

DISPLAY CONTROL METHOD, DEVICE, APPARATUS, STORAGE MEDIA, COMPUTER PROGRAM PRODUCT

TECHNICAL FIELD

[0001] The present disclosure relates to electronic technology, and relates to but is not limited to a display control method, device, apparatus, a storage media, and a computer program product.

BACKGROUND

[0002] In shopping malls, warehouses and other occasions, paper tags are usually used to show a price, a specification, an inventory level and/or a promotion sign for the commodity. However, a heavy workload is required when updating data. As an improvement, an electronic tag occurs to replace the paper tag. The electronic tag can conveniently implement dynamic pricing and display promotion information.

SUMMARY

[0003] The display control method, device, apparatus, the storage medium and the computer program product are provided by the present disclosure, which can lead more traffic for a first product and achieve the effect of energy saving.

[0004] A first aspect of the embodiments of the present disclosure provides a display control method, which includes the following operations. A first distance between a first display device and a target object is determined. Product information of the first product is displayed by the first display device. A display effect of the first display device is controlled according to the first distance, and different first distances or first distances in different ranges correspond to different display effects.

[0005] A second aspect of the embodiments of the present disclosure provides a display control device, which includes: a determination module and a control module. The determination module is configured to determine a first distance between a first display device and a target object. The first display device is configured for displaying product

information of the first product. The control module is configured to control a display effect of the first display device according to the first distance, and different first distances or first distances in different ranges correspond to different display effects.

[0006] A third aspect of the embodiments of the present disclosure provides an electronic device including a memory and a processor. The memory stores a computer program executable on the processor, and the processor implements the method of the embodiment of the present disclosure when executing the program.

[0007] A fourth aspect of the embodiments of the present disclosure provides a computer-readable storage medium having stored thereon a computer program, which, when executed by a processor, implements the method of the embodiment of the present disclosure.

[0008] A fifth aspect of the embodiments of the present disclosure provides a computer program product including a computer program or instruction, which, when executed by a processor, implements the operations of the method of the embodiment of the present disclosure.

[0009] In the embodiment of the present disclosure, a first distance between a first display device and a target object is determined, a display effect of the first display device is controlled according to the first distance, and different first distances or first distances in different ranges correspond to different display effects. Thus, the display effect of the first display device is controlled dynamically and flexibly, to attract more target objects to notice the first product. Different first distances or first distances in different ranges correspond to different display effects, and the same display effect is not kept under any circumstances, thereby attracting more traffic to the first product while saving unnecessary energy consumption.

[0010] It should be understood that the above general description and the following detailed description are exemplary and explanatory only and are not limiting to the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The accompanying drawings, which are incorporated in and constitute a part of

the specification, illustrate embodiments conforming with the present disclosure and together with the description serve to explain the technical aspects of the present disclosure. It will be apparent that the drawings described below are only some embodiments of the present disclosure, and other drawings may be obtained from these drawings without creative effort for those of ordinary skill in the art.

[0012] The flowcharts shown in the drawings are illustrative only, and are neither necessarily to include all contents and operations/steps, nor necessarily to be performed in the order described. For example, some operations/steps may also be decomposed, while others can be merged or partially merged, so the actual execution order may change according to the actual situation.

[0013] Fig. 1 is a first schematic diagram of an implementation flow of the display control method provided by the embodiment of the present disclosure;

[0014] Fig. 2 is a second schematic diagram of an implementation flow of the display control method provided by the embodiment of the present disclosure;

[0015] Fig. 3 is a schematic diagram of installing an electronic tag provided by the embodiment of the present disclosure;

[0016] Fig. 4 is a schematic diagram of an electronic tag provided by the embodiment of the present disclosure;

[0017] Fig. 5 is a schematic diagram of a wireless radiation model of an electronic tag provided by the embodiment of the present disclosure;

[0018] Fig. 6 is a third schematic diagram of an implementation flow of the display control method provided by the embodiment of the present disclosure;

[0019] Fig. 7 is a schematic structural diagram of the electronic tag provided by the embodiment of the present disclosure;

[0020] Fig. 8 is a schematic structural diagram of a display control device provided by the embodiment of the present disclosure;

[0021] Fig. 9 is a schematic structural diagram of the electronic device provided by the embodiment of the present disclosure.

DETAILED DESCRIPTION

[0022] In order to make the purpose, technical solution and advantages of the embodiments of the present disclosure clearer, the specific technical solution of the present disclosure will be further described in detail with reference to the drawings in the embodiments of the present disclosure. The following embodiments are used to illustrate the present disclosure, but are not intended to limit the scope of the present disclosure.

[0023] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as understood by those skilled in the art of the present disclosure. The terminology used herein is for the purpose of describing embodiments of the disclosure only and is not intended to limit the disclosure.

[0024] In the following description, the description such as “some embodiments”, “present embodiment”, “embodiments of the application” and examples, etc., describes a subset of all possible embodiments, but it is understood that “some embodiments” may be the same subset or different subsets of all possible embodiments and may be combined with each other without conflict.

[0025] Descriptions such as “first, second, and third” appearing in the embodiments of the present disclosure are only schematic and used for distinguishing the objects to be described, without any order, and do not indicate a particular limitation on the number of devices in the embodiments of the present disclosure, and cannot constitute any limitation on the embodiments of the present disclosure.

[0026] The embodiments of the present disclosure provide a display control method. Fig. 1 is a first schematic diagram of an implementation flow of the display control method provided by the embodiment of the present disclosure. As shown in Fig. 1, the method may include the following operations 101 to 102:

[0027] At operation 101, a first distance between a first display device and a target object is determined. The first display device is used for displaying product information of a first product;

[0028] At operation 102, a display effect of the first display device is controlled according to the first distance. Different first distances or first distances in different ranges

correspond to different display effects.

