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Light Powered Keyboard Charging for Full-screen Devices

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Light Powered Keyboard Charging for Full-screen Devices

ABSTRACT

This disclosure describes a detachable keyboard for use with foldable computing devices. The keyboard can be charged via illumination from the display of the foldable device. Photovoltaic cells are provided on the bottom surface of the keyboard and generate electrical power from display illumination when the keyboard is placed on the display such as an organic light emitting diode (OLED) display. The illumination intensity of the pixels located directly beneath the keyboard can be adjusted to its maximum level to enable faster charging.

KEYWORDS

- Detachable keyboard
- Wireless charging
- Photovoltaic charging
- Solar charging
- Foldable display
- Foldable device
- Photovoltaic panel

BACKGROUND

Full screen foldable devices can be folded similar to a conventional laptop. In such devices, the display covers the entire region of the device which enables large display sizes at a small device form factor. The display area includes the area across the hinge(s) at the location of the fold and includes the portion of the device where a keyboard and touchpad are placed on a traditional (non-foldable) device. Use of a physical keyboard on such a device to emulate laptop mode operation is commonly enabled via a wireless keyboard that has its own battery.

DESCRIPTION

This disclosure describes a detachable keyboard for use with foldable computing devices. The detachable keyboard can be charged via illumination from a display. Per techniques of this disclosure, photovoltaic cells are provided on a surface below the keyboard. The cells generate electrical power from optical emitters, e.g., display illumination, when the keyboard is placed (rested) on the display.

When the physical keyboard is rested against the display, e.g., an organic light emitting diode (OLED) display, the display area covered by the keyboard is illuminated thereby directly illuminating photovoltaic (solar) cells on the bottom of the keyboard. This enables charging of the keyboard without extra wired connections or wireless charging mechanisms. A battery or supercapacitor can be provided to store the generated electrical power.

