Using Constraints for the Identification of Buildings in Aerial Images

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Abstract:
Aerial images constitute an important data source for GeoInformation Systems. In order to get actual data at reasonable costs, the development of semiautomatic tools has been an active research topic in photogrammetry and image processing in the recent years. Based on established techniques for low level syntactic operators such as filters, feature extraction, line detectors, and simple pattern matchers, nowadays there is strong interest in explicit models in order to improve the identification of semantically meaningful objects. From the pixel to the object level, several representation formalisms such as graphs of extracted image features, aspect graphs, and constructive solid geometry (CSG) are applied. Constraint Logic Programming has been identified as an adequate representation and implementation language for building the necessary experimental environment, specifying the models on the different levels, expressing strong heuristics and approaching the complex search problem involved in object detection. This paper focuses on the detection of buildings. It discusses model representation by CLP program fragments and the required adaption and extensions of the CLP(FD) solver of Eclipse, the
Prolog/CLP platform underlying our implementation. Illustrating examples show how the problems arising in the detection of buildings are approached by CLP techniques.

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