



US009411416B2

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

(10) **Patent No.:** **US 9,411,416 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **COMPUTER DEVICE OPERABLE WITH USER'S EYE MOVEMENT AND METHOD FOR OPERATING THE COMPUTER DEVICE**

G02B 27/0179; G02B 27/021; G02B 27/01; G02B 27/02; G02B 2027/014; G02B 2027/0138; G02B 2027/0187; G02B 2027/0181; A61B 2017/00216; G06T 19/006; G06T 11/60; G06T 7/208; G06K 9/00604; G06K 9/00335

(76) Inventors: **Wenjuan Song**, Beijing (CN); **Jianping Song**, Beijing (CN); **Lin Du**, Beijing (CN)

See application file for complete search history.

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 67 days.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,973,149 A * 11/1990 Hutchinson 351/210
5,360,971 A * 11/1994 Kaufman A61B 3/113
250/221

(Continued)

FOREIGN PATENT DOCUMENTS

CN 1694045 11/2005
CN 101291364 10/2008

(Continued)

OTHER PUBLICATIONS

Kumar et al., "Gaze-Enhanced Scrolling Techniques", UIST'07, Oct. 7-10, 2007, ACM Symposium.

(Continued)

(21) Appl. No.: **14/128,625**

(22) PCT Filed: **Jun. 24, 2011**

(86) PCT No.: **PCT/CN2011/076288**

§ 371 (c)(1),
(2), (4) Date: **Dec. 22, 2013**

(87) PCT Pub. No.: **WO2012/174743**

PCT Pub. Date: **Dec. 27, 2012**

(65) **Prior Publication Data**

US 2014/0125585 A1 May 8, 2014

(51) **Int. Cl.**
G06F 3/01 (2006.01)
H04N 13/04 (2006.01)

(Continued)

(52) **U.S. Cl.**
CPC **G06F 3/013** (2013.01); **G06F 3/017** (2013.01); **A61B 3/113** (2013.01); **A61B 2017/00216** (2013.01); **H04N 13/0484** (2013.01)

(58) **Field of Classification Search**
CPC G06F 3/013; G06F 3/01; G06F 3/017; G06F 3/04842; G06F 3/012; G06F 3/041; G06F 3/011; G06F 3/0484; G06F 3/0346; G06F 3/0486; G06F 3/04883; G06F 3/005; G06F 3/038; G06F 17/30867; B60W 50/10; G09G 2354/00; H04N 13/0484; G02B 27/017;

Primary Examiner — Ariel Balaoing
Assistant Examiner — Darlene M Ritchie
(74) *Attorney, Agent, or Firm* — Meagher Emanuel Laks Goldberg & Liao, LLP

(57) **ABSTRACT**

The present invention relates to a method for operating a computer device with user's eye movement. The method comprises the steps of detecting the user's eye movement, analyzing the user's eye movement to specify an eye movement pattern in the detected user's eye movement and a time period for completing the eye movement pattern, determining a command associated with a combination of the eye movement pattern and the time period and operating the device according to the command.

8 Claims, 8 Drawing Sheets

