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(54) **Title:** PROCESSING MULTIPLE DATA ELEMENTS IN ONE TRANSACTION
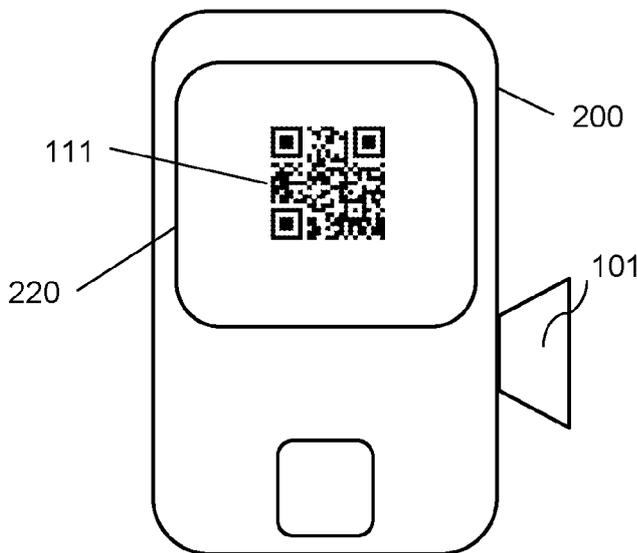
(57) **Abstract:** Method for processing multiple data elements from multiple respective objects in one transaction, in which for each object the respective data element is read out, characterized by combining the read-out data elements into a combined data element, coding the combined data element into a two-dimensional bar code, printing the two-dimensional bar code onto paper or another surface and offering the surface with the two-dimensional bar code to a processing unit in order to have the multiple data elements processed in one transaction by this processing unit.

Fig. 2

Processing multiple data elements in one transaction

FIELD OF THE INVENTION

5   The invention relates to a method for processing multiple data elements from multiple respective objects in one transaction, in which for each object the respective data element is read out.

         The invention further relates to a device for execution of the method, and to an accompanying computer program product.

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BACKGROUND OF THE INVENTION

         Processing object data, for example product prices at the teller in a diner or shop or inventory management within a company, is of crucial importance. To

15   effectively do so, products large and small have been provided with product codes that can be read out and coupled to information in databases.

         The most commonly used product code is the Universal Product Code (UPC), often included in bar codes (for example EAN-13) on the product. Next to the UPC the Global Trade Item Number (GTIN) is also in use. One of the oldest systems

20   for coding bar codes is disclosed in US patent 2,612,994. Product codes readable through RFID tags and the like are also well known.

         This way products are provided with a product code with which a cash register, inventory management system or similar system can process transactions or other actions with these products. These systems are of course quicker than manual

25   processing of a product code, or even the typing in of product codes in an automated query system. Still these codes provide significant obstacles from time to time.

         For example, a cash register may read the bar code with a bar code reader for each individual product to be rung up for a customer, and use the data elements one by one to retrieve the price and other relevant information in order to arrive at a total

30   price for the customer. If many products must be processed this way a significant time is necessary to scan all the bar codes.

         An inventory management system can use an RFID scanner to scan the tags of a collection of products and then register the products as being received, sold or

added or removed to the inventory for another reason. Adding RFID tags to products however is cumbersome, because this has to be done manually for each product.

Solutions are known in which a device such as a smartphone scans the bar codes of products, extracts the product codes and uses data communication (such as Bluetooth or an SMS message) to the data processing unit. These solutions suffer from the disadvantage that setting up the data communication channel may cost time, significantly more than scanning a two-dimensional bar code. For example Bluetooth requires a 'pairing' of the smartphone with the processing unit. SMS text messages may take several minutes to arrive, which for point-of-sale transactions in particular is undesirable.

US patent application US2007084919A1 describes an identification scheme for a communication device. A bar code or comparable 'dataform' is read by a portable apparatus that is suitable for mobile commerce (m-commerce). Information from dataform is retrieved over a network and shown on the device. In an embodiment data is transferred to a "point-of-activity" terminal by presenting same as a two-dimensional system. US2010179857A1 discloses a system in which information about an object is captured in a mobile device of a user. This way the object can be added to a wish list or shopping list.

