Camera rotation and translation recovery using optical flow based method for 3D reconstruction from un-calibrated images

ABSTRACT

Camera rotation and translation recovery from un-calibrated images is a very challenging task as it could affect the accuracy of 3D point reconstruction process. Existing method based on Structure from Motion (SfM) using epipolar geometry and fundamental matrix is a popular method to recover camera intrinsic and extrinsic parameter. However, this method requires complex process and high in computationaltime. Other than that, GIS/GPS information is not stable and could affect the accuracy and reliability. SfM method using optical flow can be used to recover camera rotation and translation. However, existing methods only focus to recover camera rotation and translation on particular angle and the assumption is the object position always perpendicular to the center of camera. Even though optical flow method is less complex but it still encounters the problem with accuracy. Therefore, this paper discusses a preliminary experiment to recover camera rotation and translation using optical flow based method. In the experiment, various camera position and optical flow pattern were observed. Result shows that world camera position can be recovered from optical flowvector. This experiment is a prerequisite step in order to propose an accurate and efficient method in 3D reconstruction from un-calibrated images.

Keyword: 3D reconstruction; Camera rotation & translation; Optical flow