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(54) **AR CONTENT DISPLAY SYSTEM AND NON-TRANSITORY COMPUTER READABLE MEDIUM**

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(52) **U.S. Cl.**

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(57) **ABSTRACT**

An augmented reality (AR) content display system includes one or more processors configured to acquire feature points in a nearby region in which guide information for displaying an AR content is pasted, and display the region in which the feature points are acquired and the AR content in association with each other.

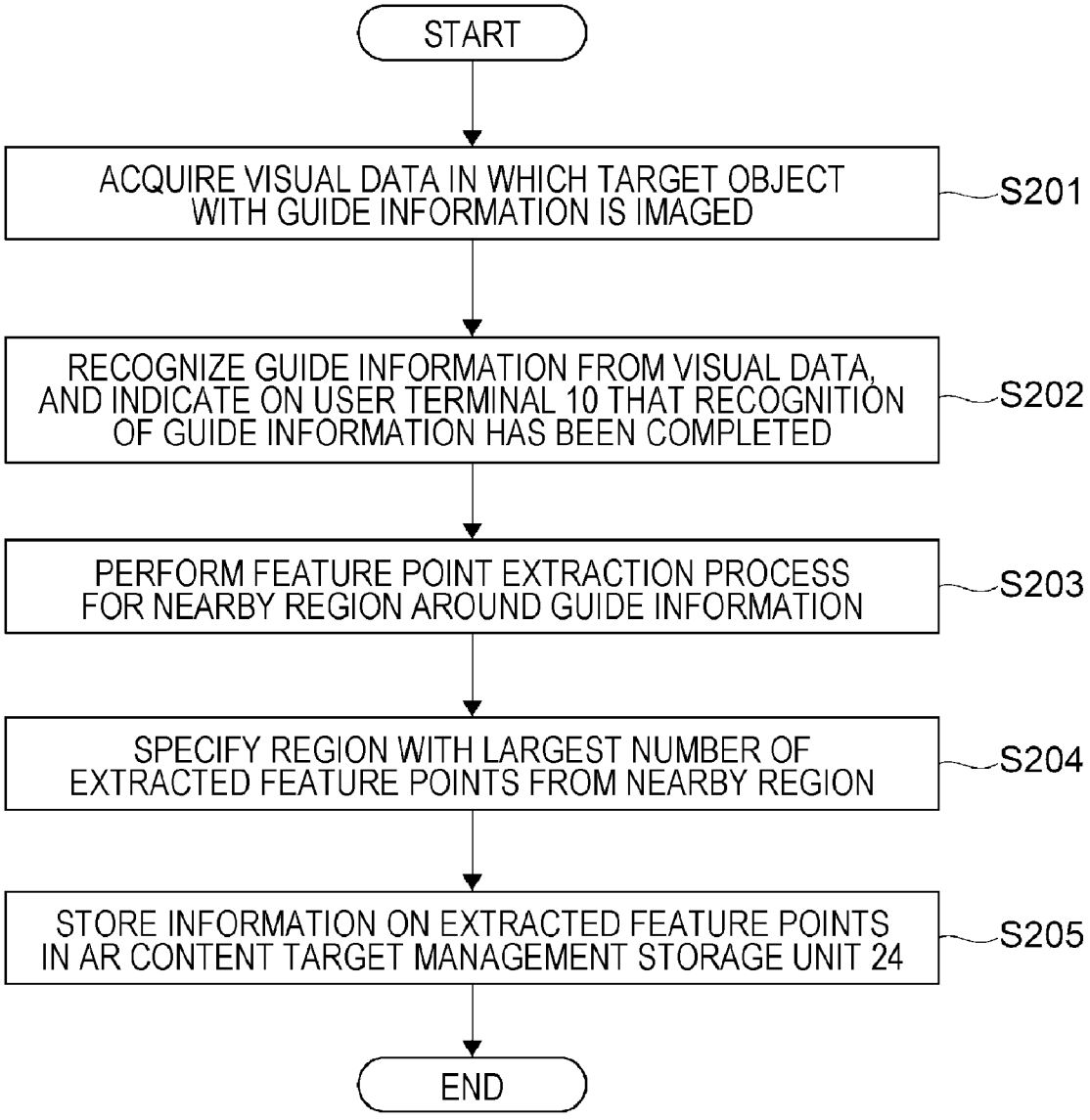


FIG. 1

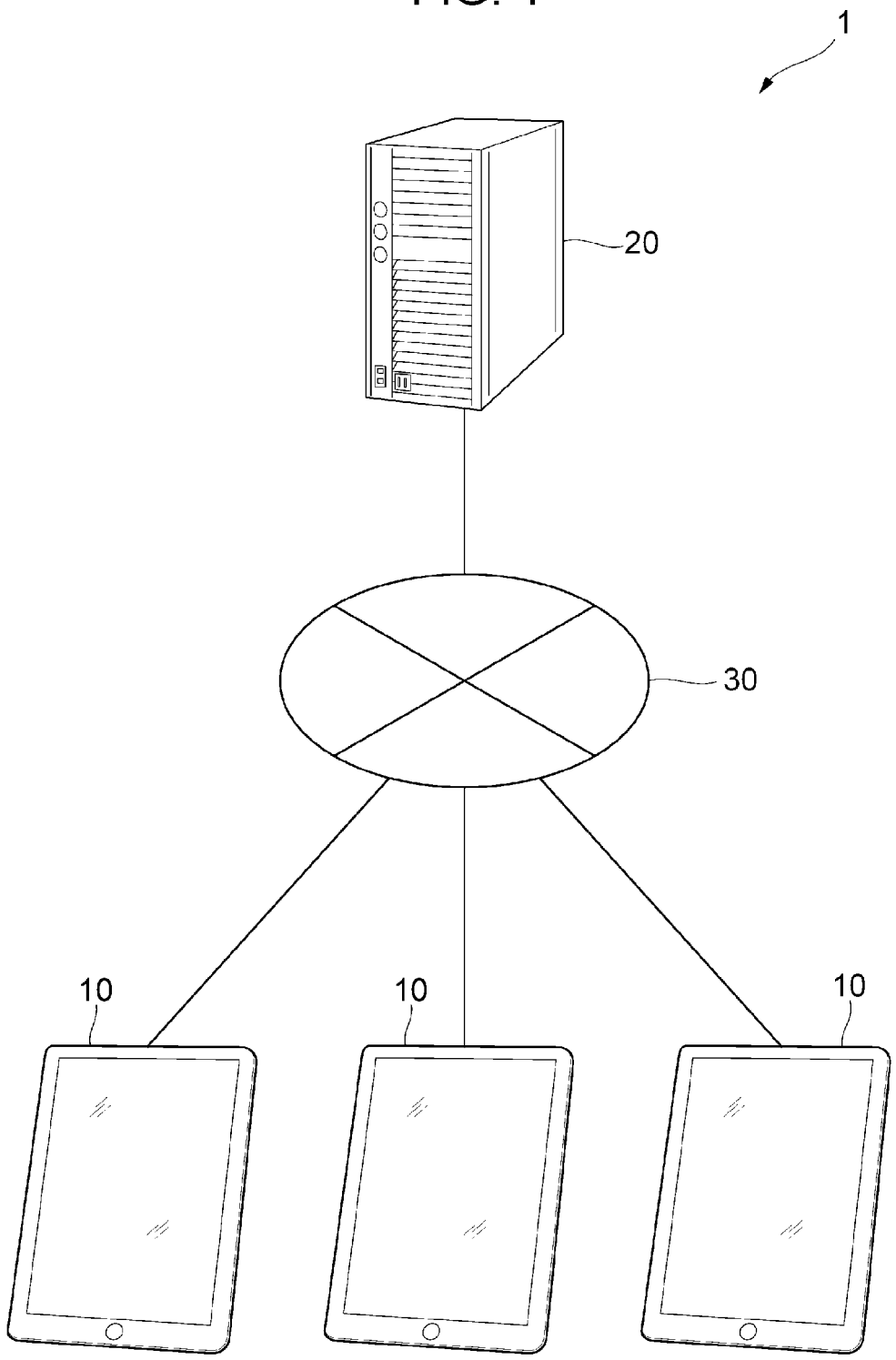


FIG. 2

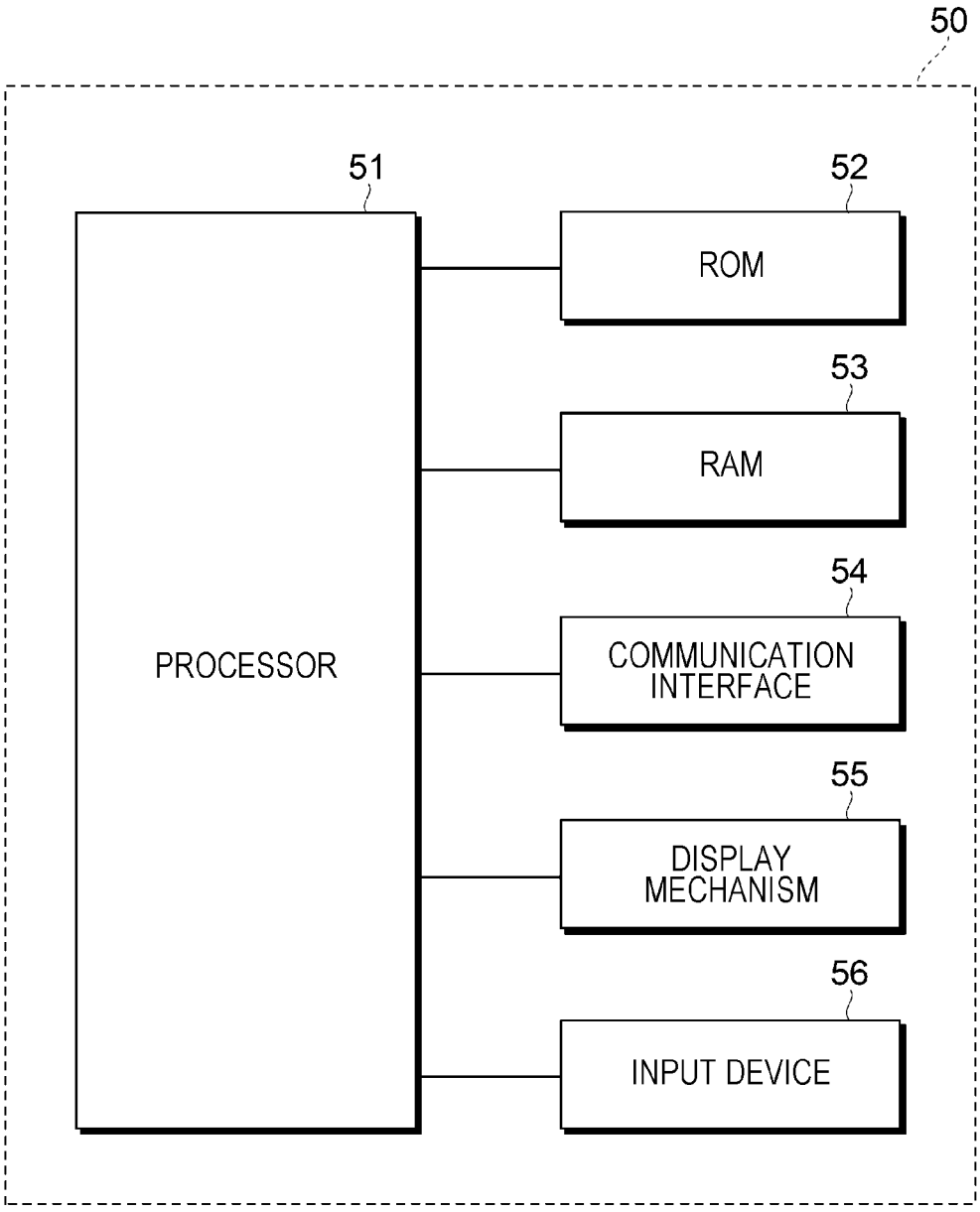

50
51
52
ROM
53
RAM
54
COMMUNICATION INTERFACE
55
DISPLAY MECHANISM
56
INPUT DEVICE
PROCESSOR

FIG. 3

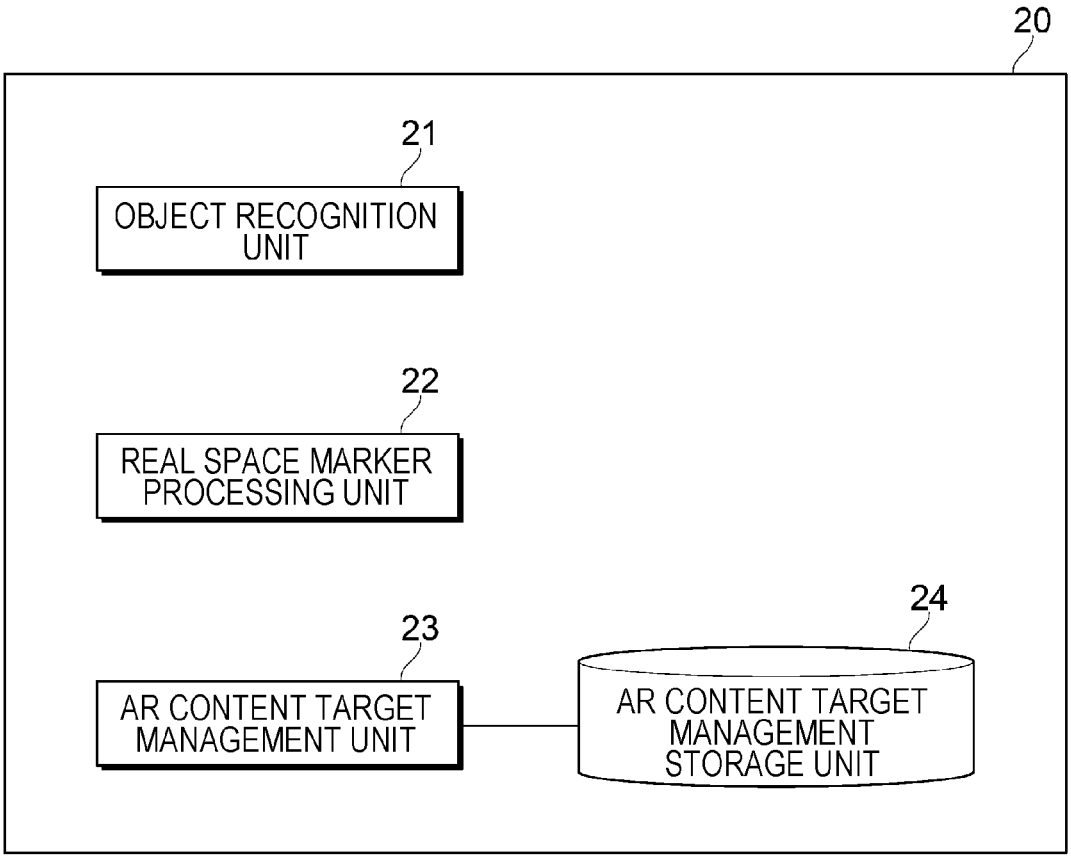

20
21
OBJECT RECOGNITION UNIT
22
REAL SPACE MARKER PROCESSING UNIT
23
AR CONTENT TARGET MANAGEMENT UNIT
24
AR CONTENT TARGET MANAGEMENT STORAGE UNIT

