SYSTEM AND METHOD FOR SECURELY LOADING, STORING AND TRANSMITTING MAGNETIC STRIPE DATA IN A DEVICE WORKING WITH A MOBILE WALLET SYSTEM

FIELD

The present disclosure relates to a system and a method for implementing a mobile wallet application.

BACKGROUND

Transmission of magnetic stripe data has been done primarily by swiping a magnetic stripe card against a magnetic stripe reader (MSR) to enable payment, identification (ID), and access control functions. Mobile wallet applications on smartphones and tablets have had difficulty interacting with existing merchant point of sale (POS) devices or other devices with MSRs. Contactless reader enabled POS terminals (typically using, for example, an ISO 14443 standard) are not ubiquitous to accept contactless or near field communications (NFC) payments. It would be expensive and would take time to replace the millions of merchant POS devices or door locks that only accept magnetic stripe cards, just to interact with NFC phones or other transmission means like barcodes.

In many countries, the number of contactless payment cards issued is still small compared to the number of magnetic stripe cards issued to consumers. NFC chips with contactless communication capabilities have been embedded in some mobile phones, and are used by companies, such as Google and ISIS, as digital wallets for storing secure cardholder information. These NFC chip based digital wallets can be used in contactless payment transactions with a limited number of NFC capable POS devices, but these NFC chip based digital wallets have significant limitations.

Most phones do not have an embedded NFC chip, severely limiting penetration of this mobile wallet solution to the masses. Furthermore, the process for loading a cardholder's payment credential into the NFC chip's memory is complex and expensive. In particular, loading the NFC chip's memory requires a

trusted security manager (TSM). Payment card issuers have to sign up for such a TSM service and to pay for such services.

There are various technical complexities to make the loading process work smoothly, especially when some part of the loading process fails in the middle of a chain of transmissions from the issuer to the TSM to the Internet, via mobile operators' networks to the phone, to the chip. Furthermore, not all standards have been worked out, and there are multiple competing parties making it more difficult to become ubiquitous.

SUMMARY

The present disclosure relates to devices, systems, and methods including a magnetic stripe capture, storage and transmission device for use in conjunction with a mobile wallet application to capture, store and transmit magnetic stripe card data to merchants' conventional point of sale (POS) terminals and other devices with magnetic stripe readers (MSRs) or checkout systems, in physical and virtual environments. The system provides a convenient buying experience for consumers, a secure and informative transaction for merchants, and in some cases additional data to be transmitted to the MSR for the purpose of loyalty, identification (ID), or access control.

According to a first aspect of the present invention, there is provided a system for a magnetic stripe card capture, storage and transmission device comprising: a mobile communication device; and a magnetic stripe transporter (MST) comprising a microprocessor, a first magnetic stripe reader (MSR), a magnetic field transmitter including a driver and an inductor for transmitting magnetic pulses, a memory means, an audio jack interface and a communication interface, the driver being configured to send current and signal to the inductor to generate varying magnetic fields; wherein the magnetic field transmitter is configured to transmit the magnetic pulses to a reader head of a second MSR of a merchant point of sale (POS) device or other MSR device without contact with the reader head; wherein the MST interfaces with the mobile communication device through

the audio jack interface or the communication interface; and wherein the MST is adapted to capture magnetic stripe data and store the magnetic stripe data encrypted into the memory means and to decrypt and transmit the magnetic stripe data to the second MSR.

In an embodiment, a system for securely capturing, storing and transmitting magnetic stripe payment card data includes a mobile communication device and mobile application, and a magnetic stripe transporter (MST) dongle. The MST dongle or MST includes a microprocessor, magnetic field transmitter which includes a driver and an inductor that can generate varying magnetic fields, a battery, a charging circuit, a magnetic stripe reader (MSR), a memory means or secure element, an audio jack interface, and a communication interface (for example, a USB interface, a 30pin or 9pin Apple interface, a Bluetooth interface, etc.) working in conjunction with a consumer mobile device and wallet application for capturing magnetic stripe card data, storing the data securely, and

transmitting such data to merchants' point of sale (POS) or checkout systems, in the physical and virtual environments.

Aspects and embodiments of the disclosure may include one or more features. The mobile communication device may include a mobile application that initializes the MST for use with a specific wallet account and unlocks the MST for transmission and use. The mobile communication device may be used with a payment checkout application on the mobile communication device or the Internet that interacts with the MST to accept payment card data from the MST and transmit the payment card data to a payment server for processing a transaction either as a merchant POS application or a consumer checkout application. The mobile wallet application may interact with the MST via the audio jack or other communication interface, in various modes of operation including, for example, an Initialize and Reset Mode, a Load Card Delete Card Mode, a Transmit and Use Mode, a Disconnected Transmit Mode, and a POS Card Read Mode.

