INDEPENDENT COMPONENT ANALYSIS APPLIED TO ILLUMINATION CORRECTION

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A digital image can be modeled as a mixture of two components: illumination and reflectance. The illumination component is related to the geometry and intensity of the lighting system. Reflectance is the component that describes the physical properties of the objects in the scene. In many applications, only the physical properties of the objects are of interest. In these cases, it may be desired to cancel effects caused by uneven illumination. The literature shows that this problem is commonly addressed by fusing image signals. As an alternative approach, this work investigates the cancelation of unwanted illumination effects by signal separation techniques. The Independent Component Analysis (ICA) is a set of techniques applied to the separation of statistically independent non-Gaussian signals, mixed by linear, invariant, and memoryless systems. However, in practical situations, the mixture of the reflectance and illuminance components is characterized as space-variant. The objective of this research is to evaluate the performance of ICA algorithms in the separation of the illumination and reflectance by dividing an image into sub-regions where the mixture of these components could be approximated as invariant. To the present time, the technique is being implemented with different ICA algorithms, which are being tested on the separation of synthetic space invariant mixtures. Preliminary results suggest that it is possible to achieve the proposed objective.

Palavras-chave: Blind source separation, Independent Component Analysis, Image processing

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