An Approach For Grid Based Authentication Mechanism To Counter Cyber Frauds With Reference To Credit Card Payments

By Nayani Sateesh

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I. Introduction

With the growth of internet technologies, the entire world become a global village with resources are being connected together even though they are geographically dispersed. By a single mouse click, we can access and make use of resources and services available over the Internet. Being cheap and an efficient medium to communicate and share the services, internet is becoming more popular in the modern economy, especially with reference to e-commerce. The following table shows various online payment systems. According to Sumanjeet (2008) credit card is most popular method of payments.

Table 1.1: E-Commerce Payments

E-Commerce Payment Systems	Percentage	Rank
Credit Card	35	1
Debit Card (Smart Card)	26.5	2
Cash on Delivery	23.5	3
Bank Transfer	9	4
Money Transfer	5	5
Postal Transfer	1	6
Prepaid Card	0	0
Payment Through Convenience Store	0	0
Total	100	0

The usage of the credit cards is increasing from the consumer perspective day by day at because of its easiness in online payments and the feature "buy now pay later".

II. Traditional credit card processing

Here let us have look at the way the credit cards working mechanism

Step 1: The merchant submits a credit card transaction to the Authorize.Net Payment Gateway on behalf of a customer via secure Web site connection, retail store, MOTO center or wireless device.

Step 2: Authorize.Net receives the secure transaction information and passes it via a secure connection to the Merchant Bank's Processor.

Step 3: The Merchant Bank's Processor submits the transaction to the Credit Card Network (a system of financial entities that communicate to manage the processing, clearing, and settlement of credit card transactions).

Step 4: The Credit Card Network routes the transaction to the Customer's Credit Card Issuing Bank.

Step 5: The Customer's Credit Card Issuing Bank approves or declines the transaction based on the customer's authentication credentials and available funds and passes the transaction results back to the Credit Card Network.

Step 6: The Credit Card Network relays the transaction results to the Merchant Bank's Processor.

Step 7: The Merchant Bank's Processor relays the transaction results to Authorize.Net.

Step 8: Authorize.Net stores the transaction results and sends them to the customer and/or the merchant. This step completes the authorization process – all in about three seconds or less!

Step 9: The Customer's Credit Card Issuing Bank sends the appropriate funds for the transaction to the Credit Card Network, which passes the funds to the Merchant's Bank. The bank then deposits the funds into the merchant's bank account. This step is known as the settlement process and typically the transaction funds are deposited into your primary bank account within two to four business days.
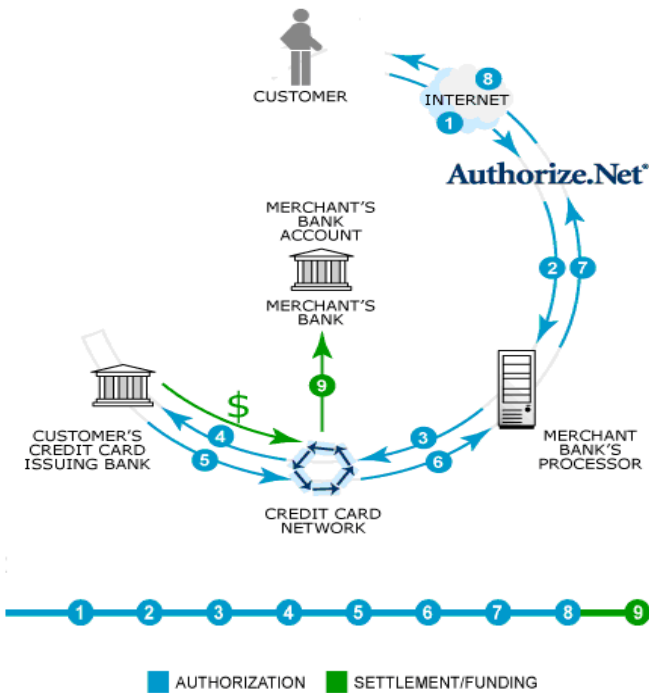
Fig: 2.1 Credit Card Process

III. RELATED WORK

As the credit cards usage is increasing, the frauds are also taking place on the other side. Credit card frauds are detected so far using Neural Network methods, Hidden Markov Model etc. All these methods work based on the unusual patterns in payments. They are all the post methods which help to detect and then take the measures on the fraud that is occurred. But we need a system that helps in preventing the fraud at the initial stage itself such that the fraud could not take part. Here let us have a look at our proposed system in the following section.

