AN INVESTIGATION ON THE USE OF THE INDEPENDENT COMPONENT ANALYSIS (ICA) TECHNIQUES FOR ELIMINATION OF THE CHANGES OF THE UNWANTED LIGHTING CONDITIONS OF IMAGES

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ABSTRACT:

In the change detection problems, the main goal is to find meaningful changes of the scene objects by using temporal images of the same scene. Change detection is a general application which is used in diverse areas such as video image processing, remote sensing, biomedical imaging etc. The basic approach of the change detection is based on the comparison of the temporal images after geometric registration process. Comparison is simply performed by either image differencing or image division methods. The main goal is to find the changes of the objects. Image differencing or image division methods are performed at the pixel level with a pixel by pixel processing approach. The lighting conditions or the atmospheric conditions are changed at the times of the image acquisition processes of the temporal images. Lighting conditions affect the pixel values of the images acquired in the visible bands. On the other side, atmospheric changes also affect the waves during the transmission to the sensors. In this case the pixel values are changed accordingly too. In this case, even if the objects under consideration haven't change, their corresponding pixel values will change. Then the differences of the corresponding pixels will be labelled as changed pixels and this is not the correct result since there is no change in the objects. To prevent this erroneous situation, currently many normalization and radiometric enhancement methods are being used. In this paper, we investigate the possible use of ICA techniques for elimination of those unwanted changes caused by the lighting and atmospheric conditions of the image acquisition medium. For this purpose, we will try to model these effects by considering them as destructive source signals and considering the images as being the mixture of the both destructive signals and error free information signals. This kind of consideration seems to have many drawbacks when considering the known ICA approaches but we think that it is worth studying on. In this paper, we will investigate the ICA within our consideration content and give the preliminary results of our ongoing works.

TOPIC: Change detection and process modelling
ALTERNATIVE TOPIC: Image processing and pattern recognition