

PLANAR DETECTION USING MODIFIED EXPECTATION MAXIMIZATION

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ABSTRACT

In this work the task of planar detection in an image pair is cast as an incomplete data problem where the parameters to be estimated are the ones that define the homographies induced by the planar regions in the scene. This incomplete data problem motivates the employment of the Expectation Maximization (EM) algorithm. Derivation of the EM algorithm equations proves that a closed form solution to the maximization step is impractical which leads to the proposal of a Modified Expectation Maximization (MEM) algorithm. The MEM algorithm presented replaces the traditional maximization step with an optimization based maximization step or a Kalman Filter based maximization step. In addition to this, recommendations are provided to reduce the number of parameters that need to be estimated by the MEM algorithm depending on the constraints of the scene. Experimental results show that the proposed MEM algorithm achieves comparable results to current methods for planar detection.