In an embodiment, the MST operated in the Initialize and Reset Mode is configured to allow a user to pair and unpair/reset a specific MST with a mobile wallet account and only allow one device per account. The MST operated in the Load Card Delete Card Mode is configured to allow a user to load magnetic stripe card data by swiping the user's existing plastic magnetic stripe card on the

MSR on board the MST and store the card track data in a memory means or secure element. For payment cards, the application loads the primary account number (PAN) data of the card to an online digital wallet via the mobile wallet application. Card information can also be deleted from the memory means and the server using the application. The MST operated in the Transmit and Use Mode is configured to allow a user to select a specific payment card as a top of wallet or default card for use in transmission of the stored track data to the merchant POS system when a button is activated or pressed. In another aspect, if non-payment cards are stored in the MST, one non-payment card can be stored as the default card to transmit without authenticating to the wallet application and selecting such a card. Non-payment cards include hotel keys, door passes, or ID

and Loyalty cards that can be loaded to the MST in a separate memory means for transmission later.

The MST operated in the POS Card read Mode is configured to allow a user to swipe a payment card with the MST's MSR and transmit the card data to a POS application on the mobile communication device then to the payment server and processor. The mobile communication device may be a smartphone, a tablet, or a personal computer. The MST further includes a battery and a charging circuit. The microprocessor is configured to provide security and communications with the mobile communication device. The memory means stores payment card data securely. The MST is configured to transmit card track data to a merchant checkout application on the mobile communication device to create a card-present transaction for the merchant. The MST may also be configured to read payment cards and to transmit payment card data to the mobile communication device and associated POS application that in turn then transmits the transaction and card data to the payment servers and processors like a POS.

According to a second aspect of the present invention, there is provided a method for a magnetic stripe card capture, storage and transmission device comprising: pairing a magnetic stripe transporter (MST) with a mobile wallet account and associating a serial number of the MST to the mobile wallet account;

initializing and unlocking the MST upon receiving an authentication of the mobile wallet account; capturing magnetic stripe card data; storing the magnetic stripe card data encrypted into a memory means of the MST; decrypting the encrypted magnetic stripe card data by the MST; and generating varying magnetic fields from an indicator to transmit the decrypted magnetic stripe card data to a reader head of a first magnetic stripe reader (MSR) of a merchant point of sale (POS) or other MSR device without contact with the reader head.

In an embodiment, the disclosure features a method for securely capturing, storing and transmitting magnetic stripe card data. A magnetic stripe transporter (MST) dongle includes a microprocessor, a driver configured to send current and signal to an inductor that creates varying magnetic fields, a battery, a charging circuit, a magnetic stripe card reader, a memory means or secure element, an audio jack interface, and a communication interface (for example, a USB interface, a 30pin or 9pin Apple interface, and a Bluetooth interface, etc.) working in conjunction with a consumer mobile communication device and a wallet application or mobile application for capturing magnetic stripe card data, storing the card data securely, and transmitting such data to merchants' point of sale (POS) terminals, checkout systems, or other MSR devices, in a physical and virtual environment.

According to a third aspect of the present invention, there is provided a magnetic stripe transporter (MST) comprising: a microprocessor; a first magnetic stripe reader (MSR); a magnetic field transmitter including a driver and an inductor, the driver being configured to send current and signal to the inductor to generate varying magnetic fields; and a memory means, wherein the MST is adapted to: capture magnetic stripe data through the first MSR, encrypt the magnetic stripe data, store the magnetic stripe data as encrypted into the memory means, decrypt the magnetic stripe data, and generate the varying magnetic fields from the inductor to transmit the magnetic stripe data as decrypted from the magnetic field transmitter to a reader head of a second MSR of a merchant point of sale (POS) device or other MSR device, the magnetic field transmitter

configured to transmit the magnetic stripe data as magnetic pulses without contact with the reader head.

The systems and methods disclosed herein provide a number of advantages, for example, the magnetic card track data can be captured and stored in the MST's secure memory means directly by the user or from the server

without modification of the magnetic stripe data, to be used later with a MSR device. For payment cards, no change to the magnetic stripe data is needed as opposed to contactless or NFC track data that has special fields that must be encoded by the card issuers in order to function properly with a contactless POS. The MST may include a button that allows transmission of the magnetic card data to a POS while the MST is disconnected or detached from the mobile device.

In an embodiment, the unique paring of a MST to a specific wallet account can provide better security, and the ability to reset a MST allows un-pairing and reuse of a MST. Further, the system and method according to the disclosure provides the ability to connect to mobile communication devices via different interfaces beyond audio jack and USB. Also, the process of loading encrypted magnetic stripe track data into memory means of the MST may later be decrypted and transmitted to the MSR of the POS, or for the data to be transmitted encrypted to the mobile communication device and then routed to the payment server for decryption and processing for loading a wallet account on the server or processing a POS transaction.

