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Mapping Stress in Submerged Aquatic Vegetation Using Multispectral Imagery and Structure from Motion Photogrammetry

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Abstract : Inland waters such as streams sustain a rich variety of species and are essentially hotspots for biodiversity. Submerged aquatic vegetation, also known as SAV, forms an important part of ecologically healthy river systems. Direct and indirect human influences, such as climate change are putting stress on aquatic plant communities, ranging from the invasion of non-native species and grazing, to changes in the river flow conditions and temperature. There is a need to monitor SAV, because they are in a state of deterioration and their disappearance will greatly impact river ecosystems. Like terrestrial plants, SAV can show visible signs of stress. However, the techniques used to map terrestrial vegetation from its spectral reflectance, are not easily transferable to a submerged environment. Optical remote sensing techniques are employed to detect the stress from remotely sensed images through multispectral imagery and Structure from Motion photogrammetry. The effect of the overlying water column in the form of refraction, attenuation of visible and near infrared bands in water, as well as highly moving targets, are NIR) key challenges that arise when remotely mapping SAV. This study looks into the possibility of mapping the changes in spectral signatures from SAV and their response to certain stresses.

Keywords : submerged aquatic vegetation, structure from motion, photogrammetry, multispectral, spectroscopy
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