



US007881902B1

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

(10) **Patent No.:** **US 7,881,902 B1**  
(45) **Date of Patent:** **Feb. 1, 2011**

- (54) **HUMAN ACTIVITY MONITORING DEVICE** 5,976,083 A 11/1999 Richardson et al.  
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- (\* ) Notice: Subject to any disclaimer, the term of this  
 patent is extended or adjusted under 35  
 U.S.C. 154(b) by 0 days.
- (21) Appl. No.: **12/694,135**
- (22) Filed: **Jan. 26, 2010**

**Related U.S. Application Data**

(63) Continuation of application No. 11/644,455, filed on  
Dec. 22, 2006, now Pat. No. 7,653,508.

(Continued)

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- (51) **Int. Cl.**  
**G01C 22/00** (2006.01)  
**G06F 19/00** (2006.01)
- (52) **U.S. Cl.** ..... **702/160; 377/24.2; 702/97**
- (58) **Field of Classification Search** ..... **33/700,**  
**33/701; 73/1.01, 1.37, 1.38, 1.75, 1.76, 1.77,**  
**73/1.78, 1.79, 1.81; 377/1, 13, 15, 17, 20,**  
**377/24, 24.1, 24.2; 702/1, 85, 97, 127, 141,**  
**702/150, 155, 158, 160, 187, 189**
- See application file for complete search history.

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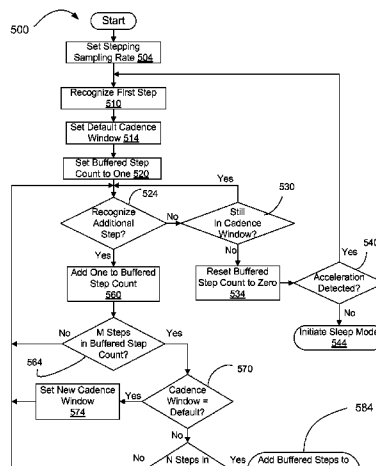
(57) **ABSTRACT**

A method for monitoring human activity using an inertial  
sensor includes continuously determining an orientation of  
the inertial sensor, assigning a dominant axis, updating the  
dominant axis as the orientation of the inertial sensor  
changes, and counting periodic human motions by monitor-  
ing accelerations relative to the dominant axis.

**11 Claims, 9 Drawing Sheets**

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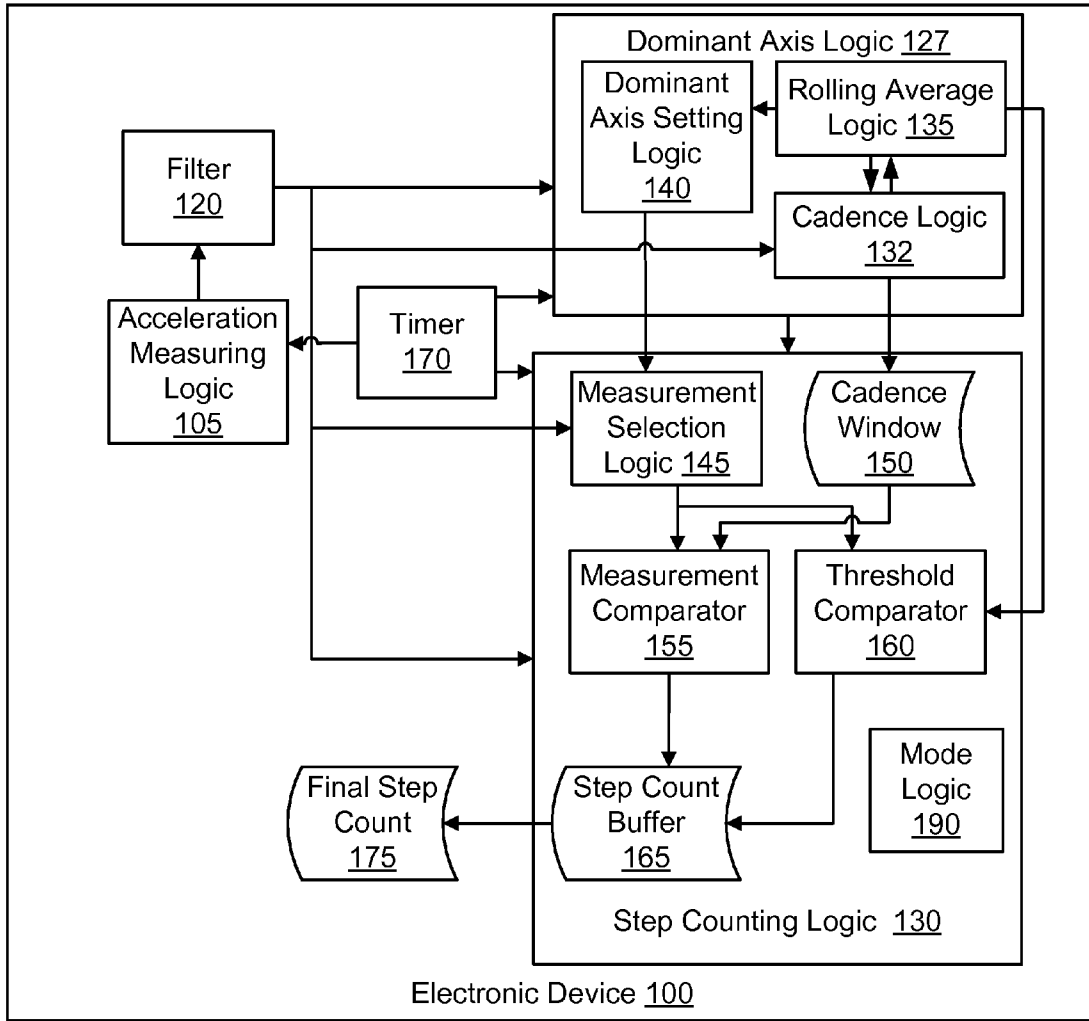


