Nicole Vincent, J Comput Eng Inf Technol 2017, 6:4(Suppl)
DOI: 10.4172/2324-9307-C1-011

Blur in text documents: Estimation and restoration

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Document transfers are more and more often achieved in an electronic way and images come from mobile camera. Then, image quality varies a lot and is no more mastered. An important first step in next processing is to evaluate the quality, blur is adding noise. In this context, blur model is difficult to apply as it has different origins, defocusing or movement blur. Models are often suited for one type of blur and when blur is uniform on the whole page. Then some learning can enable to solve a reverse problem. Some other approach can be developed that adapts itself locally to the image content. On a document, all parts are not equivalent and textual parts are more important from blur point of view than figure parts or background parts; for example, blur is based on the ambiguity coming from the pixel color associated with text part and background. Thus, fuzzy model is suited to interpret the color level distribution in the neighborhood of text contours. Fuzzy clustering leads to two classes and a fuzzy score can be defined at a pixel level from the membership values, the results can be propagated at higher levels. The interest of the approach is two-fold, quality can be estimated and the contrast in the document can be improved. Evaluation can be performed from different points of view, from an aesthetical point of view, that is human perception or in a quantitative way. The approach can be direct or indirect. In document analysis, optical character recognition is, most often, the main objective on which relies the future processing and the understanding phase. Then, improving OCR recognition rate is one way to measure the de-blurring process. Comparison with other methods can be performed on public databases, in our case on DIQA database.

Biography

Nicole Vincent has her expertise in Pattern Analysis Document. She is a Full Professor at Paris Descartes University, in SIP research group (Systèmes Intelligents de Perception) at LIPADE Lab. She completed her PhD in Computer Science in 1988 and became Full Professor in 1996. She worked in numerous projects in pattern recognition, signal and image processing and understanding and video analysis with particular interest for document image analysis domain. She has supervised more than 35 students and collaborated with many labs, institutions and companies.

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