[0029] In the embodiment of the present disclosure, a first distance between a first display device and a target object is determined, a display effect of the first display device is controlled according to the first distance, and different first distances or first distances in different ranges correspond to different display effects. Thus, the display effect of the first display device is controlled dynamically and flexibly, to attract more target objects to notice the first product. Different first distances or first distances in different ranges correspond to different display effects, and the same display effect is not kept under any circumstances, thereby attracting more traffic to the first product while saving unnecessary energy consumption.

[0030] A further alternative embodiment of each of the above operations and related terms are described below respectively.

[0031] In operation 101, a first distance between a first display device and a target object is determined, and the first display device is used for displaying product information of a first product.

[0032] In the embodiment of the present disclosure, the target object is not limited. Exemplarily, the target object may be a human or a robot. This is because with the development of technology, robots may have human capabilities, and robots can also attract people's attention. Hence, taking robots as target objects can indirectly improve the traffic of the first product.

[0033] In the embodiment of the present disclosure, the first distance between the first display device and the target object may be determined directly or indirectly.

[0034] By way of example, in some embodiments, an electronic device or processor may indirectly determine a first distance between a first display device and a target object. The first distance between the first display device and the target object is determined according to a wireless signal transmitted by at least one second display device received by the first display device. The wireless signal is transmitted by the second display device when the target object is detected by the second display device, and the second display device is used for displaying product information of a second product.

[0035] It can be understood that in an embodiment of the present disclosure, the first

distance can be determined based on a wireless signal transmitted by the second display device, and the second display device transmits the wireless signal only when the target object is detected by the second display device. Thus, the first distance changes with the movement of the target object, and accordingly, the display effect of the first display device also changes with the change of the first distance, that is, the display effect of the first display device changes with the movement of the target object.

[0036] As an example, if the display effect of the first display device is a display effect of a brightness, color or frequency of the light, the brightness, color or frequency of the light changes with the movement of the target object, thereby obtaining a colorful effect.

[0037] In some embodiments, an electronic device or processor may determine a first distance between the first display device and the target object in the following manners. A second distance between the first display device and the second display device which transmits the wireless signal is determined according to a signal reception strength of a wireless signal received by the first display device, and the first distance is determined according to the second distance corresponding to at least one second display device.

[0038] It can be understood that in the embodiment of the present disclosure, the first distance is determined based on the signal reception strength, and the calculation is simple and easy to be realized.

[0039] In the embodiment of the present disclosure, a specific implementation of determining the first distance according to the second distance corresponding to at least one second display device is not limited.

[0040] Exemplarily, in some embodiments, the first distance is equal to a weighted average result of the second distances, i.e. different weights are set for different second distances, and the first distance is determined based on the weighted average result of the second distances.

[0041] In other embodiments, the first distance is equal to a minimum distance of the second distances corresponding to at least one second display device.

[0042] In an embodiment of the present disclosure, a minimum of the second distances is determined as the first distance, and the second distance is transmitted by the second display device, and the second display device transmits the wireless signal only when

there is a target object. Then, it can be understood that in the embodiment of the present disclosure, the display effect of the first display device is controlled based on the distance between the first display device and the second display device closest to the first display device among the second display devices when the target object is detected. Therefore, the display effect of the first display device attracts the target object, and the target object can reach the first product quickly, thereby improving the efficiency of attracting traffic to the first product.

[0043] Exemplarily, in some embodiments, the first display device is in a wireless reception state when a target object is not detected, and in this case, the first display device may receive a wireless signal from the second display device. The wireless signal is received by a wireless transceiver of the first display device and a received signal strength indication (RSSI) is evaluated. Because the RSSI is related to transmission power and distance, an approximate distance D of the first display device relative to the second display device may be evaluated using the RSSI at a fixed transmission power condition.

[0044] Because different wireless chip manufacturers have different evaluation standards, accuracy and granularity on the strength of wireless received signals, parameters is re-calibrated when the distance between the first display device and the second display device is evaluated by using RSSI of wireless signals. Here, a fitting function with high similarity between a part of the function curve and Fries transmission formula is used to evaluate the distance. The fitting function is shown in formula (1).

$$D = 10^{\left(\frac{|RSSI| - A}{10 \times n}\right)} \quad (1);$$

[0045] D denotes the distance in meters. A denotes the RSSI value received at a fixed transmit power at 1 meter, and n denotes an attenuation factor. Firstly, A and n are represented by using the formula, and then the RSSI of the wireless signal received by the first display device is substituted into the formula (1). Therefore, the approximate distance D of the first display device relative to the second display device can be calculated.

[0046] In the embodiment of the present disclosure, the distance between the first display device and the second display device is grouped into different distance levels. With the distance between the second display device and the first display device that detects the target object decreases, that is, the distance level is lowered, the brighter the brightness of the first display device increases. The brightness decreases according to the

grouping of the distance level, and a light gradient sensing can be displayed under the scale effect. If the first display device simultaneously receives wireless signals transmitted by multiple second display devices indicating that a target object is detected, the smallest distance among the distances between the second display devices which detects the target object and the first display device is taken as the first distance.

[0047] In some embodiments, when the target object is not detected by the first display device and the wireless signal transmitted by at least one second display device is received by the first display device, the electronic device or processor determines a first distance between the first display device and the target object according to the wireless signal transmitted by at least one second display device received by the first display device.

[0048] It can be understood that, in the embodiment of the present disclosure, if no target object is detected by the first display device, the first display device may also receive the wireless signal sent by at least one second display device, and the electronic device or processor can determine the first distance between the first display device and the target object based on the wireless signal sent by at least one second display device and received by the first display device, to control the display effect of the first display device. In this way, the display opportunity of the first product can be increased and more traffic can be attracted for the first product.

[0049] In some embodiments, the method further includes an operation that a wireless signal is transmitted and a display effect of the first display device is enhanced by an electronic device or a processor when the target object is detected by the first display device.

