



# VISUAL ATTENTION MODEL WITH ADAPTIVE WEIGHTING OF CONSPICUITY MAPS FOR BUILDING DETECTION IN SATELLITE IMAGES

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*Abstract - The lack of automation and the limited performance of current image processing techniques pose critical challenges to the efficient and timely use of the large amount of data made available by aerial and space based assets. The imitation of fast adaptation and inference capability of human visual system appears to be a promising research direction for the development of computational algorithms able to deal with large variations in image content, characteristics and scale as those encountered in satellite imaging. The paper explores the potential use of an improved computational model of visual attention for the complex task of building identification in satellite images. It contributes to extend the envelope of application areas of such models and also to expand their current use from single object to multiple object detection. A set of original weighting schemes based on the contribution of different features to the identification of building and non-building areas is first proposed and evaluated against existing solutions in the literature. A novel adaptive algorithm then chooses the best weighting scheme based on a similarity error to ensure the best performance of the attention model in a given context. Finally, a neural network is trained*

*to predict the set of weights provided by the best weighting scheme for the context of the image in which buildings are to be detected. The solution provides encouraging results on a set of 50 satellite images.*

**Index terms:** Visual attention, weighting schemes, neural networks, building detection, satellite images.