



(19) **United States**

(12) **Patent Application Publication**  
**Shahoian et al.**

(10) **Pub. No.: US 2008/0062143 A1**  
(43) **Pub. Date: Mar. 13, 2008**

(54) **HAPTIC INTERFACE FOR TOUCH SCREEN EMBODIMENTS**

(60) Provisional application No. 60/274,444, filed on Mar. 9, 2001.

(75) Inventors: **Erik J. Shahoian**, San Ramon, CA (US); **Bruce M. Schena**, Menlo Park, CA (US); **Louis B. Rosenberg**, San Jose, CA (US)

**Publication Classification**

(51) **Int. Cl.**  
**G06F 3/041** (2006.01)  
(52) **U.S. Cl.** ..... **345/173; 345/156**

Correspondence Address:  
**IMMERSION -THELEN REID BROWN  
RAYSMAN & STEINER LLP  
P.O. BOX 640640  
SAN JOSE, CA 95164-0640 (US)**

(57) **ABSTRACT**

A haptic feedback touch control used to provide input to a computer. A touch input device includes a planar touch surface that provides position information to a computer based on a location of user contact. The computer can position a cursor in a displayed graphical environment based at least in part on the position information, or perform a different function. At least one actuator is also coupled to the touch input device and outputs a force to provide a haptic sensation to the user. The actuator can move the touchpad laterally, or a separate surface member can be actuated. A flat E-core actuator, piezoelectric actuator, or other types of actuators can be used to provide forces. The touch input device can include multiple different regions to control different computer functions.

(73) Assignee: **Immersion Corporation**, San Jose, CA

(21) Appl. No.: **11/981,041**

(22) Filed: **Oct. 30, 2007**

**Related U.S. Application Data**

(63) Continuation of application No. 10/919,798, filed on Aug. 17, 2004, which is a continuation of application No. 09/917,263, filed on Jul. 26, 2001, now Pat. No. 6,822,635, and which is a continuation-in-part of application No. 09/487,737, filed on Jan. 19, 2000, now Pat. No. 6,429,846.