[0050] It can be understood that, in an embodiment of the present disclosure, the first display device transmits a wireless signal when the target object is detected by the first display device. In this case, if another display device has the ability of receiving wireless signals, the another display device may determine the first distance based on the received wireless signal, and control the display effect of the display devices, thereby increasing traffic of displaying the product by another display device.

[0051] It can be understood that, in the embodiment of the present disclosure, when the target object is detected, the display effect of the first display device is enhanced to attract the attention of the target object, thereby attracting traffic for the first product.

[0052] Exemplarily, in some embodiments, if the target object is detected by the first display device, the first display device transmits a signal indicating that the target object is detected outward according to wireless communication or the like, and regulates a backlight, an indicator light, display content or the like of the display screen. When the target object is detected by the first display device, the target object is closest to the first display device by default, and the display effect of the first display device is enhanced according to the closest distance.

[0053] In operation 102, a display effect of the first display device is controlled according to the first distance. Different first distances or first distances in different ranges correspond to different display effects.

[0054] It should be noted that in the embodiment of the present disclosure, the display effect of the first display device is not limited. By way of example, in some embodiments, the display effect of the first display device includes a display effect of the indicator light and/or the backlight of a display screen of the first display device, and/or a display content of the display screen of the first display device.

[0055] It can be understood that, in the embodiment of the present disclosure, the display effect includes the display effect of an indicator light, a backlight and a display screen. Thus, the display effect of the indicator light can attract the attention of the target object to the first display device, the display effect of the backlight can attract the attention of the target object to the display screen, and the display effect of the display screen can make the target object be interested in product information of the first product, thereby attracting more traffic for the first product.

[0056] Specifically, in some embodiments, the display effect of the indicator light includes a flashing frequency of the indicator light and/or a brightness of the indicator light, the display effect of the backlight includes a brightness of the backlight, and the first distance is negatively correlated with the flashing frequency of the indicator light, the brightness of the indicator light, and/or the brightness of the backlight.

[0057] In an embodiment of the present disclosure, the first distance is negatively correlated with the flashing frequency of the indicator light, the brightness of the indicator light, and/or the brightness of the backlight. That is, with the first distance decreases or the range level of the first distance lowers, the flashing frequency of the indicator light

increases, and the brightness of the indicator light increases and/or the brightness of the backlight increases. With the first distance increases or the range level of the first distance improves, the flashing frequency of the indicator light decreases, and the brightness of the indicator light and/or the brightness of the backlight decreases. The flashing frequency of the indicator light increasing means that the flashing frequency within a recognizable range of the target object gets high, and the the flashing frequency of the indicator light decreasing means that the flashing frequency within the recognizable range of the target object gets low. The range level of the first distance refers to grouping the first distance into different ranges, and the range level lowers with the distance from the first display device reduces, and the range level raises with the the distance from the first display device increases.

[0058] In other embodiments, the display effect of the indicator light includes a flashing frequency of the indicator light and/or a brightness of the indicator light, and the display effect of the backlight includes brightness of the backlight, and the first distance is positively related to the flashing frequency of the indicator light, a brightness of the indicator light, and/or the brightness of the backlight.

[0059] In an embodiment of the present disclosure, the first distance is positively related to the flashing frequency of the indicator light, the brightness of the indicator light and/or the brightness of the backlight. That is, as the first distance decreases or the range level of the first distance lowers, the flashing frequency of the indicator light reduces, the brightness of the indicator light lowers and/or the brightness of the backlight lowers; and as the first distance increases or the range level of the first distance raises, the flashing frequency of the indicator light increases and the brightness of the indicator light and/or the brightness of the backlight increases.

[0060] It can be understood that, in the embodiment of the present disclosure, the first distance is linearly related to the flashing frequency of the indicator light, the brightness of the indicator light and/or the brightness of the backlight, rather than that a fixed flashing frequency or a fixed brightness is used in any case. In this way, more traffic can be attracted for the first product, thereby saving energy.

[0061] In the embodiment of the present disclosure, the embodiment in which the display contents of the display screen of the first display device corresponding to different first distances or different ranges of first distances are different is not limited. Exemplarily,

in some embodiments, as the first distance decreases or the range level of the first distance lowers, the display content may be adjusted to be in different animation forms. The animation forms include bouncing, random lines, wave shapes and the like. The displayed content can also be enlarged in a stepped manner based on the size of the distance or the level of the distance range. The display content of the display screen can also be adjusted as advertisements, etc.

[0062] In some embodiments, the enhancement of the display effect of the first display device includes highlighting promotion information of the first product on the display screen of the first display device.

[0063] It is understood that in embodiments of the present disclosure, the promotion information of the first product is highlighted on the display screen of the first display device. In this way, the target object can be attracted to the promotional product and the promotion information of the promotional product can be provided to the target object.

[0064] An implementation of highlighting promotion information of the first product on the display screen of the first display device is not limited in the embodiment of the present disclosure. Exemplarily, promotion information of the first product may be highlighted by adjusting display parameters of the display screen, for example, by raising the display contrast and display brightness of the display screen. The promotion information of the first product may also be highlighted by adjusting the display content on the display screen, for example, by enlarging the promotion information (i.e., discounts information, cash back information) in the display content, or displaying the promotion information in a different color. In a word, the promotional product can be distinguished from the non-promotional product, that is to say, the display effect of promotional product is different from that of the non-promotional product.

[0065] In some embodiments, an electronic device or processor determines that the first product is a promotional product and enhances a display effect of the first display device, in the case that a target object is not detected by the first display device and a wireless signal transmitted by at least one second display device is not received by the first display device.

[0066] It can be understood that, in the embodiment of the present disclosure, in the case that a target object is not detected by the first display device and a wireless signal

transmitted by at least one second display device is not received by the first display device, and if the first product is a promotional product, the display effect of the first display device is enhanced. In this way, the first product can be noticed by a distant target object, and the traffic of the product can be improved.

