



(19) **United States**

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

(10) **Pub. No.: US 2011/0199342 A1**

(43) **Pub. Date: Aug. 18, 2011**

(54) **APPARATUS AND METHOD FOR PROVIDING ELEVATED, INDENTED OR TEXTURIZED SENSATIONS TO AN OBJECT NEAR A DISPLAY DEVICE OR INPUT DETECTION USING ULTRASOUND**

**Publication Classification**

(51) **Int. Cl.**  
**G06F 3/043** (2006.01)  
**G06F 3/01** (2006.01)  
(52) **U.S. Cl.** ..... **345/177; 715/702**

(57) **ABSTRACT**

(76) **Inventors:** **Harry Vartanian**, Philadelphia, PA (US); **Jaron Jurikson-Rhodes**, Philadelphia, PA (US)

An apparatus and method for providing elevated, indented, or texturized contactless sensations to an object at a distance from a display device using ultrasound or ultrasonic waves is disclosed. Processes are also given involving elevated, indented, or texturized sensations to an object near a display device using airborne ultrasound or ultrasonic waves. By providing elevated, indented, or texturized sensations to an object near a display device enhanced input/output functions are provided.

(21) **Appl. No.:** **12/706,205**

(22) **Filed:** **Feb. 16, 2010**

