



US009510789B2

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

(10) **Patent No.:** **US 9,510,789 B2**

(45) **Date of Patent:** **Dec. 6, 2016**

(54) **MOTION ANALYSIS METHOD**

USPC 700/91, 92
See application file for complete search history.

(71) Applicants: **Roshanak Houmanfar**, Waterloo (CA);
Michelle Elisabeth Karg, Kitchener (CA); **Danica Kulic**, Waterloo (CA)

(56) **References Cited**

(72) Inventors: **Roshanak Houmanfar**, Waterloo (CA);
Michelle Elisabeth Karg, Kitchener (CA); **Danica Kulic**, Waterloo (CA)

U.S. PATENT DOCUMENTS

2011/0004126 A1* 1/2011 Einav G06F 19/3481
600/595

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 415 days.

* cited by examiner

Primary Examiner — Omkar Deodhar
Assistant Examiner — Wei Lee

(21) Appl. No.: **14/069,304**

(74) *Attorney, Agent, or Firm* — Venjuris, PC

(22) Filed: **Oct. 31, 2013**

(57) **ABSTRACT**

(65) **Prior Publication Data**

US 2015/0120016 A1 Apr. 30, 2015

The present invention relates to an automated system of measuring and assessing an individual's improvement in motion (for example, a patient's recovery) through exercise performance. In an embodiment of the system of the present invention, two approaches for monitoring movement are introduced for quantifying an individual's performance. Both approaches consider the control population as their reference and consider the difference, or what is referred to in this application as the distance, between the individual's data and the control population as the measure of performance.

(51) **Int. Cl.**

G06F 19/00 (2011.01)
A61B 5/00 (2006.01)
A61B 5/11 (2006.01)

(52) **U.S. Cl.**

CPC **A61B 5/7267** (2013.01); **A61B 5/1122** (2013.01); **A61B 5/725** (2013.01)

(58) **Field of Classification Search**

CPC A63F 13/06; A63F 2300/105; G06F 19/3481; A61B 5/725; A61B 5/7267; A61B 5/1122

4 Claims, 8 Drawing Sheets