[0067] An implementation of enhancing the display effect of the first display device is not limited in the embodiment of the present disclosure. Exemplarily, in some embodiments, the enhancing the display effect of the first display device includes highlighting at least one of a flashing frequency of an indicator light, the brightness of the indicator light, the color of the indicator light, the brightness of a backlight, and the color of the backlight.

[0068] In other embodiments, the enhancing the display effect of the first display device includes highlighting the promotion information of the first product on the display screen of the first display device.

[0069] It can be understood that, in an embodiment of the present disclosure, at least one of the flashing frequency of the indicator light, the brightness of the indicator light, the color of the indicator light, the brightness of a backlight, and the color of the backlight is highlighted and/or the promotion information of the first product is highlighted on the display screen of the first display device. Thus, the target object can be attracted to the promotional product and the promotion information of the promotional product can be provided to the target object.

[0070] An implementation of highlighting at least one of the flashing frequency of an indicator light, the brightness of the indicator light, the color of the indicator light, the brightness of a backlight, and the color of the backlight is not limited in the embodiment of the present disclosure. As an example, the flashing frequency of the indicator light may be set to be different from the flashing frequency of the indicator light of the non-promotional product, the brightness of the indicator light may be set to be higher than the brightness of the indicator light of the non-promotional product, the color of the indicator light may be set to be different from the color of the indicator light of the non-promotional product, the brightness of the backlight may be set to be higher than the brightness of the backlight of the non-promotional product, and the color of the backlight may be set to be different from the color of the backlight of the non-promotional product. Alternatively, the above exemplary embodiments are combined. In a word, the

promotional product can be distinguished from non-promotional products, that is to say, the display effect of promotional product is different from that of the non-promotional product.

[0071] An implementation of highlighting promotion information of the first product on the display screen of the first display device is not limited in the embodiment of the present disclosure. Exemplarily, promotion information of the first product may be highlighted by adjusting display parameters of the display screen, for example, by raising the display contrast and the display brightness of the display screen. The promotion information of the first product can also be highlighted by adjusting the display content on the display screen; for example, by enlarging the promotion information (i.e., discounts information, cash back information) in the display content, or displaying the promotion information in the display content in a different color. In a word, the promotional product can be distinguished from the non-promotional product, that is to say, the display effect of promotional product is different from that of the non-promotional product.

[0072] The embodiment of the present disclosure provides a display control method. Fig. 2 is a second schematic diagram of an implementation flow of the display control method provided by the embodiment of the present disclosure. As shown in Fig. 2, the method includes the following operations 201 to 206.

[0073] At operation 201, the display effect of the first display device is enhanced when the target object is detected by the first display device. The display effect of the first display device includes: a display effect of the indicator light of the first display device and/or the backlight of a display screen, and/or a display content of the display screen of the first display device. The display effect of the indicator light includes a flashing frequency of the indicator light and/or a brightness of the indicator light, and the display effect of the backlight includes brightness of the backlight. The first distance is negatively correlated with the flashing frequency of the indicator light, a brightness of the indicator light, and/or the brightness of the backlight;

[0074] At operation 202, the wireless signal is transmitted when the target object is detected by the first display device.

[0075] At operation 203, a second distance between the first display device and the second display device which transmits the wireless signal is determined according to a

signal reception strength of the wireless signal received by the first display device, when no target object is detected by the first display device and the wireless signal transmitted by at least one second display device is received by the first display device. The wireless signal is transmitted by the second display device when the target object is detected, and the second display device is used for displaying product information of the second product.

[0076] At operation 204, the first distance is determined according to the second distance corresponding to at least one second display device. The first distance is equal to a minimum distance of the second distance corresponding to at least one second display device;

[0077] At operation 205, a display effect of the first display device is controlled according to the first distance. Different first distances or first distances in different ranges correspond to different display effects. The display effect of the first display device includes: a display effect of the indicator light of the first display device and/or the backlight of a display screen, and/or a display content of the display screen of the first display device. The display effect of the indicator light includes a flashing frequency of the indicator light and/or a brightness of the indicator light, and the display effect of the backlight includes brightness of the backlight. The first distance is negatively correlated with the flashing frequency of the indicator light, a brightness of the indicator light, and/or the brightness of the backlight.

[0078] At operation 206, the display effect of the first display device is enhanced in response to determining the first product is a promotional product, when no target object is detected by the first display device and the wireless signal transmitted by at least one second display device is not received by the first display device.

[0079] In the embodiment of the present disclosure, a first distance between a first display device and a target object is determined, and a display effect of the first display device is controlled according to the first distance. Different first distances or first distances in different ranges correspond to different display effects. Thus, the display effect of the first display device is controlled dynamically and flexibly, to attract more target objects to notice the first product. Different first distances or first distances in different ranges correspond to different display effects, and the same display effect is kept under any circumstances, thereby attracting more traffic to the first product while saving

unnecessary energy consumption.

[0080] An exemplary application of the embodiments of the present disclosure in a practical application scenario is described below.

[0081] In an embodiment of the present disclosure, a method for applying an electronic tag having a backlight or indicator light (i.e. a possible embodiment of the first display device) for merchandise promotion is provided. The method relates to the field of electronic tags (i.e. a possible embodiment of the first display device) and is mainly applied to price, product information display, promotion discounts and the like on shelves. Fig. 3 is a schematic diagram of installation of the electronic tag provided by the embodiment of the present disclosure. As shown in Fig. 3, 301 denotes a shelf, 302 denotes an electronic tag, 303 denotes a partition plate, and 304 denotes a commodity placement area.

[0082] At present, the electronic tag products in the market are all the same, which can only display contents of the electronic tag fixedly, or change contents of the discount promotion during the discount period. This does not facilitate highlighting the relevant information of the discount promotional products, and since the electronic tag having backlight keeps the brightness of backlight or the brightness of indicator light all the time, energy saving and environmental protection is affected.