The system and method according to the disclosure provides the ability to use the stored track data or swiped track data for virtual checkout environments for a more secure and lower cost transaction for merchants, and the remote loading of track data from a card issuer to the wallet server provider to the wallet application on the mobile communication device, to the SE or memory means of the MST to be used later. Still further, the system and method provides the ability to load loyalty account information along with the payment card data into discretionary fields of the track data to be read by the issuer upon a transaction, which can lead to offers and loyalty programs combined with a payment transaction.

The combined use of all of the above technologies in a seamless user experience for consumers may increase the frequency of use of mobile wallets and allow a host of applications and functionalities, such as, offers and loyalty with

consumers that make it more compelling and deliver value to the consumers and the merchants.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of devices, systems, and methods are illustrated in the figures of the accompanying drawings which are meant to be exemplary and not limiting, in which like references are intended to refer to like or corresponding parts, and in which:

FIG. 1 is a functional block diagram of an overview of a magnetic stripe transporter (MST) and a mobile communication device and merchant point of sale (POS) device;

FIG. 2 is a flow diagram of a method of operation in an Initialization and Reset Mode;

FIG. 3 is a flow diagram of a method of operation in a Load Card Delete Card Mode;

FIG. 4 is a flow diagram of a method of operation in a Transmit and Use Mode;

FIG. 5 is a flow diagram of a method of operation in a Disconnected Transmit Mode; and

FIG. 6 is a flow diagram of a method of operation in a POS Card Read Mode.

DETAILED DESCRIPTION

Detailed embodiments of devices, systems, and methods are disclosed herein, however, it is to be understood that the disclosed embodiments are merely exemplary of the devices, systems, and methods, which may be embodied in various forms. Therefore, specific functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one skilled in the art to variously employ the present disclosure.

Generally, the devices, systems, and methods disclosed herein can include, and may be implemented, within a number of different devices and computer systems, including, for example, general-purpose computing systems, server-client computing systems, consumer-merchant computing systems, mainframe computing systems, a cloud computing infrastructure, telephone computing systems, laptop computers, desktop computers, smart phones, cellular phones, personal digital assistants (PDAs), tablet computers, and other mobile devices. The devices and computing systems may have one or more databases and other storage apparatuses, servers, and additional components, for example, processors, modems, terminals and displays, computer-readable media, algorithms, modules and applications, and other computer-related components. The devices and computer systems and/or computing infrastructures are configured, programmed, and adapted to perform the functions and processes of the systems and methods as disclosed herein.

An overview of a system 10 for capturing, storing and transmitting magnetic stripe card data to a merchant's conventional point of sale (POS) according to an illustrative embodiment is described with reference to FIG. 1. The system 10 includes a magnetic stripe transporter (MST) 100 adapted to interface with a mobile communication device 200. The MST 100 and the mobile communication device 200 may communicate through respective audio jacks 102 and 202, and/or through respective communication interfaces, for example, USB ports 104 and 204, respectively, or through other communication interfaces, including but not limited to, a 30pin or 9pin Apple interface, a Bluetooth interface, and other serial interfaces. The MST 100 also interacts with a merchant POS 300 by being adapted to transmit magnetic stripe data from a magnetic field transmitter 150 that includes a driver and an inductor, to a magnetic stripe reader (MSR) 302 of the merchant POS 300.

The mobile communication device 200 includes a mobile wallet application 220 and a POS application or payment checkout application 230. The mobile wallet application 220 initializes and unlocks the MST 100. The POS or

checkout application 230 interacts with the MST 100 and accepts card payment data from the MST 100. The POS or checkout application 230 may cause the card payment data to be transmitted to a wallet server 260 via a network 170. The card payment data may then be transmitted from the wallet server 260 to a transaction processor 270.

The MST 100 includes a microprocessor 112, a light-emitting diode (LED) indicator 114, a battery 116, a charging circuit 118, a magnetic stripe reader (MSR) 106, a memory storage component or secure element 108, an audio jack interface 102 (for example, a 3.5mm or other standard audio port), a USB port/jack interface 104 or other communication interface, including but not limited to a 30pin or 9pin Apple interface, a Bluetooth interface, and other serial interfaces, and a magnetic field transmitter 150 which includes a driver and an inductor for transmitting magnetic pulses to be received by any POS device with a MSR.

Microprocessor 112 handles security and communications with the mobile communication device 200. The microprocessor 112 can also transmit and receive encrypted card data to and from the secure element 108. The magnetic field transmitter 150 transmits magnetic stripe data of a cardholder to the POS device 300 by transmitting magnetic impulses to the MSR 302. The MST 100 may also be used for reading other magnetic stripe cards by using the MSR 106 as a POS device. The MSR 106 may be used for loading payment card data onto the secure element 108 and for capturing card track data for the POS or checkout application 230 on the mobile communication device 200.

