

METHODS AND SYSTEMS FOR CARDLESS PAYMENT TRANSACTIONS ASSOCIATED WITH FINANCIAL AID

TECHNICAL FIELD

[0001] The present disclosure relates to payment technology and, more particularly to, methods and systems for cardless and offline electronic payments utilizing humanitarian financial aid.

BACKGROUND

[0002] At times of humanitarian crises, such as natural disasters, man-made disasters, fragile and unpredictable situations, or the like, benefit programs are organized to assist people in need of aid and relief. The benefit programs provide the people with the needed humanitarian aid, such as foods, water, clothes, medical cares, temporary shelters, financial support, and more. Generally, a group of volunteers or organizations operate for providing such aid to the people in need of assistance and support.

[0003] Some of the benefit programs include distributing vouchers or prepaid payment cards for providing the aid to the people. The vouchers may include points that are redeemable to purchase aid provided in the benefit programs. The prepaid payment cards may include a prepaid amount to purchase the aid. The vouchers/prepaid payment cards are manufactured and distributed to the people that are in different geographical locations. However, manufacturing the cards (*i.e.*, the voucher/prepaid payment cards) may be expensive and the cards may be manufactured for a limited number of people. Further, deploying the benefit programs may entail various challenges. For example, delivering the cards to the people may be delayed due to poor infrastructure, poor transportation, underdeveloped network between places, far-flung remote locations or damages due to disasters. Moreover, the cards may be vulnerable to damage, theft, or counterfeit in case of losing the cards. For example, an unused lost card may be misused by fraudsters and rightful owner of the card may be barred from receiving the aid.

[0004] Therefore, there exists a need to mitigate use of cards, such as the vouchers or prepaid payment cards for providing aid to people in need. It would be advantageous to provide a technological solution to distribute the aid in a cost-effective and an efficient manner to the people.

SUMMARY

[0005] Various embodiments of the present disclosure provide systems and methods for cardless and offline payments for humanitarian financial aid.

[0006] In an embodiment, a method for conducting a cardless and offline payment transaction to provide aid in geographical locations with limited network connectivity is disclosed. The method includes scanning, by a merchant terminal, a unique machine-readable code associated with a beneficiary. The unique machine-readable code is generated in response to an enrollment of the beneficiary for a benefit program. The method includes determining, by the merchant terminal, a total number of redeemable points in the unique machine-readable code. The method includes facilitating, by the merchant terminal, a purchase of one or more commodities from a list of commodities provided in the benefit program using a pre-defined number of redeemable points of the total number of redeemable points needed for purchasing the one or more commodities. The method includes determining, by the merchant terminal, an updated total number of redeemable points based on deducting the pre-defined number of redeemable points from the total number of redeemable points. The method further includes facilitating, by the merchant terminal, printing of an updated unique machine-readable code. The updated unique machine-readable code includes the updated total number of redeemable points for a future purchase. The scanning, determining the total number of redeemable points, facilitating purchase, determining the updated number of redeemable points and facilitating printing are performed in an offline mode in which the merchant terminal is disconnected with a server managing the benefit program.

[0007] In another embodiment, a method for conducting a cardless and offline payment transaction to provide aid in geographical locations with limited network connectivity is disclosed. The method includes creating a beneficiary profile of a

beneficiary to enroll the beneficiary for a benefit program. The beneficiary profile is created based on an identification data of the beneficiary. The method includes generating a unique machine-readable code of the beneficiary. The unique machine-readable code includes the identification data of the beneficiary and a total number of redeemable points. The method includes facilitating a purchase of one or more commodities from a list of commodities provided in the benefit program using a pre-defined number of redeemable points of the total number of redeemable points needed for purchasing the one or more commodities. The method includes determining an updated total number of redeemable points based on deducting the pre-defined number of redeemable points from the total number of redeemable points. The method includes facilitating printing of an updated unique machine-readable code that includes the updated total number of redeemable points for a future purchase. The creation of the beneficiary profile, generating the unique machine-readable code, facilitating purchase, determining the updated number of redeemable points and facilitating printing are performed in an offline mode.

[0008] In yet another embodiment, a system for conducting a cardless and offline payment transaction to provide aid in geographical locations with limited network connectivity is disclosed. The system includes an electronic device associated with a benefit provider and a merchant terminal. The electronic device includes a first memory storing executable instructions and a first processor configured to execute the executable instructions. The first processor is configured to cause the electronic device to at least perform creating a beneficiary profile of a beneficiary to enroll the beneficiary for a benefit program. The beneficiary profile is created based on an identification data of the beneficiary. The first processor is configured to further cause the electronic device to at least perform generating a unique machine-readable code of the beneficiary. The unique machine-readable code includes the identification data of the beneficiary and a total number of redeemable points. The merchant terminal includes a second memory storing executable instructions and a second processor configured to execute the executable instructions. The second processor is configured to cause the merchant terminal to at least perform: scanning a unique machine-readable code associated with a beneficiary. The unique machine-readable code is generated in response to an enrollment of the beneficiary for a benefit program. The second processor is configured to cause the merchant terminal to at least perform facilitating a purchase of one or more commodities from a list of

commodities provided in a benefit program using a pre-defined number of redeemable points of the total number of redeemable points needed for purchasing the one or more commodities. The second processor is configured to cause the merchant terminal to at least perform determining an updated total number of redeemable points based on deducting the pre-defined number of redeemable points from the total number of redeemable points. The second processor is configured to cause the merchant terminal to at least perform facilitating printing of an updated unique machine-readable code that includes the updated total number of redeemable points for a future purchase. The scanning, determining the total number of redeemable points, facilitating purchase, determining the updated number of redeemable points and facilitating printing are performed in an offline mode in which the merchant terminal is disconnected from a server managing the benefit program.

[0009] Other aspects and example embodiments are provided in the drawings and the detailed description that follows.

BRIEF DESCRIPTION OF THE FIGURES

[0010] For a more complete understanding of example embodiments of the present technology, reference is now made to the following descriptions taken in connection with the accompanying drawings in which:

[0011] FIG. 1 illustrates an example representation of an environment related to at least some example embodiments of the present disclosure;

[0012] FIG. 2 represents a sequence flow diagram of enrolling a beneficiary for a benefit program by creating a beneficiary profile of the beneficiary, in accordance with an example embodiment of the present disclosure;

[0013] FIG. 3 represents a sequence flow diagram of purchasing one or more commodities by the beneficiary from a merchant using a Quick-Response (QR) code provided by the benefit provider, in accordance with another example embodiment of the present disclosure;

[0014] FIG. 4A represents a sequence flow diagram of sending an updated

beneficiary profile of the beneficiary to the benefit provider, in accordance with an example embodiment of the present disclosure;

[0015] FIG. 4B represents a sequence flow diagram of sending the updated beneficiary profile of the beneficiary to the benefit provider, in accordance with another example embodiment of the present disclosure;

[0016] FIG. 5 represents a sequence flow diagram of generating a new QR code for the beneficiary based on losing a QR code provided by the benefit provider, in accordance with an example embodiment of the present disclosure;

[0017] FIG. 6A shows an example representation of a user interface (UI) displayed to a benefit provider for enrolling a beneficiary for a benefit program, in accordance with an example embodiment of the present disclosure;

[0018] FIG. 6B shows an example representation of a UI displayed to the benefit provider for capturing a personal data of the beneficiary, in accordance with an example embodiment of the present disclosure;

[0019] FIG. 6C shows an example representation of a UI displayed to the benefit provider for capturing a fingerprint of the beneficiary, in accordance with an example embodiment of the present disclosure;

[0020] FIG. 6D shows an example representation of a UI displayed to the benefit provider for capturing an image of the beneficiary, in accordance with an example embodiment of the present disclosure;

[0021] FIG. 6E shows an example representation of a UI displayed to the benefit provider for capturing a personal identification number (PIN) of the beneficiary, in accordance with an example embodiment of the present disclosure;

[0022] FIG. 6F shows an example representation of a UI displaying a beneficiary profile of the beneficiary to the benefit provider, in accordance with an example embodiment of the present disclosure;

[0023] FIG. 6G shows an example representation of a UI displayed to the benefit

provider depicting a QR code for the beneficiary, in accordance with an example embodiment of the present disclosure;

[0024] FIG. 7A shows an example representation of a UI displayed to a merchant for providing the benefit program to the beneficiary, in accordance with an example embodiment of the present disclosure;

[0025] FIG. 7B shows an example representation of a UI displayed to the merchant for scanning a QR code provided by the beneficiary, in accordance with an example embodiment of the present disclosure;

[0026] FIG. 7C shows an example representation of a UI displayed to a merchant depicting scanning of a QR code provided by a beneficiary, in accordance with an example embodiment of the present disclosure;

[0027] FIG. 7D shows an example representation of a UI displaying a beneficiary profile of the beneficiary to the merchant, in accordance with an example embodiment of the present disclosure;

[0028] FIG. 7E shows an example representation of a UI displaying a list of commodities provided by the benefit program, in accordance with an example embodiment of the present disclosure;

[0029] FIG. 7F shows an example representation of a UI displayed to the merchant depicting an authentication page for authenticating the beneficiary, in accordance with an example embodiment of the present disclosure;

[0030] FIG. 7G shows an example representation of a UI displayed to the merchant depicting authentication of the beneficiary, in accordance with an example embodiment of the present disclosure;

[0031] FIG. 7H shows an example representation of a UI displayed to the merchant depicting a payment page for purchasing one or more commodities selected from the list of commodities of FIG. 7E by the beneficiary, in accordance with an example embodiment of the present disclosure;

[0032] FIG. 7I shows an example representation of a UI displayed to the merchant for updating the beneficiary profile of FIG. 7D, in accordance with an example embodiment of the present disclosure;

[0033] FIG. 7J shows an example representation of a UI displayed to the merchant depicting an updated beneficiary profile, in accordance with an example embodiment of the present disclosure;

[0034] FIG. 8 shows an example representation of a UI displayed to a benefit provider for generating a new QR code for a beneficiary based on a request from the beneficiary, in accordance with an example embodiment of the present disclosure;

[0035] FIG. 9 illustrates a flow diagram depicting a method for conducting an offline payment transaction to provide aid in geographical locations with limited network connectivity, in accordance with an example embodiment of the present disclosure;

[0036] FIG. 10 illustrates a flow diagram depicting a method for conducting an offline payment transaction to provide aid in geographical locations with limited network connectivity, in accordance with another example embodiment of the present disclosure;

[0037] FIG. 11 is a simplified block diagram of a system for conducting an offline payment transaction to provide aid in geographical locations with limited network connectivity, in accordance with an embodiment of the present disclosure;

[0038] FIG. 12 is a simplified block diagram of a server for hosting a benefit program facilitating an offline payment transaction to provide aid in geographical locations with limited network connectivity, in accordance with an embodiment of the present disclosure; and

[0039] FIG. 13 shows a simplified block diagram of a device for example, an electronic device capable of implementing at least some embodiments of the present disclosure.

[0040] The drawings referred to in this description are not to be understood as being drawn to scale except if specifically noted, and such drawings are only exemplary in nature.

DETAILED DESCRIPTION

[0041] In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present disclosure. It will be apparent, however, to one skilled in the art that the present disclosure can be practiced without these specific details.

[0042] Reference in this specification to “one embodiment” or “an embodiment” means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present disclosure. The appearance of the phrase “in an embodiment” in various places in the specification are not necessarily all referring to the same embodiment, nor are separate or alternative embodiments mutually exclusive of other embodiments. Moreover, various features are described which may be exhibited by some embodiments and not by others. Similarly, various requirements are described which may be requirements for some embodiments but not for other embodiments.

[0043] Moreover, although the following description contains many specifics for the purposes of illustration, anyone skilled in the art will appreciate that many variations and/or alterations to said details are within the scope of the present disclosure. Similarly, although many of the features of the present disclosure are described in terms of each other, or in conjunction with each other, one skilled in the art will appreciate that many of these features can be provided independently of other features. Accordingly, this description of the present disclosure is set forth without any loss of generality to, and without imposing limitations upon, the present disclosure.

[0044] The term "humanitarian aid network", used throughout the description, refers to a network or collection of systems used for providing a platform for distributing humanitarian financial aid to beneficiaries that are located in geographical locations with limited network connectivity. Humanitarian aid networks may use a variety of different protocols and procedures in order to provide an end-to-end and a non-financial service of distributing the humanitarian aid to the beneficiaries. Transactions that may be performed via a humanitarian network may include product or service purchases, redeemable points,

etc. The humanitarian aid networks may be configured to perform transactions via cash-substitutes, which may include printed machine-readable codes, redeemable points, etc. Examples of networks or systems configured to perform as humanitarian aid networks include those operated by Mastercard® humanitarian aid network.