FIG. 4A

101 AR CONTENT IDENTIFIER	102 DESCRIPTION	103 MODEL
AR1	BALLOON DESCRIPTION 1	SLIDE RIGHTWARD TO REMOVE COVERING
AR2	YELLOW ARROW	
AR3	COVERING MODEL	

FIG. 4B

104 DISPLAY INFORMATION IDENTIFIER	105 AR CONTENT IDENTIFIER	106 GUIDE INFORMATION IDENTIFIER	107 POSITION	108 MISREGISTRATION	109 MAGNIFICATION	110 COLOR
AD001	AR1	M002	X1, Y1, Z1	Xd1, Yd1, Zd1	100%	-
AD002	AR2	M002	X2, Y2, Z2	Xd2, Yd2, Zd2	80%	YELLOW
AD003	AR3	M003	X3, Y3, Z3		150%	-

FIG. 4C

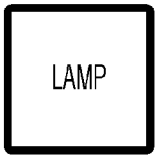
111 GUIDE INFORMATION IDENTIFIER	112 TARGET NAME	113 GUIDE INFORMATION	114 REAL SPACE MARKER INFORMATION
M001	LAMP		FEATURE POINT [0]: {v01,v02,v03,··}, FEATURE POINT [1]: {v11,v12,v13,··}, FEATURE POINT [2]: {v21,v22,v23,··}, ...
M002	COVERING		FEATURE POINT [0]: {v01,v02,v03,··}, FEATURE POINT [1]: {v11,v12,v13,··}, FEATURE POINT [2]: {v21,v22,v23,··}, ...
M003	COMPONENT A, UPPER		FEATURE POINT [0]: {v01,v02,v03,··}, FEATURE POINT [1]: {v11,v12,v13,··}, FEATURE POINT [2]: {v21,v22,v23,··}, ...

FIG. 5

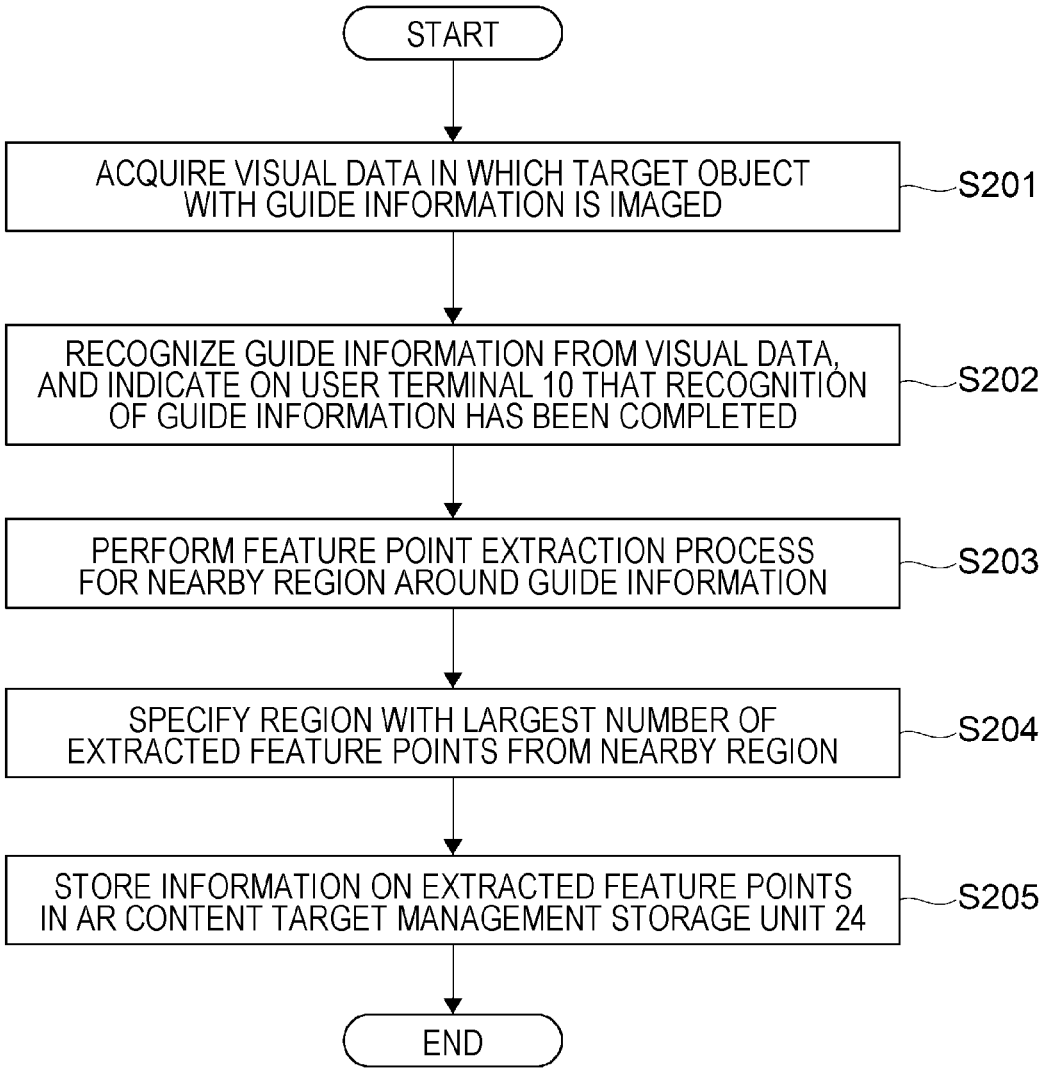

START
ACQUIRE VISUAL DATA IN WHICH TARGET OBJECT WITH GUIDE INFORMATION IS IMAGED
S201
RECOGNIZE GUIDE INFORMATION FROM VISUAL DATA, AND INDICATE ON USER TERMINAL 10 THAT RECOGNITION OF GUIDE INFORMATION HAS BEEN COMPLETED
S202
PERFORM FEATURE POINT EXTRACTION PROCESS FOR NEARBY REGION AROUND GUIDE INFORMATION
S203
SPECIFY REGION WITH LARGEST NUMBER OF EXTRACTED FEATURE POINTS FROM NEARBY REGION
S204
STORE INFORMATION ON EXTRACTED FEATURE POINTS IN AR CONTENT TARGET MANAGEMENT STORAGE UNIT 24
S205
END

