

account number search will locate the relevant phone number designated to handle authorization request messages for the account.

[0037] To provide a notification of the pending transaction and to request a confirmation of the transaction directly from a user of the assigned mobile device, the message generating program 230 on the server 122 is used to generate an authorization request message based on the information contained in the transaction request in block 350. The authorization request message may be in a form of a text message containing one or more of the following information: (i) the transaction ID, (ii) the date of the transaction, (iii) the purchase description, (iv) the purchase amount, (v) the name of the merchant, and (vi) the location of the merchant. Then in block 360, the server 122 transmits the authorization request message to the phone number of the mobile device assigned to the requesting account via a wireless network 128.

[0038] Once the authorization request message has been received by the mobile device in block 370, the user of the mobile device 130 can use the text messaging program 132 to access the authorization request message to verify the transaction information. The text messaging program 132 executed on the mobile device 130 may prompt the user to input a response (e.g., approval or denial of the transaction) by pressing designated buttons on the mobile device. Based on the user's input, the text messaging program 132 generates a reply message which includes information regarding whether or not the user of the mobile device approves the transaction. In addition, the reply message may also contain (i) the transaction ID included in the original authorization request message, and (ii) other information pertaining to the transaction, such as the description of the purchase, purchase amount, date of the purchase and name of the merchant.

[0039] In block 380, the reply message generated by the mobile device is transmitted to the server 122. When the reply message is received by the server 122, the message analyzing program 240 on the server 122 is used to determine its validity and to determine if the requested transaction is approved or denied by the mobile device user. In block 390, if the reply message approves the transaction, the system 120 will send an authorization granted message to the online merchant server 114 via the payment server 118 indicating that the merchant is authorized to accept this credit card transaction. Otherwise if the reply message denies the transaction, the system 120 is configured to send an authorization denied message instructing that the payment server 118 and the merchant 114 to deny this credit card transaction. In addition, whenever a reply message denying a transaction is received by the server 122, the card provider may immediately suspend the corresponding credit card account to prevent any further fraudulent use.

[0040] By utilizing a reply message received from a mobile device assigned by an authorized cardholder, the number of fraudulent use of the credit card can be significantly reduced since fabricating such reply message by a fraudulent user from the same mobile device phone number may be difficult, if not impossible, without actually possessing the mobile device itself. Typically, fraudulent use of a credit card occurs when the credit card is lost, stolen or the account number is compromised. The transaction processing system 120 according to embodiments of the present inven-

tion requires that a person attempting to make an unauthorized charge to possess both the credit card and the mobile device of the authorized cardholder. Since most people know immediately when they have lost their mobile devices, the mobile device designated for transmitting an authorization reply message will not be readily available to a thief who has possession of either the physical credit card or the account number of a credit card. Furthermore, because the reply message serves to authenticate the card user, it may not be necessary to verify the identity of the card user during each sales transaction, for example, by checking picture identification and/or comparing the purchaser's signature. This may advantageously save time for the card user and the merchant.

[0041] FIG. 4 shows general operations involved in validating and analyzing reply messages received from mobile devices according to an embodiment of the present invention. During the processing of each individual transaction request, a transaction ID may be assigned to each respective transaction request by the transaction processing system 120 for the purpose of identifying each individual transaction request. In one embodiment, the transaction ID assigned to each respective transaction request is used to identify authorization request messages sent to mobile devices and the same transaction ID is used to identify reply messages returned from the mobile devices.

[0042] In block 405, a transaction ID is assigned to a transaction request before an authorization request message is generated. In block 410, the message generating program 230 on the server 122 is used to generate an authorization request message which includes the transaction ID. Once the authorization request message has been generated, the server 122 sends the message with the transaction ID to the mobile device associated with the requesting account in block 415. In response to the authorization request message, the user of the mobile device may use a software program on the mobile device to generate a reply message, which automatically includes in the reply message the same transaction ID included in the corresponding authorization request message in block 420.

[0043] The reply message is sent to the transaction authorization server 122 and the server 122 uses the message analyzing program 240 to determine the transaction ID included in the reply message in block 435. At the same time, the server 122 determines the phone number of the mobile device that sent the reply message in block 440. Based on the information determined in 435 and 440, the message analyzing program 240 determines if the reply message has been returned by the intended mobile device. More specifically, the message analyzing program 240 determines if the transaction ID specified in the reply message properly corresponds with the phone number of the mobile device sending the reply message in block 445.

[0044] This may be accomplished, in one embodiment, by accessing the pending transaction database 123 which includes records of pending transaction requests. Each pending transaction record includes, among other things, the transaction ID assigned to each transaction request and the phone number of the mobile device designated to receive the authorization reply message. Accordingly, the message analyzing program can determine if the proper mobile device sent the reply message by comparing the phone number of