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December 2022

WIRELESS CHARGING HOTSPOT NAVIGATOR

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INC, HP, "WIRELESS CHARGING HOTSPOT NAVIGATOR", Technical Disclosure Commons, (December 13, 2022)

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Wireless Charging Hotspot Navigator

Abstract

Wireless charging service has become popular as its convenience. Besides *local usage (coffee shop/bus/train/airport, etc.), mobile usage is much more welcome. *Mobile wireless charging devices has been launched for years like Power-Bank, Smart-Phone, and even Laptop.

Focus on the Laptop scope, what competitor has done is to implement Wireless charging coil/chip into touch pad as integrated solution. Once the user wants to use wireless charging, simply hit certain combination key (like fn+F11 for Samsung) as the command of enabling wireless charging/disabling touch function (avoid false trigger the touch pad).

Problem

Hotspot of the best wireless charging supposedly should be the center of coil, however, no matter Tx (Laptop) or Rx (Phone), the hotspot location won't be shown as certain mark or character on product appearance. Therefore, the charging efficiency could be a problem when the hotspot misalignment happened.

- ◆ iPhone uses HW methodology (magnet) to get the best position for charging → MagSafe. However, this design is unique for iPhone12↑ and not able to apply to non-iPhone products
- Hotspot alignment matters for wireless charging efficiency !



But users don't know where to put their phone..



Problem Solution

The existing wireless charging laptops can only provide passive solution, it means there's no countermeasure when user's phone misaligned with the charging hotspot. Even though the wireless charging function has been enabled, but the shifting from hotspot may cause worse charging efficiency and bad user experience.

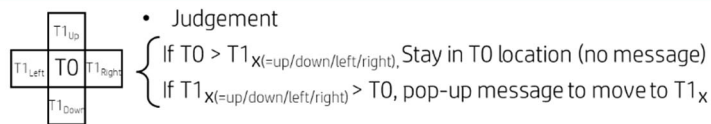
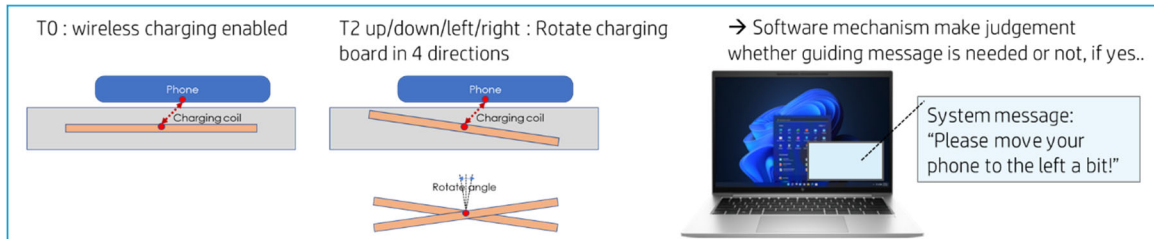
In this invention – “Wireless charging hotspot navigator”, the charging efficiency could be monitored once the wireless charging function has been triggered and enabled. The monitored charging efficiency could be collected in a consistent period as T_0 result, the charging board in laptop side could be rotated by mechanical structure & micro-motor to get another period as T_1 result (get 4 directions results on XY axis rotation). Then compare all results to get best one. From those gathered data with judgement, system will pop-out an interactive message to guide user to move the phone approach the charging hotspot until meeting criteria (good enough charging efficiency) as T_2 optimized result.

The charging experience can be improved by this invented HCI (human-computer interaction) system included hardware countermeasure and software mechanism.

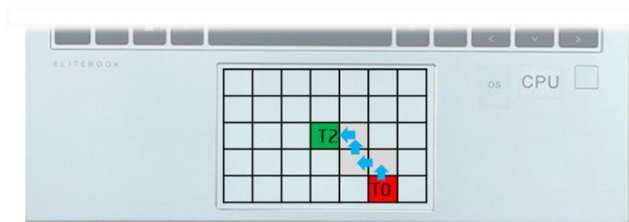
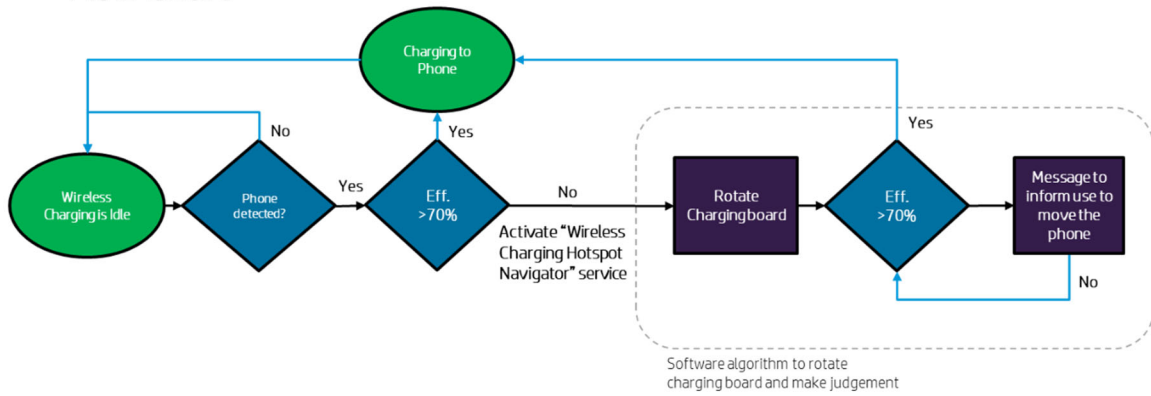
Description of Invention

The integrated charging coil designed with micro-motors on 2-axis (X-Y). When user put the phone on the wireless charging coil and trigger wireless charging function enabled, start to monitor the charging efficiency with a consistent period T_0 and rotate 4 directions within the same period to get 4 results (T_1 up/down/left/right). The software mechanism will compare the 5 results to judge if needed to inform user to move the phone approach the charging hotspot.

The hotspot navigating progress could be certain cycle time to make user getting the best charging efficiency step by step.



• Flow Chart



Advantages

- *Users don't need to investigate where's the wireless coil design in their phones.*
- *The interactive guiding message can lead user to get the best charging hotspot.*
- *The best wireless charging experience on laptop could be realized.*

Disclosed by Wallace Huang, Mars Chuang, Alice Chuang, Andy Chen, Isaac Lagnado, HP Inc.