US 20190034940A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2019/0034940 A1**

TAMBA (43) **Pub. Date: Jan. 31, 2019**

(54) **AUTHENTICITY DETERMINATION SYSTEM, SERVER AND ITS OPERATING METHOD, TERMINAL AND ITS OPERATING METHOD, AND PROGRAM**

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(21) Appl. No.: **15/833,968**

(22) Filed: **Dec. 6, 2017**

(30) **Foreign Application Priority Data**

Jul. 28, 2017 (JP) 2017-146902

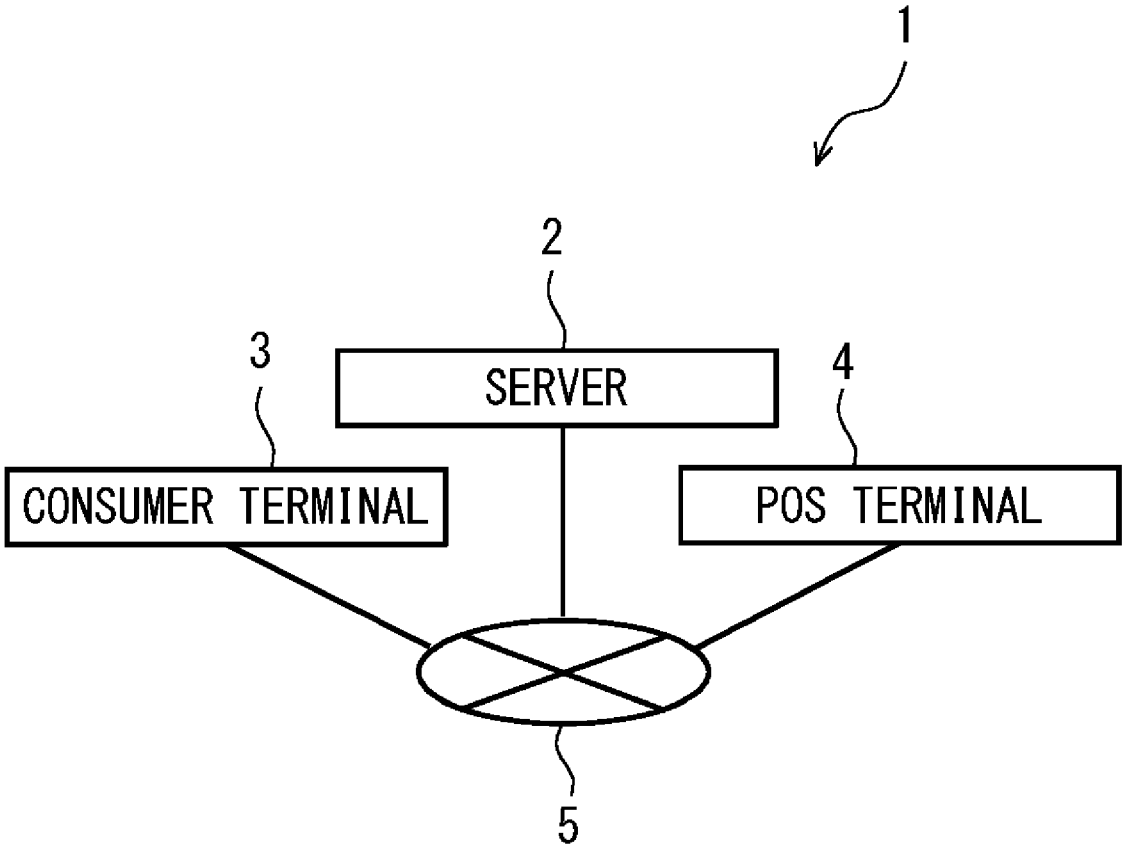
Publication Classification

(51) **Int. Cl.**
G06Q 30/00 (2006.01)

(52) **U.S. Cl.**
CPC ***G06Q 30/0185*** (2013.01)

(57) **ABSTRACT**

The consumer terminal includes an identification information acquisition unit configured to acquire unique identification information associated with the product, an identification information transmission unit, and an authenticity determination information reception unit. The server includes a product management data storage unit configured to store product management data associating the identification information with sell-off information indicating whether the product associated with the identification information has not yet been sold to an end consumer or has already been sold to an end consumer, an identification information reception unit, an authenticity determination information generation unit configured to generate the authenticity determination information based on the sell-off information associated with the received identification information, and an authenticity determination information transmission unit configured to transmit the authenticity determination information to the consumer terminal



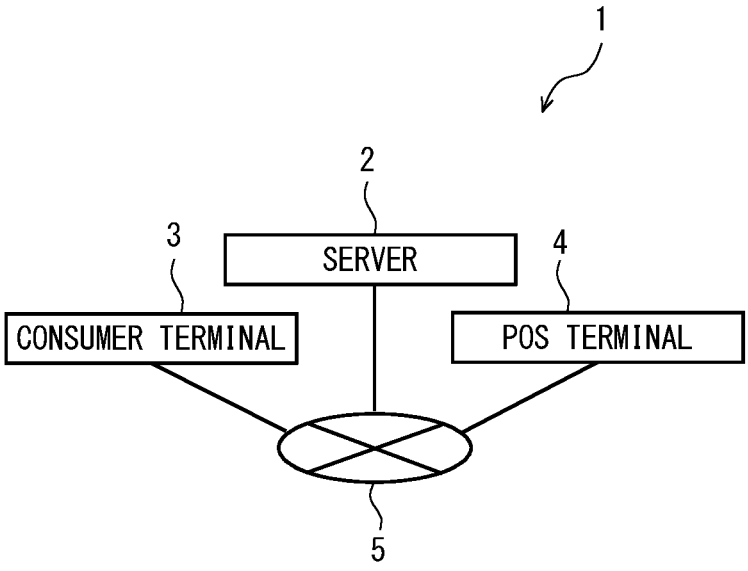


Fig. 1

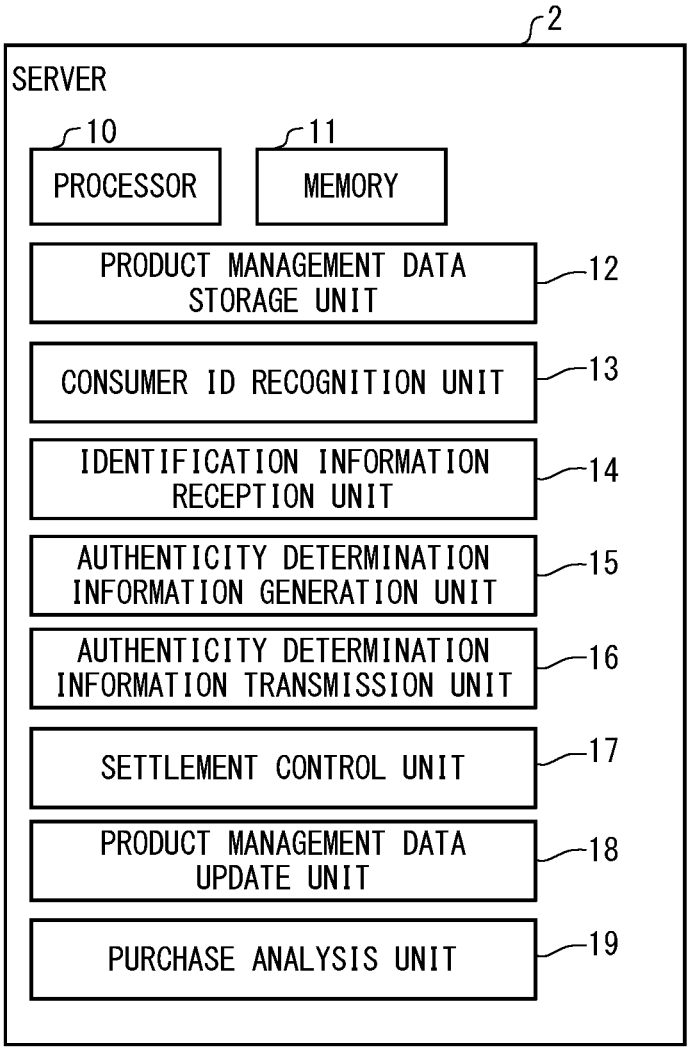
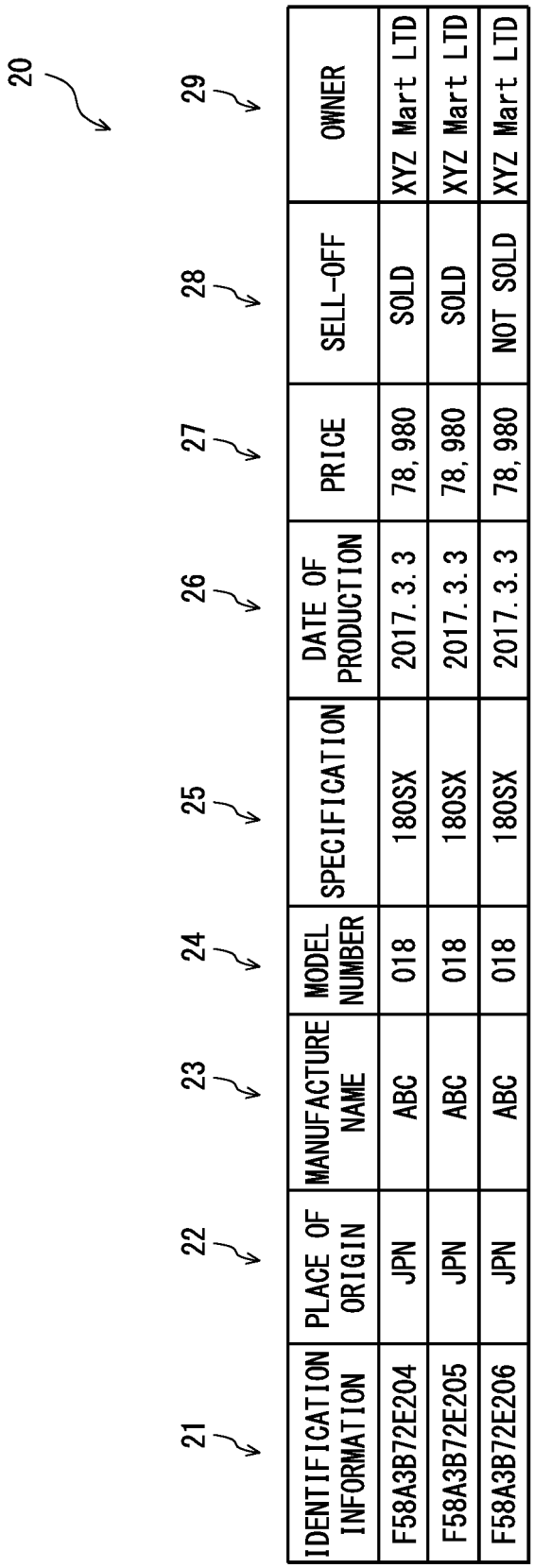