FIG. 6A

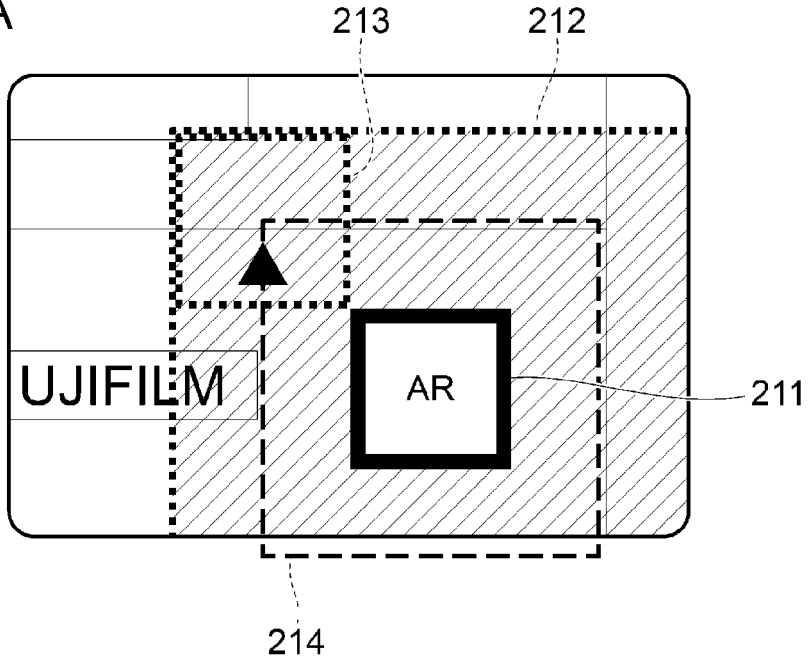


FIG. 6B

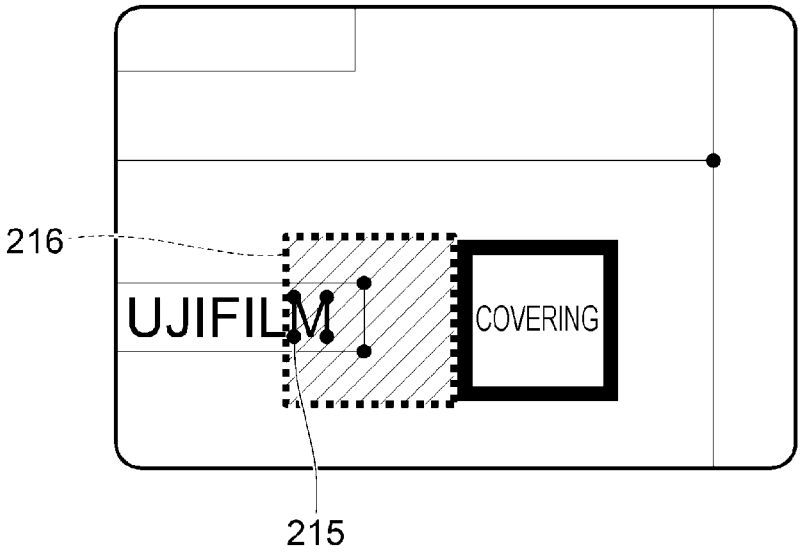


FIG. 7

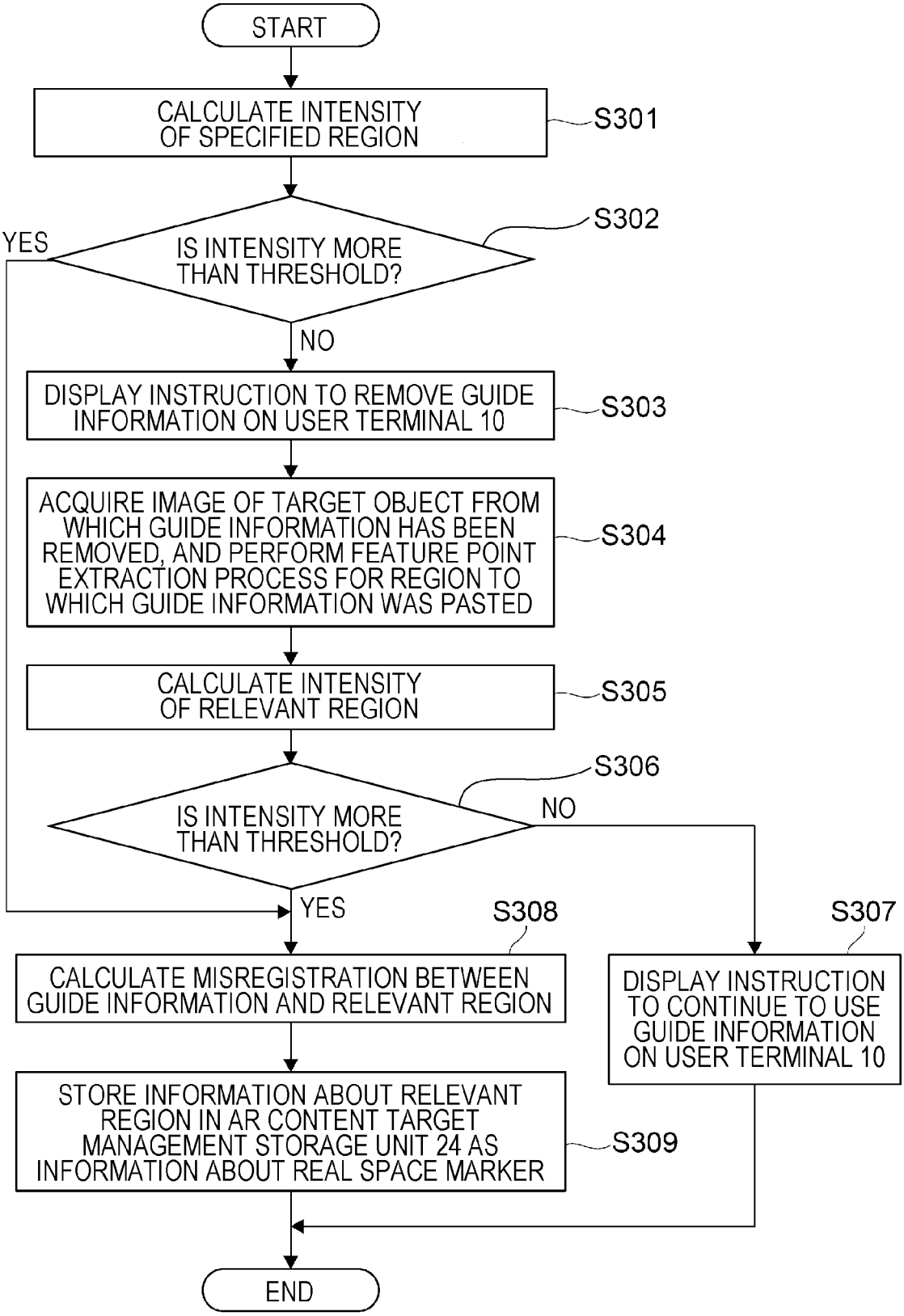

START
CALCULATE INTENSITY OF SPECIFIED REGION
S301
IS INTENSITY MORE THAN THRESHOLD?
S302
YES
NO
DISPLAY INSTRUCTION TO REMOVE GUIDE INFORMATION ON USER TERMINAL 10
S303
ACQUIRE IMAGE OF TARGET OBJECT FROM WHICH GUIDE INFORMATION HAS BEEN REMOVED, AND PERFORM FEATURE POINT EXTRACTION PROCESS FOR REGION TO WHICH GUIDE INFORMATION WAS PASTED
S304
CALCULATE INTENSITY OF RELEVANT REGION
S305
IS INTENSITY MORE THAN THRESHOLD?
S306
NO
YES
S308
S307
CALCULATE MISREGISTRATION BETWEEN GUIDE INFORMATION AND RELEVANT REGION
DISPLAY INSTRUCTION TO CONTINUE TO USE GUIDE INFORMATION ON USER TERMINAL 10
STORE INFORMATION ABOUT RELEVANT REGION IN AR CONTENT TARGET MANAGEMENT STORAGE UNIT 24 AS INFORMATION ABOUT REAL SPACE MARKER
S309
END

