3D information extraction using Region-based Deformable Net for monocular robot navigation

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Abstract:

Abstract. This paper extends the Region-based Deformable Net (RbDN) technique described in [1] to extract the 3D information of all the objects in the scene from a single moving camera. The technique is used for segmenting real-time video sequences captured from a single moving camera. The deformation process tracks the changes in the location and the shape of the segments across the frames. These changes along with the camera displacement are used to estimate the 3D information. The algorithm is completely autonomous and does not require pre-knowledge, training, or assumption about the contents of the sequence. It can handle the difficult case where the motion of the camera is parallel to its optical axis. It can also estimate the distances to objects that are more than 100 m away as long as the camera displacement is over 10% of the expected distance to the objects.

Keywords:

Robot navigation, Monocular vision, Stereo vision, Correspondence problem, Video segmentation, Deformable contours, 3D information extraction, Depth information extraction

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