[0045] The term “beneficiary”, used throughout the description, refers to recipients receiving the humanitarian aid through a benefit program. The term “benefit provider”, used throughout the description, refers to a volunteer or a group of volunteers that organizes the benefit program to provide support and assistance to the beneficiaries using the humanitarian aid network.

OVERVIEW

[0046] Various example embodiments of the present disclosure provide systems and methods for offline payments for humanitarian financial aid that overcome above-mentioned obstacles and provide additional advantages. More specifically, techniques disclosed herein enable the offline payments to provide aid in geographical locations with limited network connectivity.

[0047] In an example embodiment, a benefit provider deployed in a geographical location of a beneficiary enrolls the beneficiary for a benefit program. The benefit program provides humanitarian aid, such as a list of commodities sold by merchants in the geographical location that support the benefit program. The list of commodities includes, for example, but not limited to, food items, clothes, water, medicines, or the like. The benefit program is organized and managed by benefit providers that are deployed in a remote location. In at least an example embodiment, the beneficiary is enrolled by capturing an identification data of the beneficiary in an electronic device associated with the benefit provider. The identification data includes at least one of a personal data of the beneficiary, a biometric data of the beneficiary, a personal identification number (PIN) or an image of the beneficiary. The identification data is used for creating a beneficiary profile of the beneficiary.

[0048] After creating the beneficiary profile, a unique machine-readable code is generated. The unique machine-readable code includes the identification data and a total

number of redeemable points for the beneficiary. The unique machine-readable code is printed on a paper using security printing techniques, anti-replication techniques or the like. In an illustrative example, the benefit provider uses a security paper for printing the unique machine-readable code. The unique machine-readable code is printed on the security paper using a security ink. The security paper includes hidden security watermarks, such as text watermarks or image watermarks that are invisible to human eyes. This prevents the unique machine-readable code from replication and any kinds of frauds. The printed unique machine-readable code is then provided to the beneficiary for purchasing the aid. In at least an example embodiment, a QR code is generated after creating the beneficiary profile. The QR code is printed in a security paper using the printing techniques, the anti-replication techniques or the like. It shall be noted that the description of the present disclosure is made with respect to QR codes being example of unique machine-readable code for exemplary purposes only, and that the present disclosure can be practiced with any other suitable forms of unique machine-readable code.

[0049] Further, the printed QR code is provided to the beneficiary for purchasing the commodities from a merchant that supports the benefit program. The beneficiary provides the printed QR code to the merchant. The merchant scans the QR code using a merchant terminal. The merchant terminal is equipped with a camera for scanning the QR code. Once the QR code is scanned, the total number of redeemable points in the QR code is determined. The merchant also accesses the beneficiary profile based on scanning the QR code. A list of commodities is displayed to the beneficiary via the merchant terminal upon accessing the beneficiary profile. The beneficiary selects one or more commodities from the list of commodities.

[0050] After the selection, the beneficiary is authenticated for purchasing the selected one or more commodities. The beneficiary is authenticated based on the identification data. In at least one example embodiment, the beneficiary is authenticated based on the biometric data. The biometric data include, but are not limited to, a fingerprint of the beneficiary, a facial identification data of the beneficiary, an iris pattern of the beneficiary, or the like. In an alternate example embodiment, the beneficiary is authenticated based on the PIN. In an example embodiment, the biometric data is fetched along with geographical location of the beneficiary for an offline authentication. The

geographical location is used to determine if the beneficiary is near a location of the merchant. If the beneficiary is nearby the merchant, then the biometric data is provided to the merchant. The merchant uses the biometric data for authenticating the beneficiary.

[0051] The beneficiary purchases the selected one or more commodities upon successful authentication. The selected one or more commodities are purchased by deducting a pre-defined number of redeemable points from the total number of redeemable points. The deducted pre-defined number of redeemable points correspond to a cumulative price of the purchased one or more commodities. A payment transaction of the purchased commodities is completed based on the deducted pre-defined number of redeemable points. It shall be noted that the actual payment transaction is performed when there is network connectivity available in location of the merchant. Further, the benefit provider may be authorized for settling the payment transaction.

[0052] The total number of redeemable points is updated based on the deducted pre-defined number of redeemable points. After updating the total number of redeemable points, details of the purchased commodities are added to the beneficiary profile. The updated total number of redeemable points and the details of the purchased commodities are added to the beneficiary profile for generating an updated beneficiary profile of the beneficiary. An updated QR code is generated based on the updated beneficiary profile. In at least an example embodiment, the updated total number of redeemable points is determined by the merchant terminal. The updated QR code that includes the updated total number of redeemable points is printed for a future purchase. The updated QR code is printed on a paper provided by the benefit provider. In an illustrative example, the updated QR code is printed using the security techniques, the anti-replication techniques, or the like. The merchant provides an authorized signature and an authorized stamp mark on the printed QR code. The printed QR code is then provided to the beneficiary for the future purchase.

[0053] Furthermore, the updated beneficiary profile is provided to the benefit provider. The merchant sends the updated beneficiary profile to the benefit provider in an offline mode. In at least an example embodiment, the updated beneficiary profile is sent to the benefit provider using any of the short-range wireless communication technique such as near-field communication (NFC), Bluetooth, WiFi, or the like.. In an illustrative

example scenario, the benefit provider visits the merchant to collect the updated beneficiary profile. The benefit provider may visit the merchant at the end of a day on a daily basis, a weekly basis or the like. The benefit provider then connects the electronic device to the merchant terminal using the short-range wireless communication technique like NFC, Bluetooth, WiFi, or the like. In case of network availability, the merchant provides the updated beneficiary profile to the benefit provider in an online mode. In such case, the benefit provider need not visit the merchant to collect the updated beneficiary profile. For instance, the merchant may send the updated beneficiary profile to the benefit provider via a network, such as a mobile data network, or any wireless data services network providing internet connectivity. In such scenarios, both the merchant terminal and the electronic device are connected to the network.

[0054] In some cases, if there is loss of the QR code then the beneficiary may visit the benefit provider to request for a new QR code. The benefit provider may verify the beneficiary using the biometric data or the PIN of the beneficiary. After successful verification of the beneficiary, the benefit provider may access the beneficiary profile of the beneficiary in the device and generate the new QR code for the beneficiary. The new QR code becomes valid when the new QR code is updated with a database of the merchant as well as synced with the benefit provider. In some other cases, the beneficiary may continue using an old QR code, while the database is being updated. The beneficiary provides the old QR code to the merchant. When the old QR code is read, the update of the new QR code in the database may be completed. In such cases, the merchant may notice a discrepancy, such as difference in information with the old QR code and the new QR code. If there is any discrepancy, then the merchant generates and prints another new QR code.

[0055] The offline payment transaction to provide aid in geographical locations with limited network connectivity, is further explained in detail with reference to FIGS. 1 to 13.

[0056] FIG. 1 illustrates an example representation of an environment 100, in which at least some example embodiments of the present disclosure can be implemented. The environment 100 is depicted to include a humanitarian aid network 150. The humanitarian aid network 150 is a digital aid platform that enables distribution of humanitarian aid mostly in absence of telecommunication infrastructure and in

geographically remote areas with limited accessibility. More specifically, the humanitarian aid network 150 provides an end-to-end and a non-financial service of distributing the humanitarian aid to the beneficiaries, such as beneficiary 102a and beneficiary 102b that are located in geographical locations with limited network connectivity.

[0057] In an illustrative example, the humanitarian aid may be provided by benefit providers, such as benefit provider 106a and benefit provider 106b through a benefit program. The benefit program is organized by a benefit program organizer 104. The benefit program may provide a wide range of aid, such as foods, clothes, temporary shelters, relief funds, or the like to the beneficiary 102a and the beneficiary 102b. In one example scenario, some of the benefit providers, such as the benefit provider 106a are deployed at nearby location of the beneficiaries, the beneficiary 102a and the beneficiary 102b. Such benefit provider 106a may be considered as a field officer who helps the beneficiaries 102a and 102b in availing the aid benefit program. In another example scenario, some benefit providers, such as the benefit provider 106b create and manage the benefit program with detailed reporting to monitor performance of the benefit program via a web portal. The benefit program is hosted by a server, such as server 140. Moreover, the benefit provider 106b is deployed as a backend operator for controlling and managing the benefit program from a remote location. For example, the benefit provider 106b determines areas that are under humanitarian crises and accordingly assigns other on-site benefit providers, such as the benefit provider 106a to assist the beneficiary 102a and the beneficiary 102b.

[0058] In order to provide the humanitarian aid to the beneficiaries located in geographical locations with limited network connectivity, the beneficiaries, such as the beneficiary 102a and the beneficiary 102b are enrolled for the benefit program by the benefit provider 106a. In an illustrative example, the benefit provider 106a captures an identification data of the beneficiary 102a using an electronic device, such as electronic device 108 associated with the benefit provider 106a. The electronic device 108 is configured to create a beneficiary profile of the beneficiary 102a using the identification data. The identification data includes personal identification data, a biometric data, a Personal Identification Number (PIN), or an image of the beneficiary 102a.

[0059] The electronic device 108 is further configured to generate a unique

machine-readable code, such as QR code 110 for the beneficiary 106a. The QR code 110 includes the identification data of the beneficiary 102a and a total number of redeemable points available to the beneficiary 102a. More specifically, the electronic device 108 is equipped with an application for providing the humanitarian aid to the beneficiaries 102a and 102b located in geographical locations with limited network connectivity, where the application is hosted by the server 140. For example, the application installed in the electronic device 108, may cause the electronic device 108 to capture the identification data, create the beneficiary profile, and generate the QR code 110. The benefit provider 106a prints the QR code 110 using a printer. The printed QR code 110 is provided to the beneficiary 102a.

[0060] In at least an example embodiment, the QR code 110 is printed using techniques, such as security printing techniques, anti-replication techniques, or the like. The QR code 110 is printed on a security paper using a security ink. The security ink provides security watermarks on the paper. The security watermarks (*e.g.*, text or image watermarks) are hidden and invisible to human eyes. The techniques of printing QR codes, such as the QR code 110 in a safe and secure manner provides protection of the QR code 110. This prevents the QR code 110 from being misused by others.

[0061] In a similar manner, the benefit provider 106a creates a beneficiary profile of the beneficiary 102b and provides a printed QR code 112 to the beneficiary 102b. The beneficiary 102a and the beneficiary 102b can purchase one or more commodities using the QR codes, such as the QR code 110 and the QR code 112 respectively. The one or more commodities are purchased from merchants that support the benefit program. In an illustrative example, the beneficiary 102b visits a merchant 114 for purchasing the one or more commodities. The merchant 114 sells a list of commodities provided by the benefit program. Examples of the merchant 114 may include any retail shop, restaurant, supermarket or establishment, and/or private agency, or any service provider that support any benefit programs of the benefit program organizer 104.

[0062] The beneficiary 102b provides the QR code 112 to the merchant 114. The merchant 114 scans the QR code 112 using a merchant terminal, such as merchant terminal 116. The merchant terminal 116 is equipped with a camera for scanning QR codes, such as the QR code 112. In at least an example embodiment, instances of the application for

providing the humanitarian aid to the beneficiaries 102a and 102b located in geographical locations with limited network connectivity, hosted by the server 140 may be downloaded and installed in the merchant terminal 116. For example, an instance of the application installed in the merchant terminal 116, may cause the merchant terminal 116 to perform operations in an offline mode when the merchant terminal 116 is disconnected with the server 140. The operations include scanning the QR code (e.g., the QR code 112), determining a total number of redeemable points, facilitating purchase of one or more commodities, determining an updated number of redeemable points and facilitating printing of an updated QR code.

[0063] The merchant terminal 114 is configured to determine a total number of redeemable points in the QR code 112. The merchant terminal 114 is further configured to access a beneficiary profile of the beneficiary 102b based on scanning the QR code 112. After accessing the beneficiary profile, a list of commodities provided in the benefit program is displayed in the merchant terminal 116. The list of commodities is displayed to the beneficiary 102b. The beneficiary 102b provides a selection of one or more commodities from the list of commodities. In order to purchase the selected one or more commodities, the beneficiary 102b is authenticated. In at least one example embodiment, the beneficiary 102b is authenticated based on the biometric data, such as fingerprint of the beneficiary, a facial identification data of the beneficiary, an iris pattern of the beneficiary, or the like.

