



US009786063B2

(12) **United States Patent**  
**Moon et al.**

(10) **Patent No.:** **US 9,786,063 B2**  
(45) **Date of Patent:** **Oct. 10, 2017**

(54) **DISPARITY COMPUTATION METHOD THROUGH STEREO MATCHING BASED ON CENSUS TRANSFORM WITH ADAPTIVE SUPPORT WEIGHT AND SYSTEM THEREOF**

(52) **U.S. Cl.**  
CPC ..... **G06T 7/593** (2017.01); **H01J 37/222** (2013.01); **H01J 2237/226** (2013.01); **H01J 2237/2611** (2013.01); **H04N 2013/0081** (2013.01)

(71) Applicant: **KYUNGPOOK NATIONAL UNIVERSITY INDUSTRY-ACADEMIC COOPERATION FOUNDATION, Daegu (KR)**

(58) **Field of Classification Search**  
CPC ..... H04N 2013/0081; H04N 13/0022; H04N 13/0011; G06T 7/593; H01J 2237/226; H01J 2237/2611; H01J 37/222  
USPC ..... 348/43-46  
See application file for complete search history.

(72) Inventors: **Byung In Moon, Daegu (KR); Kyeong Ryeol Bae, Daegu (KR); Hyeon Sik Son, Daegu (KR); Seung Ho Ok, Busan (KR)**

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 2004/0026619 A1\* 2/2004 Oh ..... G01N 23/2251 250/307
- 2004/0189674 A1\* 9/2004 Zhang ..... H04N 1/04 345/629
- 2009/0066783 A1\* 3/2009 Lee ..... H04N 13/0048 348/43
- 2010/0328427 A1\* 12/2010 Sakano ..... G06T 7/593 348/43
- 2012/0007819 A1\* 1/2012 Hewes ..... H04N 13/0022 345/173

(Continued)

*Primary Examiner* — Helen Shibu

(74) *Attorney, Agent, or Firm* — Porzio Bromberg & Newman

(73) Assignee: **KYUNGPOOK NATIONAL UNIVERSITY INDUSTRY-ACADEMIC COOPERATION FOUNDATION, Daegu (KR)**

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 399 days.

(21) Appl. No.: **14/587,620**

(22) Filed: **Dec. 31, 2014**

(65) **Prior Publication Data**

US 2016/0173852 A1 Jun. 16, 2016

(30) **Foreign Application Priority Data**

Dec. 16, 2014 (KR) ..... 10-2014-0180880

(51) **Int. Cl.**  
**H04N 13/00** (2006.01)  
**G06T 7/593** (2017.01)  
**H01J 37/22** (2006.01)

(57) **ABSTRACT**

Provided is a method of computing precise disparity using a stereo matching method based on developed census transform with an adaptive support weight method in area based stereo matching. The method includes a step of setting an adaptive support weight window centered on a specific point of a left image and setting adaptive support weight windows with the same size with respect to one point positioned within a maximum disparity prediction value about a specific point of the left image in a right image.

**20 Claims, 8 Drawing Sheets**