[0083] In the embodiment of the present disclosure, the surrounding environment is sensed through sensors, and information on the display screen and the brightness of the backlight or the indicator light of the display screen in electronic tags (a possible embodiment of the first display device) can be adjusted intelligently, thereby achieving energy-saving, and cool and interesting effects, and raising the attention of products.

[0084] A human sensing sensor is installed on an electronic tag (a possible embodiment of the first display device), and a cool effect of prompting configurable product promotion can be realized by wireless communication and other technologies, and software algorithms, and scale effect. The electronic tag is shown in Fig. 4, where 401 denotes an indicator light, 402 denotes a human sensing sensor, and 403 denotes a display screen.

[0085] In the method, whether there is a person (a possible embodiment of the target object) in front of the electronic tag (i.e. a possible embodiment of the first display device) is detected through a human sensing sensor. The sensor includes but is not limited to

human infrared sensing, radar and other detection technologies. If there is no person in front of the electronic tag, the product promotional is prompted by flashing of the indicator light or a brightness change of the backlight according to a set product promotion scheme, so as to attract the attention of distant crowds. If there is a person or someone approaches, the signal indicating that the person (i.e. a possible embodiment of the target object) is detected is sent according to wireless communication and other means.

[0086] An electronic tag that has not detected a person (i.e. a possible embodiment of the first display device) can receive a wireless signal transmitted by an electronic tag that has detected a person (i.e. a possible embodiment of the second display device), and the distance between the electronic tag (i.e. one possible embodiment of the first display device) which receives the wireless signal and each electronic tag (i.e. a possible embodiment of the at least one second display device) is determined based on strength of the received wireless signal, and the backlight, the indicator light, or display content of the screen is adjusted based on the distance, thereby achieving a cool effect of light surrounding when someone (i.e. a possible embodiment of the target object) passes by. In addition, an electronic tag having a different flashing or a different brightness from the surrounding electronic tag is set for the promotional product, to reflect the discount strength, and highlight the promotional products. Fig. 5 is a schematic diagram of a wireless radiation model of an electronic tag provided by the embodiment of the present disclosure. As shown in Fig. 5, both 501 and 502 indicate that a person is detected.

[0087] The electronic tag (i.e., the first display device) in the method transmits a wireless signal to a surrounding electronic tag (which can be understood as another display device which receives the wireless signal transmitted by the first display device) by using a wireless transceiver upon detecting a person (i.e., a possible embodiment of the target object).

[0088] The electronic tag (i.e., the first display device) is in a wireless reception state when no person is detected, and in this case, the electronic tag can receive a wireless signal of another electronic tag (i.e., a possible embodiment of the second display device) by which a person is detected, and the wireless signal is received by the wireless transceiver and a Received Signal Strength Indication RSSI is evaluated. Because the RSSI is related to transmission power and a distance. Thus, under a fixed transmission power condition, an approximate distance D of the electronic tag (i.e. a possible

embodiment of the first display device) which receives the wireless signal relative to the electronic tag (i.e. a possible embodiment of the second display device) which transmits the wireless signal can be evaluated using the RSSI at a fixed transmission power condition.

[0089] Since different wireless chip manufacturers have different standards, accuracy and granularity for evaluating the strength of wireless received signal, it is necessary to re-calibrate a parameter when evaluating the distance between the electronic tag (i.e., a possible embodiment of the first display device) which receives the wireless signal and the electronic tag (i.e., a possible embodiment of the second display device) which transmits the wireless signal by using RSSI of the wireless signals. Here, a fitting function having high similarity between a part of a function curve and the Fries transmission formula is used to evaluate the distance. The fitting function is shown in formula (2).

$$D = 10^{\left(\frac{|RSSI| - A}{10 \times n}\right)} \quad (2)$$

[0090] D denotes the distance in meters. A denotes an RSSI value received at a fixed transmit power at 1 meter, and n denotes an attenuation factor. A and n are calibrated using the formula, and the RSSI of the wireless signal received by the electronic tag (i.e. a possible embodiment of the first display device) is substituted into the formula (2). Therefore, an approximate distance D of the electronic tag which receives the wireless signal (i.e. a possible embodiment of the first display device) relative to the electronic tag which transmits the wireless signal (i.e. a possible embodiment of the second display device) can be calculated.

[0091] In the embodiment of the present disclosure, a distance between the electronic tag which receives the wireless signal (i.e. a possible embodiment of the first display device) and the electronic tag which transmits the wireless signal (i.e. a possible embodiment of the second display device) is grouped into different distance levels. With the distance between the electronic tag (i.e. a possible embodiment of the second display device) by which the target object is detected and the electronic tag (i.e. a possible embodiment of the first display device) which receives the wireless signal decreases, that is, the distance level lowers, the brightness of the electronic tag (i.e. a possible embodiment of the first display device) which receives the wireless signal increases, and the brightness decreases gradually according to the distance level, so that a light gradient

can be displayed under the scale effect. If the electronic tag (i.e. one possible embodiment of the first display device) simultaneously receives wireless signals transmitted by multiple surrounding electronic tags (i.e. at least one second display device) by which a target object is detected, the minimum distance of the distances between the electronic tags (i.e. one possible embodiment of the second display device) by which the target object is detected and the electronic tag (i.e. one possible embodiment of the first display device) which receives the wireless signal is taken as the first distance.

[0092] If the electronic tag (i.e. one possible embodiment of the first display device) does not detect the target object and does not receive the wireless signal transmitted by the surrounding electronic tag (i.e. one possible embodiment of the second display device), the commodity information is displayed according to a preset rule.