[0064] In an embodiment, the merchant terminal 116 fetches the biometric data associated with geographical location of the beneficiary 102b for an offline authentication. The biometric data and the geographical location are extracted from a database, such as database 120. It shall be noted that the biometric data and the geographical location are extracted, while installing instances of the application in merchant terminal 114. The application is capable of fetching the biometric data of only those beneficiaries that are associated in the geographical area served by a merchant. For example, the application may fetch the biometric data of the beneficiary 102b that is located near the merchant 114. In some cases, the merchant 114 may relocate from one geographical area to another geographical area. For example, the merchant 114 may be a mobile merchant that changes from one position to another position. In such cases, geographical locations of the

beneficiaries that are nearby to the mobile merchant 114 are fetched by the server 140. In an illustrative example scenario, the mobile merchant 114 is in a position A and the geographical location of the beneficiary 102b is near to the position A. In such scenario, the server 140 fetches the geographical location of the beneficiary 102b. The server 140 provides information of the geographical location to the benefit provider 106b. The benefit provider 106b identifies the geographical location of the merchant 114 either manually based on an identifier (ID) (*e.g.*, a merchant ID) of the merchant 114 or an Internet Protocol (IP) address of the merchant 114. After determining beneficiaries (*e.g.*, the beneficiary 102b) that are near to the merchants (*e.g.*, the merchant 114), the biometric data of the beneficiary 102b is fetched and provided to the merchant terminal 116. The beneficiary 102b is then authenticated based on the biometric data. In another example embodiment, the beneficiary 102b is authenticated based on the PIN.

[0065] After successful authentication, the selected one or more commodities are purchased by deducting a pre-defined number of redeemable points from the total number of redeemable points. The deducted pre-defined number of redeemable points correspond to a cumulative price of the purchased one or more commodities. The total number of redeemable points is updated after the deduction. The merchant 114 performs a payment transaction of the purchased one or more commodities when a network connection is available. The merchant 114 then completes the payment transaction based on the deducted pre-defined number of redeemable points. In an alternate example embodiment, the benefit providers, such as the benefit provider 106a may be authorized for settling the payment transaction at a later point of time.

[0066] The beneficiary profile of the beneficiary 102b is updated with the updated total number of redeemable points and details of the purchased one or more commodities. Further, the merchant terminal 116 is configured to generate an updated QR code, such as QR code 118 for the updated beneficiary profile of the beneficiary 102b. The QR code 118 is printed using the security techniques, the anti-replication techniques, or the like. In at least an example embodiment, the merchant 114 prints the QR code 118 on a security paper provided by the benefit provider 106a. After printing the QR code 118, the merchant 114 may provide an authorized signature and an authorized mark of the merchant 114 on the QR code 118. The merchant 114 then provides the printed QR code 118 to the

beneficiary 102b for a future purchase. Likewise, the beneficiary profile of the beneficiary 102a is also updated and an updated QR code is generated after every purchase by the merchant 114.

[0067] The merchant 114 further provides updated beneficiary profiles, such as the updated beneficiary profile of the beneficiary 102a and the updated beneficiary profile of the beneficiary 102b to the benefit providers (*e.g.*, the benefit provider 106a). In one example scenario, the benefit provider 106a may visit the merchant 114 to collect the updated beneficiary profiles of the beneficiary 102b. In at least an example embodiment, the updated beneficiary profile is sent to the benefit provider 106a in an offline mode using any short range wireless communication technique, such as NFC, Bluetooth, WiFi, or the like. For example, the electronic device 108 and the merchant terminal 116 may be connected using the NFC technique. After establishing a connection between the electronic device 108 and the merchant terminal 116, the updated beneficiary profiles is transferred from the merchant terminal 116 to the electronic device 108.

[0068] In another example embodiment, the merchant 114 provides the updated beneficiary profile to the benefit provider 106a in an online mode. For instance, when a network connection is available, the merchant terminal 116 sends the updated beneficiary profile to the server 140 via a network, such as the humanitarian aid network 150. The server 140 stores the updated beneficiary profile in a database, such as database 120. In one example embodiment, the database 120 may be embodied within the server 140. In another example embodiment, the database 120 may be associated with the server 140. When a network connectivity is available in location of the benefit provider 106a, the server 140 further sends the updated beneficiary profile to the benefit provider 106a. The existing beneficiary profile of the beneficiary 102b in the electronic device 108 is updated based on the updated beneficiary profile.

[0069] In some cases, the beneficiaries may lose their QR codes. For instance, if the beneficiary 102b has lost the QR code 118, the beneficiary 102b may approach the benefit provider 106a and request for a new QR code. The benefit provider 106a may verify the beneficiary 102b for generating the new QR code. In at least one example embodiment, the beneficiary 102b is verified based on the biometric data of the beneficiary 102b. In another example embodiment, the beneficiary 102b is verified based on the PIN

of the beneficiary 102b. The benefit provider 106a then accesses a beneficiary profile of the beneficiary 102b in the electronic device 108 after successful verification of the beneficiary 102b. After accessing the beneficiary profile, the new QR code is generated. The new QR code is printed using the security printing techniques or the anti-replication techniques. The printed new QR code is provided to the beneficiary 102b. Once the new QR code is generated, the lost QR code becomes invalid and unusable. Moreover, the benefit provider 106a may broadcast information about the lost QR code to alert merchants, such as the merchant 114. In an example embodiment, information of the new QR code is provided to the merchant 114 and the benefit provider 106b. The beneficiary 102b may use the new QR code only when the new QR code is updated in the database 120 and synced with the benefit provider 106. In some scenarios, it may happen that the beneficiary 102b may attempt to use an old QR code despite having the new QR code. For instance, the beneficiary 102b may attempt to use the old QR code, while the new QR code is being updated in the database 120. However, as and when the database 120 is updated with the new QR code, reconciliation happens and if there is any discrepancy with the QR codes (*i.e.*, the old QR code and the new QR code), then the merchant 114 generates and prints another new QR code. For example, when the old QR code is read, the merchant 114 may notice inconsistent information in the old QR code. At this point, both QR codes are invalidated, and the merchant 114 generates and prints another new QR code.

[0070] Some non-exhaustive example embodiments of conducting offline payment transactions to provide aid in geographical locations with limited network connectivity by using a printed QR code is described with reference to FIGS. 2 to 13.

[0071] FIG. 2 represents a sequence flow diagram 200 of enrolling a beneficiary (*e.g.*, the beneficiary 102a) for a benefit program by creating a beneficiary profile of the beneficiary 102a, in accordance with an example embodiment of the present disclosure. The beneficiary profile is created in an electronic device (*e.g.*, electronic device 108) of a benefit provider (*e.g.*, the benefit provider 106a). The beneficiary 102a, the electronic device 108 and the benefit provider 106a are described in FIG. 1. In at least an example embodiment, the benefit provider 106a captures an identification data of the beneficiary 102a in the electronic device 108. The identification data includes at least one of a personal data of the beneficiary, a biometric data of the beneficiary, a personal identification

number (PIN) or an image of the beneficiary. The capture of each data may be performed in a single step or in a sequential manner. The sequence flow diagram 200 need not be necessarily executed in the same order as they are presented.

[0072] At 202, the personal data of the beneficiary 102a is captured in electronic device 108 by the benefit provider 106a. The personal data includes basic information, such as name of the beneficiary 102a, address of the beneficiary 102a, social security number (SSN) of the beneficiary 102a, and more.

[0073] At 204, the biometric data of the beneficiary 102a is captured in the electronic device 108 by the benefit provider 106a. Some of the non-limiting examples of the biometric data include a fingerprint of the beneficiary 102a, an iris pattern of the beneficiary 102a, a facial identification of the beneficiary 102a or the like.

[0074] At 206, the PIN of the beneficiary 102a is captured in the electronic device 108 by the benefit provider 106a. A few examples of the PIN may include an alphanumeric code or a numeric code of four digits, six digits or any other pre-set number of digits.

[0075] At 208, an image of the beneficiary 102a is captured using the electronic device 108. In one example scenario, the benefit provider 106a may activate a camera of the device 206 to capture the image.

[0076] At 210, a beneficiary profile of the beneficiary 102a is created based on the personal data, the biometric data, the PIN and the image. At 212, a QR code is generated for the beneficiary 102a. The QR code includes the identification data and a total number of redeemable points for the beneficiary 102a.

[0077] At 214, the QR code is printed. In at least an example embodiment, the QR code is printed using techniques, such as security printing, anti-replication, or the like. The techniques provide protection of the printed QR code from replication and any of kinds of fraud. The electronic device 108 may be connected to an external device, such as a printer to print the QR code. At 216, the benefit provider 106a provides the printed QR code to the beneficiary 102a.

[0078] Further, the beneficiary 102a uses the printed QR code for purchasing one

or more commodities from a list of commodities provided in the benefit program. The list of commodities is sold by merchants, such as the merchant 114 that support the benefit program. The purchase of the one or more commodities by the beneficiary 102a using the QR code is explained next with reference to FIG. 3.

[0079] FIG. 3 represents a sequence flow diagram 300 of purchasing one or more commodities by the beneficiary 102a from a merchant (*e.g.*, the merchant 114) using a QR code provided by the benefit provider 106a, in accordance with an example embodiment of the present disclosure. The merchant 114 is described with reference to FIG. 1. In an illustrative example scenario, the beneficiary 102a visits the merchant 114 for purchasing the one or more commodities. The merchant 114 is associated with a merchant terminal, such as the merchant terminal 116 of FIG. 1.

[0080] At 302, the beneficiary 102a provides the QR code to the merchant 114. At 304, the merchant 114 scans the QR code using the merchant terminal 116. At 306, the merchant terminal 116 determines a total number of redeemable points in the QR code.

[0081] At 308, a beneficiary profile of the beneficiary 102a is accessed based on scanning the QR code. At 310, a list of commodities is displayed to the beneficiary 102a after accessing the beneficiary profile. In an illustrative example, the list of commodities may include rice, flour, milk, sugar, salt, cookies, cereal, etc. Each commodity may be associated with a tag of redeemable points. For instance, 1 kg of rice may correspond to 2 redeemable points.

[0082] At 312, the beneficiary 102a provides a selection of one or more commodities from the list of commodities. For example, the beneficiary 102a may select 2 boxes of cookies, a cereal box and a milk packet from the list of commodities. At 314, the beneficiary 102a is authenticated for purchasing the selected one or more commodities. In at least an example embodiment, the beneficiary 102a is authenticated based on an identification data of the beneficiary 102a. At 316, the beneficiary 102a provides at least a biometric data of the beneficiary 102a or a PIN of the beneficiary 102a in the merchant terminal 116.

[0083] At 318, a pre-defined number of redeemable points corresponding to the

selected one or more commodities is deducted from the total number of redeemable points. The pre-defined number of redeemable points correspond to a cumulative price of the purchased one or more commodities. For example, 2 boxes of cookies may correspond to 2 redeemable points, a cereal box may correspond to 2 redeemable points and a milk packet may correspond to 2 redeemable points. A cumulative price of the purchased commodities, *i.e.*, $(2+2+2) = 6$ redeemable points, is deducted from the total number redeemable points, such as 1000 redeemable points in the beneficiary profile.

[0084] At 320, the total number of redeemable points is updated based on the deducted pre-defined number of redeemable points. For example, the total number of redeemable points is changed to 994 after the deducting 6 redeemable points from 1000 redeemable points.

[0085] At 322, the merchant 114 provides the purchased one or more commodities to the beneficiary 102a. At 324, details of the purchased one or more commodities are added to the beneficiary profile. For example, details of the one or more commodities, such as 2 boxes of cookies, 1 cereal box or 1 milk packet are added to the beneficiary profile.

[0086] At 326, an updated beneficiary profile of the beneficiary 102a is generated. The updated beneficiary profile includes the updated total number of redeemable points and the details of the purchased one or more commodities.

[0087] At 328, an updated QR code for the beneficiary is generated based on the updated beneficiary profile. The updated QR code includes the updated total number of redeemable points. When the updated QR code is generated, the previous QR code becomes obsolete and invalid. In an embodiment, the previous QR code is forfeited by the merchant 114. At 330, the updated QR code is printed. In at least an example embodiment, the updated QR code is printed using papers (*e.g.*, the security papers) provided by the benefit provider 106a. Moreover, the QR code is printed using security printing techniques, anti-replication techniques, or the like. For instance, the QR code is printed on a watermarked paper provided by the benefit provider 106a. The watermarked paper may be provided when the merchants are registered.

