

【DESCRIPTION】

【Invention Title】

PASSPORT INFORMATION CONVERSION DEVICE INCLUDING ADDITIONAL
INFORMATION

【Technical Field】

The present invention relates to a passport information conversion device and, more particularly, a passport information conversion device capable of converting information disclosed in a passport into a QR code or a bar code and then displaying or outputting the same.

【Background Art】

In recent years, due to increased risk of transnational crimes and terrorism, demand for an electronic passport having a built-in electronic chip in a passport or ID card has increased. However, all the passports currently used have not yet been changed into electronic passports.

Generally, a passport including an electronic passport is provided with a machine readable zone (MRZ) containing a variety of information on the bearer. The machine readable zone generally occupies two lines, wherein each line is filled in with 44 characters. A variety of information on the bearer, for example, name, gender (sex), nationality and passport number of the bearer, etc., are put in the machine readable

zone.

In order to read such information in the passport, a method for illuminating a source of white light/infrared light/ultraviolet light on the passport to compare a specific print region with the other region, a method for optically recognizing data in the machine readable zone and comparing the same with data printed on the passport, etc. have been employed.

However, conventional readable devices have entailed problems of considerably great volume, complexity and high price.

[Prior Art Document]

[Patent Document]

1. Korean Patent Registration No. 1518764: System and method for converting data in machine readable zone into data in NFC data switching mode and for storing the same

2. Korean Patent Registration No. 1084347: NFC smartphone with electronic passport readable performance and method for reading electronic passport using the same

【Disclosure】

【Technical Problem】

The present invention has been proposed to solve the problems described above, and an object of the present invention is to provide a passport information conversion

device capable of reading passport information through a relatively low-price QR code or code reader without requiring any expensive MRZ reading device.

Further, another object of the present invention is to improve utility of passport information by combining additional information such as payment information with the passport information to generate a QR code or a bar code.

【Technical Solution】

In order to accomplish the above purpose, according to an embodiment of the present invention, there is provided a passport information conversion device, including: an imaging-capture unit to capture an image of a machine readable zone in a passport and then generate image information; a character reading unit to convert the image information generated by the image-capture unit into character information and then generate passport information; an input unit to receive additional information; an information conversion unit to determine validity of the passport information generated by the character reading unit and the additional information received by the input unit, and, if the information is valid, to combine the passport information and the additional information and then convert the combined information into a single QR code or bar code format; and a code printer unit to display or print the QR code or bar code

converted by the information conversion unit.

Preferably, the information conversion unit may include: an encryption unit to encrypt the passport information and the additional information if these are all valid; and the information conversion unit to combine passport information and additional information encrypted by the encryption unit into a single QR code or bar code. In addition, the passport information conversion unit may further include a communication unit to receive the passport information or the additional information through a communication network.

Preferably, the additional information may comprise payment information.

Preferably, the QR code or the bar code may contain classifier information for displaying whether the additional information is included or not in a machine-readable or visibly identifiable form.

【Advantageous Effects】

As described above, the passport information conversion device according to embodiments of the present invention may convert data disclosed in a machine readable zone of a passport into a QR code or a bar code format and display or print the converted QR code or bar code, and may enable the displayed or printed QR code or bar code to be

readable through a code reader, thereby reducing expenses required to read passport information. Further, since the generated QR code or bar code includes additional information such as payment information, a user may provide their passport information and payment information, simultaneously, through a single QR code or bar code, thereby simply and easily going through processes of shopping, tax refund, etc.

【Description of Drawings】

FIG. 1 is a conceptual diagram illustrating the configuration of a passport information conversion device according to a first embodiment of the present invention.

FIG. 2 is a flowchart illustrating a process of displaying passport information according to the first embodiment of the present invention.

FIG. 3 is a conceptual diagram illustrating the configuration of a passport information conversion device according to a second embodiment of the present invention.

FIG. 4 is a flowchart illustrating a process of outputting passport information according to the second embodiment of the present invention.

FIG. 5 illustrates an example of a QR code generated by the present invention.

【Best mode】

Hereinafter, with reference to the accompanying drawings, preferred embodiments of the present invention will be more concretely described and illustrated such that persons having ordinary knowledge in the art, to which the present invention pertains ('those skilled in the art'), can easily practice the same. However, the present invention may be embodied in different forms and will not be particularly limited to the embodiments described below.

To clarify the present invention, description of some parts irrelevant to the present invention has been omitted. Further, the same components in the specification and drawings will be substantially indicated by the same reference numbers and/or symbols.