US patent application US2005085188A1 discloses optical bi-directional communication between devices, in which data is represented graphically on one device and the other device can read out this data. US patent application US2006071077A1 discloses how a series of visually coded images such as bar codes can be generated and then be displayed and processed in one continuous process.

BRIEF DESCRIPTION OF THE INVENTION

It is an object of the invention to reduce the time a processing unit needs to process multiple data elements in one transaction, with only a moderate increase in technical complexity.

The invention seeks to attain this goal with a method as claimed in claim 1, as well as a device as claimed in claim 6. By combining the multiple read-out data elements into a combined data element and coding the combined data element into a two-dimensional bar code, it becomes possible to print this bar code onto paper or

another surface, after which this surface can be presented to the processing unit. This unit then can process the multiple data elements at once as desired. The surface may be self-adhesive to enable the printed two-dimensional bar code to be affixed e.g. as a price sticker on a collection of products.

5   The time savings is obtained because only one two-dimensional bar code needs to be scanned by the processing unit. This is on average faster than Bluetooth or SMS messages, and in any case faster than scanning multiple individual bar codes or other data elements from multiple individual products. In addition, products can now be packaged without additional measures being necessary to make their individual bar

10   codes visible during e.g. a check-out moment. The surface with the two-dimensional bar code suffices as a substitute.

In a preferred embodiment from each product the respective data element is read out as a respective one-dimensional bar code, which bar code preferably uses the EAN-13 coding system. This provides the additional advantage that reading out such

15   one-dimensional bar codes is a simple and known technique. In the context of the invention it is now possible to scan a series of products up front, for example using a smart phone operated by a customer in the shop, and to have the combination of products scanned at once at the cash register or point of sale terminal by scanning the two-dimensional bar code with the read-out data elements encoded at once into a single

20   data element.

The data elements preferably relate to Universal Product Code (UPC) products codes but may be other codes. The processing unit for example is a cash register or point of sale terminal which this way receives the multiple data elements with the one two-dimensional bar code and processes these elements as one payment

25   transaction.

In an alternative embodiment the respective data element for each product is obtained from a database. A smartphone may for example show an overview of products created from the data in the database, and allow the user to choose using a touch interface or buttons on the smartphone. The product codes of the chosen products

30   are then obtained and combined into the one data element that is presented as the two-dimensional bar code.

In an embodiment the two-dimensional bar code is coded using the ISO/IEC 18004:2006 ("QR code") coding system. Decoding and processing QR codes

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is well known and thus an advantageous choice for a two-dimensional bar code. Many variations on the QR code are known, such as the micro QR code and the Design QR code. Alternatives to the QR code may also be used, for example the Aztec Code as disclosed in US patent 5,591,956, the Data Matrix code as disclosed in US patent 5,612,524 and the MaxiCode as defined in ISO/IEC 16023:2000. Some alternatives with color offer even more capacity for storing information. See for instance the High Capacity Color Barcode Technology as developed by Microsoft Corporation, <http://research.microsoft.com/en-us/projects/hccb/>, or the Color C Code developed by Computech Inc, <http://colorccode.net>.

In a further embodiment combining the data is performed by recording the read-out data elements into an XML-based data format. Next to XML also various Electronic Data Interchange (EDI) formats are suitable. The article 'Effective Document Information Retrieval System for Both Paper and Electronic Documents' van C.-T. Wong en C.-M. Pun in Proceeding (523) Computational Intelligence 2006 discloses that information can be coded in an XML format and then included in a two-dimensional bar code. However, this article does not disclose how the information is obtained in the manner as claimed in the present invention.

The device according to the invention preferably embodies the offering means as a display screen integrated into the device, onto which display the two-dimensional bar code is shown by way of offering. A picture of a two-dimensional bar code is easy to scan by state of the art bar code readers, meaning no modifications are necessary to enable the offering of the two-dimensional bar code.

