., Murta Jr, L. O., & Humeau-Heurtier, A. (2018). Two-dimensional multiscale entropy analysis: Applications to image texture evaluation. Signal Processing, 147, 224-232.
- [5] Azami, H., Escudero, J., & Humeau-Heurtier, A. (2017). Bidimensional distribution entropy to analyze the irregularity of small-sized textures. IEEE Signal Processing Letters, 24(9), 1338-1342.
- [6] Humeau-Heurtier, A. (2019). Texture feature extraction methods: A survey. IEEE Access, 7, 8975-9000.



Different kinds of textures (colored Brodatz texture database)