[0088] At 332, the updated QR code is provided to the beneficiary 102a. In an

illustrative example, the merchant 114 marks an authorized stamp on the printed QR code along with a signature of the merchant 114.

[0089] Furthermore, the merchant 114 provides the updated beneficiary profile to the benefit provider 106a, which is described next with reference to FIGS. 4A and 4B.

[0090] FIG. 4A represents a sequence flow diagram 400 of sending an updated beneficiary profile of the beneficiary 102a to the benefit provider 106a, in accordance with an example embodiment of the present disclosure. In at least an example embodiment, the merchant 114 sends the updated beneficiary profile to the benefit provider in an offline mode. In an illustrative example scenario, the benefit provider 106a may visit the merchant 114 to collect the updated beneficiary profile. When the benefit provider 106a is near the merchant 114, the electronic device 108 and the merchant terminal 116 are connected using the near-field communication technique.

[0091] At 402, a connection is established between the merchant terminal 116 and the electronic device 108 using any short range wireless communication technique, such as NFC, Bluetooth, WiFi, or the like. At 404, send the updated beneficiary profile from the merchant terminal 116 to the electronic device 108.

[0092] At 406, existing beneficiary profile of the beneficiary 102a in the electronic device 108 is updated based on the updated beneficiary profile. At 408, the electronic device 108 sends an acknowledgement to the merchant terminal 116 after receiving the updated beneficiary profile.

[0093] In another example embodiment, the updated beneficiary profile is sent to the benefit provider 106a over any communication network in an online mode. For example, if a wireless or wireline network connection is available at location of the benefit provider 106a and the merchant 114, then the updated beneficiary profile is sent to the benefit provider 106a using the network, which is explained in FIG. 4B.

[0094] FIG. 4B represents a sequence flow diagram 410 of sending the updated beneficiary profile of the beneficiary 102a to the benefit provider 106a, in accordance with another example embodiment of the present disclosure. In an illustrative example scenario, when there is a network connectivity available in location of the merchant 114, then the

merchant terminal 116 is connected to the server 140 for sending the updated beneficiary profile. The merchant terminal 116 communicates with the server 140 via the network, such as the humanitarian aid network 150. The communication is achieved through application program interface (API) calls, without loss of generality. The server 140 and the humanitarian aid network 150 are explained with reference to FIG. 1.

[0095] At 412, the merchant 114 sends a connection request from the merchant terminal 116 to the server 140. The server 140 approves the connection request and a connection between the merchant terminal 114 and the server 140 is established.

[0096] At 414, the updated beneficiary profile is sent to the server 140 from the merchant terminal 116. At 416, the server 140 stores the updated beneficiary profile. In at least one example embodiment, the updated beneficiary profile is stored in the database 120 shown in FIG. 1.

[0097] At 418, the server 140 further sends the updated beneficiary profile to the electronic device 108. In an illustrative example, the benefit provider 106a may connect the electronic device 116 to the server 140 in presence of a network. The electronic device 116 may be connected to the server 140 using API calls. Once a connection between the electronic device 116 and the server 140 is established, the server 140 sends the updated beneficiary profile. Moreover, the server 140 may provide a notification on the updated beneficiary profile to the benefit provider 106a.

[0098] At 420, existing beneficiary profile of the beneficiary 102a in the electronic device 108 is updated based on the updated beneficiary profile. At 422, the benefit provider 106a sends an acknowledgment to the server 140. At 424, the server 140 further sends the acknowledgement to the merchant terminal 116.

[0099] In some scenarios, it may happen that the beneficiary 102a may lose a QR code provided by the benefit provider 106a. In some other scenarios, if the beneficiary 102a loses a QR code provided by the merchant 114. Losing an unused QR code may entail a high chance of misusing the lost QR code by others. In such scenarios, the beneficiary 102a may visit the benefit provider 106a and report about the lost QR code. The benefit provider 106a may circulate the information to the merchants, such as the

merchant 114. The generation of the new QR code by the benefit provider 106a is explained further with reference to FIG. 5.

[00100] Referring now to FIG. 5, a sequence flow diagram 500 of generating a new QR code for the beneficiary 102a based on losing a QR code provided by the benefit provider is illustrated in accordance with another example embodiment of the present disclosure.

[00101] At 502, the beneficiary 102a requests the benefit provider 106a to generate a new QR code. At 504, the benefit provider 106a verifies the beneficiary 102a based on at least one of a biometric data or a PIN of the beneficiary 102a.

[00102] At 506, the beneficiary 102a provides the at least one of a biometric data or a PIN in the electronic device 108. In some cases, if the beneficiary 102a has forgotten the PIN, then the biometric data, such as a fingerprint, an iris pattern, or a facial identification can be provided for the verification.

[00103] At 508, the benefit provider 106a accesses a beneficiary profile of the beneficiary 102a, upon successful verification of the beneficiary 102a. At 510, the benefit provider 106a updates the beneficiary profile. The beneficiary provider 106a updates the beneficiary profile with details of a new QR code.

[00104] At 512, the benefit provider 106a generates a new QR code based on the updated beneficiary profile. In an example embodiment, information of the new QR code is provided to the merchant 114 and the benefit provider 106b. The new QR code becomes valid only when the new QR code is updated in the database 120 of FIG. 1 and synced with the benefit provider 106b.

[00105] At 514, the new QR code is printed by the benefit provider 106a. In at least an example embodiment, the new QR code is printed on a security paper using techniques, such as security printing, anti-replication or the like. At 516, the new QR code is provided to the beneficiary 102a. In some scenarios, it may happen that the beneficiary 102b may have both an old QR code and the new QR code. The beneficiary 102b may use attempt to the old QR code. In such scenarios, if there is any discrepancy with the QR codes (*i.e.*, the old QR code and the new QR code), then another new QR code is generated and printed.

[00106] Various embodiments cause provision of one or more user interfaces (UIs) for enrollment of a beneficiary for a benefit program in an offline mode. Some example UIs displayed in the electronic device 108 for the enrollment, such as creating a beneficiary profile of the beneficiary and generating a QR code for the beneficiary are shown and explained with reference to FIGS. 6A to 6G. Further, some example UIs displayed in the merchant terminal 116 for scanning the QR code, determining a total number of redeemable points, facilitating a purchase, determining an updated number of redeemable points and facilitating printing of the QR code that are performed in the offline mode are explained with reference to FIGS. 7A to 7J. In FIG. 8, example UIs displayed in the electronic device 108 for generating a new QR code based on a loss of a QR code are explained. It shall be noted that the UIs shown are illustrated for explanation purposes and do not limit scope of the disclosure.

[00107] Referring now to FIG. 6A, an example representation of a UI 600 displayed to a benefit provider (*e.g.*, the benefit provider 106a) for enrolling a beneficiary for a benefit program is shown in accordance with an example embodiment of the present disclosure. The UI 600 is depicted to include buttons, such as button 602 for connecting to a host (*e.g.*, the server 140 of FIG. 1), button 604 for connecting to a merchant (*e.g.*, the merchant 114 of FIG. 1), button 606 for enrollment of a beneficiary (*e.g.*, the beneficiary 102a or the beneficiary 102b of FIG. 1) and button 608 for generating a new QR code for the beneficiary based on a loss of a QR code of the beneficiary.

[00108] When the button 602 is triggered, the electronic device 108 is connected to the server 140. The button 602 is triggered in presence of a network connectivity. When the button 604 is triggered, a connection between the electronic device 108 and the merchant terminal 116 is established using near-field communication technique. The button 606 allows the benefit provider to enroll the beneficiary for a benefit program. The button 608 allows the benefit provider to generate a new QR code for the beneficiary based on a loss of a QR code of the beneficiary (refer FIG. 8).

[00109] In an illustrative example, when the benefit provider 106a clicks on the button 606, the benefit provider 106a is directed to a page for capturing an identification data of the beneficiary. The capture of identification data that include a personal data, a biometric data, an image and PIN of the beneficiary 102a is shown in a step-wise manner,

which are explained with reference to FIGS. 6B to 6E.

[00110] Referring now to FIG. 6B, an example representation of a UI 610 displayed to the benefit provider for capturing a personal data of the beneficiary is shown in accordance with an example embodiment of the present disclosure. The UI 610 is presented to the benefit provider 106a in response to the triggering of the button 606 in the UI 610 (shown in FIG. 6A). A step-wise capture of an identification data of the beneficiary 102a include steps, such as step 611 for capturing a personal data of the beneficiary, step 612 for capturing a biometric data of the beneficiary 102a, step 613 for capturing an image of the beneficiary 102a, step 614 for capturing a PIN of the beneficiary 102a and step 615 for generating a QR code for the beneficiary 102a. It is noted that the UI 610 is an exemplary representation and the UI 610 may include more input fields than those shown in FIG. 6B.

[00111] The UI 610 displays the step 611 for capturing the personal data that include basic information of the beneficiary 102a, such as a name, an address, a social security number (SSN), or the like. The basic information is provided in corresponding input fields of the name, the address and the SSN. As shown in FIG. 6B, the UI 610 is depicted to include input fields, such as name field 616, address field 617 and SSN field 618.

[00112] After completing the step 611, the benefit provider 106a proceeds to step 612 to capture the biometric data. The benefit provider 106a clicks on next tab 619 as shown in FIG. 6B. The benefit provider 106a is directed to a UI for next step, *i.e.*, the step 612, which is shown in FIG. 6C.

[00113] Referring now to FIG. 6C, an example representation of a UI 620 displayed to the benefit provider for capturing a fingerprint 622 of the beneficiary 102a is shown in accordance with an example embodiment of the present disclosure. In an illustrative example scenario, the fingerprint 622 is captured in the electronic device 108 by the benefit provider 106a. It is noted that the fingerprint 622 shown in FIG. 6C is an example of the biometric data and a different biometric data, such as an iris pattern of the beneficiary or facial identification of the beneficiary 102a may be captured.

[00114] After completing step 612, the benefit provider 106a clicks on next tab 619 and proceeds to step 613 to capture an image of the beneficiary 102a, which is shown in FIG. 6D.

[00115] Referring now to FIG. 6D an example representation of a UI 630 displayed to the benefit provider for capturing an image 632 of the beneficiary 102a is shown in accordance with an example embodiment of the present disclosure. The image 632 is captured for displaying a profile image of the beneficiary 102a.

[00116] After completing step 613, the benefit provider 106a clicks on the next tab 619 and proceeds to step 614 to capture a PIN of the beneficiary 102a, which is shown in FIG. 6E.

[00117] Referring now to FIG. 6E, an example representation of a UI 640 displayed to the benefit provider for capturing a PIN 642 of the beneficiary 102a, is shown in accordance with an example embodiment of the present disclosure. The UI 640 is depicted to include an input field 644 for entering the PIN 642 provided by the beneficiary 102a. It is noted that the input field 644 is shown for illustration purpose. Without limiting scope of the invention, the PIN 642 may include alphanumeric digits, numeric digits, etc.

[00118] After completing the step 614, a beneficiary profile of the beneficiary 102a is created based on the identification data, which is shown in FIG. 6F.

[00119] Referring now to FIG. 6F, an example representation of a UI 650 displaying a beneficiary profile 652 of the beneficiary 102a to the benefit provider is shown in accordance with an example embodiment of the present disclosure. It is noted the beneficiary profile 652 displayed in FIG. 6F is shown for illustration purposes. Further, the beneficiary profile 652 may include information other than those shown in FIG. 6F.

[00120] As shown in FIG. 6F, the beneficiary profile 652 includes the name, the address, the SSN, and the fingerprint of the beneficiary 102a. Further, the beneficiary profile 652 includes a total number of redeemable points 654 for the beneficiary 102a. In an example, the total number of redeemable points 654 for the beneficiary 102a is allotted as '1000'.

[00121] The UI 650 is further depicted to include a tab 656 with text 'QR CODE'. When the tab 656 is clicked, a QR code is generated for the beneficiary, which is shown in FIG. 6G.