2
SERVER
10
PROCESSOR
11
MEMORY
PRODUCT MANAGEMENT DATA STORAGE UNIT
12
CONSUMER ID RECOGNITION UNIT
13
IDENTIFICATION INFORMATION RECEPTION UNIT
14
AUTHENTICITY DETERMINATION INFORMATION GENERATION UNIT
15
AUTHENTICITY DETERMINATION INFORMATION TRANSMISSION UNIT
16
SETTLEMENT CONTROL UNIT
17
PRODUCT MANAGEMENT DATA UPDATE UNIT
18
PURCHASE ANALYSIS UNIT
19

Fig. 2



IDENTIFICATION INFORMATION	PLACE OF ORIGIN	MANUFACTURE NAME	MODEL NUMBER	SPECIFICATION	DATE OF PRODUCTION	PRICE	SELL-OFF	OWNER
F58A3B72E204	JPN	ABC	018	180SX	2017.3.3	78,980	SOLD	XYZ Mart LTD
F58A3B72E205	JPN	ABC	018	180SX	2017.3.3	78,980	SOLD	XYZ Mart LTD
F58A3B72E206	JPN	ABC	018	180SX	2017.3.3	78,980	NOT SOLD	XYZ Mart LTD

Fig. 3

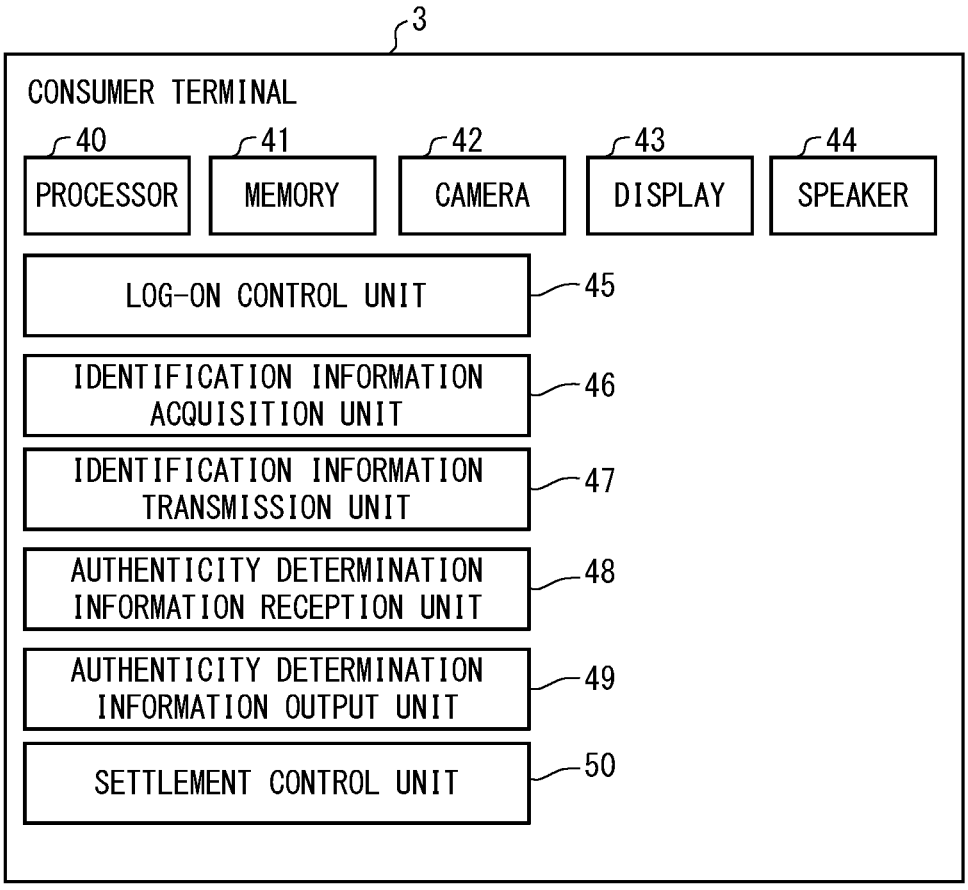

3
CONSUMER TERMINAL
40
PROCESSOR
41
MEMORY
42
CAMERA
43
DISPLAY
44
SPEAKER
LOG-ON CONTROL UNIT
45
IDENTIFICATION INFORMATION ACQUISITION UNIT
46
IDENTIFICATION INFORMATION TRANSMISSION UNIT
47
AUTHENTICITY DETERMINATION INFORMATION RECEPTION UNIT
48
AUTHENTICITY DETERMINATION INFORMATION OUTPUT UNIT
49
SETTLEMENT CONTROL UNIT
50

