

In this research, the capabilities of multi-agent systems are used in order to solve multiple object recognition difficulties in complex urban areas based on the characteristics of multi-epoch imagery and digital surface model (DSM). The proposed methodology has two main steps: processing based on single epoch and processing based on multi epochs. In the first step, object based image analysis has been performed independently on each of the image sequences. Then, in the second step, classified regions obtained from object based image analysis on all of the images are fused in the proposed decision level multi-agent system in order to solve occlusion and shadow for improving the results. Evaluation of the capabilities of the proposed decision level object recognition methodology is performed on area 1 of DMC imagery and Lidar DSM over Vaihingen, Germany. Aerial images 10030061 & 10030062 of strip3, 10040083 & 10040084 of strip4, 10050105 & 10050106 of strip 5 and images 102050131 & 102050132 of strip 25 those have full coverage on this area, are selected.

In the first step, after generation of height products such as DTM and normalized DSM based on Lidar data, object based image analysis composed of image segmentation and object level classification is performed on all of the individual DMC images. Then, in the second step of the proposed methodology, the capabilities of the multi-agent system is utilized for improving object recognition results by performing decision level fusion on classified regions and generated visibility maps.