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Merchandise Returns predictability

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“Merchandise Returns predictability”

VISA

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TECHNICAL FIELD

[0001] The present disclosure pertains to the field of payment processing and predictive modelling for merchandise returns in the context of payment transactions. More specifically, it focuses on developing a model that offers predictability scores for merchandise returns, allowing merchants and acquirers to make informed decisions about the clearing of transactions. This innovative solution leverages historical data and employs linear regression to predict potential merchandise returns, potentially saving costs and resources for the merchant and acquirer.

BACKGROUND

[0002] In the contemporary landscape of financial transactions, contactless payment systems have become increasingly prevalent, offering users the convenience of quick and secure payments without the need for physical cash or traditional payment cards. However, these systems are not without their limitations, which primarily revolve around their dependence on a user's personal device, such as a smartphone or smartwatch, for both user identification and payment authorization.

[0003] In the dynamic landscape of payment processing, predicting merchandise returns has become a crucial concern for both merchants and acquirers. The efficient handling of transactions and the management of potential returns are of paramount importance in optimizing costs and resources within the payment ecosystem.

[0004] Traditionally, payment transactions involve a sequence of steps, from the point of sale to the clearing and settlement process. The clearing process, in particular, is a crucial element that entails evaluating, validating, and delivering transactions to the intended recipients. However, this process comes at a significant cost, involving fees for data processing carried out by the payment network as well as for the Clients.

[0005] A notable challenge faced by merchants and acquirers is the uncertainty of whether a completed transaction will result in a merchandise return. In cases where goods or services are returned, merchants and acquirers may still be liable for fees associated with the authorization and clearing of the original transaction, leading to financial inefficiencies.

[0006] The present disclosure addresses the need for a predictive model that can provide a "return range" score providing the possibility of a merchandise returns of the Original transaction. The primary objective is to leverage historical data to forecast the likelihood of a return for a given Original transaction, allowing merchants and acquirers to make more informed decisions about whether to proceed with the clearing process.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The accompanying drawings, which are incorporated in and constitute a part of this disclosure, illustrate exemplary embodiments and, together with the description, explain the disclosed principles. In the figures, the left-most digit(s) of a reference number identifies the figure in which the reference number first appears. The same numbers are used throughout the figures to reference features and components. Some embodiments of device or system and or methods in accordance with embodiments of the present subject matter are now described, by way of example only, and with reference to the accompanying figures, in which:

[0008] **Fig. 1** illustrates the existing method of the processing of the clearing sales draft.

[0009] **Fig. 2** illustrates an implementation of the present disclosure after which clearing sales draft can be either delayed or discarded, in accordance with an embodiment of the present disclosure.

[0010] **Fig. 3** demonstrates a table that shows sample data that illustrates the concept of the new Return Score model.

[0011] **Fig. 4** demonstrates a table that shows sample data that illustrates the range of score.

[0012] The figures depict embodiments of the disclosure for purposes of illustration only. One skilled in the art will readily recognize from the following description that alternative embodiments of the structures and methods illustrated herein may be employed without departing from the principles of the disclosure described herein.

DESCRIPTION OF THE DISCLOSURE

[0013] It is to be understood that the present disclosure may assume various alternative variations and step sequences, except where expressly specified to the contrary. It is also to

be understood that the specific devices and processes illustrated in the attached drawings and described in the following specification are simply exemplary and non-limiting embodiments or aspects. Hence, specific dimensions and other physical characteristics related to the embodiments or aspects disclosed herein are not to be considered as limiting.

[0014] In the present document, the word “exemplary” is used herein to mean “serving as an example, instance, or illustration.” Any embodiment or implementation of the present subject matter described herein as “exemplary” is not necessarily to be construed as preferred or advantageous over other embodiments.

[0015] While the disclosure is susceptible to various modifications and alternative forms, specific embodiment thereof has been shown by way of example in the drawings and will be described in detail below. It should be understood, however that it is not intended to limit the disclosure to the particular forms disclosed, but on the contrary, the disclosure is to cover all modifications, equivalents, and alternative falling within the spirit and the scope of the disclosure.