[0093] In the embodiment of the present disclosure, a light effect of different colors or a varying brightness can be displayed for the discounted product with the method, thereby making the distant person notice the discounted product and improving the showing traffic of the product. Also, the brightness of backlight or indicator light of the electronic tag (i.e., a possible embodiment of the first display device) of a nearby commodity can be raised when someone approaches the commodity, and an electronic tag (i.e., a possible embodiment of the first display device) in other areas is kept in a low brightness, thereby preventing certain light pollution and implementing energy saving. With the set discount rules, the product with a big discount is displayed with a high brightness, to further highlight the discount effect, and attract more traffic. A person approaching the accessory shelf is enveloped by light illuminated by the electronic tag (i.e. a possible embodiment of the first display device) using the scale effect with the method, and the light can move with the person, thus achieving a color effect.

[0094] Fig. 6 is a third schematic diagram of an implementation flow of the display control method provided by the embodiment of the present disclosure. As shown in Fig. 6, the method includes the following operations 601 to 609.

[0095] At operation 601, the signal is detected by the infrared sensor in the electronic tag 1. The electronic tag 1 is an example of the first display device.

[0096] At operation 602, whether an infrared detector detects a person by the infrared sensor in the electronic tag 1. The method proceeds to operation 603 if the infrared

detector detects a person, and the method proceeds to operation 606 if no person is detected by the infrared detector.

[0097] At operation 603, broadcast information (i.e., a wireless signal) is transmitted to by the electronic tag 1.

[0098] At operation 604, a first distance in relative to a person (i.e. an example of the target object) is determined by the electronic tag 1. If a person is detected, it indicates the distance is closest, and the first distance is set to 0;

[0099] At operation 605, the display brightness is raised and the promotion information is highlighted by the electronic tag 1 according to the first distance, and then the method proceeds to operation 602. The display brightness comprises display brightness of an indicator light and/or display brightness of the backlight. The highlighting display contents of the display screen can be implemented by adjusting a display parameter of the display screen, for example, raising a display contrast of the display screen and raising the display brightness of the display screen, or by adjusting the display contents on the display screen, for example, enlarging the promotion information (i.e., discounts information, cash back information) in the display content, or displaying the promotion information in the display content in a different color.

[00100] At operation 606, whether broadcast information transmitted by at least one electronic tag 2 (i.e. an example of at least one second display device) is received is determined by the electronic tag 1. The method proceeds to operation 607 if the broadcast information is received, and the method proceeds to operation 609 if no broadcast information is received.

[00101] At operation 607, a second distance is determined by the electronic tag 1 according to signal strength of the received broadcast information. The second distance includes a second distance which is determined based on received the broadcast information transmitted by each electronic tag 2;

[00102] At operation 608, the minimum one among the second distance is taken as the first distance by the electronic tag 1, and the method proceeds to operation 605.

[00103] At operation 609, commodity default options are displayed by the electronic tag 1, and the method proceeds to operation 602. The displayed commodity default options

include enhancing a display effect in response to determining that a commodity (i.e. an example of a first commodity) displayed by the electronic tag 1 is a promotional product. The display effect includes a flashing frequency of the indicator light and/or brightness of the indicator light, and/or brightness of the backlight, and/or display content of the display screen of the first display device.

[00104] Fig. 7 is a schematic structural diagram of the electronic tag provided by the embodiment of the present disclosure. As shown in Fig. 7, the electronic tag 302 includes five basic modules, through which the electronic tag realizes the purpose of intelligently adjusting the backlight. The five basic modules include a human sensing sensor 3021, a backlight or indicator light 3022 brightness of which can be adjusted, a display screen 3023, and a wireless transceiver module 3024 which can measure the strength of wireless signal or the communication quality, and a micro controller unit (MCU) 3025 as a core control algorithm module of the device. The MCU 3025 is the core that the whole electronic tag 302 can adjust the display effect intelligently and coordinatively.

[00105] It should be noted that in the embodiment of the present disclosure, an ink screen product may also be used as a possible embodiment of the first display device.

[00106] It should be noted that although the various operations of the method in the present disclosure are described in a particular order in the drawings, it is not required or implied that these operations must be performed in that particular order, or that all the illustrated operations must be performed to achieve the desired results. Additionally or alternatively, certain operations may be omitted, a plurality of operations may be merged into one operation for execution, and/or a operations may be divided into a plurality of operations for execution, and the like; alternatively, the operations in different embodiments are combined into a new technical solution.

[00107] Based on the foregoing embodiment, the embodiment of the present disclosure provides a display control device. The modules in the display control device and units included in each module may be realized by a processor or an electronic device and may also be realized by a specific logic circuit. In the implementation process, the processor can be an Artificial Intelligence (AI) acceleration engine (such as a network processing unit (NPU), etc.), a graphic processing unit (GPU), a central processing unit (CPU), a microprocessor (MPU), a digital signal processor (DSP) or a field programmable gate array (FPGA), etc.

[00108] Fig. 8 is a schematic structural diagram of a display control device provided by the embodiment of the present disclosure. As shown in Fig. 8, the device 80 includes a determination module 801 and a control module 802.

[00109] The determination module 801 is configured to determine a first distance between a first display device and a target object. The first display device is used for displaying product information of a first product.

[00110] The control module 802 is configured to control a display effect of the first display device according to the first distance. Different first distances or first distances in different ranges correspond to different display effects.

[00111] In some embodiments, the determination module configured to determine the first distance between the first display device and the target object is configured to determine the first distance between the first display device and the target object according to a wireless signal transmitted by at least one second display device received by the first display device. The wireless signal is transmitted by the second display device when the target object is detected by the second display device, and the second display device is used for displaying product information of a second product.

[00112] Further, in some embodiments, the determination module configured to determine the first distance between the first display device and the target object according to the wireless signal transmitted by at least one second display device received by the first display device is configured to determine a second distance between the first display device and the second display device which transmits the wireless signal according to a signal reception strength of the wireless signal received by the first display device, and determine the first distance according to the second distance corresponding to at least one second display device.