FIG. 1 is a conceptual diagram illustrating the configuration of a passport information conversion device 100 according to a first embodiment of the present invention. As shown in FIG. 1, the passport information conversion device 100 may include an information acquisition unit 110, an information conversion unit 120 and a display unit 130.

The information acquisition unit 110 may include: an image-capture unit 111 to capture an image of a photograph in a passport 102, a machine readable zone, etc.; a character recognition unit 113 to deduce character information from image information generated by the image-capture unit 111; an input unit 115; and a communication unit 140.

The character information disclosed in the machine readable zone of the passport 102 may include a series of information on the bearer, for example, information in relation to type of passport, nationality of the bearer, passport number, given names of the bearer in English, surname of the bearer in English, date of expiry, date of birth of the bearer, and gender (or sex) of the bearer.

The image-capture unit 111 may be a camera to capture an image of the character information disclosed in the machine readable zone of the passport 102, while the character recognition unit 113 may be an optical character reader (OCR) to convert the image captured by the image-capture unit 111 into a character string.

The user may input the character information disclosed in the machine readable zone of the passport 102 or the payment information for settlement through an input unit 115. The input unit 115 may be any input device such as a keyboard, a keypad, a tablet PC, etc. Further, the user may use the communication unit 140 to communicate with a passport information management server 12 or a payment information management server 14 via internet 10, so as to acquire passport information, payment information, etc.

The passport information management server 12 is a server to store and manage passport information of the user. The payment information management server 14 is a server to

store and manage payment information of the user. For instance, when a credit card company may receive, store and manage passport information and payment information of the bearer in a step of membership application, a server of the credit card company may become a passport information management server or a payment information management server.

The information conversion unit 120 may combine the passport information and the payment information, which were acquired by the information acquisition unit 110, in a code generation unit 124, and then, convert the combined information into a single QR code or bar code. Since the passport information and the payment information are very important personal information, the information conversion unit 120 may further include an encryption unit 122 to encrypt the passport information, the payment information, etc.

The code generation unit 124 may convert character information on the basis of conversion parameters in relation to types of QR codes and image storage formats of QR codes. Such types of QR codes may include QR code model 1, QR code model 2, micro QR code, iQR code, SQRC and Frame QR. Further, the image storage formats of QR codes may include JPEG, GIF, PNG, Bitmap format, etc. Herein, the conversion parameters may be set up by the user.

Further, the code generation unit 124 may convert the

character information on the basis of the conversion parameters in relation to types of bar codes and image storage formats of bar codes. The types of bar codes may include a one-dimensional bar code or a two-dimensional bar code format (MAZICODE except for QR code), while the image storage format may include JPEG, GIF, PNG, Bitmap format, etc. Herein, the conversion parameters may be set by the user.

The information conversion unit 120 may be embodied by at least one processor acting with a pre-set up program, wherein the program may be programmed to execute individual processes of the passport information conversion method according to embodiments of the present invention.

In this regard, the embodiment described herein may be performed within a recording medium readable by any computer or similar device using, for example, a software process, a hardware process or a combination thereof. According to the hardware process, the embodiments described herein may be performed using at least one of, for example, application specific integrated circuits (ASICs), digital signal processors (DSPs), digital signal processing devices (DSPDs), programmable logic devices (PLDs), field programmable gate arrays (FPGAs), processors, controllers, microcontrollers, microprocessors, and other electric units for executing desired functions. According to the software

process, the embodiments described herein in relation to procedures and functions may be performed by alternative software modules. Each of such software modules may execute at least one of the functions and/or operations described in the present specification. Further, software code may be executed by software applications written in proper programming languages.

The display unit 130 may display the QR code or bar code generated by the information conversion unit 120. The display unit 130 may include different personal portable terminals to display the QR code or bar code (for example, smartphones, tablet PCs, laptop computers, etc.). The QR code or bar code displayed on the display unit 130 may be identified by a code reader 160. That is, since the code reader 160 recognizes the QR code or bar code displayed on the display unit 130, there is no requirement for a high-price apparatus to directly identify the information in the machine readable zone of the passport, whereas passport information, payment information, etc. is easily readable even using the low-cost code reader 160. Such a code reader 160 may include, for example, a bar code reader.

Hereinafter, referring to FIG. 2, a method of converting passport information using the passport information conversion device 100 according to the first embodiment of the present invention as described above will

be more concretely described.

As illustrated in FIG. 2, the information acquisition unit 110 may firstly acquire passport information or payment information of the bearer through the image-capture unit 111, the character recognition unit 113, the input unit 115 and the communication unit 140 (S110). The image-capture unit 111 may capture images of the machine readable zone (MRZ) in the passport, a photograph in the passport, etc.