[00122] Referring now to FIG. 6G, an example representation of a UI 660 displayed to the benefit provider depicting a QR code 662 for the beneficiary 102a, is shown in accordance with an example embodiment of the present disclosure. The UI 660 depicts the step 615. The QR code 662 includes the identification data and the total number of redeemable points 654 shown in FIG. 6F. The QR code 662 is printed by clicking on printer icon 664. The electronic device 108 may be connected to an external printing device, such as a printer. When the printer icon 664 is triggered, a connection between the electronic device 108 and the printer is established. The QR code 662 is sent to the printer that prints out the QR code 662. Moreover, the QR code 662 is printed on a security paper using security ink. The printed QR code 662 includes a security watermark that prevent replication by others. The printed QR code 662 is provided to the beneficiary 102a for purchasing one or more commodities from the merchant 114.

[00123] The merchant 114 scans the printed QR code 662 using the merchant terminal 116. When the QR code 662 is successfully scanned, one or more UIs displayed to the merchant 114 in the merchant terminal 116 are shown in FIGS. 7A-7H.

[00124] FIG. 7A shows an example representation of a UI 700 displayed to the merchant 114 for providing the benefit program to the beneficiary 102a, in accordance with an example embodiment of the present disclosure. As shown in FIG. 7A, the UI 700 is depicted to include buttons, such as a button 702 for connecting to a host, such as the server 140 of FIG. 1, a button 704 for connecting to a benefit provider (*e.g.*, the benefit provider 106a) and a button 706 for providing aid of the benefit program to the beneficiary 102a. The button 702 allows the merchant 114 to connect the merchant terminal 116 to the server 140 for sending updated information, such as an updated beneficiary profile of the beneficiary 102a. The merchant terminal 116 is connected to the server 140 when there is network connectivity. The button 704 allows the merchant 114 to connect the merchant terminal 116 to the electronic device 108 for sending the updated beneficiary profile in an offline manner. As explained with reference to FIG. 4A, the merchant terminal 116 is connected to the electronic device 108 using a near-field communication technique.

Further, the button 706 allows the merchant 114 to access the benefit program for providing aid to the beneficiary 102a.

[00125] In an illustrative example scenario, a beneficiary visits the merchant to purchase one or more commodities from the merchant using a QR code provided by the benefit provider. At such scenario, the merchant clicks on the button 706. The merchant is directed to a UI for scanning the QR code, which is shown in FIG. 7B.

[00126] Referring now to FIG. 7B an example representation of a UI 710 displayed to the merchant for scanning a QR code provided by the beneficiary, in accordance with an example embodiment of the present disclosure. The UI 710 is depicted to include a scan QR code button 712. When the scan QR code button 712 is clicked, camera of the merchant terminal 116 is activated. The scanning of the QR code is shown in FIG. 7C.

[00127] FIG. 7C shows an example representation of a UI 720 displayed to a merchant depicting scanning of a QR code 722 provided by the beneficiary, in accordance with an example embodiment of the present disclosure. When the QR code 722 is scanned, a total number of redeemable points in the QR code 722 is determined. After scanning the QR code 722, a beneficiary profile of the beneficiary 102a is accessed, which is shown in FIG. 7D.

[00128] FIG. 7D shows an example representation of a UI 730 displaying a beneficiary profile 732 of the beneficiary 102a to the merchant 114, in accordance with an example embodiment of the present disclosure. The beneficiary profile 732 is depicted to include an identification data of the beneficiary 102a, such as a name, an address, an SSN, an image, a PIN and a fingerprint of the beneficiary 102a. The beneficiary profile 732 is further depicted to include a total number of redeemable points 734.

[00129] After accessing the beneficiary profile, a list of commodities is displayed to the beneficiary 102a. As shown in FIG. 7D, the merchant 114 may click on a tab 736 to display the list of commodities. The list of commodities is shown in FIG. 7E.

[00130] Referring now to FIG. 7E, an example representation of a UI 740 displaying a list of commodities 742 provided by the benefit program is shown in accordance with an example embodiment of the present disclosure. The list of commodities 742 may include

commodities, such as wheat, sugar, water bottle, energy bar, milk packet and more. In an illustrative example, the beneficiary may select a commodity 744 (e.g., WHEAT) for a quantity of '1 KG' by providing a selection input to the selection button 748. The quantity of a commodity may be selected from a drop-down list button 746 as shown in FIG. 7E. A drop-down list is not shown in FIG. 7E. However, the drop-down list button 746 may include options of different quantities, such as 1 KG, 2 KG, 3 KG, 1 PKT, 2PKT, 3 PKT, or the like corresponding to each type of commodity. In a similar manner, quantities of other commodities in the list of commodities 742 can also be selected using the drop-down list button 746.

[00131] After receiving the selection for one or more commodities, the beneficiary 102a is authenticated. The UI 740 is further depicted with tab 749 for authenticating the beneficiary 102a for purchasing the selected one or more commodities. When the merchant 114 clicks on the tab 749, the merchant 114 is directed to an authentication page, which is shown in FIG. 7F.

[00132] FIG. 7F shows an example representation of a UI 750 displayed to the merchant depicting an authentication page 752 for authenticating the beneficiary, in accordance with an example embodiment of the present disclosure. In at least an example embodiment, the beneficiary 102a may be authenticated based on the identification data, such as the biometric data or the PIN of the beneficiary 102a. As shown in FIG. 7F, the fingerprint is provided by clicking on fingerprint input field 754. Alternatively, the PIN can be provided in a PIN input field 756. After receiving the fingerprint data or the PIN, the merchant may click on button 758 and proceed to next step, which is shown in FIG. 7G.

[00133] FIG. 7G shows an example representation of a UI 760 displayed to the merchant depicting authentication of the beneficiary, in accordance of an example embodiment of the present disclosure. After successfully authenticating the beneficiary, the merchant is directed to a payment page, which is shown in FIG. 7H.

[00134] FIG. 7H shows an example representation of a UI 770 displayed to the merchant depicting a payment page 772 for purchasing one or more commodities selected from the list of commodities 742 of FIG. 7E by the beneficiary 102a, in accordance with an

example embodiment of the present disclosure. The UI 770 is depicted to display total number of redeemable points 774. As shown in FIG. 7H, a summary of the selected one or more commodities of the beneficiary are displayed. For example, the selected one or more commodities, such as a commodity 'WHEAT' corresponding to 1 redeemable point and a commodity 'SUGAR' corresponding to 2 redeemable points are included in the summary. Further, the UI 770 is depicted to include deductible points 776. The deductible points 776 correspond to a cumulative price of the purchased one or more commodities. The merchant 114 may proceed further for the payment of the one or more commodities by clicking on confirm tab 778. When the merchant 114 confirms the payment, the deductible points 776 (*e.g.*, 4 points) is deducted from the total number of redeemable points 774 (*i.e.*, 1000 points).

[00135] Further, the beneficiary profile is updated after the deduction, which is shown in FIG. 7I.

[00136] FIG. 7I shows an example representation of a UI 780 displayed to the merchant 114 for updating the beneficiary profile 732 of FIG. 7D, in accordance with an example embodiment of the present disclosure. The UI 780 is depicted to include an updated number of redeemable points 782 and details 784 of the purchased one or more commodities. The UI 780 is further depicted to include a tab 786 for updating the beneficiary profile. The beneficiary profile 732 is updated with the updated number of redeemable point 782 and the details 784 of the purchased one or more commodities. The updated beneficiary profile is shown in UI 790 of FIG. 7J.

[00137] FIG. 7J shows an example representation of a UI 790 displayed to the merchant 114 depicting an updated beneficiary profile 792, in accordance with an example embodiment of the present disclosure. For the updated beneficiary profile 792, an updated QR code is generated. The UI 790 is further depicted to include tab 794 for generating an updated QR code corresponding to the updated beneficiary profile 792. The updated QR code is generated in a similar manner the QR code 662 of FIG. 6G is generated.

[00138] Further, the updated beneficiary profile 792 is sent to the benefit provider 106a to update existing beneficiary profile of the beneficiary 102a in the electronic device 108 (shown in FIG. 1). In one example scenario, the updated beneficiary profile 792 is

provided to the benefit provider 106a in an offline mode. The merchant 114 may send the updated beneficiary profile 792 to the benefit provider by establishing a connection between the merchant terminal 116 and the electronic device 108 using a near-field communication technique. In order to establish the connection, the benefit provider 106a may click on the button 604 of UI 600 shown in FIG. 6A and the merchant 114 may click on the button 704 of UI 700 shown in FIG. 7A. After establishing the connection, the updated beneficiary profile 792 is sent to the electronic device 108. The electronic device 108 sends an acknowledgement to the merchant terminal 116 upon receiving the updated beneficiary profile 792.

[00139] In another example scenario, the updated beneficiary profile 792 may be provided to the benefit provider in an online mode. The online mode transfer of the updated beneficiary profile 792 may be performed in presence of a network connectivity. In such scenario, the merchant 114 may trigger a connection to the server 140 via the network by clicking on the button 702 of UI 700 shown in FIG. 7A. After connecting to the server 140, the merchant terminal 116 sends the updated beneficiary profile 792 to the server 140. The server 140 stores the updated beneficiary profile 792 in the database 120 (shown in FIG. 1). The server 140 further sends the updated beneficiary profile 792 to the electronic device 108. The benefit provider 106a may trigger the button 602 of UI 600 shown in FIG. 6A, when a network connection is available. In at least an example embodiment, the server 140 may notify the benefit provider 106a about the updated beneficiary profile 792. The benefit provider 106a receives the updated beneficiary profile 792 from the server 140. The benefit provider 106a then updates existing beneficiary profile of the beneficiary 102a in the electronic device 108 based on the updated beneficiary profile 792. An acknowledgement is sent to the server 140 upon receiving the updated beneficiary profile 792. The server 140 further transfers the acknowledgment to the merchant terminal 116.

[00140] Referring back to FIG. 6A, the UI 600 includes the button 608 for generating a new QR code for the beneficiary based on a loss of a QR code of the beneficiary. When the benefit provider 106a clicks on the button 608, one or more UIs depicting the generation of the new QR code are shown in FIG. 8.

[00141] FIG. 8 shows an example representation of UIs displayed to a benefit

provider 106a for generating a new QR code for the beneficiary 102a based on a request from the beneficiary 102a, in accordance with an example embodiment of the present disclosure. For providing the new QR code, the benefit provider 106a verifies the beneficiary 102a. When the benefit provider 106a clicks on the button 608 as shown in UI 800 of FIG. 6A, the benefit provider 106a is directed to a verification page for verifying the beneficiary. As shown in UI 800, a verification page 802 is displayed to the benefit provider 106a. The beneficiary may be verified based on at least one of a biometric data, such as a fingerprint of the beneficiary or a PIN of the beneficiary. The biometric data may be provided in fingerprint input field 804. The PIN may be provided in PIN input field 806.

[00142] In UI 810, a successful verification of the beneficiary 102a is depicted. After the successful verification, the benefit provider 106a clicks on next button 812. The benefit provider 106a is directed to a beneficiary profile page 822 as shown in UI 820. The beneficiary profile 822 includes an identification data of the beneficiary, a total number of redeemable points of the beneficiary and details of one or more commodities purchased by the beneficiary 102a. After accessing the beneficiary profile 822, the benefit provider generates the new QR code by clicking on button 824. The new QR code, such as QR code 832 is depicted in UI 830. The QR code 832 is printed and provided to the beneficiary 102a.

[00143] FIG. 9 illustrates a flow diagram depicting a method 900 for conducting an offline payment transaction to provide aid in geographical locations with limited network connectivity, in accordance with an example embodiment of the present disclosure. The method 900 depicted in the flow diagram may be executed by, for example, the merchant terminal 116. Operations of the flow diagram 900, and combinations of operation in the flow diagram 900, may be implemented by, for example, hardware, firmware, a processor, circuitry and/or a different device associated with the execution of software that includes one or more computer program instructions. The operations of the method 900 are described herein may be performed by an application interface in the merchant terminal 116 that is hosted and managed with help of the server 140. The method 900 starts at operation 902.

[00144] At operation 902, the method 900 includes scanning, by a merchant terminal, a unique machine-readable code associated with a beneficiary. The unique

machine-readable code is generated in response to an enrollment of the beneficiary for a benefit program. In an example embodiment, the beneficiary is enrolled for the benefit program by a benefit provider using an identification data of the beneficiary. The benefit provider captures the identification data in an electronic device associated with the benefit provider. The identification data include at least one of a personal data of the beneficiary, a biometric data of the beneficiary, a personal identification number (PIN) or an image of the beneficiary. The benefit provider creates a beneficiary profile of the beneficiary based on the identification data. After creating the beneficiary profile, the unique machine-readable code (*i.e.*, a QR code) is generated. The QR code includes the identification data and a total number of redeemable points for the beneficiary. The QR code is printed and provided to the beneficiary. In at least an example embodiment, the QR code is printed using security printing techniques, anti-replication techniques, or the like. The steps for the enrollment of the beneficiary for the benefit program are explained in FIG. 2. The beneficiary provides the QR code to at least one merchant that support the benefit program. The merchant scans the QR code using the merchant terminal.