Fig. 4

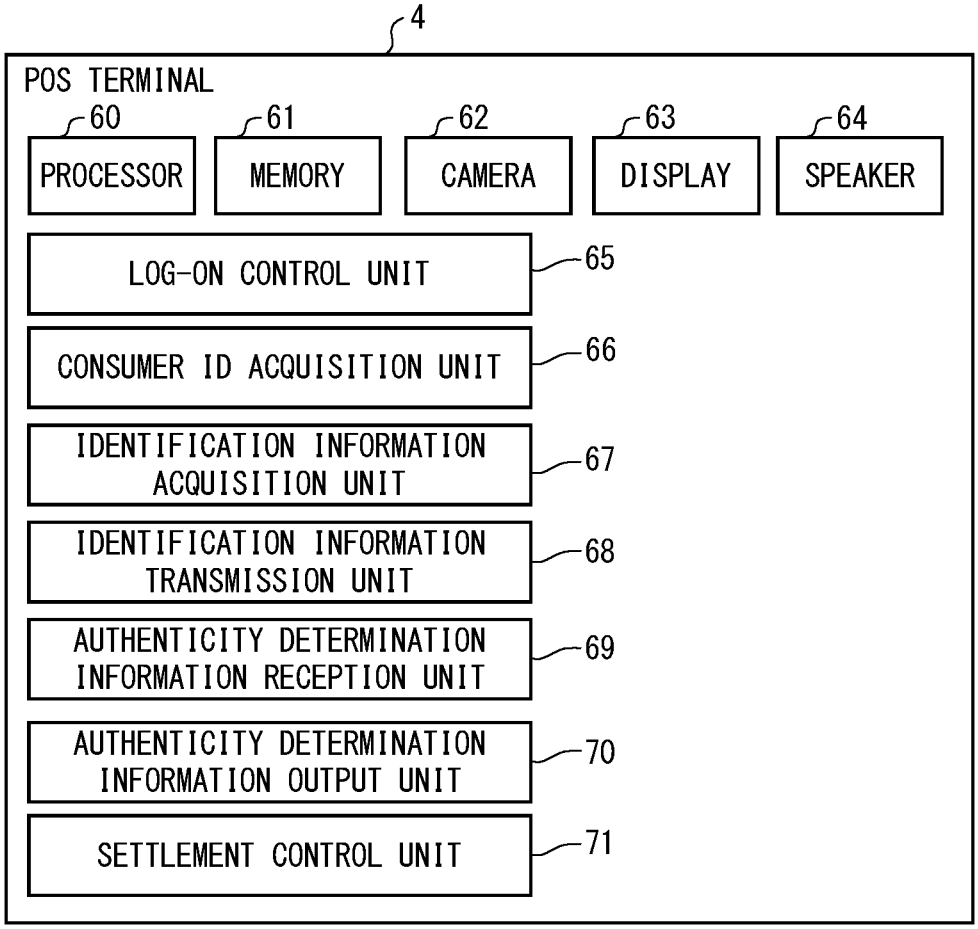
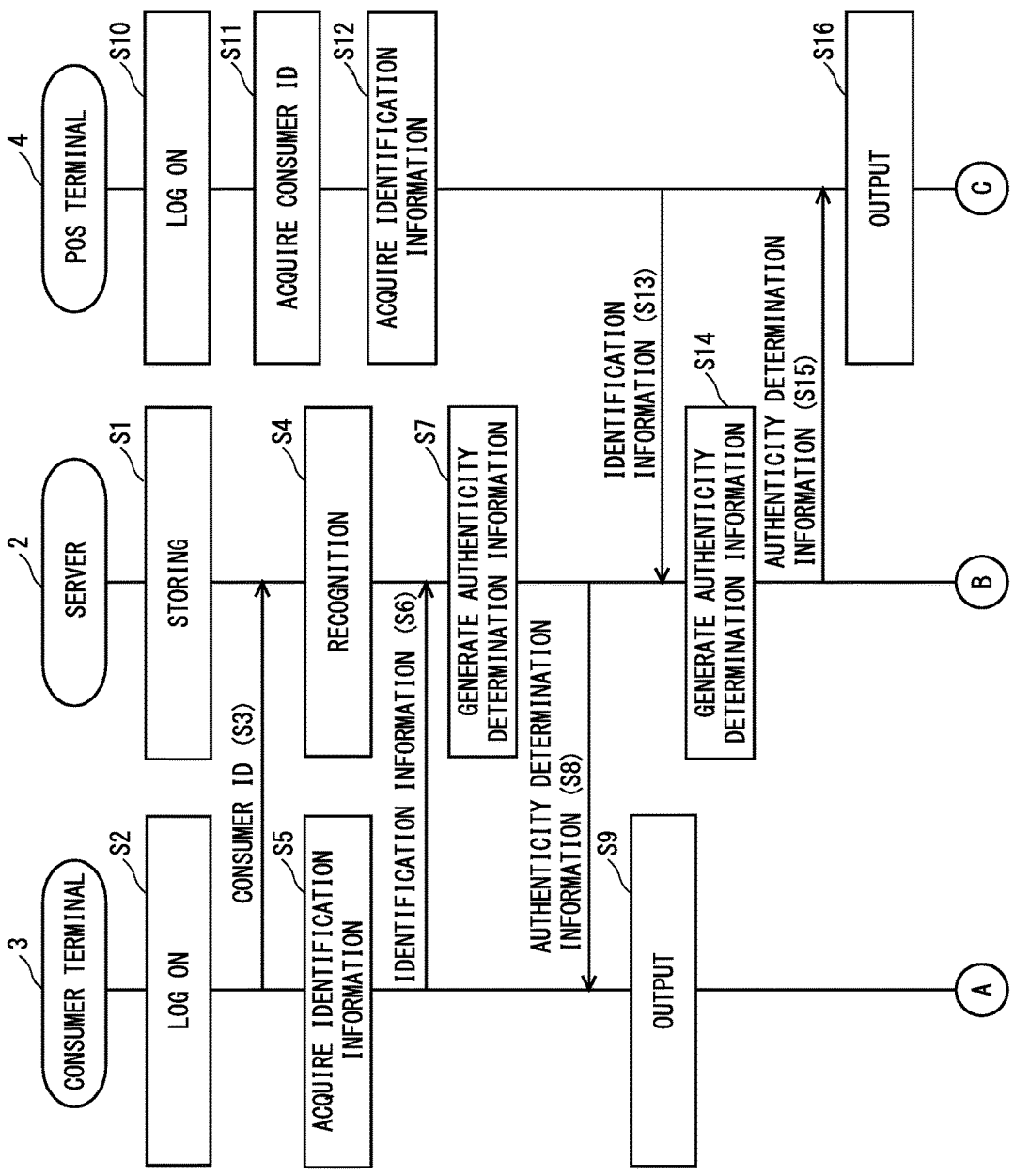

4
POS TERMINAL
60
PROCESSOR
61
MEMORY
62
CAMERA
63
DISPLAY
64
SPEAKER
LOG-ON CONTROL UNIT
65
CONSUMER ID ACQUISITION UNIT
66
IDENTIFICATION INFORMATION ACQUISITION UNIT
67
IDENTIFICATION INFORMATION TRANSMISSION UNIT
68
AUTHENTICITY DETERMINATION INFORMATION RECEPTION UNIT
69
AUTHENTICITY DETERMINATION INFORMATION OUTPUT UNIT
70
SETTLEMENT CONTROL UNIT
71

Fig. 5

Fig. 6


3
CONSUMER TERMINAL
2
SERVER
4
POS TERMINAL
S1
STORING
S2
LOG ON
S4
RECOGNITION
S5
ACQUIRE IDENTIFICATION INFORMATION
S7
GENERATE AUTHENTICITY DETERMINATION INFORMATION
S9
OUTPUT
S10
LOG ON
S11
ACQUIRE CONSUMER ID
S12
ACQUIRE IDENTIFICATION INFORMATION
S14
GENERATE AUTHENTICITY DETERMINATION INFORMATION
S16
OUTPUT
CONSUMER ID (S3)
IDENTIFICATION INFORMATION (S6)
AUTHENTICITY DETERMINATION INFORMATION (S8)
IDENTIFICATION INFORMATION (S13)
AUTHENTICITY DETERMINATION INFORMATION (S15)
A
B
C

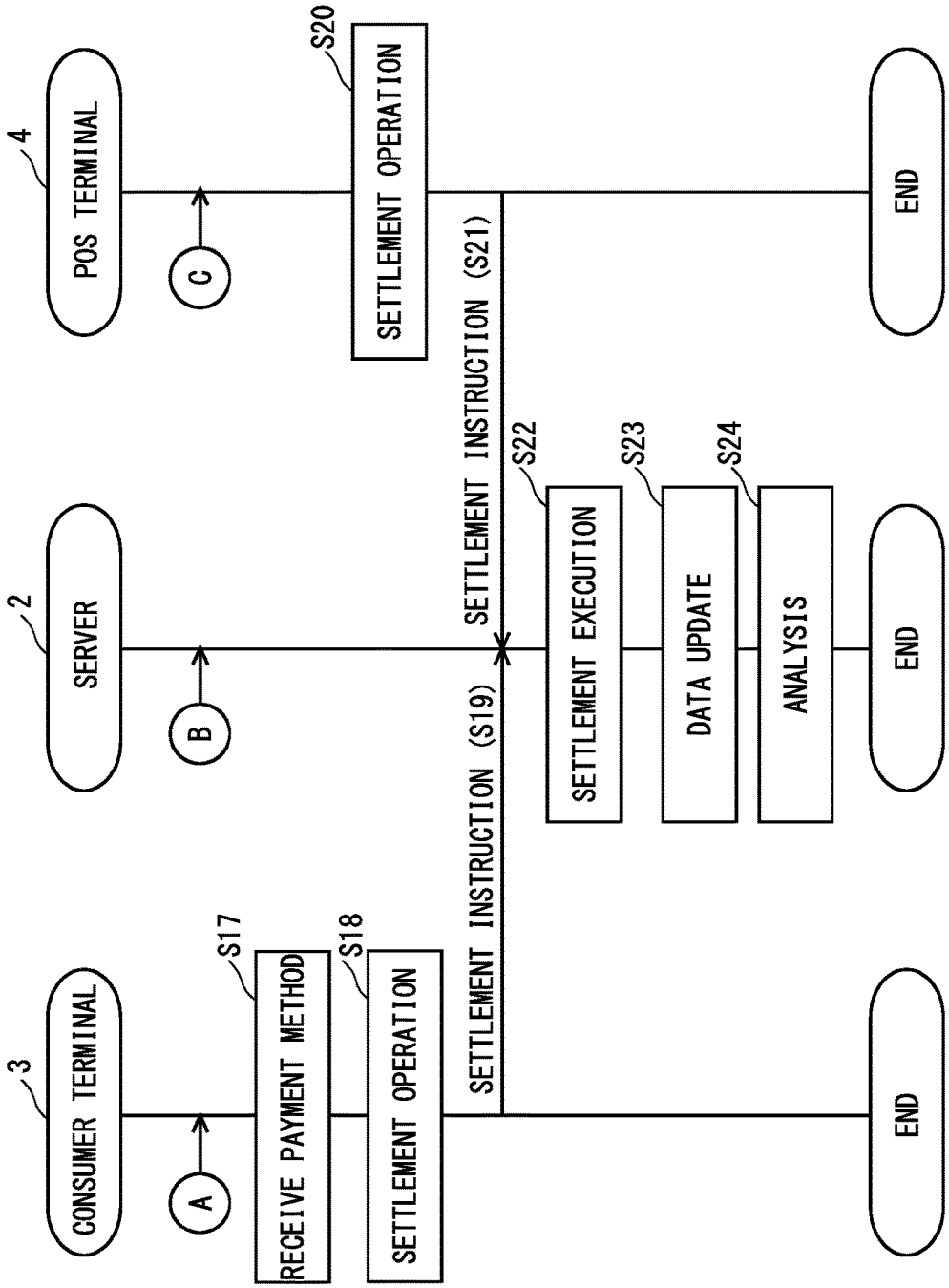

3
CONSUMER TERMINAL
A
S17
RECEIVE PAYMENT METHOD
S18
SETTLEMENT OPERATION
END
2
SERVER
B
SETTLEMENT INSTRUCTION (S19)
SETTLEMENT INSTRUCTION (S21)
S22
SETTLEMENT EXECUTION
S23
DATA UPDATE
S24
ANALYSIS
END
4
POS TERMINAL
C
S20
SETTLEMENT OPERATION
END

