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Deterministic Detection of Photovoltaic Panels in Aerial Images

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Automatically detecting the area of photovoltaic panels in images gives the possibility to forecast and plan the green energy production in a community. Most existing approaches for panel detection resort to machine learning to analyse images and find the photovoltaic panels. However, each geographical area is likely to have its own surrounding/background colours and panel colours, as the former depend on the latitude, and the latter on the materials used. Then, a specific set of annotated images and a further training phase are needed, therefore increasing the amount of time (and cost) needed for training. We propose a deterministic approach that extracts a range of significant colours for photovoltaic panels in images. This consists of the most frequent panel colours different from the surrounding parts, for the given conditions of light exposure in annotated images. Then, by reckoning pixel density and comparable levels of light, the colours in other images are compared with the extracted range to reveal panels. The approach is fast and results produced were highly accurate, independently of the shape of panels.

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