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Paper 8
Entered: December 11, 2018

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

CYWEE GROUP LTD.,
Patent Owner.

Case IPR2018-01257
Patent 8,552,978 B2

Before PATRICK M. BOUCHER, KAMRAN JIVANI, and CHRISTOPHER L. OGDEN, *Administrative Patent Judges*.

BOUCHER, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
35 U.S.C. § 314(a)

Google LLC ("Petitioner") filed a Petition pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 10 and 12 of U.S. Patent No. 8,552,978 B2 ("the '978 patent"). Paper 1 (Pet."). Cywee Group Ltd. ("Patent Owner") filed a Preliminary Response. Paper 7 ("Prelim.

Resp.”). Applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we institute an *inter partes* review on all grounds and claims set forth in the Petition. The Board has not made a final determination on the patentability of any claim.

I. BACKGROUND

A. The ’978 Patent

The ’978 patent “generally relates to a 3D pointing device,” which is described as having the function of “detecting motions of the device and translating the detected motions to a cursor display such as a cursor pointing on the screen . . . of a 2D display device.” Ex. 1001, 1:22–23, 1:29–33. For example, the pointing device “may be a mouse of a computer or a pad of a video game console” and the display device “may be a part of the computer or the video game console.” *Id.* at 1:36–39. A user may then perform control actions and movements with the pointing device for some purpose, such as playing a video game. *Id.* at 1:52–55. For example, when the user moves the pointing device, a pointer on the display device may “move along with the orientation, direction and distance travelled by the pointing device.” *Id.* at 1:56–61.

Figure 3 of the ’978 patent is reproduced below.

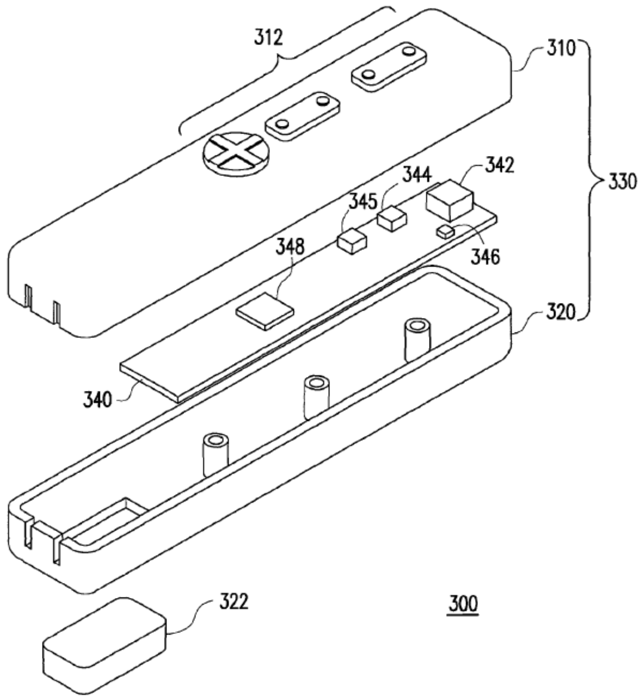

FIG. 3

Figure 3 is an exploded diagram showing electronic device 300, which may correspond to a pointing device. *Id.* at 9:14–16. Within housing 330, formed of top cover 310 and bottom cover 320, are rotation sensor 342, accelerometer 344, and magnetometer 345, each attached to printed circuit board 340, as well as other components that allow data transmission and processing. *Id.* at 9:26–33.

The ’978 patent refers to rotation sensor 342, accelerometer 344, and magnetometer 345 as “a nine-axis motion sensor module.” *Id.* at 9:57–62. The term “nine-axis” refers to and includes three angular velocities ω_x, ω_y, ω_z detected by rotation sensor 342, three axial accelerations Ax, Ay, Az detected by accelerometer 344, and three “magnetisms” Mx, My, Mz detected by magnetometer 345. *Id.* at 9:65–10:23. The *x*, *y*, and *z* components are illustrated in the patent for a Cartesian spatial reference frame relative to electronic device 300, but, more generally, “may not need to be orthogonal in a specific orientation and they may be rotated in different orientations." *Id.* at 10:23–29.