FIG. 8

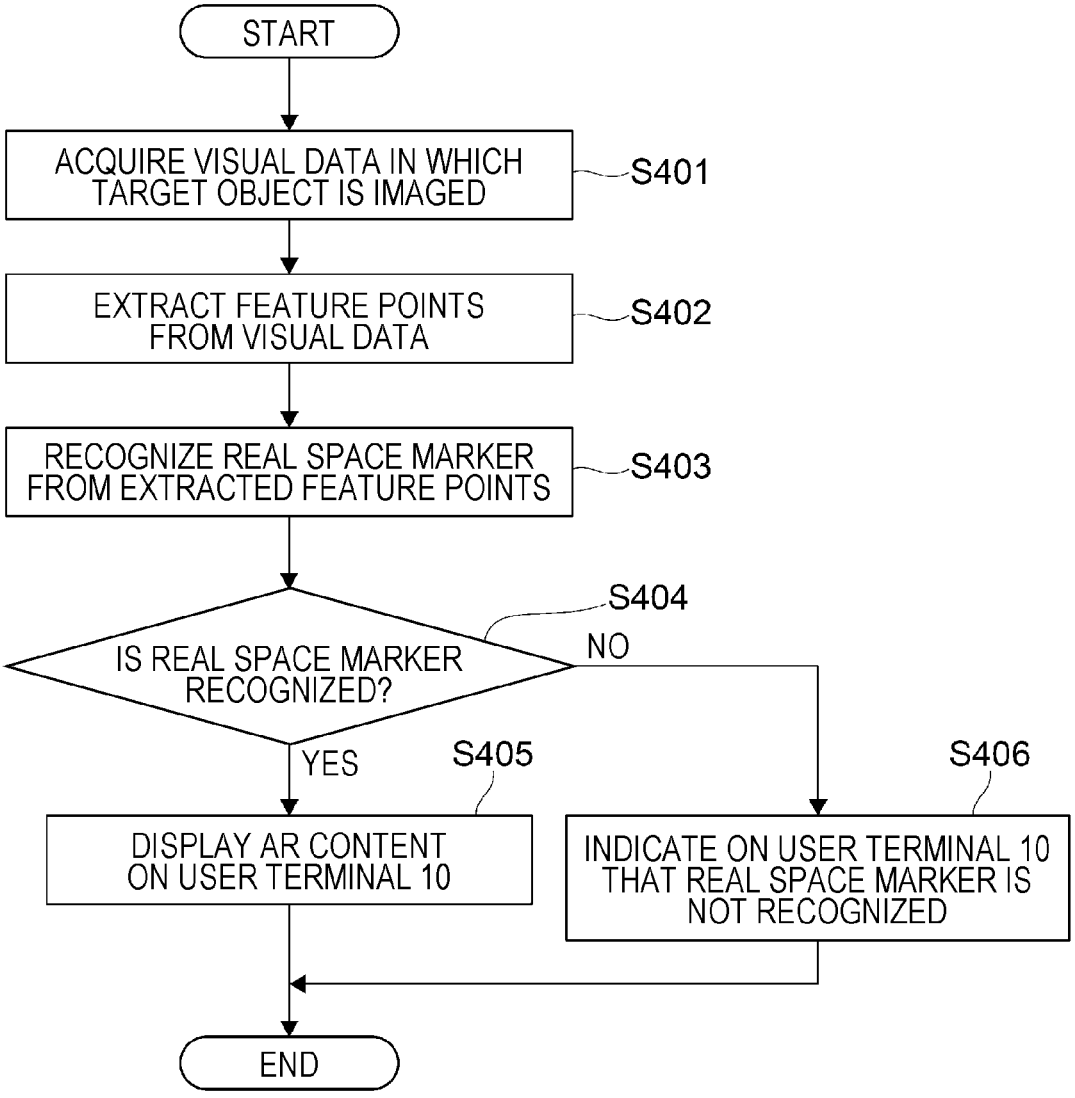
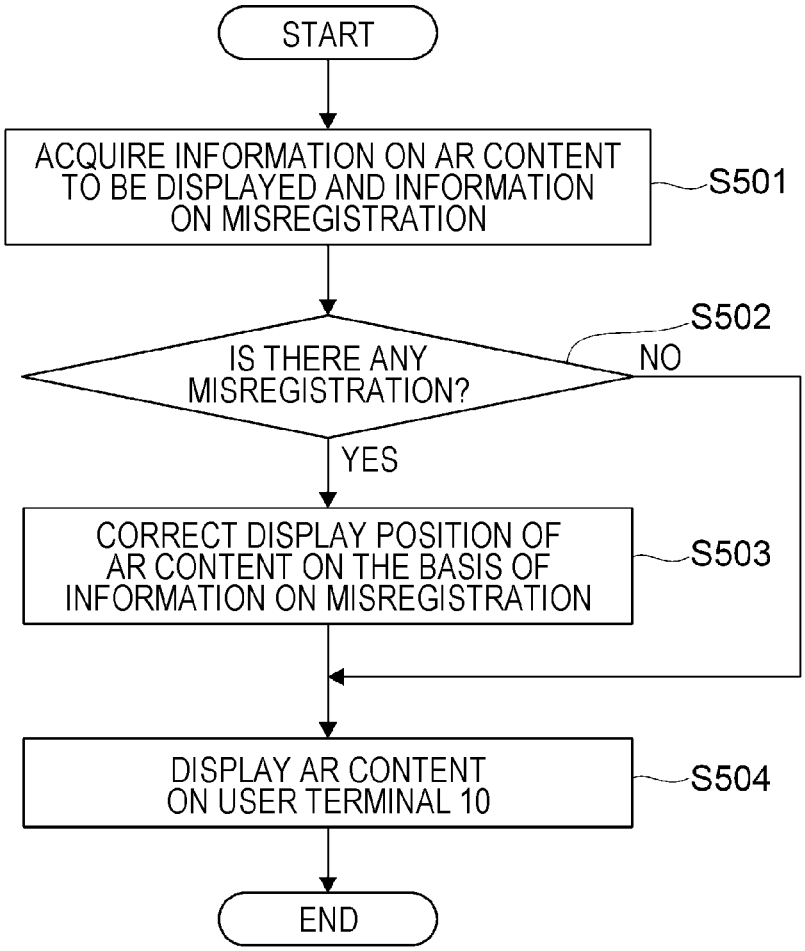

START
ACQUIRE VISUAL DATA IN WHICH TARGET OBJECT IS IMAGED
S401
EXTRACT FEATURE POINTS FROM VISUAL DATA
S402
RECOGNIZE REAL SPACE MARKER FROM EXTRACTED FEATURE POINTS
S403
S404
IS REAL SPACE MARKER RECOGNIZED?
NO
YES
S405
S406
DISPLAY AR CONTENT ON USER TERMINAL 10
INDICATE ON USER TERMINAL 10 THAT REAL SPACE MARKER IS NOT RECOGNIZED
END

FIG. 9


START
ACQUIRE INFORMATION ON AR CONTENT TO BE DISPLAYED AND INFORMATION ON MISREGISTRATION
S501
IS THERE ANY MISREGISTRATION?
S502
NO
YES
CORRECT DISPLAY POSITION OF AR CONTENT ON THE BASIS OF INFORMATION ON MISREGISTRATION
S503
DISPLAY AR CONTENT ON USER TERMINAL 10
S504
END

AR CONTENT DISPLAY SYSTEM AND NON-TRANSITORY COMPUTER READABLE MEDIUM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is based on and claims priority under 35 USC 119 from Japanese Patent Application No. 2023-050280 filed Mar. 27, 2023.

BACKGROUND

(i) Technical Field

[0002] The present disclosure relates to an augmented reality (AR) content display system and a non-transitory computer readable medium.

(ii) Related Art

[0003] In recent years, AR technologies to display information prepared through data processing as superposed on the real world have been put into practical use. For example, a technology to read a QR code (registered trademark) and display a corresponding AR content is known.

[0004] Japanese Unexamined Patent Application Publication No. 2014-142770 describes an augmented reality display device that reads a QR code and display an AR content, the device addressing an issue that the AR content is not displayed when the QR code goes out of an imaging range. The device described in Japanese Unexamined Patent Application Publication No. 2014-142770 enables the AR content to be displayed even when the QR code is in a range in which an information code may not be imaged, by preparing a mirror.

SUMMARY

[0005] In order to display an AR content by reading guide information such as a QR code and an AR marker using an imaging device, it is necessary that the guide information should be imaged. In order to display an AR content, meanwhile, it is necessary to paste the guide information to a work target object. Therefore, it is necessary to take the trouble of pasting guide information, peeling off the guide information, and pasting the guide information to another target object for each work.

[0006] Aspects of non-limiting embodiments of the present disclosure relate to reducing the trouble of work to prepare guide information when guide information for displaying an AR content is read to display the AR content.