[00113] In some embodiments, the first distance is equal to a minimum distance among the second distance corresponding to at least one second display device.

[00114] In some embodiments, the first distance between the first display device and the target object is determined according to the wireless signal transmitted by at least one second display device received by the first display device, when the first display device does not detect the target object and receives the wireless signal transmitted by at least one second display device.

- [00115] In some embodiments, the device is further configured to transmit a wireless signal when a target object is detected by the first display device.
- [00116] In some embodiments, the device is further configured to enhance a display effect of the first display device when the target object is detected by the first display device.
- [00117] In some embodiments, the display effect of the first display device includes a display effect of an indicator light of the first display device and/or a display effect of a backlight of the display screen, and/or the display content of the display screen of the first display device.
- [00118] Further in some embodiments, the display effect of the indicator light includes a flashing frequency of the indicator light and/or a brightness of the indicator light, and the display effect of the backlight includes brightness of the backlight, and the first distance is negatively correlated with a flashing frequency of the indicator light, a brightness of the indicator light, and/or a brightness of the backlight.
- [00119] In some embodiments, the device is further configured to enhance the display effect of the first display device in response to determining that the first product is a promotional product when the first display device does not detect the target object and does not receive a wireless signal transmitted by at least one second display device.
- [00120] The description of the above device embodiment is similar to the description of the above method embodiment and has the same beneficial effect as the method embodiment. For the technical details not disclosed in the embodiments of the device in present disclosure, reference can be made to the description of the method embodiments in the present disclosure for understanding.
- [00121] It should be noted that the division of the modules in the embodiment of the present disclosure is schematic and is only a logical function division, and the modules can be divided in another mode in actual implementation. In addition, the functional units in various embodiments of the present disclosure may be integrated in one processing unit, may be physically present alone, or two or more units may be integrated in one unit. The integrated unit may be realized either in the form of hardware or in the form of software functional unit, and may also be realized by combining software and hardware.

[00122] It should be noted that, in the embodiment of the present disclosure, if the method is implemented in the form of a software function module and sold or used as an independent product, the method may also be stored in a computer-readable storage medium. Based on this understanding, an essence part or a part contributing to the relevant technology in the technical solution of the embodiments of the present disclosure may be embodied in the form of a software product. The computer software product is stored in a storage medium, and includes instructions for causing the electronic device or processor to perform all or part of the methods described in the various embodiments of the present application. The aforementioned storage media includes various media capable of storing program codes, such as a U disk, a mobile hard disk, a read only memory (ROM), a magnetic disk or an optical disk. Thus embodiments of the present disclosure are not limited to any particular combination of hardware and software.

[00123] Embodiments of the present disclosure provide an electronic device. Fig. 9 is a schematic structural diagram of the electronic device provided by the embodiment of the present disclosure. As shown in Fig. 9, the electronic device 90 includes a memory 901 and a processor 902, the memory 901 has a computer program stored thereon which can be operated on the processor 902. When the processor 902 executes the program, the processor 902 can implement the operations in the method provided in the above embodiment. In some embodiments, the electronic device may be an electronic tag, an ink screen, a color screen or the like. The electronic tag can be applied to shelves for displaying/exhibiting merchandise or products, as well as to shelves in warehouses.

[00124] It should be noted that the memory 901 is configured to store instructions and applications executable by the processor 902, and may also cache data (e.g. image data, audio data, voice communication data and video communication data) to be processed or already processed by modules in the processor 902 and the electronic device 90, which may be implemented by a FLASH (FLASH) or a random access memory (RAM).

[00125] The embodiments of the present disclosure provide a computer-readable storage medium having stored thereon a computer program that, when executed by a processor, implements the operations in the method provided in the above embodiments.

[00126] The embodiments of the present disclosure provide a computer program product comprising a computer program or instruction that, when executed by a processor, implements the operations in the method provided in the above embodiments.

[00127] It should be pointed out that the above description of the storage medium and device embodiments is similar to the above description of the method embodiments and has similar beneficial effects as the method embodiments. Technical details not disclosed in the embodiments of the storage media and devices of the present disclosure are understood with reference to the description of the embodiments of the method of the present disclosure.

[00128] It should be understood that the term “an embodiment” or “one embodiment” or “some embodiments” mentioned throughout the specification means that particular features, structures, or characteristics related to the embodiments are included in at least one embodiment of the present disclosure. Thus, the terms “in one embodiment” or “in an embodiment” or “in some embodiments” appearing throughout the specification do not necessarily refer to the same embodiment. Further, these particular features, structures or characteristics may be combined in any suitable manner in one or more embodiments. It should be understood that in various embodiments of the present disclosure, the size of the sequence number of the above-mentioned processes does not mean the order of execution, and the execution order of each process should be determined by its function and inherent logic, and should not be a limitation for the implementation process of the embodiments of the present disclosure. The above sequence numbers of the embodiments of the present disclosure are for description only and do not represent the advantages and disadvantages of the embodiments. The above description of the various embodiments tends to emphasize the differences between the various embodiments, and regarding the same or similar parts of the embodiments, reference may be made to each other, and the description for the same or similar parts are not repeated herein for the sake of brevity.

[00129] The term “and/or” in the present disclosure only represents an association relationship for describing associated objects, and indicates that there can be three relationships. For example, object A and/or object B can mean that object A exists alone, object A and object B exist simultaneously, and object B exists alone.

[00130] It should be noted that, the terms “comprising”, “including”, or any other variation thereof as used herein, are intended to encompass non-exclusive inclusion such that a process, method, article or device that includes a set of elements includes not only those elements but also other elements not explicitly listed, or includes also elements inherent to such a process, method, article or device. In the absence of further limitations,

an element defined by the phrase “includes an ...” does not preclude the presence of another identical element in the process, method, article or equipment which includes the elements.

