A Stereo Matching System

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ABSTRACT

Determination of the depth of the image feature distinctive automation and other industries of machine vision and computer vision technology in everyday life are becoming increasingly popular. Some techniques have been proposed to extract from the current depth of a 2D image of the feature, which defines a particular object or structure of the information. In many cases, these techniques are automatic, such as a suitable carrier moving average depth identify objects placed in the 2D image. For this intensive depth cues to solve two stereo matching algorithm using a machine learning algorithm. Other methods, relative to the camera based on the motion of the object have been proposed and analyzed by estimating the optical flow calculation depth map. The method of dense and sparse three-dimensional surface of the object to provide the three-dimensional information. This paper discusses the evaluation of the depth cues, through intensive two standard fast algorithm for real-time stereo image matching algorithm.

Keywords: Computer Vision Technology, Dense Stereo, Depth Map, Matching, Motion, Stereo Vision

1. INTRODUCTION

Three dimensional reconstruction of three-dimensional images and video scene analysis and computer vision, machine vision is an important step forward. Automation requires three-dimensional structure modeling environment. Can be classified as a measurement-based or rule-based approach. Rule-based approach uses compact rules or regulations, is used to create three-dimensional environment model. L-system is a well-known rule-based modeling method, which is widely used in the movement of a vehicle or slow growth for mechanical systems (Kolbe, 2009). Rule-based method, although capable of synthesizing an impressive natural environment, it is difficult to produce, if there are more symmetric model is very similar to the real-world conditions (Bleyer & Gelautz, 2007). Measurement-based method to directly measure samples from analog environmental parameters, and then simulate it. There are several ways to accomplish this task. Traditionally, a priori known environment to create and use a tape measure and a protractor geometry. This tool is the easiest, and that process is the most difficult, the result is not accurate (Markovic & Gelautz, 2006). Nowadays, more and more research has focused on using a digital camera, 3D digital model, and then rebuild a more accurate measurement standards built environment. However, the data processing is more complex than the traditional way (Stamos & Allen, 2002). Rapid City Regional System based on

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the introduction of the three-dimensional scene reconstruction of three-dimensional images of automatic data collection systems and processing pipeline. The system collects multiple video streams, as well as camera calibration measurements, in order to rebuild the model mapping coordinate system (Biber, Fleck, & Staneker, 2005). In addition to both the geometry and appearance of high quality, it is aimed at real-time performance. Processing pipeline, even if it is from the real time, the choice of technology and design processing modules can achieve fast performance of the image processing system related to the plurality of CCD image sensor and a dense two-frame intended for the near real-time performance the future. The algorithm is in a real video sequence captured test bench design and draw conclusions. The paper is organized as follows: Section 2 is related work methods and contributions, and the Section 3 defined pattern provides an overview. Section 4 is the proposed method intensive two stereo matching algorithm to define the imaging sensor depth cues. Section 5 describes the experimental apparatus system overview. Section 6 is grabbed from the environmental assessment results real-time image quality. Section 7 is summary and future work.

2. METHODS AND CONTRIBUTIONS

Multi-view stereo frame provides a reference for each of a depth map. Since we do not enforce the stereo during the consistency between the depth maps, we need a separate three-dimensional integration steps. Improve the quality of the depth of integration, ensure that the same point is consistent across multiple image maps, and can produce more economically expressed as an emerging more depth estimation (Vedule, Baker, & Kanade, 2005). Related work includes volume, area, views and pixel-based methods (Yebin, Qinghai, & Webli, 2006). A volume approach is impractical because it requires a very large number of pixels of resolution and accuracy requirements (Eveland, Konolige, & Bolles, 1998). The proposed work is based on two stereo matching algorithms. Instead, a reference to its operating depth of each pixel of the view set of assumptions. The left image is as a reference plane, which is very useful, because it can rapidly produce final mesh adjacent pixel by triangulation the depth estimation. A group formed from a depth map of successive frames. Stereo correspondence between the depth is calculation step of conflict resolution, the resulting depth map, in which most of the noise has been removed. (Zhao, Nevatia, & Lv, 2001). Correspondence is very effective, since a plurality of frames visible point, which provides a number of each point of the depth estimation (Vacchetti, Lepetit, & Fua, 2004). Even though each depth estimation is controlled by a simple, fast three-dimensional algorithm, these estimates consensus is usually very accurate. Intensive two real-time image of the environment designed to resolve the conflict. In view of the occlusion reference Cref camera depth estimation in Figure 2 the depth of the other imaging camera views, the camera depth estimation by reference to Figure 1, the depth map of the camera views. In both cases it is impossible, should be corrected. The best way is to solve the corresponding algorithms left right image, and right-to-left image is to be considered, therefore intensive two corresponding algorithms. The input is a set of captured video images, one of which is usually the left image, as a reference. The purpose of the algorithm is to select the best stability, depending on each depth depth map assumptions and other conflicts between the number and type for each pixel on the basis of the depth estimation. Each depth map estimation reference depth, the number of other maps depth, it blocks or by calculation. Repeat this process for all other depth map relative to the reference image plane each depth estimates. Two frames through dense stereo matching algorithm from the identified minimum depth discontinuities are defined as the most stable solution.
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