[0016] The terms “comprises”, “comprising”, or any other variations thereof, are intended to cover a non-exclusive inclusion, such that a setup, device, or method that comprises a list of components or steps does not include only those components or steps but may include other components or steps not expressly listed or inherent to such setup or device or method. In other words, one or more elements in a device or system or apparatus preceded by “comprises... a” does not, without more constraints, preclude the existence of other elements or additional elements in the device or system or apparatus.

[0017] The terms “an embodiment”, “embodiment”, “embodiments”, “the embodiment”, “the embodiments”, “one or more embodiments”, “some embodiments”, and “one embodiment” mean “one or more (but not all) embodiments of the invention(s)” unless expressly specified otherwise.

[0018] The terms “including”, “comprising”, “having” and variations thereof mean “including but not limited to” unless expressly specified otherwise.

[0019] In the following detailed description of the embodiments of the disclosure, reference is made to the accompanying drawings that form a part hereof, and which are shown by way of illustration-specific embodiments in which the disclosure may be practised. These

embodiments are described in sufficient detail to enable those skilled in the art to practice the disclosure, and it is to be understood that other embodiments may be utilized and that changes may be made without departing from the scope of the present disclosure. The following description is, therefore, not to be taken in a limiting sense.

[0020] The present disclosure presents a model that provides a predictability score (return range) for the merchandise returns. The objective here is to leverage the historical data and predict if there will be a return (return range) for the original purchase made by a unique consumer and even further refine the data to capture the behavioral predictions for any customer who may return a good or service.

[0021] Clearing is the process of evaluating, validating and delivering the transactions to the clients. This process is a batch process including but not limited to the scenarios when the acceptance side is the Dual endpoints to a Single endpoint as receiver or acceptance being Dual to dual Issuance.

[0022] Clearing is an expensive process. It involves fees for data processing performed by the network. *When goods or services are returned*, merchants or acquirers still need to pay the fees incurred from the authorization fees and charges. Also, Merchants or Acquirers need to pay the data processing fees associated to the Clearing process for the return transactions.

[0023] **Fig. 1** demonstrates the existing method wherein an Acquirer(dual) sends an authorization message to the organization-network's Authorization switch. The Switch processes it, validates it and sends the message to the Issuer for Approval. Once it is approved, the switch sends the Authorization response which then is converted to Clearing by the Acquirers. The acquirer then sends the clearing draft to the organization-network for Clearing.

[0024] In an embodiment of the present disclosure as shown in **Fig. 2**, the Authorization switch may intercept the message, apply the new model and while building the response to the Acquirer, provide the return range score. The Merchant or Acquirer then may use the return range score and decide not to forward the Clearing message.

[0025] In an embodiment of the present disclosure, the method involves the collection of historical data (independent elements and dependent elements) influential in driving the range score model.

[0026] In an embodiment of the present disclosure, the primary data source is the Data platform warehouse that hosts the Merchandise returns and the original purchase. The model of the present disclosure may be engineered around customer attributes including but not limited to age, mode of payment etc, the product attributes including but not limited to Item ID, Amount etc. and the attributes of the merchant. The data may then be organized such that data of entities with repeat transactions is included. A score or a range of scores may then be returned. Decisions may be taken based on the scoring and predictions. This information including the range-score, may then be provided to the Acquirers or Merchants.

[0027] The embodiments of the present disclosure may be implemented for all the Acquirer or Merchants regardless of the platform. The model of the present disclosure is built to identify the transactions that may be returned for the repeat customer returning the goods/services. The model of the present disclosure may use tangible parameters including but not limited to the particulars of the customer, item ID, merchant ID etc

[0028] In an embodiment of the present disclosure, the algorithm used in the model of the present disclosure may be the linear regression (multiple regression).

[0029] In an embodiment of the present disclosure, the data elements used in the model of the present disclosure are listed in the table below.

a. Customer Data

ISO BIN	Zip Code	Age	Mode of Payment	Issuer Country Code
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b. Acquirer and Merchant

GMRID	Merchant Country
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c. Item and Amount

Item ID	Amount of a transaction (USD)
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[0030] In an embodiment of the present disclosure, there may be a number of steps involved to build the model of the present disclosure. **Fig. 3** demonstrates a table that shows sample data that illustrates the concept of the new Return Score model. The list of the transaction entities may first be restructured to fit the needs of the model. The days of return for a Merchandise return for the historical data may then be calculated based on the Original Purchase data and the Merchandise return data. Then, Linear regression may be performed on a set of data to build a score.