The mobile communication device 200 includes the mobile wallet application 220, the POS or payment checkout application 230, the audio jack port 202 and/or communication interface, for example, the USB port 204 or other communication interface, including but not limited to a 30pin or 9pin Apple interface, a Bluetooth interface, and other serial interfaces. The mobile communication device 200 may also include a display with key pad or touchpad display 240 and a central processing unit (CPU) 250.

Each MST 100 is initially open to be paired with a wallet account. Once the MST 100 is paired, the MST 100 may be locked and have to be unlocked to change modes and parameters on the MST 100. The MST 100 can store cardholder data by either an initial load at manufacturing, loading via a wireless communication network after setting up the wallet account, and/or by the consumer loading his/her own card(s) data directly into the MST 100 using a mobile wallet application. In general, a wallet user is a person that has setup a digital wallet account, for example, on a remote server via a cloud computing infrastructure, and has initialized a mobile wallet application on his/her mobile communication device.

The mobile wallet application 220 on the mobile communication device 200 interacts with the MST 100 in order to provide different modes of operation, for example including: an Initialize and Reset Mode, a Load Card Delete Card Mode, a Transmit and Use Mode, a Disconnected Transmit Mode, a POS Card Read Mode, and optionally other modes.

A method of operation in the Initialization and Reset Mode according to an illustrative embodiment is described with reference to FIG. 2. An MST is initialized for the first time to a wallet account by plugging in or connecting a "new" MST, or MST that has not been used before or has been "reset" and has no associated wallets and no card data in storage, to the mobile communication device, illustrated as block 400. Upon connecting the MST to the mobile communication device, the wallet application recognizes or determines the status of the MST as paired and unpaired, illustrated as block 402.

When the MST dongle has already been paired to another wallet account, the wallet application will recognize the MST as unpaired but paired to another wallet account, illustrated as block 404, and display "Dongle Cannot be Used, Paired with Another Account," illustrated as block 406. The wallet application may also report unauthorized pairings to the server, illustrated as block 408, for fraud management to prevent wallet users from using the MST inappropriately.

When the MST dongle has been paired to the appropriate wallet account, the wallet application recognizes the MST as paired, illustrated as block 410. The MST can be used or reset, illustrated as block 412. If the appropriate wallet account user desires to reset the MST and wipe clean all data in the SE, the user can access a settings section of the wallet application and select "Reset Dongle", illustrated as block 414. If the appropriate wallet account user desired not to reset the MST, the MST can be used and the process is complete, illustrated as block 416. In one aspect, any user may be allowed to reset the MST dongle from the user's respective authenticated wallet application. Once a unit has been reset, it will need to be Initialized or paired again with a wallet account, even if the same user reset the device, it would be like a clean device with new cards to be loaded.

When the MST dongle has not been paired and there is no wallet account paired to the MST, upon connecting the MST to the mobile communication device, for example, a smartphone with the wallet application thereon, the wallet application recognizes the MST as unpaired, illustrated as block 418. The wallet application may then face a determination as to whether the MST should be paired to the wallet account, illustrated as block 420. If the appropriate wallet account user does not wish to pair the MST, the process is completed, illustrated as block 416.

Alternatively, if the appropriate wallet account user desires to pair the MST, a pairing process begins. The pairing process may include capturing a serial number of the MST, illustrated as block 422, authenticating the wallet user one more time, illustrated as block 424, and correlating the MST to the wallet account, illustrated as block 426. The pairing process may also include storing the pairing information, for example, the serial number of the MST in the wallet account, illustrated as block 428, for future authentication matching each time the MST dongle is used with the wallet application to turn the MST on. In this regard, the MST can only be unlocked and used with the appropriate wallet account in the future.

A method of operation in the Load Card Delete Card Mode according to an illustrative embodiment is described with reference to FIG. 3. The MST is connected to the mobile communication device, illustrated as block 430, and the MST is recognized as paired, illustrated as block 432. Once the MST has been "paired" with the wallet account, the wallet user can use the wallet application to load his/her cards by swiping the cards on the built in magnetic stripe reader (MSR) of the MST, illustrated as block 434. The resulting data is digitized and encrypted, illustrated as block 436, and stored into the memory means or SE in the MST for use later, illustrated as block 438.

The encrypted data may also be transmitted to the mobile communication device, illustrated as block 440. The mobile wallet application may transmit the data to the wallet server, illustrated as block 442. The data may be decrypted at the wallet server and the primary account number (PAN) data, card number, expiration and name of the cardholder is stripped from the track data, illustrated as block 444.

The mobile wallet application or the wallet server may also make a determination as to whether the magnetic card is a payment card or a non-payment card, illustrated as block 445. If the magnetic card is a non-payment card the system can automatically store the track data in the memory for non-payment transmission, and allow the user to name the card and store the non-payment card in the memory means, for example on the MST, illustrated as block 447.

