Photovoltaic fixed bracket image recognition method

What is a photovoltaic Index (PVI)?
Firstly,aiming to address the problems related to missed extractions and background misjudgments,a Photovoltaic Index (PVI) based on visible images in the three-bandis constructed to serve as prior knowledge to differentiate between PV panels and non-PV panels.

Do PV panels exhibit visual features on remote sensing images?
The PV panels within the same dataset exhibit a multitude of visual featureson remote sensing images,stemming from factors such as installation conditions,user preferences,remote sensing techniques,and other relevant variables. Our proposed methodology demonstrates exceptional efficacy when applied to PV datasets encompassing diverse samples.

How to refine PV segmentation?
Fig. 2. Methods for PV segmentation refinement by combining U-Net,Transformer,PointRend,and Refiner Loss mechanismsto alleviate the impact of diverse visual features,including size,shape,texture,and color. The U-Net structure could extract features at different levels to capture multi-scale information.

How does remote sensing Affect the distribution of PV panels?
Remote sensing dataset cover a wide geographic areas,and the distribution of PV in the dataset is also relatively scattered. The appearance and arrangement of PV panels can be influenced by distant features from adjacent PV modules and other land objects in the image,especially in the case of large,long,or strip-shaped panels.

How to evaluate PV panel extraction ability of PVI?
In order to evaluate the PV panel extraction ability of PVI more objectively and clearly,first,we calculated the PVI of all the images in the PVP dataset. Then,we transformed the PVI images into binary images using the Otsu [50]method. The evaluation metrics show that the mean values of IoU and F1 are 57.64% and 68.49%.

Can pkgpvn extract photovoltaic panels from high-resolution optical remote sensing images?
Moreover, most previous studies have overlooked the unique color characteristics of PV panels. To alleviate these deficiencies and limitations, a method for extracting photovoltaic panels from high-resolution optical remote sensing images guided by prior knowledge (PKGPVN) is proposed.

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