[0007] Aspects of certain non-limiting embodiments of the present disclosure overcome the above disadvantages and/or other disadvantages not described above. However, aspects of the non-limiting embodiments are not required to overcome the disadvantages described above, and aspects of the non-limiting embodiments of the present disclosure may not overcome any of the disadvantages described above.

[0008] According to an aspect of the present disclosure, there is provided an augmented reality (AR) content display system including one or more processors configured to acquire feature points in a nearby region in which guide information for displaying an AR content is pasted, and display the region in which the feature points are acquired and the AR content in association with each other.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] An exemplary embodiment of the present disclosure will be described in detail based on the following figures, wherein:

[0010] FIG. **1** illustrates an example of the configuration of an AR content display system according to the present exemplary embodiment;

[0011] FIG. **2** illustrates an example of the hardware configuration of a computer that is used as user terminals and a management server;

[0012] FIG. **3** illustrates an example of the functional configuration of the management server according to the present exemplary embodiment;

[0013] FIGS. **4**A to **4**C indicate an example of information to be stored in an AR content target management storage unit, in which FIG. **4**A indicates a list of AR contents, FIG. **4**B indicates a list of AR content display information, and FIG. **4**C indicates a list of information associated with guide information;

[0014] FIG. **5** is a flowchart illustrating an example of the flow of a process of extracting feature points;

[0015] FIGS. **6**A and **6**B illustrate an example of a process of specifying a region with the largest number of extracted feature points, in which FIG. **6**A illustrates an example in which a nearby region around guide information is searched for a region with the largest number of extracted feature points and FIG. **6**B illustrates a region specified as the region with the largest number of feature points;

[0016] FIG. **7** is a flowchart illustrating an example of the flow of a process of associating a specified region and an AR content;

[0017] FIG. **8** is a flowchart illustrating an example of the flow of a process of recognizing a real space marker; and

[0018] FIG. **9** is a flowchart illustrating an example of the flow of a process of displaying an AR content.

DETAILED DESCRIPTION

[0019] An exemplary embodiment of the present disclosure will be described in detail below with reference to the accompanying drawings.

<Configuration of AR Content Display System>

[0020] FIG. **1** illustrates an example of the configuration of an AR content display system according to the present exemplary embodiment.

[0021] An AR content display system **1** includes user terminals **10** and a management server **20**. The user terminals **10** and the management server **20** are connected to each other via a network **30**.

[0022] The user terminal **10** is an information processing apparatus device that is used by a user to use an AR content. The user terminal **10** images a target object to which guide information has been pasted, and transmits visual data on a nearby region around the guide information to the management server **20**. The guide information is a mark for displaying an AR content such as an AR marker or a QR code. For example, when guide information is recognized when a target object is imaged using a terminal etc., an AR content correlated with the guide information is displayed as superimposed on a screen in which the target object is imaged. Then, the user terminal **10** receives an instruction from the management server **20**, and displays the instruction on the

screen. In addition, the user terminal **10** displays the AR content on the screen in which the target object is imaged.

[0023] The user terminal **10** is implemented by a computer, a tablet information terminal, and other information processing devices, for example. Alternatively, the user terminal **10** may be a glasses-type terminal such as a head mounted display (HMD).

[0024] The management server **20** receives visual data transmitted from the user terminal **10**, and acquires feature points in a nearby region in which guide information is pasted. Then, the management server **20** associates the region in which feature points are acquired and the AR content. Hereinafter, a region to be associated with an AR content will occasionally be referred to as a "real space marker". When the management server **20** recognizes a real space marker, the management server **20** causes the user terminal **10** to display an AR content associated with the real space marker.

[0025] The management server **20** is implemented by a computer, for example. The management server **20** may be constituted by a single computer, or may be implemented through distributed processing by a plurality of computers.

[0026] The network **30** is an information communication network that allows communication between the user terminals **10** and the management server **20**. The type of the network **30** is not specifically limited as long as the network **30** enables data transmission and reception, and the network **30** may be the Internet, a local area network (LAN), a wide area network (WAN), etc., for example. A communication line that is used for data communication may be wired or wireless. The devices may be connected to each other via a plurality of networks or communication lines.

<Hardware Configuration of Computer>

[0027] FIG. **2** illustrates an example of the hardware configuration of a computer that is used as the user terminals **10** and the management server **20**. A computer **50** includes a processor **51**, a read only memory (ROM) **52**, and a random access memory (RAM) **53**. The processor **51** is a central processing unit (CPU), for example, and uses the RAM **53** as a work area and executes a program read from the ROM **52**. The computer **50** also includes a communication interface **54** for connection to a network and a display mechanism **55** for display output on a display. The computer **50** also includes an input device **56** that is used by an operator of the computer **50** to perform an input operation. The configuration of the computer **50** illustrated in FIG. **2** is merely exemplary, and the computer that is used in the present exemplary embodiment is not limited to the configuration example in FIG. **2**.

[0028] Various processes executed in the present exemplary embodiment are executed by one or more processors.

<Functional Configuration of Management Server>

[0029] Next, the functional configuration of the management server **20** will be described. FIG. **3** illustrates an example of the functional configuration of the management server **20** according to the present exemplary embodiment.

[0030] As illustrated in FIG. **3**, the management server **20** includes an object recognition unit **21**, a real space marker processing unit **22**, an AR content target management unit **23**, and an AR content target management storage unit **24**.

[0031] Functions of the management server **20** may be executed in a distributed manner by a plurality of servers.

[0032] The object recognition unit **21** acquires visual data from the user terminal **10**, and recognizes guide information. In addition, the object recognition unit **21** extracts feature points in a nearby region in which the guide information is pasted.

[0033] The real space marker processing unit **22** acquires the result of extraction of feature points by the object recognition unit **21**, and evaluates whether or not the region in which the feature points are extracted is usable as a real space marker. In addition, the real space marker processing unit **22** calculates and corrects misregistration between the pasted guide information and the real space marker.

[0034] The AR content target management unit **23** stores, in the AR content target management storage unit **24**, information on the real space marker and information on the correlation between an AR marker and the real space marker, misregistration between the AR marker and the real space marker, etc. In addition, the AR content target management unit **23** acquires necessary information from the AR content target management storage unit **24** in accordance with an instruction received from the user terminal **10**, and transmits the information to the user terminal **10**.

[0035] The AR content target management storage unit **24** stores information on the real space marker and information on the correlation between the AR marker and the real space marker, misregistration between the AR marker and the real space marker, etc. The information to be stored in the AR content target management storage unit **24** will be described with reference to FIG. **4**. FIGS. **4**A to **4**C indicate an example of information to be stored in the AR content target management storage unit **24**, in which FIG. **4**A indicates a list of AR contents, FIG. **4**B indicates a list of AR content display information, and FIG. **4**C indicates a list of information associated with guide information.

[0036] FIG. **4**A indicates a list of AR contents. The AR content target management storage unit **24** stores an AR content identifier **101**, an AR content description **102**, and an AR content model **103** in association with each other. For example, an AR content identifier "AR1" is associated with an AR content description "balloon description **1**" and a balloon model saying "slide rightward to remove covering" indicated in FIG. **4**A.

[0037] FIG. **4**B indicates a list of AR content display information. The AR content target management storage unit **24** stores a display information identifier **104** for an AR content, an AR content identifier **105**, a guide information identifier **106**, a position **107** at which the AR content is displayed, misregistration **108** between guide information and a real space marker, a magnification **109** at which the AR content is displayed, and a color **110** in which the AR content is displayed, in association with each other. For example, a display information identifier "AD002" is associated with an AR content identifier "AR2", a guide information identifier "M002", a position "X2, Y2, Z2" at which the AR content is displayed, misregistration "Xd2, Yd2, Zd2" between guide information and a real space marker, a magnification "80%" at which the AR content is displayed, and a color "yellow" in which the AR content is displayed.