If the magnetic card is a payment card, for example, having a specific format recognizable to the system, the card may be detected as a payment card and the system determines if the name on the payment card matches the name of the wallet account, illustrated as block 449. If the name does not match, an error message may display "Name on card does not match account," illustrated as block 451. If the name on the payment card matches the name of the wallet account, the system may determine if the PAN number matches an existing card already stored on the server, to either create a new account or leave the existing one. If a new

card is created, the system may store the track data in a payment section of MST's secure memory encrypted as described below.

A determination may also made as to whether the stripped data matches with any previously stored cards stored in the wallet account, illustrated as block 446. When no match is found, then a new card is created in the wallet user's account on the server, illustrated as block 448. When a new card is creates, the system may also store the track data in a payment section of MST's secure memory in an encrypted state, such as shown in block 438. When a match is found, the card is identified as existing and the card is loaded, illustrated as block 450.

In an aspect, the MST has the ability to load any type of magnetic stripe card into the memory means, not just payment cards. Non-payment cards may be stored separately with less security for convenience. For example, some non-payment applications may include, cards to open doors, loyalty cards, etc. The loading of payment data vs. non-payment data may be separated into two separate fields or storage areas. In an example, payment cards may not be loaded into non-payment storage. For example, payment data may have a specific format that can be detected and may not be allowed to be loaded into the non-payment storage area. The payment cards may also require authentication with the application before being transmitted. On the other hand, default non-payment data may be transmitted without authentication.

In an aspect, another process of loading the MST is to dynamically send the magnetic stripe data from the server through the mobile device and application to the MST. This methodology enables magnetic stripe data to be transmitted from the server to the MST after authentication of the wallet user is performed so that dynamic magnetic stripe data can be transmitted to the mobile device and stored and/or transmitted. In an aspect, track data generated by the server can be dynamically loaded for payment purposes, such that a one-time use payment credential can be generated for the wallet user dynamically at the time of payment.

In another aspect, a hotel or casino room key can be to be transmitted to the user's wallet application or digital wallet and then to the MST so that the user would not have to physically check in and wait in line. The wallet user can "check in" to the hotel via an application on the user's mobile device (optionally, the mobile device location can be matched with the address of the reservation to ensure further security), then reservation server sends to the wallet server a "key" which is then transmitted to the wallet application or digital wallet and loaded on the MST's memory means for non-payment purposes. The user can press a transmit key on the MST, and transmit the magnetic stripe data stored in the MST for non-payment purposes without authenticating to the wallet application. The "key" from the hotel or magnetic stripe data may expire on the server side after a period of time so this method is relatively safe, it can be equated to forgetting to return your magnetic stripe hotel key.

In these aspects, the system has the ability to remotely load an MST from the server, allowing third parties, for example, card issuers to dynamically send payment or non-payment card data to the MST for transmission. A properly paired MST may have to be used in order to load remotely. The system can control if the magnetic stripe data is stored as payment or non-payment card data, thus the system can be used in disconnected mode in different ways. Applications of this method can include sending dynamic payment card tokens from the server for one-time payment use, and remote check-in for hotel rooms without going to the front desk.

When a new "key" or magnetic stripe card data is loaded to the MST and stored in the default non-payment card container of the memory means, then it can be used in a "Disconnected Mode," described in further detail below. When a payment card is selected by the wallet application, the specific card may be enabled for a period of time, for example, 5 minutes, and during this period of time, the non-payment default card would not be able to be transmitted by the MST. To distinguish between payment and non-payment cards, payment cards may have a special format and bank identification number (BIN) that is

recognizable, when the application detects a payment card. The BIN may be checked against the name of the account and may be stored for the user if the name matches.

In some aspects, the track data is not stored on the server, only the PAN data is stored. Multiple cards can be loaded into the memory means or SE for selection or use later and can be separated into payment and non-payment cards. In an aspect, payment cards may only be transmitted after authenticating to the wallet application and there may be a time limit after selecting the card to transmit in disconnected mode, while a non-payment card can be selected as a default card transmitted in disconnected mode without authenticating to the wallet application for convenience.

In one aspect, the name on the track data of a card swiped from a physical payment card should match the name of the wallet account in order for storing of a card to be successful for both the MST and the server side, otherwise the application may not complete the load process for that card and display an error message to the user "Error: Name on card does not match account." Once a track data is stored into the SE, the user can view the cards stored in the wallet application, and select a top of wallet card as a default card for transmission for payment and non-payment. There may also be cards stored in a cloud computing architecture via card-not-present methods that are not stored on the MST for card-present payments. However, every card stored to the MST should have an equivalent copy of PAN data only in the cloud computing infrastructure and those cards may have to be separately deleted from the cloud computing infrastructure via the application or Web/Internet. Resetting the MST does not wipe out card data in the cloud computing infrastructure. Duplicated cards that have the same PAN data will not show up as a different card, in order words, if a user already entered a card number in his/her wallet account in the cloud computing infrastructure remotely, and later he/she swipes the same card to load into the MST for physical use, the card in the cloud computing infrastructure would remain and not need to be replicated if the PAN data is the same.