The device of the invention can be combined into an arrangement further comprising a processing unit comprising scanning means for reading out a two-dimensional bar code from the offering means. The processing unit, e.g. a cash register, then comprises transaction means for processing the multiple data elements in a single transaction. This obtains an integrated solution in accordance with the invention.

In an embodiment of this integrated solution the processing unit is provided with conversion means which capture the multiple data elements and pass on the captured data elements one by one to the transaction means. This way the transaction module is indistinguishable from a traditional bar code scanner, from the point of view of the transaction means, as a traditional bar code scanner also passes on data elements one by one.

The method of the invention can be realized with a computer program product.

BRIEF DESCRIPTION OF THE FIGURES

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The invention will now be explained in more detail with reference to the figures, in which:

Fig. 1 schematically shows an arrangement comprising a scanning device and a processing unit; and

10   Fig. 2 schematically shows a smartphone comprising a reading-out module and a display screen on which a two-dimensional bar code is visible.

DESCRIPTION OF VARIOUS EMBODIMENTS

15   Fig. 1 schematically shows an arrangement comprising a scanning device 100 and a processing unit 150. As will be discussed in more detail below, this arrangement is configured for processing multiple data elements from multiple respective objects in one transaction. For clarity the text below will use the term 'products' that are provided with one-dimensional bar codes, but other objects and data

20   means may be thought of.

The scanning device 100 comprises a reading module 101, in this case a bar code reader, for reading out from each of a number of products 130a, ..., 130n the respective data element, the bar codes 131a, ..., 13 In. The reading out of bar codes to obtain data elements such as the UPC of a product by itself is well known and will not

25   be elaborated upon further. A bar code does not necessarily have to be affixed on the product to which the code relates. A bar code could be affixed for example on an advertisement for that product. Next to the UPC or other product code also other unique identification codes such as article numbers, container numbers, part numbers, patient numbers, employee numbers, social security numbers, flight numbers, order numbers

30   etcetera can be used within the context of the invention.

As an alternative to a bar code or similar code reading module, the reading module 101 can be embodied as a module which for each product acquires the respective data element from a database (not shown). In an embodiment a smartphone

can be provided with a network-accessible product database with data of a number of products, from which the user can choose. The choices are indicated to the reading module 101. This way the user can use the invention to select products on his smartphone and have them processed in one single transaction, for example by

5   supplying them as an order to a point-of-sale terminal.

In accordance with the invention, the scanning device 100 is provided with combining module 105 for combining the read-out data elements as read out by the reading module 101 into a combined data element 106. Many ways can be thought of to combine the multiple read-out data elements. A first, simple way is to concatenate the

10   elements sequentially into one long data element. If the elements have mutually different lengths, a separator element (such as a space, tab or |-sign) can be used. But if the data elements all have a different length, this is not necessary.

If the data elements comprise a large amount of information or more advanced processing options can be thought of, it is preferred to code the read-out data

15   elements in an XML-based file format. This can then be processed in a structured manner in the processing unit 150.

An option when using XML is to enrich the products codes that are to be coded with extra information, such as a description or price. This information can be retrieved from a database in the scanning device 100 or be retrieved from an external

20   database. This way the information also becomes available in the processing unit 150. When the scanning device 100 is embodied as a smartphone, it may e.g. consult the internet to acquire the extra information. The processing unit 150 can now use this information.

As an alternative the processing unit 150 can itself obtain the coded

25   product codes and consult an internal or external database to obtain this additional information. However this may introduce delays in the processing unit 150.

The combined data element 106 subsequently is delivered to coding module 110, which codes the combined data element into a two-dimensional bar code. As noted the QR code is an advantageous choice, but other codes may be used instead.