From the image information of the passport captured by the image-capture unit 111, the character recognition unit 113 may deduce character information. The user may input the character information and/or payment information disclosed in the machine readable zone through the input unit 115. Further, the user may receive the passport information from a passport information management server 12 and acquire the payment information from a payment information management server 14 through the communication unit 140.

The information conversion unit 120 may determine whether the character information acquired by the information acquisition unit 110 is valid passport information and/or payment information (S120). For instance, character strings in MRZ are configured in the following format.

Ptiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii
#####CbbbYYMMDDCsyyymmddCpccccccccccccccCX

From the above format, first 'C' in the second line refers to a check digit, while the last 'X' in the second line refers to a final check digit. The information conversion unit 120 may estimate a checksum of a character string read in MRZ (that is, a character string in the first line and another character string before the first 'C' in the second line), and then, compare the checksum with the check digit, thereby determining whether the passport information is valid or not.

If the passport information is valid, the information conversion unit 120 may convert the character information disclosed in the machine readable zone of the passport, which was acquired by the information acquisition unit 110, into a QR code or bar code format so as to generate a QR code or a bar code (S130). In this case, the information conversion unit 120 may convert the character information on the basis of conversion parameters in relation to types QR codes and image storage formats of QR codes, wherein the conversion parameters may be set by the user. The information conversion unit 120 may encrypt passport information and

payment information (S125) before the code generation step (S130).

The information conversion unit 120 may store the converted QR code or bar code (S140), wherein the QR code or bar code displayed in the display unit 130 may be read through a code reader 160 (S150).

Hereinafter, referring to FIGS. 3 and 4, the passport information conversion device 200 according to the second embodiment of the present invention will be more concretely described. Firstly, FIG. 3 is a conceptual diagram illustrating configuration of the passport information conversion device 200 according to the second embodiment of the present invention. As illustrated in FIG. 3, the passport information conversion device 200 may include an information acquisition unit 210, an information conversion unit 220 and a printer unit 230.

The information acquisition unit 210 may be provided with an image-capture unit 211 to capture an image of a photograph in a passport 202, a machine readable zone (MRZ) of the passport, etc.; a character recognition unit 213 to deduce character information from the image information generated by the image-capture unit 211; an input unit 215; and a communication unit 240.

The image-capture unit 211 may be a camera to capture images of the machine readable zone and/or photograph in the

passport 202, and the character recognition unit 213 may be an optical character reader (OCR) to deduce the character information from the image captured by the image-capture unit 211 and then convert the character information into a character string.

The user may input the character information and/or payment information disclosed in the machine readable zone of the passport 202 by the input unit 215. The input unit 215 may be any input device such as a keyboard, a keypad, a tablet PC, etc. Further, the user may communicate with a passport information management server 22 or a payment information management server 24 via the internet 20 using the communication unit 240, thereby acquiring passport information, payment information, etc.

The passport information management server 22 is a server to store and manage the passport information of the user. The payment information management server 24 is a server to store and manage the payment information of the user. For instance, a server of a credit company may play a role of the passport information management server or the payment information management server. In particular, when the credit card company may receive, store and manage passport information and payment information of the bearer in a step of membership application, the server of the credit card company may become a passport information management

server or a payment information management server.

The information conversion unit 220 may combine the passport information and the payment information acquired by the information acquisition unit 210 in a code reader 224, and then, convert the combined information into a single QR code or a bar code. The information conversion unit 220 may further include an encryption unit 222 to encrypt passport information, payment information, etc.

A printer unit 230 may print the QR code or bar code converted by the information conversion unit 220. The printer unit 230 may be an output device such as a printer. QR code or bar code printed matter printed by the printer unit 230 may be output on paper, or may be a printout including a sticker, credit card, traffic card or other printouts such as, for example, a new passport. The QR code or bar code printed by the printer unit 230 may be recognized by a code reader 260. In other words, since the QR code or bar code displayed by the printer unit 230 is recognized through the code reader 260, there is no requirement for any high-price apparatus used to directly identify information disclosed in the machine readable zone of the passport, instead using a low-cost code reader 160 that may desirably read the passport information.

Hereinafter, referring to FIG. 4, a method of converting passport information using the passport

information conversion device 200 according to the second embodiment of the present invention as described above will be more concretely described.

As illustrated in FIG. 4, the information acquisition unit 210 may firstly acquire passport information and/or payment information of the bearer through the image-capture unit 211, the character recognition unit 213, the input unit 215 and the communication unit 240 (S210). Then, the image-capture unit 211 may capture images of a machine readable zone (MRZ) in the passport, a photograph in the passport, etc.

