changes constantly, it is demanded to present information in a state as close as possible to the reality and instantly perceivable with respect to the timing of obtaining information, the type of information, and so on.

[0010] Embodiments of t~~T~~he present invention seek~~is made in view of such a problem, and it is an object thereof~~ to provide strengthened perception for allowing intuitive understanding by displaying information in real time in an overlaid manner at arbitrary timing by utilizing an augmented reality technology considering the current status of a navigation target in a constantly variable situation.

[0011] In the technology disclosed in Patent Literature 1, for example, it is possible that the navigation information may include information which is recommended by the shop side but is unnecessary for a user. On the other hand, the technology disclosed in Patent Literature 2 can display product information of a product to buy which is registered in the list in advance on the mobile terminal. However, it is not always the case that the user goes shopping at a time when a product is registered in the list, and thus it is possible that the product to buy is out of stock or the price of the product to buy is changed when the user goes shopping.

Moreover, in order to allow intuitive

understanding in an environment where the status changes constantly, such as the price of product or inventory status, it is demanded to present information in a state as close as possible to the reality and instantly perceivable with respect to the timing of obtaining information, the type of information, and so on.

[0012] Embodiments of t~~T~~he present invention also seek~~is made in view of such a problem, and it is a first object thereof~~ to provide a support for facilitating obtaining product information or guidance information of a product to buy at arbitrary timing.

[0013] Besides that, for example, in the structure as in Patent Literature 3, the car navigation system or the like needs to store map information of parking lots, which poses a problem that the map information of the car navigation system needs to be updated every time the parking lot is renovated, or the like.

[0014] Furthermore, in order to allow intuitive understanding in an environment where the status changes constantly, such as the status of a vacant space in a parking lot, it is demanded to present information in a state as close as possible to the reality and instantly perceivable with respect to the timing of obtaining information, the type of information, and so on.

[0015] Embodiments of t~~T~~he present invention also seek~~is made in view of such a problem, and it is a second object thereof~~

to provide a technology which allows a driver to find and reach a target vacant space, without updating map information of the car navigation system provided in a car, or even when the car navigation system is not provided in the car.

[0016] Besides that, in order to allow intuitive understanding in an environment where the status changes constantly, such as operation of a ship for example, it is demanded to present information in a state as close as possible to the reality and instantly perceivable with respect to the timing of obtaining information, the type of information, and so on.

[0017] Embodiments of t~~T~~he present invention further seek~~is made in view of such a problem, and it is a third object thereof~~ to provide information which is beneficial while a ship is cruising in a manner that a shipman or the like can intuitively comprehend the situation.

SOLUTION TO PROBLEM

[0018] According to a first aspect of the present invention, there is provided a information processing apparatus, comprising: a vacant space information obtaining unit obtaining vacant space information of a parking lot; a vehicle information obtaining unit obtaining a position and a direction of a car in the parking lot based on one or more image imaged by one ore more imaging device installed in the parking lot; a vacant space determining unit determining one

or more vacant space existing in a traveling direction of the car based on the vacant space information obtained in the vacant space information obtaining unit, the position and the direction of the car in the parking lot obtained in the vehicle information obtaining unit, and information related to position information of respective vacant spaces of a parking lot map stored in a storage device; a route determining unit determining one or more route from the car to the vacant space based on the vacant space determined in the vacant space determining unit, the position and the direction of the car in the parking lot obtained in the vehicle information obtaining unit, and the parking lot map; an image generating unit generating one or more virtual space image in the parking lot which includes one or more vacant space object indicating the vacant space determined in the vacant space determining unit and one or more guidance object indicating the route determined in the route determining unit and indicates a position of the vacant space; and a transmitting unit transmitting the virtual space image generated in the image generating unit to the car. ~~Accordingly, an information processing system of the present invention is an information processing system having an augmented reality presenting device capable of combining an image in real space with computer graphics image data and displaying the combined image and a managing device managing at least one of inventory information and sales information of respective products posted on a flier, wherein the augmented~~

~~reality presenting device has: an imaging unit obtaining image data related to a product posted on the flier by imaging; and a first transmitting unit transmitting the image data related to the product obtained by the imaging unit to the managing device, wherein the managing device has: a first obtaining unit determining, upon reception of the image data related to the product from the augmented reality presenting device, the product by analyzing the image data related to the product, and obtaining at least one of the inventory information and the sales information of the product; and a second transmitting unit transmitting at least one of the inventory information and the sales information of the product obtained by the first obtaining unit to the augmented reality presenting device, and wherein the augmented reality presenting device further has a presenting unit combining computer graphics image data indicating at least one of the inventory information and the sales information of the product transmitted from the managing device with an image of the flier in real space and presenting the combined image.~~