Fig. 7

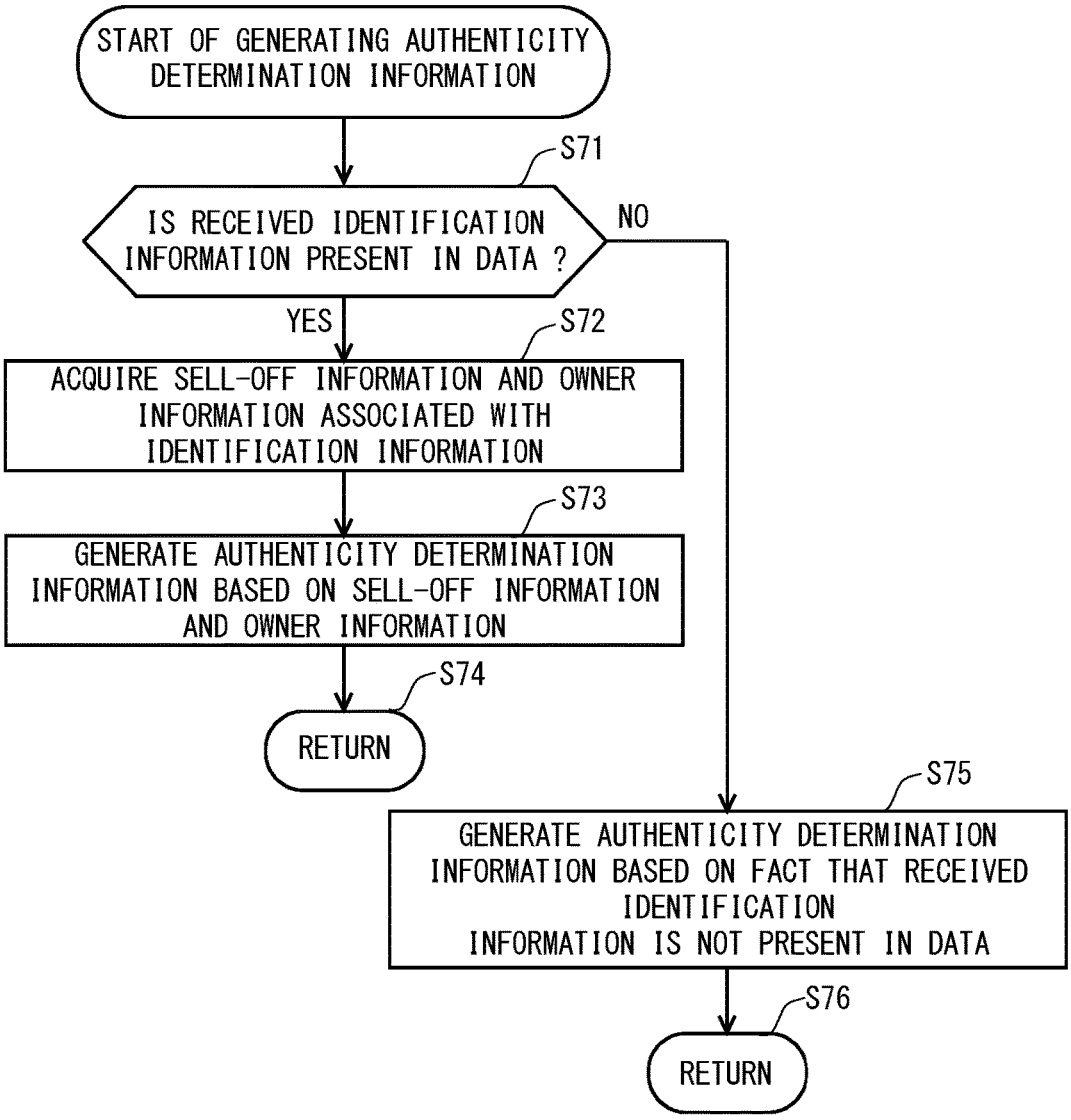

START OF GENERATING AUTHENTICITY DETERMINATION INFORMATION
S71
IS RECEIVED IDENTIFICATION INFORMATION PRESENT IN DATA ?
NO
YES
S72
ACQUIRE SELL-OFF INFORMATION AND OWNER INFORMATION ASSOCIATED WITH IDENTIFICATION INFORMATION
S73
GENERATE AUTHENTICITY DETERMINATION INFORMATION BASED ON SELL-OFF INFORMATION AND OWNER INFORMATION
S74
RETURN
S75
GENERATE AUTHENTICITY DETERMINATION INFORMATION BASED ON FACT THAT RECEIVED IDENTIFICATION INFORMATION IS NOT PRESENT IN DATA
S76
RETURN

Fig. 8

AUTHENTICITY DETERMINATION SYSTEM, SERVER AND ITS OPERATING METHOD, TERMINAL AND ITS OPERATING METHOD, AND PROGRAM

INCORPORATION BY REFERENCE

[0001] This application is based upon and claims the benefit of priority from Japanese patent application No. 2017-146902, filed on Jul. 28, 2017, the disclosure of which is incorporated herein in its entirety by reference.

BACKGROUND

[0002] The present disclosure relates to an authenticity determination system, a server and its operating method, a terminal and its operating method, and a program.

[0003] In recent years, imitations have been increasingly circulated all over the world. While the amount of damage they have caused is undoubtedly increasing, their types have also been diversified. As imitations are continuously circulated, sales of authentic products and the value of their brands could be reduced. Therefore, taking measures against imitations has become an imminent challenge that should be tackled by companies.

[0004] To meet the above-described need, Patent Literature 1 (Japanese Unexamined Patent Application Publication No. 2017-21235) discloses a label for authenticity determination using refraction of light called a hologram.

SUMMARY

[0005] However, the present inventors have found the following problem. That is, in the technique disclosed in the aforementioned Patent Literature 1, once counterfeit labels that are identical to labels stuck on authentic products are manufactured, it is impossible to prevent imitations of the authentic products from being circulated.

[0006] Therefore, an object of the present disclosure is to provide a new authenticity determination technique.

[0007] A first exemplary aspect is an authenticity determination system for determining authenticity of a product, including a terminal and a server, in which the terminal includes: an identification information acquisition unit configured to acquire unique identification information associated with the product; an identification information transmission unit configured to transmit the identification information to the server; and an authenticity determination information reception unit configured to receive authenticity determination information from the server, and the server includes: a product management data storage unit configured to store product management data associating the identification information with sell-off information indicating whether the product associated with the identification information has not yet been sold to an end consumer or has already been sold to an end consumer; an identification information reception unit configured to receive the identification information from the terminal; an authenticity determination information generation unit configured to generate the authenticity determination information based on the sell-off information associated with the received identification information; and an authenticity determination information transmission unit configured to transmit the authenticity determination information to the terminal.

[0008] A second exemplary aspect is a server for determining authenticity of a product, including: a product management data storage unit configured to store product management data associating unique identification information with sell-off information, the unique identification information being associated with the product, the sell-off information indicating whether the product associated with the identification information has not yet been sold to an end consumer or has already been sold to an end consumer; an identification information reception unit configured to receive the identification information from a terminal; an authenticity determination information generation unit configured to generate authenticity determination information based on the sell-off information associated with the received identification information; and an authenticity determination information transmission unit configured to transmit the authenticity determination information to the terminal.

[0009] A third exemplary aspect is a method for operating a server for determining authenticity of a product, including: a product management data storing step of storing product management data associating unique identification information with sell-off information, the unique identification information being associated with the product, the sell-off information indicating whether the product associated with the identification information has not yet been sold to an end consumer or has already been sold to an end consumer; an identification information receiving step of receiving the identification information from a terminal; an authenticity determination information generating step of generating authenticity determination information based on the sell-off information associated with the received identification information; and an authenticity determination information transmitting step of transmitting the authenticity determination information to the terminal.

[0010] A fourth exemplary aspect is a terminal for determining authenticity of a product, including: an identification information acquisition unit configured to acquire unique identification information associated with the product; an identification information transmission unit configured to transmit the identification information to a server, the server including a product management data storage unit configured to store product management data associating the identification information with sell-off information indicating whether the product associated with the identification information has not yet been sold to an end consumer or has already been sold to an end consumer; and an authenticity determination information reception unit configured to receive authenticity determination information from the server, the server being configured to generate the authenticity determination information based on the sell-off information associated with the identification information transmitted to the server.

[0011] A fifth exemplary aspect is a method for operating a terminal for determining authenticity of a product, including: an identification information acquiring step of acquiring unique identification information associated with the product; an identification information transmitting step of transmitting the identification information to a server, the server including a product management data storage unit configured to store product management data associating the identification information with sell-off information indicating whether the product associated with the identification information has not yet been sold to an end consumer or has already been sold to an end consumer; and an authenticity determination information receiving step of receiving

authenticity determination information from the server, the server being configured to generate the authenticity determination information based on the sell-off information associated with the identification information transmitted to the server.

