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## MODEL-BASED BUILDING DETECTION FROM LOW-COST OPTICAL SENSORS ONBOARD UNMANNED AERIAL VEHICLES

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**Abstract.** The automated and cost-effective building detection in ultra high spatial resolution is of major importance for various engineering and smart city applications. To this end, in this paper, a model-based building detection technique has been developed able to extract and reconstruct buildings from UAV aerial imagery and low-cost imaging sensors. In particular, the developed approach through advanced structure from motion, bundle adjustment and dense image matching computes a DSM and a true orthomosaic from the numerous GoPro images which are characterised by important geometric distortions and fish-eye effect. An unsupervised multi-region, graphcut segmentation and a rule-based classification is responsible for delivering the initial multi-class classification map. The DTM is then calculated based on inpainting and mathematical morphology process. A data fusion process between the detected building from the DSM/DTM and the classification map feeds a grammar-based building reconstruction and scene building are extracted and reconstructed. Preliminary experimental results appear quite promising with the quantitative evaluation indicating detection rates at object level of 88% regarding the correctness and above 75% regarding the detection completeness.

[Conference paper](#) (PDF, 6848 KB)

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