30   The two-dimensional bar code 111 is presented using presenting means 120 to the processing unit 150 in order to have the multiple data elements processed in one transaction by this processing unit. The processing unit comprises a two-dimensional bar code scanner 155 and transaction module 157 to process multiple data elements in a

single transaction. The processing unit 150 may for instance be a point-of-sale transaction register where the products in question are rung up and paid.

Processing a transaction, e.g. as the settlement of a series of purchases, is by itself straightforward and will not be elaborated upon further. However sometimes an extra component may be necessary, such as conversion module 156 which converts the output of the two-dimensional bar code scanner 155 into the right format for the transaction module 157. Traditionally one scan with the bar code scanner would result in one product code or other data element, while in the present invention one scan results in multiple such data elements.

In other embodiments the transaction module 157 itself is configured to process multiple data elements in one single transaction. This obviates the need for conversion module 156. This may be useful if the transaction module 157 works with XML-based transactions, because then the XML data supplied by the scanning device 100 can be employed as input.

The transaction can be used in an environment where a customer himself scans products, without intervention by an employee of the seller. The customer uses the scanning device 100 to scan each product and next puts the product in a basket or shopping cart. At the exit a processing unit 150, embodied as a cash register, is presented, to which the customer presents the two-dimensional bar code. The processing unit 150 processes all scanned products in one transaction. Optionally the processing unit 50 is provided with means for giving a signal to have an employee perform a random check of the contents of the basket or cart.

In a first example data elements are coded in an XML format as follows:

```
<PRODUCT >
    <DESCRIPTION>Desk  Sorensen  Black< /DESCRIPTION
    <ARTICLENUMBER >943453< /ARTICLENUMBER >
    <LOCATION>3rd  aisle,  2nd case,  2nd shelf </LOCATION>
    <PRICE>11, 30</PRICE>
</PRODUCT >
<PRODUCT >
    <DESCRIPTION>Desk  Dave  White</DESCRIPTION>
    <ARTICLENUMBER> 121337</ARTICLENUMBER>
    <LOCATION>4rd  aisle,  2nd case,  6th shelf </LOCATION>
    <PRICE>9, 30</PRICE>
</PRODUCT >
```

The fields defined in this XML format for each product comprise information regarding a description, article number, location in warehouse or shop and price. This data can be used in a situation where products are shown in a first location and later must be picked up (and/or paid) at a second location, as with the well-known
5   IKEA chain of furniture stores. The visitor uses scanning device 100 to scan each piece of furniture he is interest in, and has the two-dimensional bar code scanned at the processing unit 150. This could be a cash register to effect payment, or a terminal in the self-service warehouse where the visitor can receive a customized map for the products in question.
10   In a second example data elements are coded in an XML format as follows:

```
<ORDER>
  <ARTICLE>
    <DESCRIPTION>CD  "Bruce Springsteen" </DESCRIPTION >
    <ART ICLENUMBER >4444231</ ART ICLENUMBER >
    <LOCATION>10 .12 .l</LOCATION>
  </ARTICLE>
  <ARTICLE>
    <DESCRIPTION>CD  "Michael Jackson" </DESCRIPTION >
    <ARTICLENUMBER>4421231</ARTICLENTJMBER>
    <LOCATION>7 .1 .9</LOCATION>
  </ARTICLE>
  <ARTICLE>
    <DESCRIPTION>Book  "The joy of happiness "</DESCRIPTION>
    <ARTICLENUMBER>4 12314231</ARTICLENUMBER >
    <LOKATIE>1 .2 .l</LOKATIE>
  </ARTICLE>
  <ARTICLE>
    <DESCRIPTION>DVD  "Moonwalker "</DESCRIPTION>
    <ARTICLENUMBER>444 6531</ARTICLENUMBER>
    <LOCATION>10 .12 .l</LOCATION>
  </ARTICLE>
</ORDER >
```

In this example various articles are bundled into an order. For each article
35   a description, article number and coded location is provided. A store employee can now scan bar codes of products that need restocking, after which he presents the two-

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dimensional bar code to a processing unit operated by a warehouse employee who can this way retrieve the products needed in one go.