[0012] According to the present disclosure, it is possible to provide a new authenticity determination technique.

[0013] The above and other objects, features and advantages of the present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus are not to be considered as limiting the present invention.

BRIEF DESCRIPTION OF DRAWINGS

[0014] FIG. **1** is a schematic diagram of an authenticity determination system;

[0015] FIG. **2** is a functional block diagram of a server;

[0016] FIG. **3** is a table showing a data structure of product management data;

[0017] FIG. **4** is a functional block diagram of a consumer terminal;

[0018] FIG. **5** is a functional block diagram of a POS (Point-Of-Sale) terminal;

[0019] FIG. **6** is a sequence diagram in the authenticity determination system;

[0020] FIG. **7** is a sequence diagram in the authenticity determination system; and

[0021] FIG. **8** is a flowchart for generating authenticity determination information.

DESCRIPTION OF EMBODIMENTS

[0022] Embodiments according to the present disclosure are explained hereinafter with reference to the drawings.

[0023] FIG. **1** shows a schematic diagram of an authenticity determination system **1**. As shown in FIG. **1**, the authenticity determination system **1** includes a server **2**, a consumer terminal **3** as a terminal possessed by a consumer, and a POS (Point-Of-Sale) terminal **4** as a terminal installed in a counter of a retail store. However, the authenticity determination system **1** may include a plurality of servers **2** and thereby perform one or a plurality of processes by two or more servers **2** in a distributed manner. The authenticity determination system **1** may include a plurality of consumer terminals **3** or include only one consumer terminal **3**. Alternatively, the authenticity determination system **1** may include no consumer terminal **3**. The authenticity determination system **1** may include a plurality of POS terminals **4** or include only one POS terminal **4**. Alternatively, the authenticity determination system **1** may include no POS terminal **4**.

[0024] As shown in FIG. **1**, the server **2**, the consumer terminal **3**, and the POS terminal **4** are configured so that, for example, they can communicate bidirectionally with each other through a network **5** such as the Internet.

(Server **2**)

[0025] Next, the server **2** is explained with reference to FIGS. **2** and **3**.

[0026] As shown in FIG. **2**, the server **2** includes a computer including a processor **10** and a memory **11**. The memory **11** is composed of a non-volatile memory, a volatile memory, an HDD (Hard Disk Drive), or the like. In the memory **11**, a server control program for controlling the server **2** is stored. As the server control program is loaded into the processor **10** and the processor **10** executes it, the server control program causes the computer including the processor **10** and the memory **11** to function as a product management data storage unit **12**, a consumer ID recognition unit **13**, an identification information reception unit **14**, an authenticity determination information generation unit **15**, an authenticity determination information transmission unit **16**, a settlement control unit **17**, a product management data update unit **18**, and a purchase analysis unit **19**. Note that at the technical level at the time of the filing of this application, the product management data storage unit **12** is implemented mainly by an HDD.

[0027] The product management data storage unit **12** stores product management data **20** shown in FIG. **3**. As shown in FIG. **3**, the product management data **20** contains identification information **21**, place-of-origin information **22**, manufacture name information **23**, model number information **24**, specification information **25**, date-of-production information **26**, price information **27**, sell-off information **28**, and owner information **29** while they are associated with each other. That is, each of the place-of-origin information **22**, the manufacture name information **23**, the model number information **24**, the specification information **25**, the date-of-production information **26**, the price information **27**, the sell-off information **28**, and the owner information **29** is associated with the identification information **21** in a one-to-one manner

[0028] The identification information **21** is unique and one-and-only identification information for which no duplicate identification information exists anywhere in the world. Hence, two piece of the identification information **21** associated with exactly the same kind of two products inevitably differs from each other. Therefore, as shown in FIG. **3**, there is a possibility that the same place of origin, the same manufacture name, the same model number, the same specification, the same date of production, or the same price could be associated with a plurality of pieces of mutually-different identification information **21**. As an example, the identification information **21** could have an amount of information of about 10 kbits. At the technical level at the time of the filing of this application, the identification information **21** is associated with a product by disposing it in the product itself or an accessory of the product by using, for example, a QR-code label (Registered Trademark) or an RF tag or barcode label. Note that "the accessory of the product" means an item that is present for the product in a one-to-one relation and is distributed together with the product. For example, "the accessory of the product" means packaging in which the product is packaged, a price tag attached to the product or its packaging, or a label attached to the product or its packaging. The term "disposing" includes attaching, sticking, printing, and other means.

[0029] The place-of-origin information **22** indicates the place of origin of the product. The manufacture name information **23** indicates the name of the manufacturer (or the producer) of the product. The model number information **24** indicates the model number of the product. The specification information **25** indicates the specifications of the product. The date-of-production information **26** indicates the date of production of the product. The price information **27** indicates the price of the product. Note that the price of the product indicted by the price information **27** means a

manufacturer's recommended retail price determined by the manufacturer, an actual retail price in a store, or other prices.

[0030] The sell-off information **28** is information indicating whether the product associated with the identification information **21** has not yet been sold to an end consumer or has already been sold to an end consumer. In FIG. **3**, "SOLD" indicates that the product associated with the identification information **21** has already been sold to an end consumer and "NOT SOLD" indicates that the product associated with the identification information **21** has not yet been sold to an end consumer. However, whether the product has not yet been sold or has already been sold may instead be expressed by simply using Boolean types, i.e., by using "TRUE" and "FALSE" or by simply using integer types, i.e., "1" and "0", instead of using "SOLD" and "NOT SOLD".

[0031] The owner information **29** is information indicating the current legitimate owner of the product associated with the identification information **21**. Alternatively, the owner information **29** may be information indicating all the owners through the channel of distribution of the product, including the current legitimate owner of the product associated with the identification information **21**, in a chronological order.

[0032] It should be noted that in the product management data **20**, any of the place-of-origin information **22**, the manufacture name information **23**, the model number information **24**, the specification information **25**, the date-of-production information **26**, the price information **27**, and the owner information **29** may be omitted. That is, the product management data **20** may include only the identification information **21** and the sell-off information **28**, or may include only the identification information **21**, the sell-off information **28**, and the owner information **29**.

[0033] The consumer ID recognition unit **13** recognizes a consumer who has logged on the consumer terminal **3** by receiving a consumer ID transmitted from the consumer terminal **3**.

[0034] The identification information reception unit **14** receives the identification information **21** from the consumer terminal **3**.

[0035] The authenticity determination information generation unit **15** generates authenticity determination information based on the sell-off information **28** associated with the received identification information **21**.

[0036] The authenticity determination information transmission unit **16** transmits the authenticity determination information generated by the authenticity determination information generation unit **15** to the consumer terminal **3**.

[0037] The settlement control unit **17** controls a settlement (e.g., a payment) for the purchase/sale of the product.

[0038] The product management data update unit **18** updates the product management data **20**.

[0039] The purchase analysis unit **19** analyzes the whole process of the commercial transaction.

(Consumer Terminal **3**)

[0040] Next, the consumer terminal **3** is explained with reference to FIG. **4**.

[0041] As shown in FIG. **4**, the consumer terminal **3** includes a computer including a processor **40** and a memory **41**, a camera **42**, a display **43**, and a speaker **44**. The memory **41** is composed of a non-volatile memory, a volatile memory, an HDD (Hard Disk Drive), or the like. At the technical level at the time of the filing of this application, the memory **41** is composed of a non-volatile memory and a volatile memory in order to reduce the size and the weight of the consumer terminal **3**. In the memory **41**, a consumer terminal program for controlling the consumer terminal **3** is stored. As the consumer terminal program is loaded into the processor **40** and the processor **40** executes it, the consumer terminal program causes the computer including the processor **40** and the memory **41** to function as a log-on control unit **45**, an identification information acquisition unit **46**, an identification information transmission unit **47**, an authenticity determination information reception unit **48**, an authenticity determination information output unit **49**, and a settlement control unit **50**.

[0042] The log-on control unit **45** controls log-on of a consumer to the consumer terminal **3**.

[0043] The identification information acquisition unit **46** acquires identification information disposed in the product itself or an accessory of the product. When the identification information is disposed in the product itself or an accessory of the product by using a QR-code label, the identification information acquisition unit **46** acquires the identification information through the camera **42**. When the identification information is disposed in the product itself or an accessory of the product by using an RF tag, the identification information acquisition unit **46** acquires the identification information through near-field wireless communication means (not shown). When the identification information is disposed in the product itself or an accessory of the product by using a barcode label, the identification information acquisition unit **46** acquires the identification information through the camera **42** or a barcode reader. Note that the identification information may be disposed in the product itself or an accessory of the product by directly printing a barcode on the product itself or an accessory of the product.

[0044] The identification information transmission unit **47** transmits the identification information to the server **2**.

[0045] The authenticity determination information reception unit **48** receives authenticity determination information from the server **2**.

[0046] The authenticity determination information output unit **49** outputs the authenticity determination information through output means such as the display **43** and the speaker **44**. Note that the authenticity determination information output unit **49** may output the authenticity determination information through, for example, a vibration motor that vibrates the consumer terminal **3**, instead of through the display **43** or the speaker **44**.

