Legal Analysis

Year: 2021 Semester: Fall Team: 6 Project:RevEx

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Assignment Evaluation:

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| --- | --- | --- | --- | --- |
| **Item** | **Score (0-5)** | **Weight** | **Points** | **Notes** |
| **Assignment-Specific Items** | | | | |
| **Regulatory Analysis** |  | x3 |  |  |
| **Analysis of Patent 1** |  | x3 |  |  |
| **Analysis of Patent 2** |  | x3 |  |  |
| **Analysis of Patent 3** |  | x3 |  |  |
| **Writing-Specific Items** | | | | |
| **Spelling and Grammar** |  | x2 |  |  |
| **Formatting and Citations** |  | x1 |  |  |
| **Figures and Graphs** |  | x2 |  |  |
| **Technical Writing Style** |  | x3 |  |  |
| **Total Score** |  | | |  |

5: Excellent 4: Good 3: Acceptable 2: Poor 1: Very Poor 0: Not attempted

Comments:

*Comments from the grader will be inserted here.*

1.0 Regulatory Analysis

The process of bringing RevEx to market will comprise of two phases: (1) certification and marketing in the US (2) certification and marketing in Europe/worldwide. We will likely avoid the Japanese market until we have more resources; Japan is (comparatively) a smaller market, it has its own set of regulatory agencies, and the bureaucracy surrounding electronics certification can be difficult to navigate [1].

In phase 1, we will apply for FCC Class B “verification,” which indicates that a household appliance is unlikely to electromagnetically-interfere with a receiver located 10 ft away (i.e. in another house) [2]. The main EMI sources on RevEx are our bluetooth module, microcontroller, and switching regulators. The switching regulators and MCU can be shielded if needed, and the bluetooth module has already passed FCC verification (thus, unintentional EMI from the bluetooth module is not expected to be a problem). There are third parties that can perform electromagnetic testing and produce the documentation necessary for FCC verification or CE certification at a low cost [3]. After the testing documentation is received, there are several standard bureaucratic steps one must follow to file, receive, and display FCC verification.

In phase 2, we will apply for certifications from ROHS and CE to market our device in Europe. For ROHS certification, we would need to lower the amount of lead in our device. We use lead-free solder, but we know that PCBs from JLCPCB, our board house of choice, contain trace amounts of lead. Furthermore, we need to rigorously-check if any of our components contain lead (most do not). The process of getting ROHS approval is to undergo (1) documentation review, (2) auditing, (3) testing, and (4) certification. Although lengthy, the process seems relatively straight-forward if outsourced to a third-party representative (of course, this comes at an additional cost). The testing data generated during the FCC verification process can also be used to obtain the CE mark as well. The CE is somewhat of an honor system, and all one must do is rigorously document conformity via a dossier and sign an EU declaration of conformity before affixing the mark on the product in question [4].

2.0 Legal Liability Analysis

Fig. 1 shows a depiction of our product as a point of comparison to the patents in this section. Furthermore, text highlighted in red are key grounds for infringement claims while text highlighted in green shows ways that our system differs from the scope of the patent.

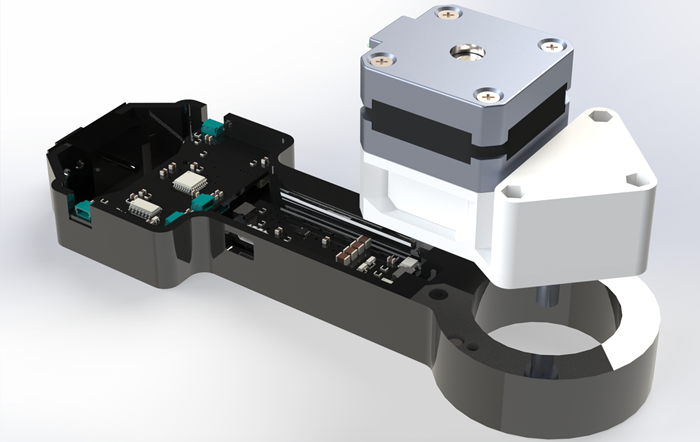


Fig. 1: Depiction of RevEx

2.1 Analysis of Patent 1: US8624714B2 [5]

***Patent Title:***Virtual simulator having an eddy current brake for providing haptic feedback

***Current Assignee:*** Immersion Corp

***Patent Filing Date:*** December 14, 2011

***Condensed Abstract:*** This patent covers a virtual simulator including a movable object, an eddy current brake actuator, and a controller. The controller monitors the velocity of the movable object and imparts corresponding haptic feedback to the user by electronically controlling the eddy current brake actuator. The actuator is composed of an elongated conductor inside a controllable magnet.

***Potential Infringements:*** This patent contains only “apparatus claims,” and our device potentially infringes on the following independent claims:

A virtual simulator comprising:

* a movable user object having an elongated conductor coupled thereto and a sensor for measuring a velocity of the user object.
* at least one magnet defining a passageway for receiving the elongated conductor, wherein movement of the user object causes the conductor to move through the passageway and the at least one magnet imparts a transient drag force on the conductor,
* a controller coupled to the user object and to the at least one magnet, wherein the controller receives velocity measurements from the sensor and provides control signals to the at least one magnet that vary the drag force on the conductor to provide haptic feedback to a user that relates to force applied to the user object: and
* a display coupled to the controller, wherein the controller controls a graphical environment on the display according to position information received from the user object.