The conversion module 156 can be embodied as a buffer which captures the multiple data elements and passes them on one by one to the transaction module 157 so that the transaction module 157 does not need to be adapted. The transaction module after all is indistinguishable from a traditional bar code scanner, from the point of view of the transaction means, as a traditional bar code scanner also passes on data elements one by one.

This way, a processing unit such as a cash register can be adapted for the invention by only adding a combination of scanning module 155 and conversion module 156, for example as an external device coupled to the cash register using a serial, parallel, USB or other port. The conversion module 156 can be embodied in whole or in part in software and/or dedicated hardware switch which can be inserted into the processing unit 150.

Fig. 2 schematically shows a smartphone 200 comprising a reading-out module 101 and a display screen 220 on which two-dimensional bar code 111 is visible. In this embodiment display screen 220 is responsible for offering the two-dimensional bar code 111, by way of displaying the code 111 in visual form to allow a two-dimensional bar code reader or other scanning means coupled to the processing unit 150 to read out the data elements.

In addition to the smartphone embodiment shown in Fig. 2 the scanning device 100 can be embodied as a dedicated device designed for realizing the functionality of the invention. Such a dedicated device would in principle require nothing more than a bar code reader or other reading module 101 and a display such as display screen 220 to present the two-dimensional bar code, as well as (embedded) software to execute the method of the invention. A suitable starting point for this embodiment is the Proline PPL-DPF 151 digital photo keychain, a device that is equipped with a memory and embedded software and a display that is well suited for showing two-dimensional bar codes.

Instead of a display 220 a printer can be used to print the two-dimensional bar code 111 on paper or another surface. This surface can then be presented to the two-dimensional bar code scanner 155. The surface may be self-adhesive, allowing the printed two-dimensional bar code 111 to be affixed as a price tag

to a collection of products. Consider a gift wrapping in which the individual wrapped products are not visible through the packaging, in which situation the individual bar codes cannot be scanned anymore. By employing the present invention here, one single two-dimensional bar code can be affixed to the gift wrapping, instead of a long, hard to

5   create and aesthetically undesirable list of copies of the individual bar codes.

Another area of application relates to warehouses where a pallet or other large collection of products is provided with one two-dimensional bar code on the outer packaging (e.g. shrink-wrap). This one two-dimensional bar code can be translated to the individual product codes of the products in the collection.

10   The above provides a description of several useful embodiments that serve to illustrate and describe the invention. The description is not intended to be an exhaustive description of all possible ways in which the invention can be implemented or used. The skilled person will be able to think of many modifications and variations that still rely on the essential features of the invention as presented in the claims. In

15   addition, well-known methods, procedures, components, and circuits have not been described in detail.

The invention is preferably implemented in a computer program product, i.e. a collection of computer program instructions stored on a computer readable storage device, such as a hard disk or a flash memory, for execution by a computer. The

20   instructions can be provided as complete executable programs, as modifications to existing programs or extensions ("plug-ins") for existing programs. Moreover, parts of the processing of the present invention may be distributed over multiple computers or processors for better performance, reliability, and/or cost.

The use of the word "comprising" in the claims does not exclude the

25   presence of other features than claimed in a system, product or method implementing the invention. Any reference to a claim feature in the singular shall not exclude the presence of a plurality of this feature. The word "means" in a claim can refer to a single means or to plural means for providing the indicated function.

Claims

1.   A method for processing multiple data elements from multiple respective objects in one transaction, in which for each object the respective data element is read out, characterized by combining the read-out data elements into a combined data element, coding the combined data element into a two-dimensional bar code, printing the two-dimensional bar code onto paper or another surface and offering the surface with the two-dimensional bar code to a processing unit in order to have the multiple data elements processed in one transaction by this processing unit.

2.   The method of claim 1, in which the surface is self-adhesive.

3.   The method of claim 1, in which for each object the respective data element is read out via respective one-dimensional bar codes.