[00145] At operation 904, the method 900 includes determining, by the merchant terminal, a total number of redeemable points in the unique machine-readable code. The total number of redeemable points in the QR code is determined based on scanning of the QR code. In at least an embodiment, the beneficiary profile is accessed after scanning the QR code. After accessing the beneficiary profile, a list of commodities is displayed to the beneficiary by the merchant.

[00146] At operation 906, the method 900 includes facilitating, by the merchant terminal, a purchase of one or more commodities from a list of commodities provided in a benefit program using a pre-defined number of redeemable points of the total number of redeemable points needed for purchasing the one or more commodities. In at least an example embodiment, the beneficiary provides a selection of the one or more commodities from the list of commodities. The selected one or more commodities are purchased by authenticating the beneficiary based on the identification data. A pre-defined number of redeemable points is deducted from the total number of redeemable points for purchasing the selected one or more commodities. The deducted pre-defined number of redeemable points correspond to a cumulative price of the purchased one or more commodities. After

deducting the pre-defined number of redeemable points, the merchant terminal completes a payment transaction of the purchased one or more commodities. Further, the total number of redeemable points is updated based on the deducted pre-defined number of redeemable points. In at least an example embodiment, details of the purchased one or more commodities are added to the beneficiary profile. After adding the details, an updated beneficiary profile is generated. The updated beneficiary profile includes the updated total number of redeemable points and the details of the purchased one or more commodities. An updated unique machine-readable code for the beneficiary is generated based on the updated beneficiary profile. Further, the updated beneficiary profile is sent to a benefit provider of the benefit program using a short-range wireless communication technique, such as NFC, Bluetooth, WiFi, or the like.

[00147] At operation 908, the method 900 includes determining, by the merchant terminal, an updated total number of redeemable points based on deducting the pre-defined number of redeemable points from the total number of redeemable points. In at least an example embodiment, the total number of redeemable points is updated based on the deducted pre-defined number of redeemable points.

[00148] At operation 910, the method 900 includes facilitating, by the merchant terminal, printing of an updated unique machine-readable code that includes the updated total number of redeemable points for a future purchase. Herein, facilitating printing includes sending electronic commands for printing to an associated printing machine. The scanning, determining the total number of redeemable points, facilitating purchase, determining the updated number of redeemable points and facilitating printing are performed in an offline mode in which the merchant terminal is disconnected with a server managing the benefit program.

[00149] The sequence of operations of the method 900 need not be necessarily executed in the same order as they are presented. Further, one or more operations may be grouped together and performed in form of a single step, or one operation may have several sub-steps that may be performed in parallel or in sequential manner.

[00150] FIG. 10 illustrates a flow diagram depicting a method 1000 for conducting an offline payment transaction to provide aid in geographical locations with limited

network connectivity, in accordance with another example embodiment of the present disclosure. The method 1000 depicted in the flow diagram may be executed by, for example, the electronic device 108. Operations of the flow diagram 1000, and combinations of operation in the flow diagram 1000, may be implemented by, for example, hardware, firmware, a processor, circuitry and/or a different device associated with the execution of software that includes one or more computer program instructions. The operations of the method 1000 are described herein may be performed by an application interface in the electronic device 108 that is hosted and managed with help of the server 140. The method 1000 starts at operation 1002.

[00151] At operation 1002, the method 1000 includes creating a beneficiary profile of a beneficiary to enroll the beneficiary for a benefit program. The beneficiary profile is created based on an identification data of the beneficiary. The identification data includes at least one of a personal data of the beneficiary, a biometric data of the beneficiary, a personal identification number (PIN) or an image of the beneficiary. In an example scenario, a benefit provider of the benefit program captures the identification data in an electronic device associated with the benefit provider.

[00152] At operation 1004, the method 1000 includes generating a unique machine-readable code of the beneficiary. The unique machine-readable code includes the identification data of the beneficiary and a total number of redeemable points. The unique machine-readable code (*i.e.*, the QR code) is generated after creating the beneficiary profile. The QR code is printed and provided to the beneficiary. In case of losing the QR code, the beneficiary may request the benefit provider. The beneficiary may request the benefit provider to generate a new QR code based on a loss of a QR code provided to the beneficiary. Upon receiving the request, the beneficiary is verified based on the identification data of the beneficiary. The new QR code is generated upon successful verification of the beneficiary. The beneficiary is verified based on at least one of a biometric data of the beneficiary or a PIN of the beneficiary.

[00153] At operation 1006, the method 1000 includes facilitating a purchase of one or more commodities from a list of commodities provided in a benefit program using a pre-defined number of redeemable points of the total number of redeemable points needed for purchasing the one or more commodities. In an example embodiment, the beneficiary

provides the QR code to a merchant supporting the benefit program for purchasing the one or more commodities. The merchant scans the QR code using a merchant terminal to determine the total number of redeemable points. The merchant then accesses the beneficiary profile based on scanning the QR code. After accessing the beneficiary profile, the list of commodities is displayed to the beneficiary. The beneficiary provides a selection of the one or more commodities. The beneficiary is authenticated for purchasing the selected one or more commodities based on the identification data of the beneficiary. In order to purchase the selected one or more commodities, a pre-defined number of redeemable points is deducted from the total number of redeemable points. The deducted pre-defined number of redeemable points correspond to a cumulative price of the purchased one or more commodities. After the deduction, a payment transaction of the purchased one or more commodities is completed.

[00154] At operation 1008, the method 1000 includes determining an updated total number of redeemable points based on deducting the pre-defined number of redeemable points from the total number of redeemable points. The total number of redeemable points is updated based on the deducted pre-defined number of redeemable points. In at least an example embodiment, an updated beneficiary profile is generated. The updated beneficiary profile includes the updated total number of redeemable points and details of the purchased one or more commodities. An updated QR code for the beneficiary is generated based on the updated beneficiary profile. Further, the updated beneficiary profile is sent to the benefit provider using a short-range wireless communication technique, such as NFC, Bluetooth, WiFi, or the like.

[00155] At operation 1010, the method 1000 includes facilitating printing of an updated unique machine-readable code that include the updated total number of redeemable points for a future purchase. The scanning, determining the total number of redeemable points, facilitating purchase, determining the updated number of redeemable points and facilitating printing are performed in an offline mode.

[00156] The sequence of operations of the method 1000 need not be necessarily executed in the same order as they are presented. Further, one or more operations may be grouped together and performed in form of a single step, or one operation may have several sub-steps that may be performed in parallel or in sequential manner.

[00157] FIG. 11 is simplified block diagram of an overall system 1100 for facilitating an offline payment transaction to provide aid in geographical locations with limited network connectivity, in accordance with an embodiment of the present disclosure. The system 1100 is depicted to include an electronic device 1102 associated with a benefit provider and a merchant terminal 1112 associated with at least one merchant supporting the benefit program. The electronic device 1102 is an example of the electronic device 108 shown in FIG. 1 and the merchant terminal 1120 is an example of the merchant terminal 116 shown in FIG. 1. In at least one example embodiment, the electronic device 1102 communicates with the merchant terminal 1120 using a short-range wireless communication network, such as near-field communication (NFC) network 1138.

[00158] The electronic device 1102 includes at least one processor 1104 (first processor) and a memory 1106 (first memory) storing executable instructions. The electronic device 1102 further includes a database 1108, a QR code generator 1110, a verification module 1112, an input/output module 1114, a communication interface 1116 and an NFC module 1118. The components of the electronic device 1102 provided herein may not be exhaustive and that the electronic device 1102 may include more or fewer components than that of depicted in FIG. 11. Further, two or more components may be embodied in one single component, and/or one component may be configured using multiple sub-components to achieve the desired functionalities. Some components of the electronic device 1102 may be configured using hardware elements, software elements, firmware elements and/or a combination thereof.

[00159] The processor 1104 is configured to execute the executable instructions to cause the electronic device 1102 to create a beneficiary profile of a beneficiary to enroll the beneficiary for a benefit program. The beneficiary profile is created based on an identification data of the beneficiary. The identification data includes at least one of a personal data of the beneficiary, a biometric data of the beneficiary, a personal identification number (PIN) or an image of the beneficiary. In an at least an example embodiment, the identification data is captured from the beneficiary and stored in the database 1108.

[00160] The QR code generator 1110 is configured to generate a QR code for the beneficiary. The QR code includes the identification data and a total number of redeemable

points for the beneficiary. The QR code generator 1110 is also configured to generate a new QR code based on receiving a request from the beneficiary for a loss of a QR code provided by the benefit provider or the merchant. The new QR code is generated by verifying the beneficiary based on the identification data. The verification module 1112 is configured to verify the beneficiary based on at least a biometric data of the beneficiary or a PIN of the beneficiary. In one example embodiment, the beneficiary is verified based on at least the biometric data. In another example embodiment, the beneficiary is verified based on the PIN.

[00161] In an embodiment, the input/out module 1114 (hereinafter referred to as an ‘I/O module 1114’) may include mechanisms configured to receive inputs from and provide outputs to the merchant. To that effect, the I/O module 1114 may include at least one input interface and/or at least one output interface. Examples of the input interface may include, but are not limited to, a keypad, a touch screen, soft keys, a microphone, and the like. Examples of the output interface may include, but are not limited to, a display such as a light emitting diode display, a thin-film transistor (TFT) display, a liquid crystal display, an active-matrix organic light-emitting diode (AMOLED) display, a microphone, a speaker, a ringer, a vibrator, and the like.

[00162] The processor 1104 is operatively coupled to a communication interface 1116 such that electronic device 1102 is capable of communicating with a server, such as server 1200 (*e.g.*, the server 140) hosting the benefit program or communicates with any entity within the humanitarian aid network 150. Further, the electronic device 1102 is configured to connect with the merchant terminal 1120 for receiving updated beneficiary profile of the beneficiary. In an embodiment, the NFC module 1118 is configured to connect the merchant terminal 1120 using the near-field communication.

[00163] Moreover, the various components of the electronic device 1102, such as the processor 1104, the memory 1106, the database 1108, the QR code generator 1110, the verification module 1112, the input/output module 1114, the communication interface 1116 and the NFC module 1118 may be configured to communicate with each other via or through a centralized circuitry 1140. The centralized circuit system 1140 may be various devices configured to, among other things, provide or enable communication between the components (1104 - 1106) of the electronic device 1102. In certain embodiments, the

centralized circuit system 1140 may be a central printed circuit board (PCB) such as a motherboard, a main board, a system board, or a logic board. The centralized circuit system 1140 may also, or alternatively, include other printed circuit assemblies (PCAs) or communication channel media. In some embodiments, the centralized circuit system 1140 may include appropriate storage interfaces to facilitate communication among the components (1102 - 1106). Some examples of the storage interface may include, for example, an Advanced Technology Attachment (ATA) adapter, a Serial ATA (SATA) adapter, a Small Computer System Interface (SCSI) adapter, a RAID controller, a SAN adapter, a network adapter, and/or any component providing the electronic device 1102 with access to the data stored in a memory (not shown in FIG. 11).

[00164] The merchant terminal 1120 includes at least one processor 1122 (second processor) and a memory 1124 (second memory) storing executable instructions. The merchant terminal 1120 also includes a database 1126, a QR code scanner 1128, an input/output module 1130, a communication interface 1132, an authentication module 1134 and an NFC module 1136. The components of the merchant terminal 1120 provided herein may not be exhaustive and that the merchant terminal 1120 may include more or fewer components than that of depicted in FIG. 11. Further, two or more components may be embodied in one single component, and/or one component may be configured using multiple sub-components to achieve the desired functionalities. Some components of the merchant terminal 1120 may be configured using hardware elements, software elements, firmware elements and/or a combination thereof.

[00165] The processor 1122 is configured to execute the executable instructions to cause the merchant terminal 1120 to scan a QR code of the beneficiary. The QR code scanner 1128 is configured to scan the QR code of the beneficiary. The QR code scanner 1128 is also configured to determine a total number of redeemable points in the QR code. The processor 1122 is also configured to access the beneficiary profile based on the QR code. In an embodiment, the beneficiary profile is accessed from the database 1126. The processor 1122 is further configured to display a list of commodities to the beneficiary.