[0047] The settlement control unit **50** controls a settlement (e.g., a payment) for the purchase/sale of the product.

(POS Terminal **4**)

[0048] Next, the POS terminal **4** is explained with reference to FIG. **5**.

[0049] As shown in FIG. **5**, the POS terminal **4** includes a computer including a processor **60** and a memory **61**, a camera **62**, a display **63**, and a speaker **64**. The memory **61** is composed of a non-volatile memory, a volatile memory, an HDD (Hard Disk Drive), or the like. In the memory **61**, a POS terminal program for controlling the POS terminal **4** is stored. As the POS terminal program is loaded into the processor **60** and the processor **60** executes it, the POS terminal program causes the computer including the processor **60** and the memory **61** to function as a log-on control unit **65**, a consumer ID acquisition unit **66**, an identification

information acquisition unit **67**, an identification information transmission unit **68**, an authenticity determination information reception unit **69**, an authenticity determination information output unit **70**, and a settlement control unit **71**.

[0050] The log-on control unit **65** controls log-on of a salesclerk to the POS terminal **4**.

[0051] The consumer ID acquisition unit **66** acquires a consumer ID of a consumer.

[0052] The identification information acquisition unit **67** acquires identification information disposed in the product itself or an accessory of the product. When the identification information is disposed in the product itself or an accessory of the product by using a QR-code label, the identification information acquisition unit **67** acquires the identification information through the camera **62**. When the identification information is disposed in the product itself or an accessory of the product by using an RF tag, the identification information acquisition unit **67** acquires the identification information through near-field wireless communication means (not shown). When the identification information is disposed in the product itself or an accessory of the product by using a barcode label, the identification information acquisition unit **67** acquires the identification information through the camera **62** or a barcode reader.

[0053] The identification information transmission unit **68** transmits the identification information to the server **2**.

[0054] The authenticity determination information reception unit **69** receives authenticity determination information from the server **2**.

[0055] The authenticity determination information output unit **70** outputs the authenticity determination information through output means such as the display **63** and the speaker **64**.

[0056] The settlement control unit **71** controls a settlement for the purchase/sale of the product.

(Sequence of Authenticity Determination System **1**)

[0057] Next, a sequence performed by the authenticity determination system **1** is explained with reference to FIGS. **6** to **8**.

[0058] S**1**: Product Management Data Storing Step

[0059] Firstly, the product management data storage unit **12** of the server **2** stores product management data **20**. Specifically, by an operation performed by an operator of the server **2**, product management data **20** is entered into the server **2** and the product management data storage unit **12** stores the entered product management data **20**.

[0060] Note that the product management data **20** is entered at the request of a manufacture that wants to prevent or stop the distribution of imitations. That is, a manufacture that wants to prevent the distribution of imitations disposes identification information in their products themselves or accessories of their products and requests a company in charge of the server **2** to enter or update the product management data **20** whenever necessary.

[0061] It should be noted that the current legitimate owner of a product could change during the distribution of the product. Therefore, the manufacture that wants to prevent the distribution of imitations appropriately keeps track of the distribution of their products. Further, whenever the current legitimate owner of their product changes, the manufacture requests the company in charge of the server **2** to enter or update the product management data **20** whenever necessary.

[0062] S**2**-S**3**:

[0063] Next, a consumer starts, for example, an application program such as WeChat and performs a predetermined log-on operation in the consumer terminal **3**. As a result, the log-on control unit **45** acquires a consumer ID and transmits the acquired consumer ID to the server **2**.

[0064] S**4**:

[0065] The consumer ID recognition unit **13** of the server **2** recognizes the consumer, who has logged on the consumer terminal **3**, by receiving the consumer ID from the consumer terminal **3**.

[0066] S**5**: Identification Information Acquiring Step

[0067] Next, in order to verify the authenticity of a product that the consumer is considering purchasing (hereinafter referred to as "a product under consideration"), the consumer photographs a QR-code label disposed in the product under consideration itself or an accessory of the product under consideration by operating the camera **42** of the consumer terminal **3**. In this way, the identification information acquisition unit **46** of the consumer terminal **3** decodes the photographed QR-code label and thereby acquires identification information of the product under consideration.

[0068] S**6**: Identification Information Transmitting Step, Identification Information Receiving Step

[0069] Next, the identification information transmission unit **47** of the consumer terminal **3** transmits the identification information acquired by the identification information acquisition unit **46** to the server **2**. The identification information reception unit **14** of the server **2** receives the identification information from the consumer terminal **3**. Hereinafter, the identification information that the identification information reception unit **14** of the server **2** receives from the consumer terminal **3** is referred to as received identification information.

[0070] S**7**: Outline of Authenticity Determination Information Generating Step

[0071] Next, the authenticity determination information generation unit **15** of the server **2** generates authenticity determination information based on sell-off information associated with the received identification information.

[0072] S**71**-S**76**: Detail of Authenticity Determination Information Generating Step

[0073] FIG. **8** shows an authenticity determination information generating step performed by the authenticity determination information generation unit **15** in detail. As shown in FIG. **8**, firstly, the authenticity determination information generation unit **15** determines whether the received identification information is present in the product management data **20** (S**71**).

[0074] In the step S**71**, when the authenticity determination information generation unit **15** determines that the received identification information is present in the product management data **20** (S**71**: YES), it acquires sell-off information and owner information associated with the received identification information by referring to the product management data **20** (S**72**). Then, the authenticity determination information generation unit **15** generates authenticity determination information based on the acquired sell-off information and the owner information (S**73**) and returns to the sequence shown in FIG. **6** (S**74**). Note that the authenticity determination information may be information including the sell-off information and the owner information as they are, or may be information that is obtained by processing the

sell-off information and the owner information. Alternatively, the authenticity determination information generation unit **15** may generate the authenticity determination information based solely on the sell-off information, instead of generating the authenticity determination information based on the sell-off information and the owner information.

[0075] In the step S**71**, when the authenticity determination information generation unit **15** determines that the received identification information is not present in the product management data **20** (S**71**: NO), it generates authenticity determination information based on the fact that the received identification information is not present in the product management data **20** (S**75**) and returns to the sequence shown in FIG. **6** (S**76**). In this case, the authenticity determination information is preferably information directly or indirectly indicating that the received identification information is not present in the product management data **20**, such as Boolean type information "FALSE".

[0076] S**8**: Authenticity Determination Information Transmitting Step, Authenticity

Determination Information Receiving Step

[0077] Next, the authenticity determination information transmission unit **16** of the server **2** transmits the authenticity determination information generated by the authenticity determination information generation unit **15** to the consumer terminal **3**. The authenticity determination information reception unit **48** of the consumer terminal **3** receives the authenticity determination information from the server **2**.

[0078] S**9**: Authenticity Determination Information Outputting Step

[0079] Then, the authenticity determination information output unit **49** of the consumer terminal **3** outputs the received authenticity determination information to the display **43**. Specifically, the authenticity determination information output unit **49** outputs (i.e., displays), based on the authenticity determination information, information on whether the product under consideration has not yet been sold to an end consumer or has already been sold to an end consumer by using text, symbols, figures, etc., in the display **43**. In this way, the consumer can determine (i.e., find out) whether the product under consideration has not yet been sold to an end consumer or has already been sold to an end consumer. That is, when the product under consideration is displayed in a store even though it has already been sold to an end consumer, there is a high possibility that the product under consideration is an imitation. Therefore, the consumer can be skeptical about the authenticity of the product under consideration and hence can avoid purchasing the product under consideration. Consequently, it is possible to prevent imitations from being circulated.

[0080] Further, the authenticity determination information output unit **49** outputs (i.e., displays), based on the authenticity determination information, information on the current legitimate owner of the product under consideration by using text, symbols, figures, etc., in the display **43**. In this way, the consumer can determine (i.e., find out) whether or not the current legitimate owner of the product under consideration is the retail store in which the product under consideration is displayed. When the current legitimate owner of the product under consideration is not the same as the retail store in which the product under consideration is displayed, there is a high possibility that the product under consideration is an imitation. Therefore, the consumer can be skeptical about the authenticity of the product under consideration and hence can avoid purchasing the product under consideration. Consequently, it is possible to prevent imitations from being circulated.

[0081] Further, the authenticity determination information output unit **49** outputs (i.e., displays), based on the authenticity determination information, information on whether or not the identification information associated with the product under consideration is present in the product management data **20** by using text, symbols, figures, etc., in the display **43**. When the identification information associated with the product under consideration is not present in the product management data **20**, there is a high possibility that the product under consideration is an imitation. Therefore, the consumer can be skeptical about the authenticity of the product under consideration and hence can avoid purchasing the product under consideration. Consequently, it is possible to prevent imitations from being circulated.

[0082] Next, a sequence performed in the POS terminal **4** is explained.

[0083] S**10**:

[0084] Firstly, as a salesclerk performs a predetermined log-on operation in the POS terminal **4**, the log-on control unit **65** acquires a salesclerk ID.

[0085] S**11**:

[0086] Next, as the salesclerk performs a predetermined reading operation for the consumer terminal **3** in the POS terminal **4**, the consumer ID acquisition unit **66** acquires a consumer ID.

