

DESCRIPTION

Title of Invention

ROUTE ESTIMATION APPARATUS

Technical Field

[0001]

The present invention relates to technology for estimating a route taken by a customer in a store.

Background Art

[0002]

Since improving the arrangement of products in a store leads to grasping of customer needs and improvement of customer satisfaction, and also leads to improvement of sales, this is a very important theme in business management.

On the other hand, in optimizing the arrangement of products in the store, it is important to know and analyze what kind of route the customer has taken in the store at the time of shopping.

[0003]

Under such a background, various technologies for knowing a customer's in-store route have been developed. For example, Patent Literature 1 discloses technology for acquiring behavior route information by acquiring a position of an individual customer in real time by image

analysis using cameras installed in a retail store.

Citation List

Patent Literature

[0004]

Patent Literature 1: JP 2021-174271 A

Summary of Invention

Technical Problem

[0005]

However, the conventional technology as described above has a problem that a system configuration is complicated and an amount of capital investment tends to be large because it is necessary to install a device such as a camera or a beacon in a store or it is necessary to analyze information acquired by such a device.

Therefore, in view of the above problems, an object of the present invention is to provide a route estimation apparatus that easily and inexpensively estimates a movement route of a customer in a store.

Solution to Problem

[0006]

An aspect of a route estimation apparatus disclosed herein includes: a purchased product information

acquisition unit that acquires product identification information of a product to be checked out by a user in a checkout place in a store; an in-store position specifying unit that specifies in-store position information corresponding to the product identification information of the product to be checked out, based on a product position storage unit storing the product identification information and the in-store position information being information indicating a place where the product identified by the product identification information is arranged in the store in association with each other; a mark plotting unit that plots a mark indicating the product identified by the product identification information corresponding to each of the in-store position information at a corresponding position on a sketch of the inside of the store for the specified in-store position information; and a route generation unit that draws a line connecting the plotted marks according to a predetermined rule on the sketch, and generates in-store route information indicating a route on which the user is estimated to have moved in the store.

Advantageous Effects of Invention

[0007]

A route estimation apparatus disclosed herein easily and inexpensively estimates a movement route of a customer

in a store.

Brief Description of Drawings

[0008]

Fig. 1 is a diagram illustrating an outline of a route estimation apparatus according to the present embodiment.

Fig. 2 is a functional block diagram of the route estimation apparatus according to the present embodiment.

Fig. 3 is a diagram illustrating an example of a product position storage unit according to the present embodiment.

Fig. 4 is a diagram illustrating processing by a mark plotting unit and a route generation unit according to the present embodiment.

Fig. 5 is a diagram illustrating a hardware configuration example of the route estimation apparatus according to the present embodiment.

Fig. 6 is a flowchart illustrating a flow of processing by the route estimation apparatus according to the present embodiment.

Description of Embodiments

[0009]

An embodiment of the present invention will be

described with reference to the drawings.

(Operation Principle of Route Estimation Apparatus
According to Present Embodiment)

[0010]

An operation principle of a route estimation apparatus (hereinafter, simply referred to as the "present apparatus") 100 according to the present embodiment will be described with reference to Figs. 1 to 4. Fig. 1 is a diagram illustrating a connection relationship between the present apparatus 100 and another apparatus, Fig. 2 is a functional block diagram of the present apparatus 100, and Figs. 3 and 4 are diagrams illustrating components of the present apparatus 100.

[0011]

As illustrated in Fig. 1, the present apparatus 100 is connected to a point of sales (POS) system that performs checkout for a product 240 in a checkout place 230 of a store 210 via a communication network 310. The communication network 310 may be in a form of a wired communication network or a form of a wireless communication network. The present apparatus 100 acquires product identification information 250 of the product 240 to be checked out by a user 300 at the checkout place 230 in the store 210 via the POS system.

[0012]

As illustrated in Fig. 2, the present apparatus 100 includes a product position storage unit 110, a purchased product information acquisition unit 120, an in-store position specifying unit 130, a mark plotting unit 140, and a route generation unit 150.

[0013]

The product position storage unit 110 stores product identification information 250 for identifying the product 240 to be sold in the store 210 and in-store position information 260 being information indicating a place where the product 240 identified by the product identification information 250 is arranged in the store 210 in association with each other. The present apparatus 100 may be in a form in which the product position storage unit 110 is not directly provided but the product position storage unit 110 is available via the communication network 310.

[0014]

Fig. 3 is a diagram illustrating an example of the product position storage unit 110. As illustrated in Fig. 3, the product position storage unit 110 stores, for example, product names: product (1), product (2), ..., product identification information 250: xxxx1, xxxx2, ..., and in-store position information 260: 3-5, 6-2, ... in association with each other. Here, the in-store position information 260: A-B may indicate a place (position) of an

A-th product shelf from the right and a B-th product shelf from the top in the store 210, but may indicate a place (position) by another specifying method.

