

## INFORMATION CONTENT IN MULTI-SENSOR IMAGE FUSION

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### **ABSTRACT:**

Fusing bands coming from the same or different sensors has been observed to be a method to increase the information content (IC) of a sensed scene. Within the field of multi-sensor fusion, optical and radar satellites have perspectives on the same observed scene which can be very diverse. In general optical images have more semantic information; on the other hand a radar image can be extremely useful thanks to its independence from sunlight and weather conditions. The information content of an image can be altered from sensor noise, motion blur or other additional camera factors and system performance in general. In other words the image quality (IQ) and the IC are connected. When using a radar image, no particular change or improvement in the fused image is present in terms of interpretability. We assume a significant change in the IC of the fused image when the IQ of the radar and optical images are comparable, as both radar and optical bands participate with a comparable level of information in the final image and therefore we expect that this change can be noted by the assessment of the IQ. The instrument chosen for the analysis of the IQ is the National Imagery Interpretability Rating Scale (NIIRS), a human-eye-based imagery rating scale, with a range of ten levels, from 0 to 9. The algorithm chosen for the fusion is the Principal Component Analysis (PCA) and the imagery sets include the areas of Dresden and Berlin (Germany).

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