4.   The method of claim 1, in which the two-dimensional bar code is coded according to the ISO/IEC 18004:2006 ("QR code") coding system.

5.   The method of claim 1, in which the step of combining the read-out data elements is performed by coding the read-out data elements in an XML-based file format.

6.   A device for processing multiple data elements from multiple respective objects in one transaction, comprising reading means for reading out the respective data element of each object, which device is characterized by combining means for combining the read-out data elements into a combined data element, coding means for coding the combined data element into a two-dimensional bar code, printing means for printing the two-dimensional bar code onto paper or another surface and offering means for offering the surface with the two-dimensional bar code to an external processing unit in order to have the multiple data elements processed in one transaction by this external processing unit.

7.   The device of claim 6, in which the surface is self-adhesive.

8. An arrangement of a device as claimed in claim 6 and a processing unit comprising scanning means for reading out a two-dimensional bar code from the offering means, in which arrangement the processing unit comprises transaction means to process the multiple data elements in one transaction.

9. The arrangement of claim 8, in which the processing unit is provided with conversion means which capture the multiple data elements and pass on the captured data elements one by one to the transaction means.

10. A computer program product comprising machine-readable instructions suitable for making a programmable device process in one transaction multiple data elements obtained by reading out multiple respective objects, characterized by instructions for combining the read-out data elements into a combined data element, for coding the combined data element into a two-dimensional bar code, for printing the two-dimensional bar code onto paper or another surface and for offering the surface with the two-dimensional bar code to the processing unit in order to have the multiple data elements processed in one transaction by this processing unit.