***Analysis of Liability:*** At first glance, there seems to be a case for infringement because if the “controller” and “user object” in this patent are matched to our host computer and our wearable, respectively, there is considerable overlap between the patent and our proposed product. Furthermore, it can be argued that our haptic feedback motor contains an elongated conductor (i.e. the motor shaft). However, RevEx differs from the claims in this patent in the following ways (which should protect us against infringement claims):

* Our “user object” (i.e. the wearable) does not measure velocity or position. The “user object” rather measures angular rate, orientation, and acceleration.
* The “elongated conductor” (i.e. the motor shaft) does not move through any passageway (it rotates in place). Furthermore, in our embodiment, the conductor defines the passageway for the magnet, not vice-versa.

2.2 Analysis of Patent 2: US20170084051A1 [6]

***Patent Title:*** Tracking position of device inside-out for virtual reality interactivity

***Current Assignee:*** Sony Interactive Entertainment America LLC

***Patent Filing Date:*** December 24, 2009

***Condensed Abstract:*** This patent covers a method for generating an interactive space. This proposed method associates a device with a dead reckoning based inertial measurement scheme to a reference point in 3D space. This device then captures images with a camera, corrects its position estimate using static features in the images, and displays an interactive scene rendered from the reference point containing virtual objects.

***Potential Infringements:*** This patent only contains the following independent methods claim:

A method comprising:

* associating a first device to a reference point in a three-dimensional (3D) space using a camera of the first device.
* calculating by the first device a position of the first device in the 3D space based on inertial information captured by the first device.
* identifying locations of one or more static features in the images.
* correcting the position of the first device based on the identified locations of the one or more static features.

***Analysis of Liability:*** At first glance, it might seem like the method we are using cannot be marketed/patented because we are using a VR headset that will perform localization with a camera as well as a wearable inertial measurement unit; however, our implementation is different in that the inertial information from the headset is not used for localization. Rather, the arm-mounted wearable (a “second device”) has the inertial measurement unit.

2.3 Analysis of Patent 3: US8347710B2 [7]

***Patent Title:*** Robotic exoskeleton for limb movement

***Current Assignee:*** Queens University at Kingston

***Patent Filing Date:*** May 01, 2008

***Condensed Abstract:*** This patent covers a robotic exoskeleton that couples to the user’s joints. The exoskeleton is intended to measure the angular position, rate, and acceleration of joints.

**Potential Infringements:** This patent has two independent (apparatus) claims. The claim with which we may potentially infringe is:

A robotic exoskeleton, comprising:

* a first mechanical linkage adapted to couple to a first selected joint of a limb of a subject, the first mechanical linkage including links for said coupling to the first selected joint, with at least one joint having articulation about an axis; and
* limb attaching means for attaching the limb to the linkage;
* wherein the first mechanical linkage defines a virtual joint having an axis that is not located on the first mechanical linkage.
* wherein the virtual joint is coupled to the first selected joint of the limb when the limb is attached to the first mechanical linkage.
* wherein the first mechanical linkage is not located on or along an axis of the first selected joint of the limb when the limb is attached to the linkage.
* wherein the first mechanical linkage includes a second joint that is not located on an axis of the first selected joint of the limb when the limb is attached to the linkage; and
* wherein the first mechanical linkage includes at least two links that couple the virtual joint to the second joint of the mechanical linkage.

***Analysis of Liability:*** At first glance, it seems like we have largely infringed on this patent, since we have off-axis rotational elements; however, the language of this patent is particular to the relative position of joints. The joints on RevEx will be along the arm, and the rendered joint will also be as true as possible to the location of the user’s joints. In this sense, we have not infringed on this patent.

3.0 Sources Cited:

[1] M. Maynard, “Electronic product compliance in Japan,” Incompliancemag.com, 30-Jun-2016. [Online]. Available: <https://incompliancemag.com/article/electronic-product-compliance-in-japan/>. [Accessed: 29-Oct-2021].

[2] Fcc.gov. [Online]. Available: <https://transition.fcc.gov/bureaus/oet/info/documents/bulletins/oet62/oet62rev.pdf>. [Accessed: 29-Oct-2021].

[3] “All-inclusive EMC & wireless testing with unlimited retesting,” Sunfiretesting.com. [Online]. Available: <https://www.sunfiretesting.com/?gclid=Cj0KCQjwt-6LBhDlARIsAIPRQcJvaUUkjRH-QUYM_lUlrd6o3ikt2mXCt0OvjfPnvrihlUf_LASWhHIaAhxSEALw_wcB>. [Accessed: 29-Oct-2021].

[4] “CE marking,” Europa.eu, 28-Sep-2015. [Online]. Available: <https://europa.eu/youreurope/business/product-requirements/labels-markings/ce-marking/index_en.htm>. [Accessed: 29-Oct-2021].

[5] A. Gosline & J. M. C. Hernandez, “Virtual simulator having an eddy current brake for providing haptic feedback,” US8624714B2, 07-Jan-2014. [<https://patents.google.com/patent/US8624714>]

[6] G. Weising & T. Miller, “Tracking position of device inside-out for virtual reality interactivity,” US20170084051A1, 23-Mar-2017. [<https://patents.google.com/patent/US20170084051>]

[7] I. E. Brown, S. J. Ball & S. H. Scott, “Robotic exoskeleton for limb movement,” US8347710B2, 11-Dec-2008. [<https://patents.google.com/patent/US8347710B2>]