Once cards are loaded on the MST, they can be selected by the wallet application. Selected cards can also be deleted from the MST's memory and from the application.

In yet other aspects, the wallet account may enable the loading of encrypted track data onto the secure memory means or SE of the MST directly from the wallet server such that an issuer can choose to create a card account for a wallet user and then load the SE as a top of wallet card with the track data via the wallet application communicated from the wallet server to the mobile communication device and to the MST. This is a type of remote loading of track data to a wallet user's MST for physical acceptance use. For example, the issuer of a card can be a payment card provider, such as, a credit card provider or bank, or a non-payment card provider, such as, an issuing a hotel card, a door pass, or a loyalty card. The payment card can be a standard payment card or it can be a one-time-use payment card such that the card number is a token that references an actual payment card account on the issuer's server. This can provide more security even if the token becomes compromised or copied, because the number can only be used one time.

Once magnetic card track data is loaded onto the MST, the wallet application may also be configured to capture an image of the front and/or back of the card using a camera of the mobile device, and allow the user to select the cards in his/her MST to be used for transmission. Cards selected in the application can also be deleted using the wallet application, and erased from the memory means. The wallet application can also be used to capture identification cards of the wallet users to show merchants forms of identification with a touch of a button in the wallet application.

A method of operation in the Transmit & Use Mode according to an illustrative embodiment is described with reference to FIG. 4. The transaction with a POS begins in block 452. For POS face-to-face transactions, the encrypted track data stored in the memory means or SE can be decrypted by the MST, illustrated as block 454, and then transmitted to the POS, illustrated as block 456.

The POS may also transmit the data to the transaction processor, illustrated as block 458.

For remote transactions, the encrypted track data can be transmitted to the mobile communication device's checkout application, illustrated as block 460. The checkout application may then transmit the data to the payment server, illustrated as block 462. This data can only be decrypted by the corresponding payment server upon checkout, illustrated as block 464, and is not useful otherwise to the mobile application or anyone intercepting such data during transmission over the wireless or wired Internet network or other communication network. The payment server may also transmit the decrypted data to the transaction processor, illustrated as block 466.

A method of operation in the Disconnected Transmit Mode according to an illustrative embodiment is described with reference to FIG. 5. A wallet user logs into his/her wallet application with the MST connected, for example, via the audio jack or other communication interface, illustrated as block 468. Assuming a card or multiple cards are loaded securely into the SE / secure memory, if more than one card is loaded, the user can change the default / top of wallet card to be used to transmit to a POS when the MST unit is turned on. In one aspect, a specific card may be "Selected" first. The "Selected Card" on the MST can then be transmitted to the POS by pressing the "Transmit" button in the wallet application with the MST dongle plugged in, or by pressing a transmit button on the MST itself, illustrated s block, 470, within a specified period of time before the MST no-longer will allow the transmission of a payment card. Upon the transmission attempting to complete, the LED indicator may flash a light, for example a green light, for about 500ms or other amount of time as desired, illustrated as block 472. For non-payment cards stored in the MST, whenever the payment card is not overriding the default card position, the default non-payment card is available to be transmitted by simply pressing the button on the MST and the LED indicator indicates transmission taking place.

If the MST is authenticated by the wallet application enabled in the default Transmit Mode, and the MST is unplugged from the mobile communication device, illustrated as block 474, then the dongle would stay ON and remain unlocked for up to about 4 minutes or longer, illustrated as block 476. This allows the MST dongle to be transported and used by a merchant or the user to complete the transmission of the card data when the MST is in proximity of the POS by pressing the button on the MST during this period, illustrated as block 478, after which the dongle may shut down and have to be turned on and unlocked again by the wallet application. This feature is useful for many restaurants where cards must be taken back to a POS system away from the dining table. This feature allows a waiter to simply take only the MST dongle and move to the POS during the 4 minutes while the unit is on, without needing to take the consumer's mobile communication device along with the MST dongle.

In an aspect, track data can be either stored in the memory means upon manufacturing, loaded by the server remotely, loaded by the consumer by converting his/her magnetic stripe track data into contactless track data if needed via the wallet application using a special procedure, or stored directly as is into the memory means or SE of the MST for use later.