[0031] In an embodiment of the present disclosure, the coefficient for dependent variables may be calculated based on linear regression and data regression, by the following:

$Y = B_0$ (intercept) + B_1x_1 + B_2x_2 + ... + B_kx_k where B_0 is the intercept and B_1 is the coefficient of x_1 and B_2 is the coefficient of x_2 and so on. This algorithm is leveraged to apply the linear regression to calculate the return predictability score.

[0032] In an embodiment, the range score as demonstrated in **Fig. 4** may be calculated using the intercept and coefficient. The Score may be calculated using intercepts plus regression coefficients and the predictors of all the elements used in the transaction. Since the score may vary depending on the parameters unless all the parameters are repeated in a transaction, the Range score is more valuable and helpful. The range score will need to be used as: Range score may be assessed based on the customer's age, transaction Amount, mode of Payment, Merchant, and the Item Purchase. This way, the score may be used regardless of a particular consumer. Rather the range score would be based on the kind of customer, a particular merchant, amount, and item purchased.

[0033] The present disclosure entails numerous benefits and advantages. The **Acquirer or Merchant** community is likely to be the biggest beneficiary of this new model. Based on the prediction by the Processing network, the Merchants or Acquirers may decide if they need to hold the Clearing transactions from processing for a few days. Processing of a clearing transaction does not only need resources but also costs additional data processing fees and charges that includes the Interchange reimbursement fees paid to the Issuer as well the charges concurred by the processing network. Acquirer or the Acquirer processors to the merchant can save lots of money by not having to go through Clearing when there is an indication in the Original transaction that the Consumer may be returning the service or goods that they have bought or by holding the transaction to see if there may be a return in

a range (number of days) calculated and provided by the Network. The Acquirers might as well share this saved cost with their merchants and provide more discounts. Although it may seem that the Network processor may lose revenue from Clearing processing fees, it in fact may bring more return of investments to the network because of multiple reasons including (i) – the processor may need to process less data which may save license costs, (ii) this service may be monetized by the Networks.

[0034] The embodiments of the present disclosure work on the assumption that most retailers or merchants have a 30-day return policy so the model of the present disclosure is implemented within the days of the return policy of the merchant.

[0035] In an embodiment, one or more computer-readable storage media may be utilized in implementing embodiments consistent with the present disclosure. A computer-readable storage medium refers to any type of physical memory on which information or data readable by a processor may be stored. Thus, a computer-readable storage medium may store instructions for execution by one or more processors, including instructions for causing the processor(s) to perform steps or stages consistent with the embodiments described herein. A non-transitory computer readable medium may include media such as magnetic storage medium, optical storage, volatile and non-volatile memory devices etc. Further, non-transitory computer-readable media may include all computer-readable media except for a transitory. The code implementing the described operations may further be implemented in hardware logic (e.g., an integrated circuit chip, Programmable Gate Array (PGA), Application Specific Integrated Circuit (ASIC), etc.).

[0036] The described operations may be implemented as a method, system or article of manufacture using standard programming and or engineering techniques to produce software, firmware, hardware, or any combination thereof. The described operations may be implemented as code maintained in a “non-transitory computer readable medium”, where a processor may read and execute the code from the computer readable medium. The processor is at least one of a microprocessor and a processor capable of processing and executing the queries.

[0037] The illustrated steps are set out to explain the exemplary embodiments shown, and it should be anticipated that ongoing technological development will change the manner in which particular functions are performed. These examples are presented herein for purposes

of illustration, and not limitation. Further, the boundaries of the functional building steps have been arbitrarily defined herein for the convenience of the description. Alternative boundaries can be defined so long as the specified functions and relationships thereof are appropriately performed. Alternatives (including equivalents, extensions, variations, deviations, etc., of those described herein) will be apparent to persons skilled in the relevant art(s) based on the teachings contained herein. Such alternatives fall within the scope and spirit of the disclosed embodiments. Also, the words "comprising," "having," "containing," and "including," and other similar forms are intended to be equivalent in meaning and be open ended in that an item or items following any one of these words is not meant to be an exhaustive listing of such item or items or meant to be limited to only the listed item or items. It must also be noted that as used herein, the singular forms "a," "an," and "the" include plural references unless the context clearly dictates otherwise.