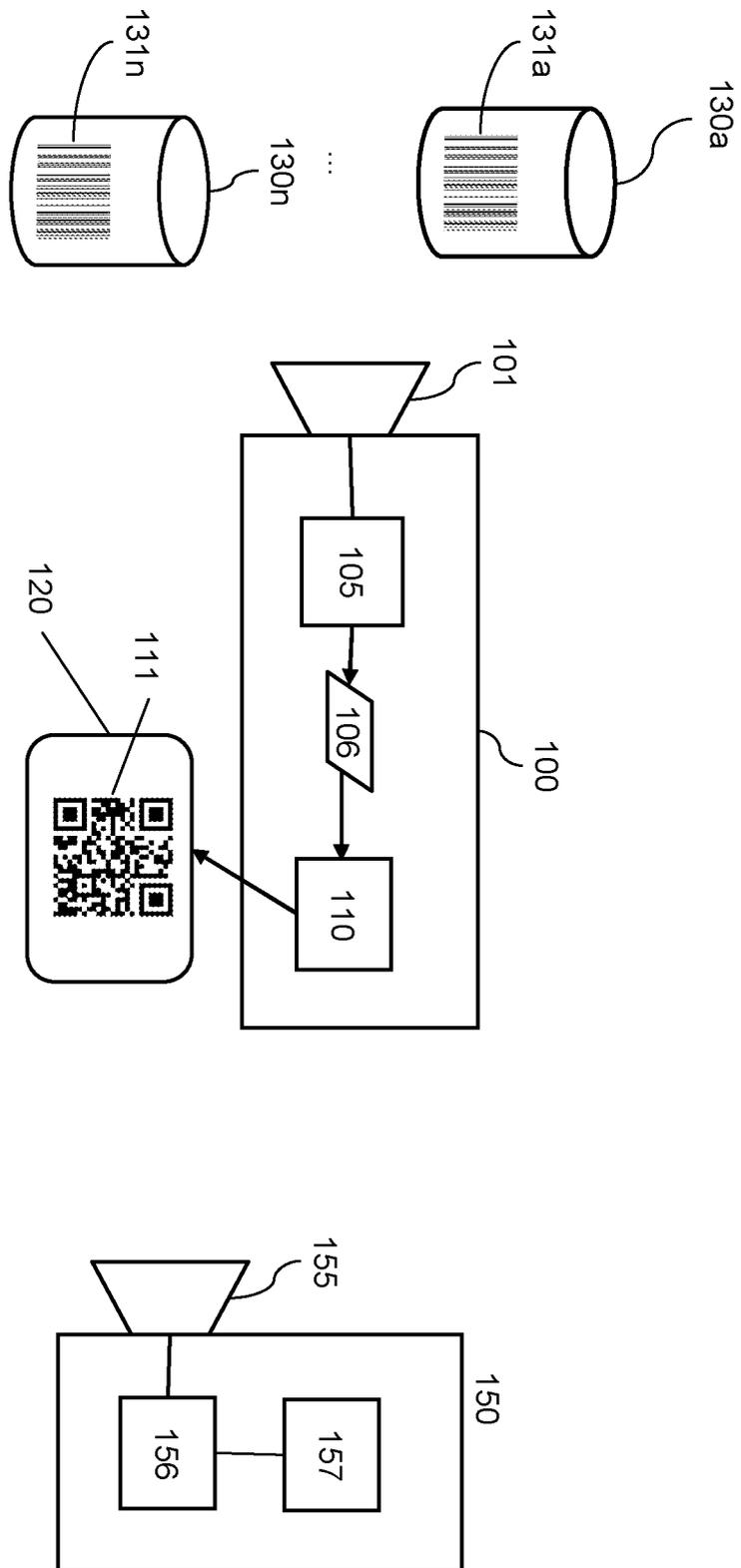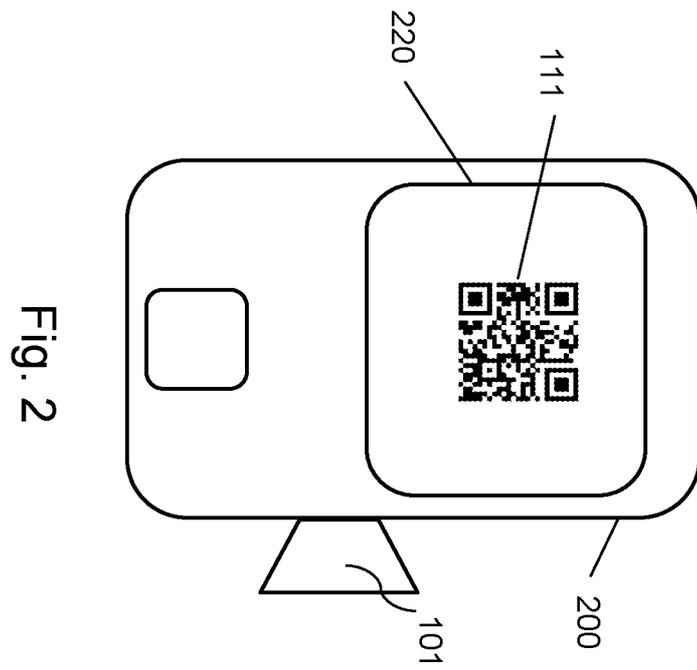11. A data carrier comprising the computer program product of the previous claim.

Fig. 1

Fig. 2

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

INV. G06Q30/06
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G07F   G06Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 821 514 A (KIKUCHI KAORU [JP] ET AL) 13 October 1998 (1998-10-13) abstract figures 1,4 column 2, lines 33-37 column 6, lines 22-53 column 11, line 17 - column 12, line 11 -----	1-11
X	US 5 393 965 A (BRAVMAN RICHARD [US] ET AL) 28 February 1995 (1995-02-28) figure 9A column 9, line 45 - column 10, line 26 -----	1-11
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| X | Further documents are listed in the continuation of Box C. | | X | See patent family annex. |

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 March 2013	05/04/2013

| Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016 | Authorized officer Gabriel , Christiaan |

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INTERNATIONAL SEARCH REPORT

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2010/179857 A1 (KALABOUKIS CHRIS [US] ET AL) 15 July 2010 (2010-07-15) paragraphs [0055], [0061] -----	1-11
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