[00131] It should be understood that in several embodiments provided herein, the disclosed device and method may be implemented in other ways. The above-described embodiments are only schematic, for example, the division of the modules is only a logical function division, and in practice there may be other division modes. For example, multiple modules or components can be combined, or can be integrated into another system, or some features can be ignored or not implemented. In addition, the coupling, or direct coupling, or communication connection between the various components shown or discussed may be indirect coupling or communication connection through some interface, device or module, and may be electrical, mechanical, or other form.

[00132] The modules described above as separate components may or may not be physically separated, and the components displayed as modules may or may not be physical modules. That is, the modules may be located in one place or distributed to multiple network elements, and a part or all of the modules can be selected according to the actual needs to achieve the purpose of the embodiment.

[00133] In addition, the functional modules in the embodiment of the present disclosure may be all integrated in one processing unit, each module can be separately used as a unit, and two or more modules can be integrated in one unit. The above-mentioned integrated modules can be realized either in the form of hardware or in the form of hardware and software functional units.

[00134] One of ordinary skill in the field may appreciate that all or part of the operations for implementing the above method embodiments may be implemented by means of program instructions associated with hardware, the aforementioned program may be stored in a computer readable storage medium, and the program, when executed, performs the operations including the above method embodiments. The aforementioned storage media includes various media capable of storing program codes, such as a removable storage device, a read only memory (ROM), a magnetic disk or an optical disk.

[00135] Alternatively, the integrated units of the present disclosure may be stored in a computer readable storage medium if implemented in the form of software functional

modules and sold or used as stand-alone products. Based on this understanding, an essence part or a part contributing to the related technology in the technical solution of the embodiments of the present disclosure may be embodied in the form of a software product. The computer software product is stored in a storage medium, including instructions for causing the electronic device or processor to perform all or part of the methods described in the various embodiments of the present disclosure. The aforementioned storage media includes various media capable of storing program codes, such as a removable storage device, a ROM, a magnetic disk or an optical disk.

[00136] The methods disclosed in several method embodiments provided in the present disclosure can be arbitrarily combined without conflict to obtain new method embodiments.

[00137] The features disclosed in several product embodiments provided in the present disclosure can be arbitrarily combined without conflict to obtain new product embodiments.

[00138] The features disclosed in several methods or device embodiments provided in the present disclosure can be arbitrarily combined without conflict to obtain new method embodiments or device embodiments.

[00139] The foregoing is only an embodiment of the present disclosure, but the scope of protection of the present disclosure is not limited thereto. The changes or substitutions within the technical scope disclosed in the present disclosure conceived easily by any technical person familiar with the technical field should be within the scope of protection of the present disclosure. Therefore, the scope of protection of the present disclosure shall be subject to the scope of protection of the claims.

CLAIMS

1. A display control method, comprising:
 - determining a first distance between a first display device and a target object, wherein the first display device is used for displaying product information of a first product; and
 - controlling a display effect of the first display device according to the first distance, wherein different first distances or first distances in different ranges correspond to different display effects.
2. The method of claim 1, wherein the determining the first distance between the first display device and the target object comprises:
 - determining the first distance between the first display device and the target object according to wireless signals which are transmitted by one or more second display devices and received by the first display device,
 - wherein the wireless signal is transmitted by the second display device in response to the target object being detected by the second display device, and the second display device is used for displaying product information of a second product.
3. The method of claim 2, wherein the determining the first distance between the first display device and the target object according to the wireless signals transmitted by one or more second display devices and received by the first display device comprises:
 - determining a second distance between the first display device and each of the one or more second display device which transmits the wireless signal according to a signal reception strength of the wireless signal received by the first display device; and
 - determining the first distance according to the second distances respectively corresponding the one or more second display devices.
4. The method of claim 3, wherein the first distance is equal to a minimum distance of the second distances respectively corresponding to the one or more second display devices.
5. The method according to any one of claims 2 to 4, wherein,
 - determining the first distance between the first display device and the target object according to the wireless signals which are transmitted by the one or more second display devices and received by the first display device, when no target object is detected by the first

display device and the wireless signals transmitted by the one or more second display devices are received by the first display device.

6. The method according to any one of claims 2 to 5, further comprising:
transmitting the wireless signal when the target object is detected by the first display device.

7. The method according to any one of claims 2 to 6, further comprising:
enhancing the display effect of the first display device when the target object is detected by the first display device.

8. The method according to claim 1 or 7, wherein the display effect of the first display device comprises: a display effect of the indicator light of the first display device, and/or a display effect of the backlight of a display screen of the first display device, and/or a display content of the display screen of the first display device.

9. The method according to claim 8, wherein the display effect of the indicator light comprises a flashing frequency of the indicator light and/or a brightness of the indicator light, and the display effect of the backlight comprises brightness of the backlight, and the first distance is negatively correlated with the flashing frequency of the indicator light, the brightness of the indicator light, and/or the brightness of the backlight.

10. The method according to any one of claims 2 to 9, further comprising:
enhancing the display effect of the first display device in response to determining the first product is a promotional product when no target object is detected by the first display device and no wireless signal transmitted by one or more second display devices is received by the first display device.

11. A display control device comprising:
a determination module configured to determine a first distance between a first display device and a target object, wherein the first display device is used for displaying product information of a first product; and

a control module configured to control a display effect of the first display device according to the first distance, wherein different first distances or first distances in different ranges correspond to different display effects.

12. An electronic device comprising a memory and a processor, the memory storing a computer program executable on the processor, wherein the processor implements the method of any one of claims 1 to 10 when executing the program.

13. A computer-readable storage medium having stored thereon a computer program, wherein the computer program, when executed by a processor, implements the method according to any one of claims 1 to 10.

14. A computer program product comprising a computer program or instruction, wherein the computer program or instruction, when executed by a processor, implements the method of any one of claims 1 to 10.