[0038] Finally, the language used in the specification has been principally selected for readability and instructional purposes, and it may not have been selected to delineate or circumscribe the inventive subject matter. Accordingly, the disclosure of the embodiments of the disclosure is intended to be illustrative, but not limiting, of the scope of the disclosure.

[0039] With respect to the use of substantially any plural and or singular terms herein, those having skill in the art can translate from the plural to the singular and or from the singular to the plural as is appropriate to the context and or application. The various singular or plural permutations may be expressly set forth herein for sake of clarity.

ABSTRACT

The present disclosure pertains to the field of payment processing and predictive modelling for the Merchandise returns transactions in the context of payment transactions. More specifically, it focuses on developing a new model that offers predictability scores for merchandise returns, allowing merchants and acquirers to make informed decisions about the clearing of the original transactions. This innovative solution leverages historical data and employs linear regression to predict likelihood of a potential merchandise returns, potentially saving huge costs and resources for the merchant and acquirer and all the parties involved in the transaction processing.



Fig. 1: The existing method of clearing sales draft

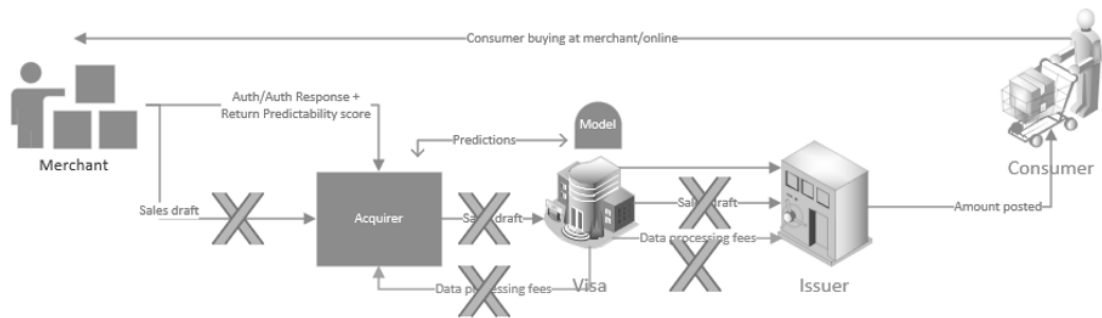


Fig. 2 : An implementation of the present disclosure

Number of Days returned (Return Date - Purchase date)	Age	Mode of Payment	Amount of a transaction (USD)	ISO BIN	GMRID	Zip Code	Item ID
4	21	0	38.21	465942	25036880531	94555	12345
2	34	1	19.99	414903	25036880531	78681	98765
15	56	1	23.30	475140	28478867968	78660	45678
18	23	0	38.21	407580	25036880531	94000	12345
30	50	1	18.21	477596	28353129183	95000	12346
2	22	1	18.21	465942	28353129183	94555	12346
23	34	1	19.99	414903	25036880531	78681	98765
12	66	1	23.30	475140	28478867968	78660	45678
3	32	0	22.21	407580	25059651082	94000	12347
14	3	1	22.21	477596	25059651082	95000	12347

Fig. 3: A table that shows sample data that illustrates the concept of the new Return Score model.

Age	Mode of Payment	Amount of a transaction (USD)	GMRID	Item ID	Range of Return days
21	0	38.21	25036880531	12345	4.45-17.57
34	1	19.99	25036880531	98765	12.5-12.5
56	1	23.30	28478867968	45678	8.9-18.02
23	0	38.21	25036880531	12345	4.45-17.57
50	1	18.21	28353129183	12346	4.13-27.94
22	1	18.21	28353129183	12346	4.13-27.94
34	1	19.99	25036880531	98765	12.5-12.5
66	1	23.30	28478867968	45678	8.9-18.02
32	0	22.21	25059651082	12347	2.97-13.97
3	1	22.21	25059651082	12347	2.97-13.97

Fig. 4: A table that shows sample data that illustrates the range of score.