[0015]

The purchased product information acquisition unit 120 acquires the product identification information 250 of the product 240 to be checked out by the user 300 in the checkout place 230 in the store 210. The purchased product information acquisition unit 120 may acquire the product identification information 250 of the product 240 to be checked out by the user 300 via the POS system.

[0016]

As illustrated in Fig. 3, for example, the purchased product information acquisition unit 120 acquires the product identification information 250: xxxx1, xxxx2, ... for the product (1), the product (2), ... to be purchased by the user 300.

[0017]

The in-store position specifying unit 130 refers to the product position storage unit 110 to specify the in-store position information 260 corresponding to the product identification information 250 acquired by the purchased product information acquisition unit 120.

[0018]

As illustrated in Fig. 3, for example, the in-store

position specifying unit 130 refers to the product position storage unit 110 for the product identification information 250: xxxx1, xxxx2, ... acquired by the purchased product information acquisition unit 120, and specifies the in-store position information 260: 3-5, 6-2,

[0019]

The mark plotting unit 140 plots a mark 280 indicating the product 240 identified by the product identification information 250 corresponding to each in-store position information 260 at a corresponding position on a sketch 270 of the inside of the store 210 for the in-store position information 260 specified by the in-store position specifying unit 130.

[0020]

Fig. 4 is a diagram illustrating an example of the sketch 270 of the inside of the store 210. As illustrated in Fig. 4, for example, the mark plotting unit 140 plots the marks 280 indicating the products 240: product (1), product (2), ... on the sketch 270 for the in-store position information 260: 3-5, 6-2, ... specified by the in-store position specifying unit 130.

[0021]

The route generation unit 150 draws, on the sketch 270, a line connecting the marks 280 plotted by the mark plotting unit 140 according to a predetermined rule,

thereby generating in-store route information 290 indicating a route on which the user 300 is estimated to have moved in the store 210.

Here, the route generation unit 150 may draw a line connecting the marks 280 from the side closer to a store entrance 220 to the side farther from the store entrance on the sketch 270.

[0022]

As illustrated in Fig. 4, for example, the route generation unit 150 draws a line from the mark 280 related to the product (1) closest to the store entrance 220 to the mark 280 related to the product (2) second closest to the store entrance on the sketch 270, and then draws a line from the mark 280 related to the product (2) second closest to the store entrance to the mark 280 related to the product (3) third closest to the store entrance on the sketch. Thereafter, similarly, the route generation unit 150 draws a line from the mark 280 related to the product (3) to the mark 280 related to the product (4), a line from the mark 280 related to the product (4) to the mark 280 related to the product (5), and a line from the mark 280 related to the product (5) to the mark 280 related to the product (6).

[0023]

By such processing, since it is possible to estimate

what kind of movement route the user 300 has taken in shopping in the store 210, it is possible to obtain basic information for analyzing and improving the product arrangement of the store 210.

[0024]

In the sketch 270, the route generation unit 150 may draw a line connecting the mark 280 farthest from the store entrance 220 and the checkout place 230.

[0025]

In addition, the route generation unit 150 may draw a line connecting the store entrance 220 and the mark 280 closest to the store entrance 220 in the sketch 270.

[0026]

With such processing, since it is possible to estimate what kind of movement route the user 300 has taken from the store entrance 220 to the checkout place 230 in shopping in the store 210, it is possible to obtain basic information for analyzing and improving the product arrangement of the store 210.

[0027]

Note that the route generation unit 150 may set each line connecting the store entrance 220, the mark 280, and the checkout place 230 as an oriented line segment from the store entrance 220 toward the checkout place 230. In this way, the movement route of the user 300 in the store 210

including the movement direction can be recognized at a glance.

[0028]

As illustrated in Fig. 4, for example, in the sketch 270, the route generation unit 150 draws a line from the store entrance 220 to the mark 280 related to the product (1) closest to the store entrance 220, and a line from the mark 280 related to the product (6) farthest from the store entrance 220 to the checkout place 230.

[0029]

Based on the above operation principle, the present apparatus 100 easily and inexpensively estimates the movement route of the customer 300 in the store 210 without requiring a sensing device such as a camera or a beacon or analysis of data acquired by such a device.

(Hardware Configuration of Route Estimation
Apparatus According to Present Embodiment)

[0030]

A hardware configuration example of the present apparatus 100 will be described with reference to Fig. 5. Fig. 5 is a diagram illustrating an example of a hardware configuration of the present apparatus 100. As illustrated in Fig. 5, the present apparatus 100 includes a central processing unit (CPU) 510, a read-only memory (ROM) 520, a random access memory (RAM) 530, an auxiliary storage device

540, a communication I/F 550, an input device 560, a display device 570, and a storage medium I/F 580.