[0038] FIG. **4**C indicates a list of information associated with guide information. The AR content target management storage unit **24** stores a guide information identifier **111**, a target name **112**, guide information **113**, and real space

marker information **114** in association with each other. For example, a guide information identifier "M001" is associated with a target name "lamp", guide information on the lamp indicated in FIG. **4**C, and information on feature points of the real space marker indicated in FIG. **4**C.

<Extraction of Feature Points>

[0039] Next, the flow of a process of extracting feature points will be described with reference to FIG. **5**. FIG. **5** is a flowchart illustrating an example of the flow of a process of extracting feature points.

[0040] In FIG. **5**, first, the object recognition unit **21** acquires visual data in which a target object with guide information is imaged (step S**201**). In step S**201**, the object recognition unit **21** acquires visual data on a target object imaged by the user terminal **10**, for example. The visual data may be a moving image, or may be a still image.

[0041] Next, the object recognition unit **21** recognizes guide information from the visual data, and indicates on the user terminal **10** that recognition of guide information has been completed (step S**202**). Next, the object recognition unit **21** performs a feature point extraction process for a nearby region around the guide information (step S**203**). The feature point extraction is performed using a conventional technique such as scale invariant feature transform (SIFT), for example.

[0042] The nearby region in which the feature point extraction process is performed is a region in a range determined in advance around the position at which the guide information is pasted, for example. The region in the range determined in advance is a region in which the presence of the target object to which the guide information is pasted may be recognized. That is, when a region that is usable as a real space marker is specified from the region in the range determined in advance, it is necessary that the target object may be recognized at the same time when the real space marker is recognized. The nearby region may be a region in a range imaged when the guide information is imaged.

[0043] Next, the real space marker processing unit **22** specifies a region with the largest number of extracted feature points from the nearby region (step S**204**). The process performed in step S**204** will be discussed in detail later. Then, the object recognition unit **21** stores information on the extracted feature points in the AR content target management storage unit **24** (step S**205**).

[0044] The process performed in step S**204** in FIG. **5** will be described with reference to FIGS. **6**A and **6**B. FIGS. **6**A and **6**B illustrate an example of a process of specifying a region with the largest number of extracted feature points, in which FIG. **6**A illustrates an example in which a nearby region around guide information is searched for a region with the largest number of extracted feature points and FIG. **6**B illustrates a region specified as the region with the largest number of feature points.

[0045] The object recognition unit **21** extracts feature points for a nearby region **212** around guide information **211** pasted to a target object. As illustrated in FIG. **6**B, feature points **215** are extracted inside the region **212**. Then, the real space marker processing unit **22** specifies a region with the largest number of extracted feature points from the nearby region. The real space marker processing unit **22** moves a region **213** in a range determined in advance along an arrow **214** in the nearby region **212**, and specifies a region with the largest number of feature points included in the region **213** in the range determined in advance. In the example illustrated in FIG. **6**B, a region **216** is specified as a region that includes the largest number of feature points **215**.

<Registration of Real Space Marker>

[0046] Next, the flow of a process of associating a specified region and an AR content will be described with reference to FIG. **7**. FIG. **7** is a flowchart illustrating an example of the flow of a process of associating a specified region and an AR content.

[0047] In FIG. **7**, first, the real space marker processing unit **22** calculates an intensity of the specified region (step S**301**). In step S**301**, the real space marker processing unit **22** calculates the number of feature points as the intensity, for example. In the example illustrated in FIG. **6**B, the region **216** includes six feature points **215**, and has an intensity of 6.

[0048] Next, the real space marker processing unit **22** determines whether or not the intensity is more than a threshold (step S**302**). In step S**302**, the real space marker processing unit **22** determines whether or not the region to which guide information is pasted is usable as a real space marker. The real space marker processing unit **22** makes a comparison between the calculated intensity and a threshold determined in advance. When the threshold is determined as 5, for example, it is determined that the intensity of the region **216** is more than the threshold in the example in FIG. **6**B.

[0049] When the calculated intensity is more than the threshold (YES in step S**302**), the process proceeds to step S**308**. When the calculated intensity is not more than the threshold (NO in step S**302**), on the other hand, the object recognition unit **21** displays an instruction to remove the guide information on the user terminal **10** (step S**303**). In step S**303**, the object recognition unit **21** displays on the user terminal **10** a message saying "No region with necessary intensity was detected. Please peel off guide information and extract feature points again", for example.

[0050] Next, the object recognition unit **21** acquires an image of the target object from which the guide information has been removed, and performs a feature point extraction process for the region to which the guide information was pasted (step S**304**). Next, the object recognition unit **21** calculates an intensity of the relevant region (step S**305**). Next, the real space marker processing unit **22** determines whether or not the intensity is more than the threshold (step S**306**). In step S**306**, the real space marker processing unit **22** determines whether or not the region to which guide information was pasted is usable as a real space marker.

[0051] When the calculated intensity is more than the threshold (YES in step S**306**), the process proceeds to step S**308**. When the calculated intensity is not more than the threshold (NO in step S**306**), on the other hand, the real space marker processing unit **22** displays an instruction to continue to use the guide information on the user terminal **10** (step S**307**). In step S**307**, the real space marker processing unit **22** displays on the user terminal **10** a message saying "No region with necessary strength was detected. Please continue to use guide information", for example.

[0052] When it is determined in step S**302** or step S**306** that the intensity is more than the threshold (YES in step S**302** or step S**306**), the relevant region is usable as a real space marker. In this case, the real space marker processing

unit **22** calculates misregistration between the guide information and the relevant region (step S**308**). In step S**308**, the real space marker processing unit **22** calculates misregistration in a three-dimensional space from the position of the center of the pasted guide information to the position of the center of the relevant region.

[0053] Next, the AR content target management unit **23** stores information about the relevant region in the AR content target management storage unit **24** as information about a real space marker (step S**309**).

[0054] In step S**309**, the AR content target management unit **23** acquires information about the relevant region, information on the correlation between the relevant region and the guide information, and information on the misregistration between the relevant region and the guide information from the real space marker processing unit **22**. Then, the AR content target management unit **23** stores the acquired information in the AR content target management storage unit **24**. The AR content display information indicated in FIG. **4**B and the information associated with guide information indicated in FIG. **4**C are updated through the process in step S**309**.

[0055] The information on the misregistration between the relevant region and the guide information is added to the list of AR content display information. In addition, the information about the relevant region correlated with the guide information is added to the list of information associated with guide information. The information about the relevant region is the real space marker information indicated in FIG. **4**C, and information about feature points.

[0056] The specified relevant region and the AR content are associated with each other and the relevant region is registered as a real space marker through the processes described above. Since the real space marker is associated with the AR content, the AR content is displayed by recognizing the real space marker without pasting the guide information.

<Recognition of Real Space Marker>

[0057] Next, a process of recognizing a real space marker will be described with reference to FIG. **8**. FIG. **8** is a flowchart illustrating an example of the flow of a process of recognizing a real space marker.

[0058] In FIG. **8**, first, the object recognition unit **21** acquires visual data in which a target object is imaged (step S**401**). In step S**401**, the object recognition unit **21** acquires visual data on a target object to which guide information is not pasted and which is imaged by the user terminal **10**, for example.

[0059] Next, the object recognition unit **21** extracts feature points from the visual data (step S**402**). In step S**402**, the object recognition unit **21** performs a feature point extraction process in a range imaged in the visual data. Next, the real space marker processing unit **22** recognizes a real space marker from the extracted feature points (step S**403**). In step S**403**, the real space marker processing unit **22** acquires the real space marker information **114** (see FIG. **4**C) stored in the AR content target management storage unit **24**. Then, the real space marker processing unit **22** recognizes a real space marker by collating the extracted feature points and the information on the feature points stored in the AR content target management storage unit **24** as the real space marker information **114**.

