with closely spaced buildings of significantly different heights. Furthermore, in order for such an error to have a negative influence on the accuracy of the joint visibility maps, the incorrectly labelled point needs to occur with the same incorrect label in both the SAR and optical cross-modal visibility maps.

In the case of the SAR simulation, the effects of not modelling the building facades are not as apparent. This is due to the fact that the rooftop and facade points layover onto the ground, and while the facade pixels are not simulated these ground and rooftop pixels are, thus encapsulating the full extent of the layover.

6. CONCLUSION AND OUTLOOK

Through our experiments for the first time a strong intuition on the bounds of joint visibility in multi-modal remote sensing was gained – backed by quantitative results. To achieve this, we developed a framework which allows for pixel-wise correspondence to be determined between multi-modal remote sensing images. This framework can provide the basis for many other applications involving the investigation of joint-visibility as well as for data acquisition in applications where high quality labelled data and correspondence information is required, such as training deep matching algorithms.

We further developed an intuition as to the appearance and effect of the various factors involved in the imaging of the scene. We were able to show why a small baseline between the sensors is favourable for stereogrammetry applications. We further described the trade-off between non-visible regions and uncertain regions and present an argument for why the selection of the scene viewing angle is mainly dependent on factors influencing the SAR image. Our results further describe the joint visibility for our test scene is around 55%, even without any optimizing of viewing angle or sensors baselines. This number can serve as an approximate upper bound for matching and image fusion endeavours. Since our test scene was fairly typical, it can be expected that this upper bound approximately extends to scenes with a similar structure and imaging geometry.

In future work the simulation of the building facades will be included in order to gain a more accurate understanding of the nature of uncertain areas in the image, and to what degree these areas remain uncertain and difficult to match. An investigation into the visibility of strong feature points, and their transferability between the SAR and optical domain will be discussed, with the aim of assisting in the selection of high quality feature points and regions to aid matching in SAR-optical stereogrammetry. We will further present a mathematical framework to allow for easier selection of an optimal viewing angle and baseline for use in matching and SAR-optical stereogrammetry data acquisition.

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