[0031]

The CPU 510 is a device that executes a program stored in the ROM 520, and performs arithmetic operation processing on data developed (loaded) in the RAM 530 according to a command of the program to control the entire present apparatus 100. The ROM 520 stores programs and data executed by the CPU 510. When the CPU 510 executes the program stored in the ROM 520, the program to be executed and data are developed (loaded) in the RAM 530, and the RAM 530 temporarily holds arithmetic operation data during arithmetic operation.

[0032]

The auxiliary storage device 540 is a device that stores an operating system (OS) that is basic software, an application program according to the present embodiment, and the like together with related data. The auxiliary storage device 540 is, for example, a hard disk drive (HDD) or a flash memory.

[0033]

The communication I/F 550 is an interface that is connected to the communication network 310 such as a wired or wireless local area network (LAN) or the Internet and exchanges data with another apparatus (POS system or the

like) that provides a communication function.

[0034]

The input device 560 is a device such as a keyboard for inputting data to the present apparatus 100. The display device (output device) 570 is a device including a liquid crystal display (LCD) or the like, and is a device that functions as a user interface when a user uses the functions of the present apparatus 100 or performs various settings. The storage medium I/F 580 is an interface for transmitting and receiving data to and from a storage medium 590 such as a CD-ROM, a DVD-ROM, or a USB memory.

[0035]

Each unit included in the present apparatus 100 may be realized by the CPU 510 executing a program corresponding to each unit stored in the ROM 520 or the auxiliary storage device 540. In addition, each unit included in the present apparatus 100 may have a form in which processing related to each unit is realized as hardware. In addition, a program according to the present invention may be read from an external server device via the communication I/F 550, or the program according to the present invention may be read from the storage medium 590 via the storage medium I/F 580 to cause the present apparatus 100 to execute the program.

(Processing Example by Route Estimation Apparatus

According to Present Embodiment)

A flow of a processing example by the present apparatus 100 will be described with reference to Fig. 6. Fig. 6 is a flowchart illustrating a flow of the processing example by the present apparatus 100.

[0036]

In S10, the purchased product information acquisition unit 120 acquires the product identification information 250 of the product 240 to be checked out by the user 300 in the checkout place 230 in the store 210. The purchased product information acquisition unit 120 may acquire the product identification information 250 of the product 240 to be checked out by the user 300 via the POS system.

[0037]

As illustrated in Fig. 3, for example, the purchased product information acquisition unit 120 acquires the product identification information 250: xxxx1, xxxx2, ... for the product (1), the product (2), ... to be purchased by the user 300.

[0038]

In S20, the in-store position specifying unit 130 refers to the product position storage unit 110 to specify the in-store position information 260 corresponding to the product identification information 250 acquired in S10.

[0039]

As illustrated in Fig. 3, for example, the in-store position specifying unit 130 refers to the product position storage unit 110 for the product identification information 250: xxxx1, xxxx2, ... acquired by the purchased product information acquisition unit 120, and specifies the in-store position information 260: 3-5, 6-2,

[0040]

In S30, the mark plotting unit 140 plots the mark 280 indicating the product 240 identified by the product identification information 250 corresponding to each in-store position information 260 at the corresponding position on the sketch 270 of the inside of the store 210 for the in-store position information 260 specified in S20.

[0041]

Fig. 4 is a diagram illustrating an example of the sketch 270 of the inside of the store 210. As illustrated in Fig. 4, for example, the mark plotting unit 140 plots the marks 280 indicating the products 240: product (1), product (2), ... on the sketch 270 for the in-store position information 260: 3-5, 6-2, ... specified by the in-store position specifying unit 130.

[0042]

In S40, the route generation unit 150 draws, on the sketch 270, a line connecting the marks 280 plotted in S30

according to a predetermined rule, thereby generating the in-store route information 290 indicating a route on which the user 300 is estimated to have moved in the store 210.

Here, the route generation unit 150 may draw a line connecting the marks 280 from the side closer to a store entrance 220 to the side farther from the store entrance on the sketch 270.

[0043]

As illustrated in Fig. 4, for example, the route generation unit 150 draws a line from the mark 280 related to the product (1) closest to the store entrance 220 to the mark 280 related to the product (2) second closest to the store entrance on the sketch 270, and then draws a line from the mark 280 related to the product (2) second closest to the store entrance to the mark 280 related to the product (3) third closest to the store entrance on the sketch. Thereafter, similarly, the route generation unit 150 draws a line from the mark 280 related to the product (3) to the mark 280 related to the product (4), a line from the mark 280 related to the product (4) to the mark 280 related to the product (5), and a line from the mark 280 related to the product (5) to the mark 280 related to the product (6).

[0044]

By such processing, since it is possible to estimate

what kind of movement route the user 300 has taken in shopping in the store 210, it is possible to obtain basic information for analyzing and improving the product arrangement of the store 210.