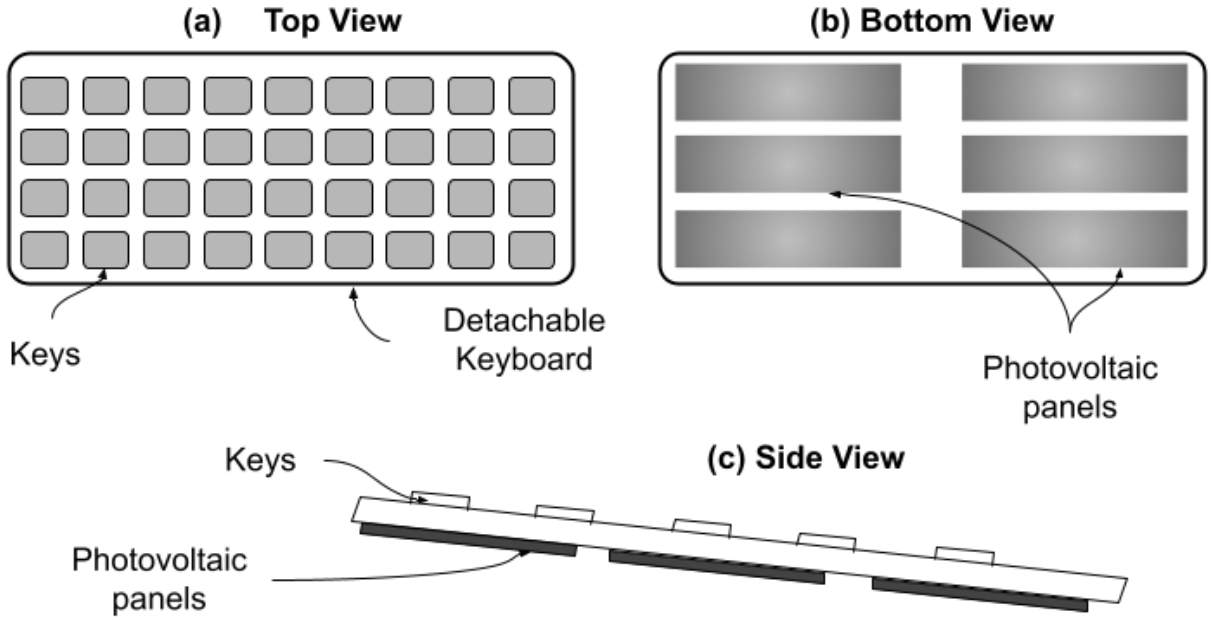

Fig. 1: A detachable keyboard includes keys and photovoltaic panels

Fig. 1 depicts example top, bottom, and side (profile) views of a keyboard that can be charged via illumination from a display, per techniques of this disclosure. As depicted in Fig.

1(a), the keyboard includes a standard set of keys on its top surface. Fig. 1(b) shows the bottom surface of the keyboard. As seen, a set of photovoltaic panels are provided on the bottom surface. Fig. 1(c) is a profile view of the keyboard and depicts the keys and photovoltaic panels on the top and bottom surface, respectively.

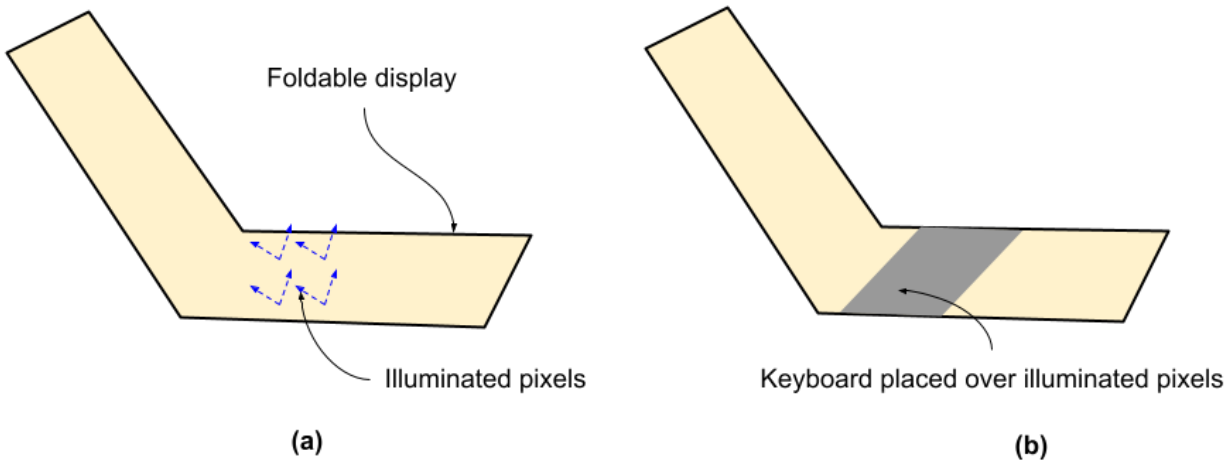

Fig. 2: Keyboard is charged via illuminated display pixels

Fig. 2 depicts charging of the detachable keyboard. As depicted in Fig. 2(a), pixels of the foldable display are illuminated with various light intensities. When the keyboard is placed over the illuminated pixels as depicted in Fig. 2(b), the keyboard is charged via the photovoltaic panels provided on the bottom surface of the keyboard. The illumination intensity of the pixels located directly beneath the keyboard can be adjusted to its maximum level to enable faster charging.

CONCLUSION

This disclosure describes a detachable keyboard for use with foldable computing devices. The keyboard can be charged via illumination from the display of the foldable device. Photovoltaic cells are provided on the bottom surface of the keyboard and generate electrical power from display illumination when the keyboard is placed on the display such as an organic

light emitting diode (OLED) display. The illumination intensity of the pixels located directly beneath the keyboard can be adjusted to its maximum level to enable faster charging.

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