Figure 1

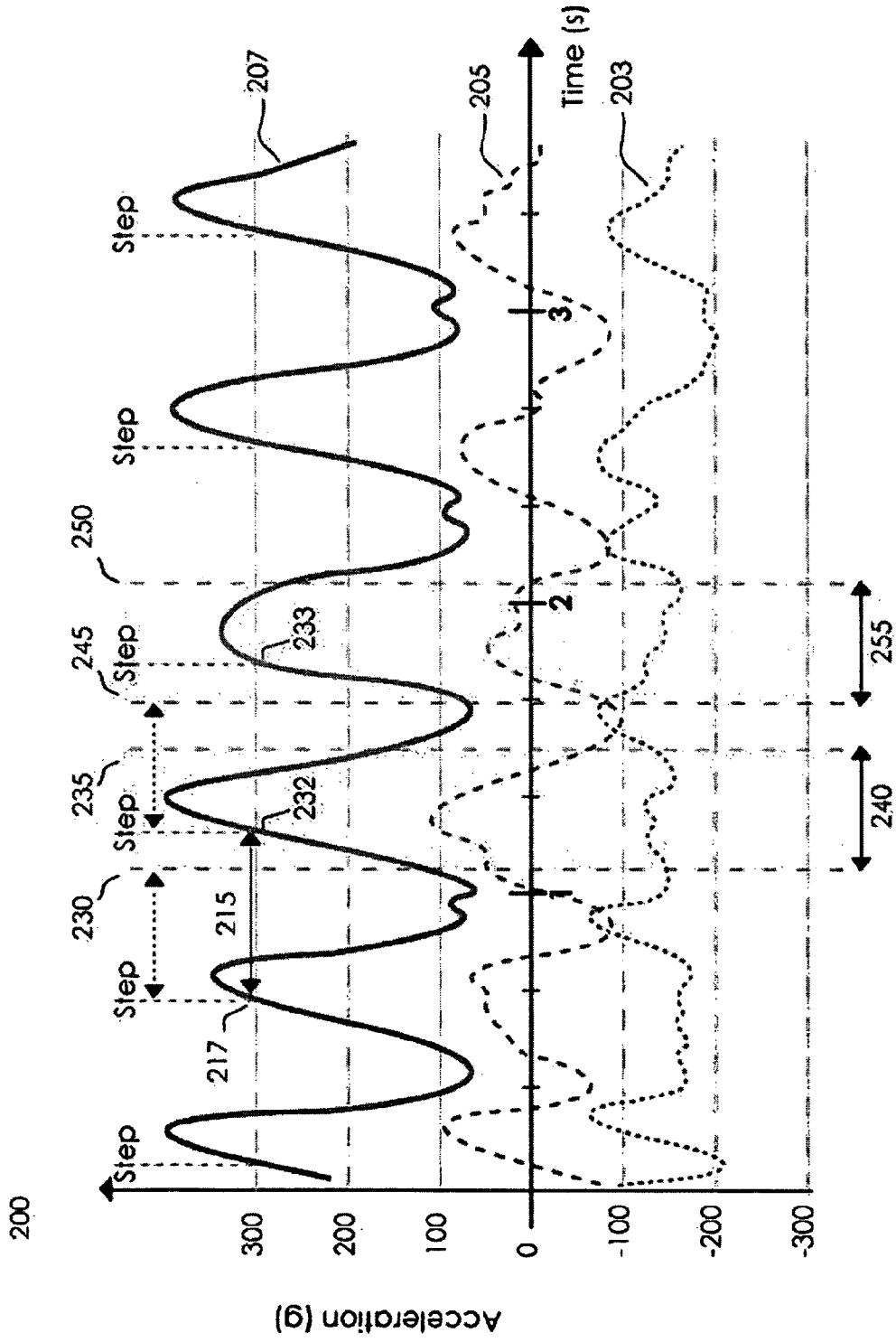


Figure 2

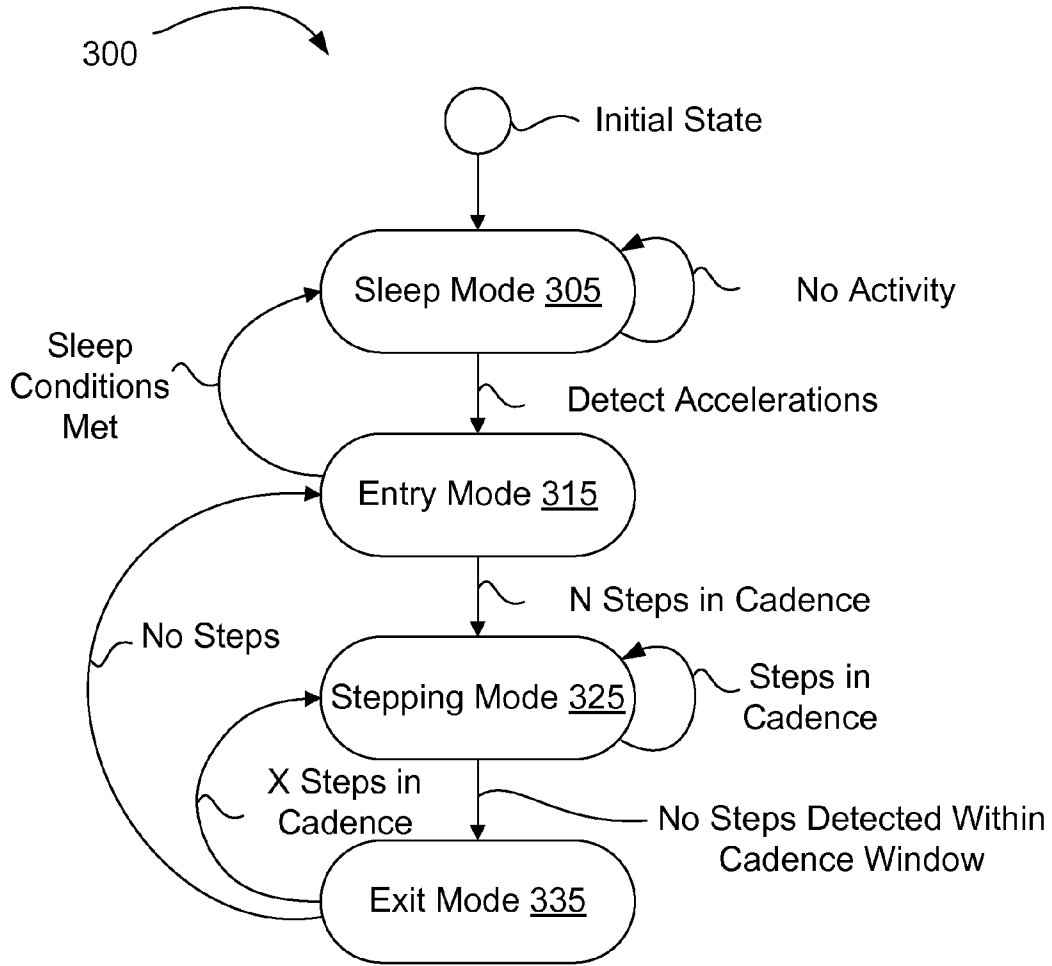


Figure 3

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