[0019] According to another aspect of the present invention, there is provided a system comprising an information processing apparatus and a car, wherein the information processing

apparatus comprises: a vacant space information obtaining unit obtaining vacant space information of a parking lot; a vehicle information obtaining unit obtaining a position and a direction of a car in the parking lot based on one or more image imaged by one or more imaging device installed in the parking lot; a vacant space determining unit determining one or more vacant space existing in a traveling direction of the car based on the vacant space information obtained in the vacant space information obtaining unit, the position and the direction of the car in the parking lot obtained in the vehicle information obtaining unit, and information related to position information of respective vacant spaces of a parking lot map stored in a storage device; a route determining unit determining one or more route from the car to the vacant space based on the vacant space determined in the vacant space determining unit, the position and the direction of the car in the parking lot obtained in the vehicle information obtaining unit, and the parking lot map; an image generating unit generating one or more virtual space image in the parking lot which includes one or more vacant space object indicating the vacant space determined in the vacant space determining unit and one or more guidance object indicating the route determined in the route determining

unit and indicates a position of the vacant space; and a transmitting unit transmitting the virtual space image generated in the image generating unit to the car, and wherein the car comprises: a receiving unit receiving one or more virtual space image from the information processing apparatus; and a display control unit performing control to project the virtual space image received in the receiving unit on a display of the car so as to display the virtual space image in a manner overlaid on a view in the parking lot from the display. ~~Accordingly, an information processing apparatus of the present invention has: a vacant space information obtaining unit obtaining vacant space information of a parking lot; a vehicle~~

~~information obtaining unit obtaining a position and a direction of a car in the parking lot; a vacant space determining unit determining a vacant space existing in a traveling direction of the car based on the vacant space information obtained in the vacant space information obtaining unit, the position and the direction of the car in the parking lot obtained in the vehicle information obtaining unit, and information related to position information of respective vacant spaces of a parking lot map stored in a storage device; an image generating unit generating a virtual space image in the parking lot which includes a vacant space object indicating the vacant space determined in the vacant space determining unit and indicates a position of the vacant space; and a transmitting unit transmitting the virtual space image generated in the image generating unit to the car.~~

[0020] According to another aspect of the present invention, there is provided an information processing method executed by an information processing apparatus, the method comprising: a vacant space information obtaining step of obtaining vacant space information of a parking lot; a vehicle information obtaining step of obtaining a position and a direction of a car in the parking lot based on one or more image

imaged by one or more imaging device installed in the parking lot; a vacant space determining step of determining one or more vacant space existing in a traveling direction of the car based on the vacant space information obtained in the vacant space information obtaining step, the position and the direction of the car in the parking lot obtained in the vehicle information obtaining step, and information related to position information of respective vacant spaces of a parking lot map stored in a storage device; a route determining step of determining one or more route from the car to the vacant space based on the vacant space determined in the vacant space determining step, the position and the direction of the car in the parking lot obtained in the vehicle information obtaining step, and the parking lot map; an image generating step of generating one or more virtual space image in the parking lot which includes one or more vacant space object indicating the vacant space determined in the vacant space determining step and one or more guidance object indicating the route determined in the route determining step and indicates a position of the vacant space; and a transmitting step of transmitting the virtual space image generated in the image generating step to the car. ~~Further, an information processing apparatus of the present invention~~

~~has: a vacant space information obtaining unit obtaining vacant space information of a parking lot; a vehicle information obtaining unit obtaining a position and a direction of a car in the parking lot; a vacant space determining unit determining a vacant space existing in a traveling direction of the car based on the vacant space information~~

~~obtained in the vacant space information obtaining unit, the position and the direction of the car in the parking lot obtained in the vehicle information obtaining unit, and information related to position information of respective vacant spaces of a parking lot map stored in a storage device; and a transmitting unit transmitting to the car a vacant space object indicating the vacant space determined in the vacant space determining unit and position information representing a position of the vacant space.~~