[00166] In an embodiment, the input/output module 1130 may include mechanisms configured to receive inputs from and provide outputs to the merchant. To that effect, the I/O module 1130 may include at least one input interface and/or at least one output

interface. Examples of the input interface may include, but are not limited to, a keypad, a touch screen, soft keys, a microphone, and the like. Examples of the output interface may include, but are not limited to, a display such as a light emitting diode display, a thin-film transistor (TFT) display, a liquid crystal display, an active-matrix organic light-emitting diode (AMOLED) display, a microphone, a speaker, a ringer, a vibrator, and the like. The processor 1122 is operatively coupled to the communication interface 1132 such that the merchant terminal 1120 is capable of communicating with a server, such as server 1200 (*e.g.*, the server 140) hosting the benefit program or communicates with any entity within the humanitarian aid network 150.

[00167] In one example scenario, the beneficiary provides a selection of one or more commodities from the list of commodities. The beneficiary is authenticated for purchasing the selected one or more commodities. In an embodiment, the authentication module 1134 is configured to authenticate the beneficiary for purchasing the selected one or more commodities based on the identification data. The processor 1122 is further configured to deduct a pre-defined number of redeemable points from the total number of redeemable points. The deducted pre-defined number of redeemable points correspond to a cumulative price of the purchased one or more commodities. The processor 1122 is configured to update the total number of redeemable points based on the deducted pre-defined number of redeemable points. The processor 1122 is also configured to generate an updated beneficiary profile. The updated beneficiary profile includes the updated total number of redeemable points and details of the purchased one or more commodities.

[00168] The processor 1122 is further configured to generate an updated QR code based on the updated beneficiary profile. The updated QR code includes the updated total number of redeemable points for a future purchase. The updated QR code is printed using a printer and the printed QR code is provided to the beneficiary. Further, the updated beneficiary profile is provided to the benefit provider. In an embodiment, the NFC module 1136 is configured to connect the merchant terminal 1122 with the electronic device 1102 using near-field communication technique.

[00169] Moreover, the various components of the merchant terminal 1120, such as the processor 1122, the memory 1124, the database 1126, the QR code scanner 1128, the input/output module 1130, the communication interface 1132, the authentication module

1134 and the NFC module 1136 may be configured to communicate with each other via or through a centralized circuitry 1142. The centralized circuit system 1142 may be various devices configured to, among other things, provide or enable communication between the components (1120 - 1142) of the merchant terminal 1120. In certain embodiments, the centralized circuit system 1142 may be a central printed circuit board (PCB) such as a motherboard, a main board, a system board, or a logic board. The centralized circuit system 1142 may also, or alternatively, include other printed circuit assemblies (PCAs) or communication channel media. In some embodiments, the centralized circuit system 1140 may include appropriate storage interfaces to facilitate communication among the components (1120 - 1142). Some examples of the storage interface may include, for example, an Advanced Technology Attachment (ATA) adapter, a Serial ATA (SATA) adapter, a Small Computer System Interface (SCSI) adapter, a RAID controller, a SAN adapter, a network adapter, and/or any component providing the merchant terminal 1120 with access to the data stored in a memory (not shown in FIG. 11).

[00170] FIG. 12 is a simplified block diagram of a server 1200 for hosting a benefit program facilitating an offline payment transaction to provide aid in geographical locations with limited network connectivity, in accordance with an embodiment of the present disclosure. The server 1200 is an example of a server (*e.g.*, the server 140) that is a part of the humanitarian aid network 150. The server 1200 includes a computer system 1202 and a database 1204. The computer system 1202 includes at least one processor 1206 configured to execute executable instructions for providing various features of the present disclosure. The executing instructions are stored in a memory 1208. The components of the computer system 1202 provided herein may not be exhaustive and that the computer system 1202 may include more or fewer components than that of depicted in FIG. 12. Further, two or more components may be embodied in one single component, and/or one component may be configured using multiple sub-components to achieve the desired functionalities. Some components of the computer system 1202 may be configured using hardware elements, software elements, firmware elements and/or a combination thereof.

[00171] The processor 1206 is configured to facilitate an offline payment transaction to provide aid in geographical locations with limited network connectivity. The processor 1206 is operatively coupled to a communication interface 1210 such that computer system

1202 is capable of communicating with a remote device 1220 such as the electronic device 1102, the merchant terminal 1120 or communicates with any entity within the humanitarian aid network 150. In an embodiment, the communication interface 1210 is configured to receive a request from the electronic device 1102 or the merchant terminal 1120 for receiving updated information, such as an updated beneficiary profile of a beneficiary. The communication may be achieved through API calls, without loss of generality.

[00172] The processor 1206 may also be operatively coupled to the database 1204. The database 1204 is any computer-operated hardware suitable for storing and/or retrieving data, such as, but not limited to, beneficiary profiles, transaction data generated as part of performing activities related to an offline payment transaction of purchasing one or more commodities by a beneficiary from a merchant supporting the benefit program. The database 1204 may include multiple storage units such as hard disks and/or solid-state disks in a redundant array of inexpensive disks (RAID) configuration. The database 1204 may include a storage area network (SAN) and/or a network attached storage (NAS) system.

[00173] In some embodiments, the database 1204 is integrated within computer system 1202. For example, the computer system 1202 may include one or more hard disk drives as the database 1204. In other embodiments, the database 1204 is external to the computer system 1202 and may be accessed by the computer system 1202 using a storage interface 1212. The storage interface 1212 is any component capable of providing the processor 1206 with access to the database 1204. The storage interface 1212 may include, for example, an Advanced Technology Attachment (ATA) adapter, a Serial ATA (SATA) adapter, a Small Computer System Interface (SCSI) adapter, a RAID controller, a SAN adapter, a network adapter, and/or any component providing processor 1206 with access to the database 1204.

[00174] FIG. 13 shows a simplified block diagram of a device 1300 for example, an electronic device capable of implementing the various embodiments of the present disclosure. The device 1300 is depicted to include one or more applications 1306. The device 1300 is an example of the electronic device 108 and the merchant terminal 116. It should be understood that the device 1300 as illustrated and hereinafter described is merely

illustrative of one type of device and should not be taken to limit the scope of the embodiments. As such, it should be appreciated that at least some of the components described below in connection with that the device 1300 may be optional and thus in an example embodiment may include more, less or different components than those described in connection with the example embodiment of the FIG. 13. As such, among other examples, the device 1300 could be any of an electronic device, for example, cellular phones, tablet computers, laptops, mobile computers, personal digital assistants (PDAs), mobile televisions, mobile digital assistants, or any combination of the aforementioned, and other types of communication or multimedia devices.

[00175] The illustrated device 1300 includes a controller or a processor 1302 (*e.g.*, a signal processor, microprocessor, ASIC, or other control and processing logic circuitry) for performing such tasks as signal coding, data processing, image processing, input/output processing, power control, and/or other functions. An operating system 304 controls the allocation and usage of the components of the device 1300 and support for one or more applications programs (*see*, applications 1306), such as an application interface in an electronic device (*e.g.*, the electronic device 108) of a benefit provider (*e.g.*, the benefit provider 106a) or an application interface in a merchant terminal (*e.g.*, the merchant terminal 116). The application interface in the electronic device 108 is used for creating a beneficiary profile of the beneficiary based an identification data of the beneficiary and generating a unique machine-readable code (*e.g.*, QR code). The application interface in the merchant terminal 116 is used for scanning the QR code, determining a total number of redeemable points in the QR code, facilitating a purchase of one or more commodities from a list of commodities provided in the benefit program, determining an updated total number of redeemable points and facilitating printing of an updated QR code. In addition to the application interface, the applications 1306 may include common mobile computing applications (*e.g.*, telephony applications, email applications, calendars, contact managers, web browsers, messaging applications such as USSD messaging or SMS messaging or SIM Tool Kit (STK) application) or any other computing application.

[00176] The illustrated device 1300 includes one or more memory components, for example, a non-removable memory 1308 and/or removable memory 1310. The non-removable memory 1308 and/or removable memory 1310 may be collectively known as

database in an embodiment. The non-removable memory 1308 can include RAM, ROM, flash memory, a hard disk, or other well-known memory storage technologies. The removable memory 1310 can include flash memory, smart cards, or a Subscriber Identity Module (SIM). The one or more memory components can be used for storing data and/or code for running the operating system 1304 and the applications 1306. The device 1300 may further include a user identity module (UIM) 1312. The UIM 1312 may be a memory device having a processor built in. The UIM 1312 may include, for example, a subscriber identity module (SIM), a universal integrated circuit card (UICC), a universal subscriber identity module (USIM), a removable user identity module (R-UIM), or any other smart card. The UIM 1312 typically stores information elements related to a mobile subscriber. The UIM 1312 in form of the SIM card is well known in Global System for Mobile Communications (GSM) communication systems, Code Division Multiple Access (CDMA) systems, or with third-generation (3G) wireless communication protocols such as Universal Mobile Telecommunications System (UMTS), CDMA9000, wideband CDMA (WCDMA) and time division-synchronous CDMA (TD-SCDMA), or with fourth-generation (4G) wireless communication protocols such as LTE (Long-Term Evolution).

[00177] The device 1300 can support one or more input devices 1320 and one or more output devices 1230. Examples of the input devices 1320 may include, but are not limited to, a touch screen / a screen 1322 (*e.g.*, capable of capturing finger tap inputs, finger gesture inputs, multi-finger tap inputs, multi-finger gesture inputs, or keystroke inputs from a virtual keyboard or keypad), a microphone 1224 (*e.g.*, capable of capturing voice input), a camera module 1326 (*e.g.*, capable of capturing still picture images and/or video images) and a physical keyboard 1328. Examples of the output devices 1330 may include, but are not limited to a speaker 1332 and a display 1334. Other possible output devices can include piezoelectric or other haptic output devices. Some devices can serve more than one input/output function. For example, the touch screen 1322 and the display 1334 can be combined into a single input/output device.

[00178] A wireless modem 1340 can be coupled to one or more antennas (not shown in the FIG. 13) and can support two-way communications between the processor 1302 and external devices, as is well understood in the art. The wireless modem 1340 is shown generically and can include, for example, a cellular modem 1242 for communicating at

long range with the mobile communication network, a Wi-Fi compatible modem 1244 for communicating at short range with an external Bluetooth-equipped device or a local wireless data network or router, and/or a Bluetooth-compatible modem 1346. The wireless modem 1340 is typically configured for communication with one or more cellular networks, such as a GSM network for data and voice communications within a single cellular network, between cellular networks, or between the device 1300 and a public switched telephone network (PSTN).

[00179] The device 1300 can further include one or more input/output ports 1350 for establishing connection with peripheral devices including a power supply 1352, one or more sensors 1354 for example, an accelerometer, a gyroscope, a compass, or an infrared proximity sensor for detecting the orientation or motion of the device 1300 and biometric sensors for scanning biometric identity of an authorized user, a transceiver 1356 (for wirelessly transmitting analog or digital signals) and/or a physical connector 1360, which can be a USB port, IEEE 1294 (FireWire) port, and/or RS-232 port. The illustrated components are not required or all-inclusive, as any of the components shown can be deleted and other components can be added.

[00180] With the application (*see*, applications 1306) and/or other software or hardware components, the device 1300 can implement the technologies described herein. In one example embodiment, the processor 1302 can cause generation of one or more UIs for creating a beneficiary profile of the beneficiary to enroll in the benefit program and generating a QR code for the beneficiary. In another example embodiment, the processor 1302 can cause generation of one or more UIs for scanning the QR code of the beneficiary, determining the total number of redeemable points in the QR code, facilitating purchase of the one or more commodities, determining an updated total number of redeemable points and facilitating printing of an updated QR code that includes the updated total number of redeemable points for a future purchase.

[00181] Without limiting the scope of the present disclosure, the one or more example embodiments disclosed herein is to provide methods and systems for offline payment transactions to provide aid in geographical locations with limited network connectivity. More specifically, the aid is provided by enrolling beneficiaries for a benefit program in an offline mode. After enrolling the beneficiaries, QR codes are generated. The

QR codes are printed on a paper using techniques, such as security printing, anti-replication techniques, or the like that prevent misuse of unused QR code by others. Moreover, an updated QR code is generated after every purchase of one or more commodities provided in the benefit program. Further, the generation of the QR codes on a paper in the offline mode enables the benefit providers to distribute the aid in a cost-effective and an efficient manner to the beneficiaries.