A method of operation in the POS Card Read Mode according to an illustrative embodiment is described with reference to FIG. 6. This mode allows the MST's magnetic stripe reader (MSR) to not only load cards, but also act as a POS by reading and encrypting any magnetic stripe cards used with a POS application on the mobile device to accept payments like any merchant POS application. The user may swipe a magnetic card on the MSR of the MST, illustrated as block 480. The MST reads and encrypts the data on the card, illustrated as block 482. The data may be transmitted to the POS application on the mobile communication device, illustrated as block 484, which can then transmit the data to the payment server, illustrated as block 486. The payment serve may also transmit data to the transaction processor for processing of the payment, illustrated as block 488.

The devices, systems, and methods disclosed herein provide for the magnetic card track data to be captured and stored in the MST's secure memory means directly by the user without modification, and to be used later with a POS or other MSR device unlike contactless or NFC track data that has special fields that must be encoded by the card issuers in order to work with a contactless POS. The MST includes a button that allows transmission of the magnetic card data to a POS while the MST is disconnected or detached from the mobile device, and an LED indicator activates when the MST is properly transmitting. The unique paring of a MST to a specific wallet account such that the MST can be only used with that account for track data storage and transmission use provides better security, and the ability to reset a MST allows unpairing and reuse of a MST. The MST is capable of connecting to mobile communication devices via different interfaces beyond audio jack and USB connections. The devices, systems, and methods allow for the loading of encrypted magnetic stripe track data into the memory means of the MST that can later be decrypted and transmitted to the POS, or can be transmitted encrypted to the mobile communication device and then routed to the payment server for decryption and processing for loading a wallet account on the server or processing a POS transaction. The devices, systems, and methods provide for the ability to use the stored track data or swiped track data for virtual checkout environments for a more secure and lower cost transaction for merchants. The devices, systems, and methods provide for the remote loading and transmission of track data from a card issuer to the wallet server provider, to the wallet application on the mobile communication device, and to the SE or memory means of the MST for later use. The devices, systems, and methods also provide for the ability to load loyalty account information along with the payment card data into one or more discretionary fields of the track data to be read by the issuer during or after a transaction, which can lead to offers and loyalty programs combined with a payment transaction.

The mobile communication device may be a laptop computer, a cellular phone, a personal digital assistant (PDA), a tablet computer, and other mobile

devices of the type. Communications between components and/or devices in the systems and methods disclosed herein may be unidirectional or bidirectional electronic communication through a wired or wireless configuration or network. For example, one component or device may be wired or networked wirelessly directly or indirectly, through a third party intermediary, over the Internet, or otherwise with another component or device to enable communication between the components or devices. Examples of wireless communications include, but are not limited to, radio frequency (RF), infrared, Bluetooth, wireless local area network (WLAN) (such as WiFi), or wireless network radio, such as a radio capable of communication with a wireless communication network such as a Long Term Evolution (LTE) network, WiMAX network, 3G network, 4G network, and other communication networks of the type.

Although the devices, systems, and methods have been described and illustrated in connection with certain embodiments, many variations and modifications will be evident to those skilled in the art and may be made without departing from the spirit and scope of the disclosure. The discourse is thus not to be limited to the precise details of methodology or construction set forth above as such variations and modification are intended to be included within the scope of the disclosure.

CLAIMS

What is claimed is:

1. A system for a magnetic stripe card capture, storage and transmission device comprising:

a mobile communication device; and

a magnetic stripe transporter (MST) comprising a microprocessor, a first magnetic stripe reader (MSR), a magnetic field transmitter including a driver and an inductor for transmitting magnetic pulses, a memory means, an audio jack interface and a communication interface, the driver being configured to send current and signal to the inductor to generate varying magnetic fields;

wherein the magnetic field transmitter is configured to transmit the magnetic pulses to a reader head of a second MSR of a merchant point of sale (POS) device or other MSR device without contact with the reader head;

wherein the MST interfaces with the mobile communication device through the audio jack interface or the communication interface; and

wherein the MST is adapted to capture magnetic stripe data and store the magnetic stripe data encrypted into the memory means and to decrypt and transmit the magnetic stripe data to the second MSR.

2. The system of claim 1, wherein the mobile communication device comprises a mobile wallet application and a valid mobile wallet account that initializes and unlocks the MST upon authentication of the mobile wallet account, wherein the MST can only operate with one valid mobile wallet account at a time.

3. The system of claim 2, wherein the magnetic stripe data is payment card data and the mobile communication device further comprises a payment POS or checkout application that interacts with the MST and accepts the payment card data from the MST.

4. The system of claim 2, wherein the mobile wallet application interacts with the MST to provide modes of operation including at least one of an

Initialization and Reset Mode, a Load Card Delete Card Mode, a Transmit & Use Mode, a Disconnected Transmit Mode, and a POS Card Reader Mode.

5. The system of claim 4, wherein the MST operated in the Initialization Reset Mode is configured to allow a user to pair a new or reset the MST to a valid mobile wallet account through the wallet application, and associate a serial number of the MST to the specific valid mobile wallet account such that a paired MST can only be accessed or used with the specific valid mobile wallet account it is paired with.