[0060] Next, the real space marker processing unit **22** determines whether or not a real space marker may be recognized (step S**404**). When a real space marker may be recognized (YES in step S**404**), the real space marker processing unit **22** displays an AR content on the user terminal **10** (step S**405**). A process executed to display an AR content in step S**405** will be discussed in detail later.

[0061] When a real space marker may not be recognized (NO in step S**404**), on the other hand, the object recognition unit **21** indicates that a real space marker may not be recognized on the user terminal **10** (step S**406**). In step S**406**, the object recognition unit **21** displays on the user terminal **10** a message saying "No marker able to display AR content is recognized", for example.

<Display of AR Content>

[0062] Next, a process executed to display an AR content in step S**405** in FIG. **8** will be described with reference to FIG. **9**. FIG. **9** is a flowchart illustrating an example of the flow of a process of displaying an AR content.

[0063] In FIG. **9**, first, the real space marker processing unit **22** acquires information on an AR content to be displayed and information on misregistration (step S**501**). In step S**501**, the real space marker processing unit **22** requests information on an AR content to be displayed and information on misregistration from the AR content target management unit **23**. The AR content target management unit **23** acquires such information from the AR content target management storage unit **24**, and transmits the information to the real space marker processing unit **22**.

[0064] Next, the real space marker processing unit **22** determines whether or not there is any misregistration (step S**502**). When there is no misregistration (NO in step S**502**), the process proceeds to step S**504**. When there is any misregistration (YES in step S**502**), on the other hand, the real space marker processing unit **22** corrects the display position of the AR content on the basis of the information on the misregistration (step S**503**). In step S**503**, the position at which the AR content is displayed is corrected on the basis of the misregistration between the position of the originally pasted guide information and the real space marker.

[0065] Then, the real space marker processing unit **22** displays the AR content on the user terminal **10** (step S**504**). In step S**504**, the real space marker processing unit **22** displays the AR content with the display position corrected when it is determined in step S**502** that there is any misregistration. When it is determined in step S**502** that there is no misregistration, on the other hand, the real space marker processing unit **22** displays the AR content at the original display position.

[0066] While an exemplary embodiment of the present disclosure has been described above, the technical scope of the present disclosure is not limited to the above exemplary embodiment described above. It is apparent from the following claims that a variety of modifications and improvements that may be made to the exemplary embodiment described above also fall within the technical scope of the present disclosure.

[0067] In the embodiments above, the term "processor" refers to hardware in a broad sense. Examples of the processor include general processors (e.g., CPU: Central Processing Unit) and dedicated processors (e.g., GPU:

Graphics Processing Unit, ASIC: Application Specific Integrated Circuit, FPGA: Field Programmable Gate Array, and programmable logic device).

[0068] In the embodiments above, the term "processor" is broad enough to encompass one processor or plural processors in collaboration which are located physically apart from each other but may work cooperatively. The order of operations of the processor is not limited to one described in the embodiments above, and may be changed.

[0069] The foregoing description of the exemplary embodiments of the present disclosure has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the disclosure to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in the art. The embodiments were chosen and described in order to best explain the principles of the disclosure and its practical applications, thereby enabling others skilled in the art to understand the disclosure for various embodiments and with the various modifications as are suited to the particular use contemplated. It is intended that the scope of the disclosure be defined by the following claims and their equivalents.

(Appendix)

(((1)))

[0070] An AR content display system comprising:

[0071] one or more processors configured to:

[0072] acquire feature points in a nearby region in which guide information for displaying an AR content is pasted; and

[0073] display the region in which the feature points are acquired and the AR content in association with each other.

(((2)))

[0074] The AR content display system according to (((1))),

[0075] wherein the one or more processors are configured to specify a region with a large number of feature points from the nearby region, and associate the specified region and the AR content with each other.

(((3)))

[0076] The AR content display system according to (((2))),

[0077] wherein the one or more processors are configured to calculate an intensity for evaluating the feature points in the specified region.

(((4)))

[0078] The AR content display system according to (((3))),

[0079] wherein the one or more processors are configured to associate the specified region and the AR content with each other when the intensity is more than a threshold determined in advance.

(((5)))

[0080] The AR content display system according to (((3))),

[0081] wherein the one or more processors are configured to suggest acquiring feature points again with the guide information removed when the intensity is less than a threshold determined in advance.

(((6)))

[0082] The AR content display system according to (((5))),

[0083] wherein the one or more processors are configured to suggest using the guide information when the intensity of the feature points acquired again is less than the threshold determined in advance.

(((7)))

[0084] The AR content display system according to (((1))),

[0085] wherein the one or more processors are configured to calculate misregistration between a position at which the guide information is pasted and a position in the region in which the feature points are acquired.

(((8)))

[0086] The AR content display system according to (((1))),

[0087] wherein the one or more processors are configured to display the AR content associated with the region when the feature points in the region are detected, and correct a position at which the AR content is displayed on a basis of calculated misregistration.

(((9)))

[0088] An AR content display system comprising

[0089] one or more processors configured to:

[0090] recognize a region with feature points of a target object, an AR content for which is to be displayed, and display the AR content while correcting misregistration between a position of the region with the feature points and a position at which the AR content is to be displayed when the AR content is displayed on a basis of the recognized region with the feature points.

(((10)))

[0091] A program causing one or more processors to execute a process comprising:

[0092] acquiring feature points in a nearby region in which guide information for displaying an AR content is pasted; and displaying the region in which the feature points are acquired and the AR content in association with each other.

(((11)))

[0093] A program causing one or more processors to execute a process comprising:

[0094] recognizing a region with feature points of a target object, an AR content for which is to be displayed, and displaying the AR content while correcting misregistration between a position of the region with the feature points and a position at which the AR content is to be displayed when the AR content is displayed on a basis of the recognized region with the feature points.

What is claimed is:

1. An augmented reality (AR) content display system comprising:

one or more processors configured to:

acquire feature points in a nearby region in which guide information for displaying an AR content is pasted; and

display the region in which the feature points are acquired and the AR content in association with each other.

2. The AR content display system according to claim **1**,

wherein the one or more processors are configured to specify a region with a large number of feature points from the nearby region, and associate the specified region and the AR content with each other.

3. The AR content display system according to claim 2, wherein the one or more processors are configured to calculate an intensity for evaluating the feature points in the specified region.

4. The AR content display system according to claim 3, wherein the one or more processors are configured to associate the specified region and the AR content with each other when the intensity is more than a threshold determined in advance.

5. The AR content display system according to claim 3, wherein the one or more processors are configured to suggest acquiring feature points again with the guide information removed when the intensity is less than a threshold determined in advance.

6. The AR content display system according to claim 5, wherein the one or more processors are configured to suggest using the guide information when the intensity of the feature points acquired again is less than the threshold determined in advance.

7. The AR content display system according to claim 1, wherein the one or more processors are configured to calculate misregistration between a position at which the guide information is pasted and a position in the region in which the feature points are acquired.

8. The AR content display system according to claim 1, wherein the one or more processors are configured to display the AR content associated with the region when the feature points in the region are detected, and correct a position at which the AR content is displayed on a basis of calculated misregistration.

9. A non-transitory computer readable medium storing a program causing one or more processors to execute a process comprising:

acquiring feature points in a nearby region in which guide information for displaying an AR content is pasted; and

displaying the region in which the feature points are acquired and the AR content in association with each other.

10. A non-transitory computer readable medium storing a program causing one or more processors to execute a process comprising:

recognizing a region with feature points of a target object, an AR content for which is to be displayed, and displaying the AR content while correcting misregistration between a position of the region with the feature points and a position at which the AR content is to be displayed when the AR content is displayed on a basis of the recognized region with the feature points.

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