[0087] S**12**: Identification Information Acquiring Step

[0088] Next, in order to verify the authenticity of a product under consideration, the consumer or the salesclerk photographs a QR-code label disposed in the product under consideration itself or an accessory of the product under consideration by operating the camera **62** of the POS terminal **4**. In this way, the identification information acquisition unit **67** of the POS terminal **4** decodes the photographed QR-code label and thereby acquires identification information of the product under consideration. Note that when an RF tag is used in place of the QR-code label, the consumer or the salesclerk reads information recorded in the RF tag disposed in the product under consideration itself or an accessory of the product under consideration by operating an RF communication device or the like of the POS terminal **4** in order to verify the authenticity of the product under consideration. Note that when a barcode label is used in place of the QR-code label, the consumer or the salesclerk reads information recorded in the barcode label disposed in the product under consideration itself or an accessory of the product under consideration by operating the camera **62** or a barcode reader of the POS terminal **4** in order to verify the authenticity of the product under consideration. In this way, the identification information acquisition unit **67** of the POS terminal **4** acquires the identification information of the product under consideration.

[0089] S**13**: Identification Information Transmitting Step, Identification Information Receiving Step

[0090] Next, the identification information transmission unit **68** of the POS terminal **4** transmits the identification information acquired by the identification information acquisition unit **67** to the server **2**. The identification information reception unit **14** of the server **2** receives the identification information from the POS terminal **4**. Hereinafter, the identification information that the identification infor-

mation reception unit **14** of the server **2** receives from the POS terminal **4** is referred to as received identification information.

[0091] S**14**: Authenticity Determination Information Generating Step

[0092] Next, the authenticity determination information generation unit **15** of the server **2** generates authenticity determination information based on sell-off information associated with the received identification information. Detailed operations performed by the authenticity determination information generation unit **15** are similar to the operations in the steps S**71** to S**76** shown in FIG. **8** and therefore their explanations are omitted.

[0093] S**15**: Authenticity Determination Information Transmitting Step, Authenticity Determination Information Receiving Step

[0094] Next, the authenticity determination information transmission unit **16** of the server **2** transmits the authenticity determination information generated by the authenticity determination information generation unit **15** to the POS terminal **4**. The authenticity determination information reception unit **69** of the POS terminal **4** receives the authenticity determination information from the server **2**.

[0095] S**16**: Authenticity Determination Information Outputting Step

[0096] Then, the authenticity determination information output unit **70** of the POS terminal **4** outputs the received authenticity determination information to the display **63**. Specifically, the authenticity determination information output unit **70** outputs (i.e., displays), based on the authenticity determination information, information on whether the product under consideration has not yet been sold to an end consumer or has already been sold to an end consumer by using text, symbols, figures, etc., in the display **63**. In this way, the consumer can determine (i.e., find out) whether the product under consideration has not yet been sold to an end consumer or has already been sold to an end consumer. That is, when the product under consideration is displayed in a store even though it has already been sold to an end consumer, there is a high possibility that the product under consideration is an imitation. Therefore, the consumer can be skeptical about the authenticity of the product under consideration and hence can avoid purchasing the product under consideration. Consequently, it is possible to prevent imitations from being distributed.

[0097] Further, the authenticity determination information output unit **70** outputs (i.e., displays), based on the authenticity determination information, information on the current legitimate owner of the product under consideration by using text, symbols, figures, etc., in the display **63**. In this way, the consumer can determine (i.e., find out) whether or not the current legitimate owner of the product under consideration is the retail store in which the product under consideration is displayed. When the current legitimate owner of the product under consideration is not the same as the retail store in which the product under consideration is displayed, there is a high possibility that the product under consideration is an imitation. Therefore, the consumer can be skeptical about the authenticity of the product under consideration and hence can avoid purchasing the product under consideration. Consequently, it is possible to prevent imitations from being circulated.

[0098] A sequence that is performed by the authenticity determination system **1** when and after a consumer has determined to purchase a product under consideration is explained hereinafter.

[0099] S**17**: Payment Method Receiving Step

[0100] Firstly, the settlement control unit **50** displays a plurality of methods for payment in the display **43** of the consumer terminal **3** in such a manner that a consumer can select one of the methods for payment. The consumer selects one of the plurality of methods for payment and enters his/her choice in the consumer terminal **3** by performing a predetermined operation.

[0101] Examples of the methods for payment include WeChat payment, Alipay, Baidu Wallet, Union Pay, Line Pay, and ordinary credit cards.

[0102] S**18**-S**19**: Settlement Instructing Step

[0103] Next, the settlement control unit **50** of the consumer terminal **3** displays a settlement button in the display **43** of the consumer terminal **3**. In response to this, as the consumer operates the settlement button (S**18**), the settlement control unit **50** transmits a settlement instruction to the server **2** (S**19**). Note that the settlement instruction that the settlement control unit **50** transmits to the server **2** includes the identification information of the product under consideration and a consumer ID.

[0104] S**20**-S**21**: Settlement Instructing Step

[0105] At the same time, as the salesclerk operates a settlement button in the POS terminal **4** (S**20**), the settlement control unit **71** transmits a settlement instruction to the server **2** (S**21**). Note that the settlement instruction that the settlement control unit **71** transmits to the server **2** includes the identification information of the product under consideration, the consumer ID, a salesclerk ID, and a retail store ID.

[0106] S**22**: Settlement Executing Step

[0107] When the settlement control unit **17** of the server **2** receives the settlement instruction from the consumer terminal **3** (S**19**) and receives the settlement instruction from the POS terminal **4** (S**21**), it performs a settlement process in which a predetermined amount of money is remitted from an account of the consumer to an account of the retail store directly or through an account of a settlement agent (S**22**). In this way, the purchase/sale of the product under consideration is settled between the consumer and the retail store and the settlement is completed.

[0108] S**23**: Product Management Data Updating Step

[0109] Next, the product management data update unit **18** of the server **2** updates the sell-off information and the owner information of the product under consideration, i.e., the object for which the above-described settlement process has been carried out. That is, by the above-described settlement process, the product under consideration has already been sold to the end consumer. Therefore, the product management data update unit **18** updates the product management data **20** so that the sell-off information of the product under consideration is changed from "NOT SOLD" to "SOLD". In this way, the identification information related to the product under consideration is invalidated, so to speak, in the commercial transaction. Therefore, the function of guaranteeing the authenticity commercial transaction, which has been included in the identification information, is lost. Further, since the product under consideration has been transferred to the end consumer through the above-described settlement process, the product management data update

unit **18** updates the product management data **20** so that the owner information indicating the current legitimate owner of the product under consideration is changed from "XYZ Mart LTD" to "CONSUMER" or "NULL".

[0110] S**24**: Purchase Analyzing Step

[0111] Lastly, the purchase analysis unit **19** of the server **2** collects and analyzes information that is obtained through the above-described series of purchasing/selling processes. For example, the purchase analysis unit **19** analyzes a purchasing trend of each consumer, totals up sales results for each salesclerk, and so on. Further, the purchase analysis unit **19** provides purchase points to consumers.

[0112] Preferred embodiments according to the present disclosure have been described above. The above-described embodiments include the following features.

[0113] An authenticity determination system **1** for determining authenticity of a product includes a consumer terminal **3** (or a POS terminal **4**) and a server **2**. The consumer terminal **3** (or the POS terminal **4**) includes an identification information acquisition unit **46** (an identification information acquisition unit **67**) configured to acquire unique identification information **21** associated with the product, an identification information transmission unit **47** (an identification information transmission unit **68**) configured to transmit the identification information **21** to the server **2**, and an authenticity determination information reception unit **48** (an authenticity determination information reception unit **69**) configured to receive authenticity determination information from the server **2**. The server **2** includes a product management data storage unit **12** configured to store product management data **20** associating the identification information **21** with sell-off information **28** indicating whether the product associated with the identification information **21** has not yet been sold to an end consumer or has already been sold to an end consumer, an identification information reception unit **14** configured to receive the identification information **21** from the consumer terminal **3** (or the POS terminal **4**), an authenticity determination information generation unit **15** configured to generate the authenticity determination information based on the sell-off information **28** associated with the received identification information **21**, and an authenticity determination information transmission unit **16** configured to transmit the authenticity determination information to the consumer terminal **3** (or the POS terminal **4**). By the above-described configuration, a consumer can determine authenticity of a product based on authenticity determination information through the consumer terminal **3** (or the POS terminal **4**). Specifically, when the product has already been sold to an end consumer, the consumer can determine that the product is an imitation.

[0114] Note that the terminal included in the authenticity determination system **1** may be the consumer terminal **3** or may be the POS terminal **4**. Alternatively, the authenticity determination system **1** may include both the consumer terminal **3** and the POS terminal **4**.

[0115] When the received identification information **21** is not present in the product management data **20**, the authenticity determination information generation unit **15** generates authenticity determination information based on the fact that the received identification information **21** is not present in the product management data **20**. By the above-described configuration, a consumer can determine authenticity of a product based on authenticity determination information through the consumer terminal **3** (or the POS terminal **4**). Specifically, when identification information **21** of a product is not present in the product management data **20**, the consumer can determine that the product is an imitation.

