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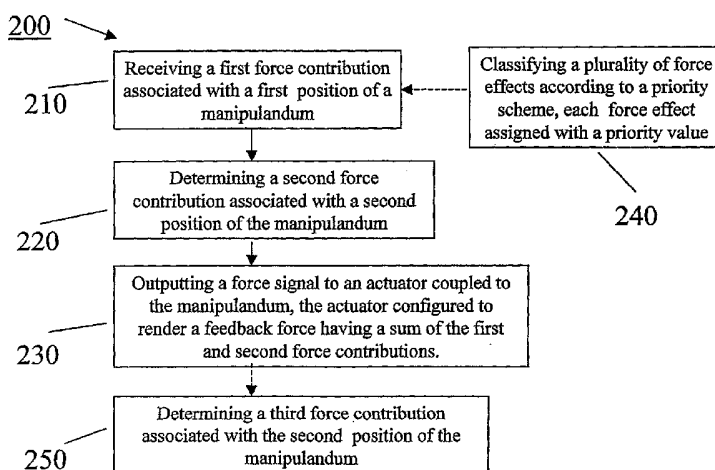
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(54) Title: HIERARCHICAL METHODS FOR GENERATING FORCE FEEDBACK EFFECTS



(57) Abstract: Embodiments of the invention relate to a hierarchical method for generating force feedback effects. In one embodiment, a method comprises receiving a first force contribution associated with a first (e.g., previous) position of a manipulandum; determining a second force contribution associated with a second (e.g., current) position of the manipulandum; and outputting a force signal to an actuator coupled to the manipulandum, such that the actuator renders a feedback force having a sum of the first and second force contributions. The method may further include classifying force effects according to a predetermined "hierarchy" (or "priority") scheme, whereby the second force contribution is related to "high" priority force effects associated with the second position, and the first force contribution is related to "low" priority force effects associated with the first position. As such, computation delay in outputting force feedback effects can be substantially reduced, thereby enhancing the stability and performance of the underlying force feedback system.



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

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US CL : 345/161

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,999,168 A (ROSENBERG et al) 07 December 1999, see entire document.	1-17
A	US 5,959,613 A (ROSENBERG et al) 28 September 1999, see entire document.	1-17
A	US 2002/0109668 A1 (ROSENBERG et al) 15 August 2002, see entire document.	1-17
A	US 5,513,100 A (PARKER et al) 30 April 1996, see entire document.	1-17
A	US 5,264,768 A (GREGORY et al) 23 November 1993, see entire document.	1-17

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