IV. PROPOSED GIRD MERCHANT PROCESSING

Step 1: The customer submits his/her credit card credentials along with the respective Grid Characters on the grid card associated with the credit card. Grid card contains the alphabets associated with the numeric numbers printed on it. These grid codes are generated randomly by the user interface application through which the customer is connecting to the Payment Gateway via secure internet connection
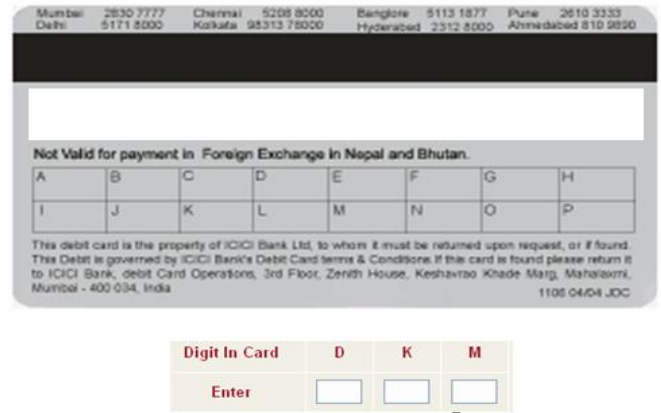

Fig: 4.1 : Grid Card

Where Grid Codes Like A = 12, B= 49, C = 89 ……..

Step 2: Authorize.Net receives the secure transaction information along with the Grid codes and passes it via a secure connection to the Merchant Bank's Processor.

Step 3: The Merchant Bank's Processor submits the transaction to the Credit Card Network (a system of financial entities that communicate to manage the processing, clearing, and settlement of credit card transactions).

Step 4: The Credit Card Network routes the transaction to the Customer's Credit Card Issuing Bank.

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Step 8: Authorize.Net stores the transaction results and sends them to the customer and/or the merchant. This step completes the authorization process – all in about three seconds or less!

Step 9: *once the Customer is authenticated* The Customer's Credit Card Issuing Bank sends the appropriate funds for the transaction to the Credit Card Network, which passes the funds to the Merchant's Bank. The bank then deposits the funds into the merchant's bank account. This step is known as the settlement process and typically the transaction funds are deposited into your primary bank account within two to four business days.
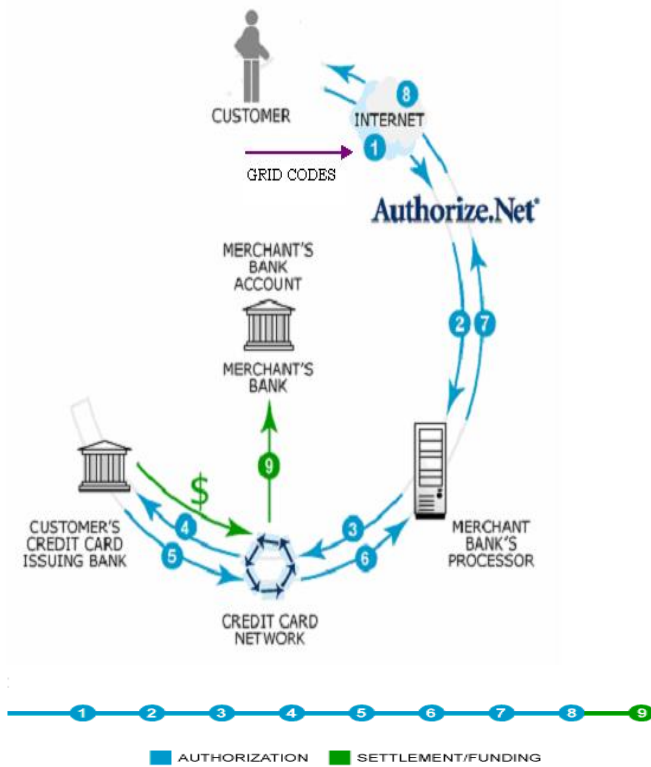
Fig: 4.2 Grid Based Credit Card Process

V. Conclusion

In Grid Based approach each credit card is associated with a Grid Card. Without the Grid Card, no one can do the online payments incase of credit card theft or lost. It helps in get ride of the credit card fraud.

VI. Limitations

Grid Based system requires the existing traditional Credit card process applications to be enhanced and revised. Every Credit card should have an associated Grid card which makes the user inconvenience at the initial stage while doing the online payments but it helps in get ride of the credit card frauds. If both the credit card and Grid card are lost then there is a chance for the credit card frauds and this process is slow

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