Various dynamic environments may present external influences that impact the ability to calculate orientation accurately. *See id.* at 15:53–16:4. For example, nongravitational forces may cause undesirable axial accelerations and/or extraneous electromagnetic fields may cause undesirable magnetism. *Id.* at 15:55–60. Such complications are addressed with a method illustrated by the flow diagram shown in Figure 7 of the '978 patent, reproduced below.

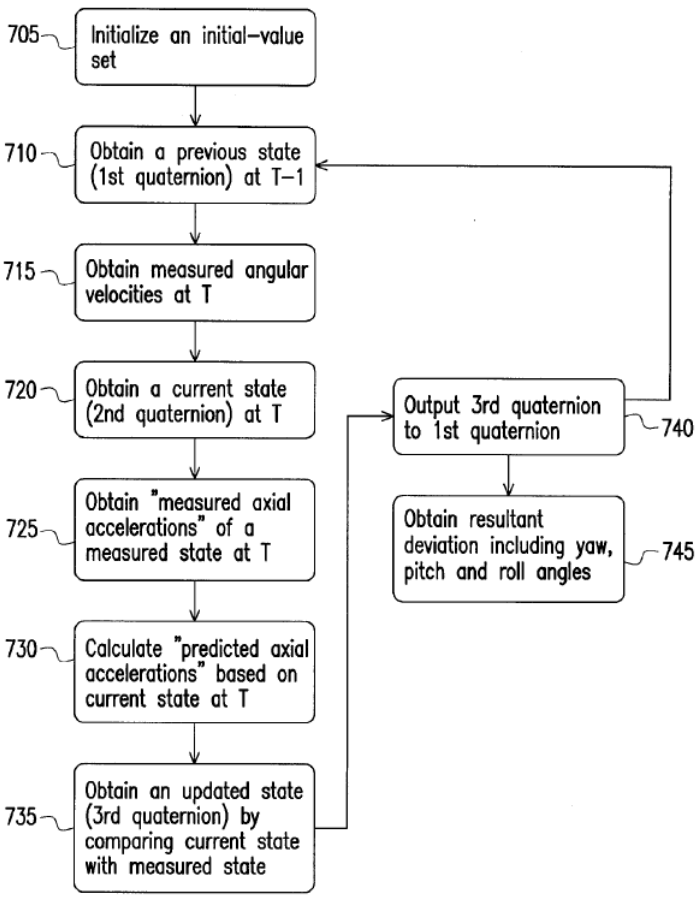

FIG. 7

Figure 7 shows a method "for obtaining and/or outputting a resultant deviation including deviation angles in a spatial reference frame of an electronic device." *Id.* at 13:60–63. The method of Figure 7 uses quaternions, which Petitioner's declarant, Majid Sarrafzadeh, Ph.D., explains are four-valued vector generalizations of complex numbers with "special mathematical properties that allow them to describe rotations efficiently." Ex. 1002 ¶¶ 30–31.

After obtaining a previous state of the nine-axis sensor module at steps 705 and 710, the method obtains measured angular velocities ω_x, ω_y, ω_z from the motion sensor signals of the nine-axis motion sensor module at a current time, at steps 715 and 720. Ex. 1001, 14:23–43. A current-time measured state of the nine-axis motion sensor module is then obtained by obtaining measured axial accelerations Ax, Ay, Az at step 725; and predicted axial accelerations Ax′, Ay′, Az′ based on measured angular velocities ω_x, ω_y, ω_z are calculated at step 730. *Id.* at 14:43–51. This allows obtaining an updated state of the nine-axis motion sensor module at step 735 by comparing the current state with the measured state. *Id.* at 14:51–54. "[T]o provide a continuous loop," the updated state of the nine-axis motion sensor module is output to the previous state at step 740, i.e. by outputting the third quaternion obtained at step 735 to the first quaternion identified at step 710 for the previous state. *Id.* at 14:62–15:3. Ultimately, the resultant deviation is obtained at step 745, "whereby the resultant deviation compris[es] deviation angles associated with the updated state of the nine-axis motion module[,] excluding said undesirable external interferences in the dynamic environments." *Id.* at 14:54–62.

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