

FLEXIBLE DISPLAY UNIT WITH SENSORS

A display unit has a flexible display section, a detection section for detecting a deflection amount and a deflection direction of the display section, a determination section for determining a visible portion and a non-visible portion of the display section based on the deflection amount and the deflection direction, and a control section for controlling display contents of the display section. The control section either prevents an image display on the non-visible portion or displays one of a fixed image or a pre-set moving image on the non-visible portion. The display unit also includes a displacement sensor located in the same region as the display section.

PATENT BACKGROUND

The present disclosure relates to a display unit using a flexible substrate. In display units represented by liquid crystal display units, organic EL display units, electrophoretic display units, and the like, reduction in thickness and weight is desired. A glass substrate is often used in a device configuring known display units; however, since a glass substrate is heavy and susceptible to cracking, a certain thickness has been necessitated and thus reduction in thickness and weight has been limited.

Currently, flexible substrates such as plastic substrates are drawing attention as substrates that overcome the limitation of reduction in thickness and weight. Various display units have been disclosed as display units using a flexible substrate (flexible display unit). For example, it is proposed to utilize bending as a user interportion such that, when the whole display unit is deflected, a displayed image is decreased, enlarged, divided, or deformed, or the direction of the image is inverted (see, for example, Japanese Unexamined Patent Application Publication Nos. 2010-157060, 2011-118303, and 2011-118245).

SUMMARY

A flexible display unit is often used in a bent state, and when the device is bent, the rear portion of the device is not visually recognized. This is easily understood by imagining a person reading a folded newspaper on the train for example, and the person does not see the rear side of the folded newspaper. To see the rear side of the newspaper, the person turns over the whole newspaper. In other words, the portion of a display unit visually recognized by a user is often limited to only one of the portions of the display unit.

However, in the above-mentioned flexible display units disclosed in Japanese Unexamined Patent Application Publication Nos. 2010-157060, 2011-118303, and 2011-118245, an image similar to that of a visible portion is displayed also on a portion which is not visually recognized by the user. In other words, there has been an issue that the visible portion actually recognized by the user and the display portion (display section) may not necessarily correspond to each other.

It is desirable to provide a display unit that controls a display portion having flexibility so as to allow a display portion and a visible portion to correspond to each other.

A display unit according to an embodiment of the present technology includes: a display section having flexibility; a detection section that detects a deflection amount and a deflection direction of the display section; a determination section that determines a visible portion and a non-visible portion of the display section based on a result of the detection of the detection section; and a control section that controls display contents of the display section based on a result of the determination of the determination section.

In the display unit according to the above-described embodiment of the present technology, the determination section and the control section are included. The determination section determines the visible portion and the non-visible portion of the display section based on a result of the detection by the detection section that detects the deflection amount and the deflection direction of the display section. The control section controls display contents of the display section based on a result of the determination of the determination section. With this configuration, it is possible to control the display on the visible portion and the display on the non-visible portion of the display section having flexibility.

According to the display unit of the above-described embodiment of the present technology, the determination section and the control section are included, in which the determination section determines the visible portion and the non-visible portion of the display section, and the control section controls display contents of the display section based on the result of the determination of the determination section. This makes it possible to allow the visible portion actually visually recognized by the user and the display section of the display unit having flexibility to correspond to each other.

It is to be understood that both the foregoing general description and the following detailed description are exemplary, and are intended to provide further explanation of the technology as claimed.

PATENT CLAIMS

1. A display unit, comprising: a display panel having flexibility; a sensor configured to detect a direction of the display panel including a first plane and a second plane, the first plane facing a different direction from the second plane, and control circuitry configured to: control the first plane of the display panel in a first mode based on the detected direction of the display panel, and control the second plane of the display panel in a second mode based on the detected direction of the display panel, the second mode being different from the first mode, wherein the second mode is selected from a group consisting of (i) stopping an image display, (ii) displaying a fixed image, and (iii) using a screen-saver function.
2. The display unit according to claim 1, wherein the first plane is a visible portion for a user, and the second plane is a non-visible portion for the user.
3. The display unit according to claim 2, wherein the sensor is configured to detect the direction of the display panel to determine the visible portion and the non-visible portion for the user.
4. The display unit according to claim 1, wherein the sensor includes a feature selected from a group consisting of (i) an acceleration sensor, (ii) a resistance sensor, (iii) a pressure sensor, (iv) a photosensor, (v) a temperature sensor, and (vi) a combination thereof.
5. The display unit according to claim 1, wherein the sensor is a displacement sensor.
6. The display unit according to claim 1, wherein the control circuitry is further configured to change a mode of at least one of the first plane or the second plane to a different state based on the detected direction.
7. The display unit according to claim 1, wherein the first mode is displaying a visible image, the second mode is stopping an image display, and the display panel includes organic electro luminescence (EL) pixels.
8. A display unit, comprising: a display panel having flexibility; a sensor configured to detect a visible plane and a non-visible plane of the display panel based on a direction of the display panel, the visible plane facing a different direction from the non-visible plane, and control circuitry configured to: respectively control the visible plane and the non-visible plane of the display panel based on the detected direction of the display panel such that the visible plane and the non-visible plane are respectively operated in a first mode and a second mode different from the first mode, wherein the first mode is displaying an image, and the second mode is selected from a group consisting of (i) stopping an image display, (ii) displaying a fixed image, and (iii) using a screen-saver function.
9. The display unit according to claim 1, wherein a direction of the first plane is selectable by a user.