Advances in typical ground object observation and recognition based on polarized optical remote sensing

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Observation and recognition of ground objects are significant research directions in the field of remote sensing, with considerable societal application value[1]. Polarized optical remote sensing, as an emerging technology, demonstrates clear advantages over classical optical remote sensing in terms of environmental interference suppression[2] and ground object recognition[3]. This paper focuses on target recognition using polarized optical remote sensing from perspectives such as camouflage identification, image overexposure suppression, and building shadow removal. Firstly, indoor experiments are conducted using a multi-angle polarized observation device and a portable hyperspectral instrument to measure the angular characteristics of 160 sets of real and fake leaf spectra for camouflage identification. Secondly, an outdoor polarizing industrial camera is used to collect the surface flare, and the surface flare suppression experiment was carried out. By comparing with classical intensity images, the advantages of polarized features in reducing image overexposure rates are highlighted. Lastly, aerial images taken by outdoor UAV loads are used to select scenes such as buildings, farmland, and lakes for edge detection, shadow removal, and image contrast enhancement experiments. These experiments demonstrate the effectiveness of polarized features in eliminating environmental background interference and enhancing the ability to recognize ground objects.

References

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Preferred mode of presentation: Oral/Poster