[0045]

In S40, the route generation unit 150 may draw a line connecting the mark 280 farthest from the store entrance 220 and the checkout place 230 in the sketch 270.

[0046]

Further, in S40, the route generation unit 150 may draw a line connecting the store entrance 220 and the mark 280 closest to the store entrance 220 in the sketch 270.

[0047]

With such processing, since it is possible to estimate what kind of movement route the user 300 has taken from the store entrance 220 to the checkout place 230 in shopping in the store 210, it is possible to obtain basic information for analyzing and improving the product arrangement of the store 210.

[0048]

Note that the route generation unit 150 may set each line connecting the store entrance 220, the mark 280, and the checkout place 230 as an oriented line segment from the store entrance 220 toward the checkout place 230. In this way, the movement route of the user 300 in the store 210

including the movement direction can be recognized at a glance.

[0049]

As illustrated in Fig. 4, for example, in the sketch 270, the route generation unit 150 draws a line from the store entrance 220 to the mark 280 related to the product (1) closest to the store entrance 220, and a line from the mark 280 related to the product (6) farthest from the store entrance 220 to the checkout place 230.

[0050]

Based on the above operation principle, the present apparatus 100 easily and inexpensively estimates the movement route of the customer 300 in the store 210 without requiring a sensing device such as a camera or a beacon or analysis of data acquired by such a device.

[0051]

Although the embodiments of the present invention have been described in detail above, the present invention is not limited to the specific embodiments, and various modifications and changes can be made within the scope of the gist of the present invention described in the claims.

Reference Signs List

[0052]

100 route estimation apparatus
110 product position storage unit

120 purchased product information acquisition unit
130 in-store position specifying unit
140 mark plotting unit
150 route generation unit
210 store
220 store entrance
230 checkout place
240 product
250 product identification information
260 in-store position information
270 sketch
280 mark
290 in-store route information
300 user
310 communication network
510 CPU
520 ROM
530 RAM
540 auxiliary storage device
550 communication interface
560 input device
570 output device
580 storage medium interface
590 storage medium

CLAIMS

[Claim 1]

A route estimation apparatus comprising:

a purchased product information acquisition unit that acquires product identification information of a product to be checked out by a user in a checkout place in a store;

an in-store position specifying unit that specifies in-store position information corresponding to the product identification information of the product to be checked out, based on a product position storage unit storing the product identification information and the in-store position information being information indicating a place where the product identified by the product identification information is arranged in the store in association with each other;

a mark plotting unit that plots a mark indicating the product identified by the product identification information corresponding to each of the in-store position information at a corresponding position on a sketch of the inside of the store for the specified in-store position information; and

a route generation unit that draws a line connecting the plotted marks according to a predetermined rule on the sketch, and generates in-store route information indicating

a route on which the user is estimated to have moved in the store.

[Claim 2]

The route estimation apparatus according to claim 1, wherein the route generation unit draws, on the sketch, a line connecting the plotted marks from a side closer to the store entrance to a side farther from the store entrance.

[Claim 3]

The route estimation apparatus according to claim 2, wherein the route generation unit draws, on the sketch, a line connecting the mark farthest from the store entrance among the plotted marks and the checkout place.

[Claim 4]

The route estimation apparatus according to claim 3, wherein the route generation unit draws, on the sketch, a line connecting the store entrance and the mark closest to the store entrance among the plotted marks.

[Claim 5]

A route estimation method comprising:

a step of causing a purchased product information acquisition unit to acquire product identification information of a product to be checked out by a user in a checkout place in a store;

a step of causing an in-store position specifying unit to specify in-store position information corresponding

to the product identification information of the product to be checked out, based on a product position storage unit storing the product identification information and the in-store position information being information indicating a place where the product identified by the product identification information is arranged in the store in association with each other;

a step of causing a mark plotting unit to plot a mark indicating the product identified by the product identification information corresponding to each of the in-store position information at a corresponding position on a sketch of the inside of the store for the specified in-store position information; and

a step of causing a route generation unit to draw a line connecting the plotted marks according to a predetermined rule on the sketch, and generate in-store route information indicating a route on which the user is estimated to have moved in the store.

[Claim 6]

The route estimation method according to claim 5, wherein the route generation unit draws, on the sketch, a line connecting the plotted marks from a side closer to the store entrance to a side farther from the store entrance.

[Claim 7]

The route estimation method according to claim 6,

wherein the route generation unit draws, on the sketch, a line connecting the mark farthest from the store entrance among the plotted marks and the checkout place.

[Claim 8]

The route estimation method according to claim 7, wherein the route generation unit draws, on the sketch, a line connecting the store entrance and the mark closest to the store entrance among the plotted marks.

[Claim 9]

A route estimation program for causing a computer to execute the method according to any one of claims 5 to 8.