6. The system of claim 4, wherein the MST operated in the Load Card Delete Card Mode is configured to allow a user to swipe a card on the MSR of the MST, convert card data into encrypted card track data to be stored to the memory means on the MST, wherein the encrypted card track data is also transmitted to a wallet server via the mobile communication device and wallet application such that the server can decrypt the card track data and match the card track data to a name of the mobile wallet account.

7. The system of claim 4, wherein the MST is configured to allow a card issuer and wallet application provider to load an encrypted or non-encrypted card track data to the memory means on the MST remotely from a server.

8. The system of claim 7, wherein the MST is configured to allow a wallet application provider to load loyalty account information with magnetic stripe data in a discretionary field of the track data, to be read by the card issuer upon completion of a transaction.

9. The system of claim 4, wherein the MST operated in the Transmit and Use Mode is configured to allow a user to select a specific payment card or non-payment card stored in the MST as a default card to transmit, and to change the default card.

10. The system of claim 4, wherein the MST operated in the Disconnected Transmit Mode is configured to allow a user to unlock the MST after authentication of the wallet application to the MST and allow the MST to be unplugged or disconnected from the mobile communication device and remain on for a predefined period of time to transmit a default payment card stored on the MST to the second MSR of the merchant POS device or other MSR device in response to a pressing of a button on the MST.

11. The system of claim 4, wherein the MST operated in the Disconnected Transmit Mode is configured to allow magnetic stripe data to be transmitted by enabling a default card to be transmitted without first authenticating to the wallet account.

12. The system of claim 1, wherein the mobile communication device is one of a smartphone, a tablet, and a personal computer.

13. The system of claim 1, wherein the MST further comprises:

a battery; and

a light-emitting diode (LED) indicator adapted to illuminate upon a transmission and indicate a battery capacity of the battery.

14. The system of claim 1, wherein the MST stores payment card track data in a secure memory means or secure element that can be either on the MST or on the mobile communication device.

15. The system of claim 14, wherein the MST is configured to read a magnetic payment card's track data and to transmit the payment card track data to a POS application on the mobile communication device to be transmitted to a payment server for decryption and processing with merchant account information.

16. A method for a magnetic stripe card capture, storage and transmission device comprising:

pairing a magnetic stripe transporter (MST) with a mobile wallet account and associating a serial number of the MST to the mobile wallet account;

initializing and unlocking the MST upon receiving an authentication of the mobile wallet account;

capturing magnetic stripe card data;

storing the magnetic stripe card data encrypted into a memory means of the MST;

decrypting the encrypted magnetic stripe card data by the MST; and

generating varying magnetic fields from an inductor to transmit the decrypted magnetic stripe card data to a reader head of a first magnetic stripe reader (MSR) of a merchant point of sale (POS) or other MSR device without contact with the reader head.

17. The method of claim 16, further comprising pairing the MST with the mobile wallet account, and associating a serial number of the MST to the mobile wallet account.

18. The method of claim 16, further comprising allowing a user to reset the MST.

19. The method of claim 16, further comprising:

allowing a user to swipe a card on a second magnetic stripe reader (MSR) of the MST;

converting data on the card into encrypted card track data;

storing the encrypted card track data to a secure memory means of the MST; and

transmitting the encrypted card track data to a wallet server via a mobile communication device such that the wallet server can decrypt the encrypted card track data and match the card track data to a name of the mobile wallet account.

20. The method of claim 16, further comprising allowing a user to select a specific payment card stored in the MST as a default card to transmit in a connected or disconnected mode.

21. The method of claim 16, further comprising:

allowing a user to unlock the MST after authentication of a wallet application to the MST; and

allowing the MST to be disconnected from a mobile communication device and remain on to allow a user or a merchant to transmit a default card on the MST to the first MSR of the merchant POS system upon activation of a button on the MST.

22. A magnetic stripe transporter (MST) comprising:

a microprocessor;

a first magnetic stripe reader (MSR);

a magnetic field transmitter including a driver and an inductor, the driver being configured to send current and signal to the inductor to generate varying magnetic fields; and

a memory means,

wherein the MST is adapted to:

capture magnetic stripe data through the first MSR,

encrypt the magnetic stripe data,

store the magnetic stripe data as encrypted into the memory means,

decrypt the magnetic stripe data, and

generate the varying magnetic fields from the inductor to transmit the magnetic stripe data as decrypted from the magnetic field transmitter to a reader head of a second MSR of a merchant point of sale (POS) device or other MSR device, the magnetic field transmitter configured to transmit the magnetic stripe data as magnetic pulses without contact with the reader head.

23. The MST of claim 22, further comprising:

at least one of an audio jack interface and a communication interface,

wherein the MST is adapted to interface with a mobile communication device through the audio jack interface or the communication interface.