From the image information of the passport captured by the image-capture unit 211, the character recognition unit 213 may deduce character information. The user may input the character information and/or payment information disclosed in the machine readable zone of the passport through the input unit 215. Further, the user may receive the passport information from a passport information management server 22 and acquire the payment information from a payment information management server 24 through the communication unit 240.

The information conversion unit 220 may determine whether the character information acquired by the information acquisition unit 210 is valid passport information and/or payment information or not (S220). If

the passport information is valid, the information acquisition unit 220 may convert the character information disclosed in the machine readable zone of the passport, which was acquired by the information acquisition unit 210, into a QR code or bar code format so as to generate a QR code or bar code (S230). The information conversion unit 220 may encrypt the passport information and the payment information (S225) before the code generation step (S230).

Next, the information conversion unit 220 may store the converted QR code or bar code (S240), while the printed QR code or bar code printed by the printer unit 230 may be read through the code reader 260 (S250).

FIG. 5 illustrates an example of the QR code generated according to the present invention. As illustrated in this figure, a QR code 300 may include a machine readable code part 302. The code part 302 may include passport information, payment information and classifier information. Therefore, the code reader 160, 260 may read the passport information and/or the payment information through scanning only one time. The classifier information may display types of information contained in the code part, thereby enabling the code reader 160, 260 to exactly and correctly read the code. For instance, the classifier information may display whether to include additional information or not, types of additional information, etc. Further, the classifier

information may include information required to decrypt the information encrypted by the encryption unit 122, 222.

Further, the QR code 300 may include a visibly identifiable explanation part 304. The explanation part 304 may be displayed in a form of visibly identifying types of information contained in the code part 302. The explanation part 304 can easily identify types of QR codes even without machine-reading the QR codes by a passport bearer, a QR code generator, etc.

As shown in FIG. 5, as a result of indicating both the passport information and the payment information with a single QR code or bar code, the user may easily and conveniently receive services abroad such as purchase of goods, tax refund, etc.

The passport information conversion device and the passport information conversion method using the same may be implemented by a computer program including a series of instructions to implement the above described method or device. In particular, the present invention may include a computer program driven in a mobile operation system, and this program may perform processes according to the above series of instructions, thereby accomplishing the inventive method. Further, according to another embodiment of the present invention, the computer program may be stored in any recording medium such as floppy disks, CDs, DVDs, hard disks,

diverse types of memory, etc., which can be read by a computer or similar electronic devices. The computer or similar devices, for example, smartphones having read the computer program in the recording medium may fulfill the inventive method according to the above-described series of instructions in the computer program.

As such, although preferred embodiments of the present invention have been described, the present invention is not particularly limited thereto. Within the range of appended claims, the detailed description of the invention and accompanying drawings, various modifications are possible and are duly included in the scope of the present invention.

[Description of Symbols]

12, 22: Passport information management server
14, 24: Payment information management server
110, 210: Information acquisition unit
111, 211: Image-capture unit
113, 213: Character recognition unit
115, 215: Input unit
120, 220: Information conversion unit
122, 222: Encryption unit
130: Display unit
140, 240: Communication unit
160, 260: Code reader

230: Printer unit

【CLAIMS】

【Claim 1】

A passport information conversion device, comprising:

an image-capture unit to capture an image of a machine readable zone (MRZ) in a passport and then generate image information;

a character reading unit to convert the image information generated by the image-capture unit into character information and then generate passport information;

an input unit to receive additional information;

an information conversion unit to determine validity of the passport information generated by the character reading unit and the additional information input to the input unit and if the passport information and the additional information are valid, to combine the passport information and the additional information so as to convert the combined information into a single QR code or bar code format; and

a code printer unit to display or print the QR code or bar code converted by the information conversion unit.

【Claim 2】

The passport information conversion device according to claim 1, wherein the information conversion unit comprises an encryption unit to encrypt the passport information and the

additional information if the passport information and the additional information are valid, and an information conversion unit to combine the passport information and the additional information, which were encrypted by the encryption unit, so as to convert the combined information into a single QR code or bar code.

【Claim 3】

The passport information conversion device according to claim 1, wherein the additional information is payment information.

【Claim 4】

The passport information conversion device according to claim 1, wherein the QR code or bar code comprises classifier information in a machine-readable form to indicate whether the additional information is contained or not.

【Claim 5】

The passport information conversion device according to claim 1, wherein the QR code or bar code comprises classifier information in a visibly identifiable form to indicate whether the additional information is contained or not.

【Claim 6】

The passport information conversion device according to claim 1, further comprising a communication unit to receive the passport information or additional information through a communication network.