[0116] The product management data **20** includes information on relevance between identification information **21** and owner information **29**, which is information on a current legitimate owner of the product associated with the identification information **21**. The authenticity determination information generation unit **15** generates authenticity determination information based on the sell-off information **28** and the owner information **29** associated with the received identification information **21**. By the above-described configuration, a consumer can determine authenticity of a product based on authenticity determination information through the consumer terminal **3** (or the POS terminal **4**). Specifically, when the current legitimate owner of the product is not the same as a retail store in which the product is displayed, the consumer can determine that the product is an imitation.

[0117] A server **2** for determining authenticity of a product includes a product management data storage unit **12** configured to store product management data **20** associating unique identification information **21** with sell-off information **28**, the unique identification information **21** being associated with the product, the sell-off information **28** indicating whether the product associated with the identification information **21** has not yet been sold to an end consumer or has already been sold to an end consumer, an identification information reception unit **14** configured to receive the identification information **21** from the consumer terminal **3** (or the POS terminal **4**), an authenticity determination information generation unit **15** configured to generate the authenticity determination information based on the sell-off information **28** associated with the received identification information **21**, and an authenticity determination information transmission unit **16** configured to transmit the authenticity determination information to the consumer terminal **3** (or the POS terminal **4**). By the above-described configuration, a consumer can determine authenticity of a product based on authenticity determination information through the consumer terminal **3** (or the POS terminal **4**). Specifically, when the product has already been sold to an end consumer, the consumer can determine that the product is an imitation.

[0118] A method for operating a server **2** for determining authenticity of a product includes a product management data storing step (S**1**) of storing product management data **20** associating unique identification information **21** with sell-off information **28**, the unique identification information **21** being associated with the product, the sell-off information **28** indicating whether the product associated with the identification information **21** has not yet been sold to an end consumer or has already been sold to an end consumer, an identification information receiving step (S**6**, S**13**) of receiving the identification information **21** from a consumer terminal **3** (a POS terminal **4**), an authenticity determination information generating step (S**7**, S**14**) of generating authenticity determination information based on the sell-off information **28** associated with the received identification information **21**, and an authenticity determination information transmitting step (S**8**, S**15**) of transmitting the authenticity determination information to the consumer terminal **3** (the POS terminal **4**). By the above-described configuration, a consumer can determine authenticity of a product based on

authenticity determination information through the consumer terminal **3** (the POS terminal **4**). Specifically, when the product has already been sold to an end consumer, the consumer can determine that the product is an imitation.

[0119] A consumer terminal **3** (a POS terminal **4**) for determining authenticity of a product includes an identification information acquisition unit **46** (an identification information acquisition unit **67**) configured to acquire unique identification information **21** associated with the product, an identification information transmission unit **47** (an identification information transmission unit **68**) configured to transmit the identification information **21** to a server **2**, the server **2** including a product management data storage unit **12** configured to store product management data **20** associating the identification information **21** with sell-off information **28** indicating whether the product associated with the identification information **21** has not yet been sold to an end consumer or has already been sold to an end consumer, and an authenticity determination information reception unit **48** (an authenticity determination information reception unit **69**) configured to receive authenticity determination information from the server **2**, the server being configured to generate the authenticity determination information based on the sell-off information **28** associated with the identification information **21** transmitted to the server **2**. By the above-described configuration, a consumer can determine authenticity of a product based on authenticity determination information through the consumer terminal **3** (or the POS terminal **4**). Specifically, when the product has already been sold to an end consumer, the consumer can determine that the product is an imitation.

[0120] A method for operating a consumer terminal **3** (a POS terminal **4**) for determining authenticity of a product includes an identification information acquiring step (S**5**, S**12**) of acquiring unique identification information **21** associated with the product, an identification information transmitting step (S**6**, S**13**) of transmitting the identification information **21** to a server **2**, the server **2** including a product management data storage unit **12** configured to store product management data **20** associating the identification information **21** with sell-off information **28** indicating whether the product associated with the identification information **21** has not yet been sold to an end consumer or has already been sold to an end consumer, and an authenticity determination information receiving step (S**8**, S**15**) of receiving authenticity determination information from the server **2**, the server **2** being configured to generate the authenticity determination information based on the sell-off information **28** associated with the identification information **21** transmitted to the server **2**. By the above-described configuration, a consumer can determine authenticity of a product based on authenticity determination information through the consumer terminal **3** (or the POS terminal **4**). Specifically, when the product has already been sold to an end consumer, the consumer can determine that the product is an imitation.

[0121] The program can be stored and provided to a computer using any type of non-transitory computer readable media. Non-transitory computer readable media include any type of tangible storage media. Examples of non-transitory computer readable media include magnetic storage media (such as floppy disks, magnetic tapes, hard disk drives, etc.), optical magnetic storage media (e.g. magneto-optical disks), CD-ROM (compact disc read only memory), CD-R (compact disc recordable), CD-R/W (compact disc rewritable), and semiconductor memories (such as mask ROM, PROM (programmable ROM), EPROM (erasable PROM), flash ROM, RAM (random access memory), etc.). The program may be provided to a computer using any type of transitory computer readable media. Examples of transitory computer readable media include electric signals, optical signals, and electromagnetic waves. Transitory computer readable media can provide the program to a computer via a wired communication line (e.g. electric wires, and optical fibers) or a wireless communication line.

[0122] From the invention thus described, it will be obvious that the embodiments of the invention may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended for inclusion within the scope of the following claims.

What is claimed is:

1. An authenticity determination system for determining authenticity of a product, comprising a terminal and a server, wherein

the terminal comprises:

an identification information acquisition unit configured to acquire unique identification information associated with the product;

an identification information transmission unit configured to transmit the identification information to the server; and

an authenticity determination information reception unit configured to receive authenticity determination information from the server, and

the server comprises:

a product management data storage unit configured to store product management data associating the identification information with sell-off information indicating whether the product associated with the identification information has not yet been sold to an end consumer or has already been sold to an end consumer;

an identification information reception unit configured to receive the identification information from the terminal;

an authenticity determination information generation unit configured to generate the authenticity determination information based on the sell-off information associated with the received identification information; and

an authenticity determination information transmission unit configured to transmit the authenticity determination information to the terminal.

2. The authenticity determination system according to claim **1**, wherein when the received identification information is not present in the product management data, the authenticity determination information generation unit generates the authenticity determination information based on the fact that the received identification information is not present in the product management data.

3. The authenticity determination system according to claim **1**, wherein

the product management data includes information on relevance between the identification information and owner information, the owner information being information on a current legitimate owner of the product associated with the identification information, and

the authenticity determination information generation unit generates the authenticity determination information

based on the sell-off information and the owner information associated with the received identification information.

4. A server for determining authenticity of a product, comprising:

a product management data storage unit configured to store product management data associating unique identification information with sell-off information, the unique identification information being associated with the product, the sell-off information indicating whether the product associated with the identification information has not yet been sold to an end consumer or has already been sold to an end consumer;

an identification information reception unit configured to receive the identification information from a terminal;

an authenticity determination information generation unit configured to generate authenticity determination information based on the sell-off information associated with the received identification information; and

an authenticity determination information transmission unit configured to transmit the authenticity determination information to the terminal.

5. The server according to claim **4**, wherein when the received identification information is not present in the product management data, the authenticity determination information generation unit generates the authenticity determination information based on the fact that the received identification information is not present in the product management data.

6. The server according to claim **4**, wherein

the product management data includes information on relevance between the identification information and owner information, the owner information being information on a current legitimate owner of the product associated with the identification information, and

the authenticity determination information generation unit generates the authenticity determination information based on the sell-off information and the owner information associated with the received identification information.

7. A method for operating a server for determining authenticity of a product, comprising:

a product management data storing step of storing product management data associating unique identification information with sell-off information, the unique identification information being associated with the product, the sell-off information indicating whether the product associated with the identification information has not yet been sold to an end consumer or has already been sold to an end consumer;

an identification information receiving step of receiving the identification information from a terminal;

an authenticity determination information generating step of generating authenticity determination information based on the sell-off information associated with the received identification information; and

an authenticity determination information transmitting step of transmitting the authenticity determination information to the terminal.

8. A non-transitory computer readable media storing a program for causing a computer to perform an operating method according to claim **7**.

9. A terminal for determining authenticity of a product, comprising:

an identification information acquisition unit configured to acquire unique identification information associated with the product;

an identification information transmission unit configured to transmit the identification information to a server, the server comprising a product management data storage unit configured to store product management data associating the identification information with sell-off information indicating whether the product associated with the identification information has not yet been sold to an end consumer or has already been sold to an end consumer; and

an authenticity determination information reception unit configured to receive authenticity determination information from the server, the server being configured to generate the authenticity determination information based on the sell-off information associated with the identification information transmitted to the server.

10. A method for operating a terminal for determining authenticity of a product, comprising:

an identification information acquiring step of acquiring unique identification information associated with the product;

an identification information transmitting step of transmitting the identification information to a server, the server comprising a product management data storage unit configured to store product management data associating the identification information with sell-off information indicating whether the product associated with the identification information has not yet been sold to an end consumer or has already been sold to an end consumer; and

an authenticity determination information receiving step of receiving authenticity determination information from the server, the server being configured to generate the authenticity determination information based on the sell-off information associated with the identification information transmitted to the server.

11. A non-transitory computer readable media storing a program for causing a computer to perform an operating method according to claim **10**.

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