[00182] The disclosed methods with reference to FIGS. 1 to 13, or one or more operations of the flow diagram 900 and the flow diagram 1000 may be implemented using software including computer-executable instructions stored on one or more computer-readable media (*e.g.*, non-transitory computer-readable media, such as one or more optical media discs, volatile memory components (*e.g.*, DRAM or SRAM), or nonvolatile memory or storage components (*e.g.*, hard drives or solid-state nonvolatile memory components, such as Flash memory components) and executed on a computer (*e.g.*, any suitable computer, such as a laptop computer, net book, Web book, tablet computing device, smart phone, or other mobile computing device). Such software may be executed, for example, on a single local computer or in a network environment (*e.g.*, via the Internet, a wide-area network, a local-area network, a remote web-based server, a client-server network (such as a cloud computing network), or other such network) using one or more network computers. Additionally, any of the intermediate or final data created and used during implementation of the disclosed methods or systems may also be stored on one or more computer-readable media (*e.g.*, non-transitory computer-readable media) and are considered to be within the scope of the disclosed technology. Furthermore, any of the software-based embodiments may be uploaded, downloaded, or remotely accessed through a suitable communication means. Such suitable communication means include, for example, the Internet, the World Wide Web, an intranet, software applications, cable (including fiber optic cable), magnetic communications, electromagnetic communications (including RF, microwave, and infrared communications), electronic communications, or other such communication means.

[00183] Although the disclosure has been described with reference to specific exemplary embodiments, it is noted that various modifications and changes may be made to these embodiments without departing from the broad spirit and scope of the disclosure. For example, the various operations, blocks, etc., described herein may be enabled and

operated using hardware circuitry (for example, complementary metal oxide semiconductor (CMOS) based logic circuitry), firmware, software and/or any combination of hardware, firmware, and/or software (for example, embodied in a machine-readable medium). For example, the apparatuses and methods may be embodied using transistors, logic gates, and electrical circuits (for example, application specific integrated circuit (ASIC) circuitry and/or in Digital Signal Processor (DSP) circuitry).

[00184] Particularly, the server 1200 (*e.g.* server 140) and its various components such as the computer system 1202 and the database 1204 may be enabled using software and/or using transistors, logic gates, and electrical circuits (for example, integrated circuit circuitry such as ASIC circuitry). Various embodiments of the disclosure may include one or more computer programs stored or otherwise embodied on a computer-readable medium, wherein the computer programs are configured to cause a processor or computer to perform one or more operations. A computer-readable medium storing, embodying, or encoded with a computer program, or similar language, may be embodied as a tangible data storage device storing one or more software programs that are configured to cause a processor or computer to perform one or more operations. Such operations may be, for example, any of the steps or operations described herein. In some embodiments, the computer programs may 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), DVD (Digital Versatile Disc), BD (BLU-RAY® Disc), and semiconductor memories (such as mask ROM, PROM (programmable ROM), EPROM (erasable PROM), flash memory, RAM (random access memory), etc.). Additionally, a tangible data storage device may be embodied as one or more volatile memory devices, one or more non-volatile memory devices, and/or a combination of one or more volatile memory devices and non-volatile memory devices. In some embodiments, the computer programs 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.

[00185] Various embodiments of the disclosure, as discussed above, may be practiced with steps and/or operations in a different order, and/or with hardware elements in configurations, which are different than those which, are disclosed. Therefore, although the disclosure has been described based upon these exemplary embodiments, it is noted that certain modifications, variations, and alternative constructions may be apparent and well within the spirit and scope of the disclosure.

[00186] Although various exemplary embodiments of the disclosure are described herein in a language specific to structural features and/or methodological acts, the subject matter defined in the appended claims is not necessarily limited to the specific features or acts described above. Rather, the specific features and acts described above are disclosed as exemplary forms of implementing the claims.

CLAIMS

What is claimed is:

1. A method for conducting a cardless and offline payment transaction to provide humanitarian aid, the method comprising:

scanning, by a merchant terminal, a unique machine-readable code associated with a beneficiary, the unique machine-readable code generated in response to an enrollment of the beneficiary for a benefit program;

determining, by the merchant terminal, a total number of redeemable points in the unique machine-readable code;

facilitating, by the merchant terminal, a purchase of one or more commodities from a list of commodities provided in a benefit program using a pre-defined number of redeemable points of the total number of redeemable points needed for purchasing the one or more commodities;

determining, by the merchant terminal, an updated total number of redeemable points based on deducting the pre-defined number of redeemable points from the total number of redeemable points; and

facilitating, by the merchant terminal, printing of an updated unique machine-readable code comprising the updated total number of redeemable points for a future purchase,

wherein scanning, determining the total number of redeemable points, facilitating purchase, determining the updated number of redeemable points and facilitating printing are performed in an offline mode in which the merchant terminal is disconnected with a server managing the benefit program.

2. The method as claimed in claim 1, wherein facilitating the purchase of one or more commodities comprises:

accessing, by the merchant terminal, the beneficiary profile based on the unique machine-readable code; and

displaying, by the merchant terminal, the list of commodities to the beneficiary.

3. The method as claimed in claim 2, further comprising:
 - facilitating, by the merchant terminal, a selection of the one or more commodities by the beneficiary;
 - authenticating, by the merchant terminal, the beneficiary for purchasing the selected one or more commodities based on the identification data of the beneficiary;
 - deducting, by the merchant terminal, the pre-defined number of redeemable points from the total number of redeemable points, wherein the deducted pre-defined number of redeemable points correspond to a cumulative price of the purchased one or more commodities; and
 - updating, by the merchant terminal, the total number of redeemable points based on the deducted pre-defined number of redeemable points.
4. The method as claimed in claim 3, wherein deducting the pre-defined number of redeemable points comprises:
 - completing, by the merchant terminal, a payment transaction of the purchased one or more commodities based on the deducted pre-defined number of redeemable points.
5. The method as claimed in claim 3, wherein updating the total number of redeemable points further comprises:
 - adding, by the merchant terminal, details of the purchased one or more commodities to the beneficiary profile;
 - generating, by the merchant terminal, an updated beneficiary profile comprising the updated total number of redeemable points and the details of the purchased one or more commodities; and
 - generating, by the merchant terminal, an updated unique machine-readable code for the beneficiary based on the updated beneficiary profile.
6. The method as claimed in claim 5, further comprising:
 - sending, by the merchant terminal, the updated beneficiary profile to a benefit provider of the benefit program using a short-range wireless communication technique.
7. A method for conducting a cardless and offline payment transaction to provide aid in

geographical locations with limited network connectivity, the method comprising:

creating a beneficiary profile of a beneficiary to enroll the beneficiary for a benefit program, the beneficiary profile created based on an identification data of the beneficiary;

generating a unique machine-readable code of the beneficiary, the unique machine-readable code comprising the identification data of the beneficiary and a total number of redeemable points;

facilitating a purchase of one or more commodities from a list of commodities provided in a benefit program using a pre-defined number of redeemable points of the total number of redeemable points needed for purchasing the one or more commodities;

determining an updated total number of redeemable points based on deducting the pre-defined number of redeemable points from the total number of redeemable points; and

facilitating printing of an updated unique machine-readable code comprising the updated total number of redeemable points for a future purchase,

wherein creating the beneficiary profile, generating the unique machine-readable code, facilitating purchase, determining the updated number of redeemable points and facilitating printing are performed in an offline mode.

8. The method as claimed in claim 1, wherein the identification data comprises at least one of a personal data of the beneficiary, a biometric data of the beneficiary, a personal identification number (PIN) or an image of the beneficiary.

9. The method as claimed in claim 7, wherein facilitating the purchase of one or more commodities comprises:

accessing the beneficiary profile based on the unique machine-readable code; and displaying the list of commodities to the beneficiary.

10. The method as claimed in claim 9, further comprising:

facilitating a selection of the one or more commodities by the beneficiary;

authenticating the beneficiary for purchasing the selected one or more commodities based on the identification data of the beneficiary;

deducting the pre-defined number of redeemable points from the total number of redeemable points, wherein the deducted pre-defined number of redeemable points correspond to a cumulative price of the purchased one or more commodities; and updating the total number of redeemable points based on the deducted pre-defined number of redeemable points.

11. The method as claimed in claim 7, wherein deducting the pre-defined number of redeemable points comprises:

completing, by the merchant terminal, a payment transaction of the purchased one or more commodities based on the deducted pre-defined number of redeemable points.

12. The method as claimed in claim 10, wherein updating the total number of redeemable points further comprises:

adding details of the purchased one or more commodities to the beneficiary profile; generating an updated beneficiary profile comprising the updated total number of redeemable points and the details of the purchased one or more commodities; and generating an updated unique machine-readable code for the beneficiary based on the updated beneficiary profile.

13. The method as claimed in claim 12, further comprising:

sending the updated beneficiary profile to a benefit provider of the benefit program using a short-range wireless communication technique.

14. The method as claimed in claim 7, further comprising:

receiving a request from the beneficiary for generating a new unique machine-readable code based on a loss of the unique machine-readable code provided to the beneficiary; upon receiving the request, verifying the beneficiary based on the identification data of the beneficiary; and generating the new unique machine-readable code upon successful verification of the beneficiary.

15. The method as claimed in claim 14, wherein verifying the beneficiary based on the identification data comprises at least one of:

- verifying, by the device, the beneficiary based on a biometric data of the beneficiary;
- and
- verifying, by the device, the beneficiary based on a PIN of the beneficiary.

16. A system for conducting a cardless and offline payment transaction to provide aid in geographical locations with limited network connectivity, the system comprising:

- an electronic device associated with a benefit provider, the electronic device comprising:
 - a first memory storing executable instructions; and
 - a first processor configured to execute the executable instructions to cause the electronic device to at least perform:
 - creating a beneficiary profile of a beneficiary to enroll the beneficiary for a benefit program, the beneficiary profile created based on an identification data of the beneficiary; and
 - generating a unique machine-readable code of the beneficiary, the unique machine-readable code comprising the identification data of the beneficiary and a total number of redeemable points; and
- a merchant terminal, the merchant terminal comprising:
 - a second memory storing executable instructions; and
 - a second processor configured to execute the executable instructions to cause the merchant terminal to at least perform:
 - scanning a unique machine-readable code associated with a beneficiary, the unique machine-readable code generated in response to an enrollment of the beneficiary for a benefit program;
 - determining a total number of redeemable points in the unique machine-readable code;
 - facilitating a purchase of one or more commodities from a list of commodities provided in a benefit program using a pre-defined number of redeemable points of the total number of redeemable points needed for purchasing the one or more commodities;

determining an updated total number of redeemable points based on deducting the pre-defined number of redeemable points from the total number of redeemable points; and
facilitating printing of an updated unique machine-readable code comprising the updated total number of redeemable points for a future purchase,
wherein scanning, determining the total number of redeemable points, facilitating purchase, determining the updated number of redeemable points and facilitating printing are performed in an offline mode in which the merchant terminal is disconnected from a server managing the benefit program.

17. The system as claimed in claim 16, wherein the identification data comprises at least one of a personal data of the beneficiary, a biometric data of the beneficiary, a personal identification number (PIN) or an image of the beneficiary.

18. The system as claimed in claim 16, wherein the electronic device is further caused to at least perform:

receiving a request from the beneficiary for generating a new unique machine-readable code based on a loss of the unique machine-readable code provided to the beneficiary;
upon receiving the request, verifying the beneficiary based on the identification data of the beneficiary; and
generating the new unique machine-readable code upon successful verification of the beneficiary.

19. The system as claimed in claim 16, wherein for facilitating the purchase of one or more commodities the merchant terminal is further caused to at least perform:

accessing the beneficiary profile based on the unique machine-readable code; and
displaying the list of commodities to the beneficiary.

20. The system as claimed in claim 19, wherein the merchant terminal is further caused to at least perform:

facilitating a selection of the one or more commodities by the beneficiary;
authenticating the beneficiary for purchasing the selected one or more commodities
based on the identification data of the beneficiary;
deducting the pre-defined number of redeemable points from the total number of
redeemable points, wherein the deducted pre-defined number of redeemable points
correspond to a cumulative price of the purchased one or more commodities; and
updating the total number of redeemable points based on the deducted pre-defined
number of redeemable points.