[0021] According to another aspect of the present invention, there is provided a vacant space guidance method in a system comprising an information processing apparatus and a car, the method comprising: a vacant space information obtaining step of obtaining by the information processing apparatus vacant space information of a parking lot; a vehicle information obtaining step of obtaining by the information processing apparatus a position and a direction of a car in the parking lot based on one or more image imaged by one or more imaging device installed in the parking lot; a vacant space determining step of determining by the information processing apparatus one or more vacant space existing in a traveling direction of the car based on the vacant space information obtained in the vacant

space information obtaining step, the position and the direction of the car in the parking lot obtained in the vehicle information obtaining step, and information related to position information of respective vacant spaces of a parking lot map stored in a storage device; a route determining step of determining by the information processing apparatus one or more route from the car to the vacant space based on the vacant space determined in the vacant space determining step, the position and the direction of the car in the parking lot obtained in the vehicle information obtaining step, and the parking lot map; an image generating step of generating by the information processing apparatus one or more virtual space image in the parking lot which includes one or more vacant space object indicating the vacant space determined in the vacant space determining step and one or more guidance object indicating the route determined in the route determining step and indicates a position of the vacant space; a transmitting step of transmitting by the information processing apparatus the virtual space image generated in the image generating step to the car; a receiving step of receiving by the car one or more virtual space image from the information processing apparatus; and a display control step of performing by the car control to

project the virtual space image received in the receiving step on a display of the car so as to display the virtual space image in a manner overlaid on a view in the parking lot from the display. ~~Accordingly, the present invention is an image display system including a position information obtaining device obtaining position information of a ship, an information storage device storing an electronic marine chart including seafloor shapes and a tide table, an image display device, and an image providing device providing an image to the image display device, wherein the image providing device obtains a depth below sea level at a position of the ship based on the position information of the ship obtained in the position information obtaining device, the tide table, and information related to depths indicated on the electronic marine chart, creates a virtual space image of a seafloor shape below sea level at the depth at the position of the ship based on the position~~

~~information, the depth below sea level, and seafloor topography image data indicated on the electronic marine chart, and provides the virtual space image to the image display device, and wherein the image display device displays the virtual space image of the seafloor shape provided by the image providing device in a manner overlaid on a view from the image display device.~~

[0021a] According to another aspect of the present invention, there is provided a program causing a computer to execute: a vacant space information obtaining step of obtaining vacant space information of a parking lot; a vehicle information obtaining step of obtaining a position and a direction of a car in the parking lot based on one or more image imaged by one or more imaging device installed in the parking lot; a vacant space determining step of determining one or more vacant space existing in a traveling direction of the car based on the vacant space information obtained in the vacant space information obtaining step, the position and the direction of the car in the parking lot obtained in the vehicle information obtaining step, and information related to position information of respective vacant spaces of a parking lot map stored in a storage device; a route determining

step of determining one or more route from the car to the vacant space based on the vacant space determined in the vacant space determining step, the position and the direction of the car in the parking lot obtained in the vehicle information obtaining step, and the parking lot map; an image generating step of generating one or more virtual space image in the parking lot which includes one or more vacant space object indicating the vacant space determined in the vacant space determining step and one or more guidance object indicating the route determined in the route determining step and indicates a position of the vacant space; and a transmitting step of transmitting the virtual space image generated in the image generating step to the car.

ADVANTAGEOUS EFFECTS OF INVENTION

[0022] According to embodiments of the present invention, in order to allow intuitive understanding in a navigation technology in an environment where the status changes constantly, it becomes possible to present information in a state as close as possible to the reality and instantly perceivable with respect to the timing of obtaining information, the type of information, and so on.

For example, according to embodiments of the present invention, it is possible to provide a

support for facilitating obtaining product information or guidance information of a product to buy at arbitrary timing.

[0023] Besides that, for example, according to embodiments of the present invention, it is possible to provide a technology which allows a driver to easily find and reach a target vacant space, without updating map information of the car navigation system

provided in a car, or even when the car navigation system is not provided in the car.

[0024] Besides that, for example, according to embodiments of the present invention, it is possible to provide information which is beneficial while a ship is cruising in a manner that a shipman or the like can intuitively comprehend the situation.

BRIEF DESCRIPTION OF DRAWINGS

[0025] [Fig. 1] Fig. 1 is a diagram schematically illustrating a structure of a shopping navigation system of Embodiment 1.

[Fig. 2A] Fig. 2A is a diagram illustrating a hardware structure of a shopping management server.

[Fig. 2B] Fig. 2B is a diagram illustrating a hardware structure of a mobile terminal.

[Fig. 3A] Fig. 3A is a flowchart illustrating the flow of registration processing of product to buy in the shopping navigation system of Embodiment 1.

[Fig. 3B] Fig. 3B is a flowchart illustrating presentation processing of product information of a product to buy and navigation processing from a current location to a shop in the shopping navigation system of Embodiment 1.

[Fig. 4] Fig. 4 is a diagram illustrating a state that a user points at a product to buy posted on a flier and this state is captured in