TechLineage

Cogniyug

Case Study in retail segment

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Contents

Background

TechLineage is in the middle of a successful "Proof of Concept" (the POC) of their flagship product Cogniyug at XYZ Inc. (actual name cannot be disclosed at this point of time due to non-disclosure agreement signed by both parties). XYZ hosts a web platform where users can come and purchase goods online. XYZ Inc has a large database where all the user transactions over last few years are captured. This database serves as the input data for our analysis and outputs.

Problem Statement

We targeted top three problems listed below in the current POC

1. As user selects a particular item while shopping, appropriate suggestions for the *closely correlated* items must be provided to the user in *real time.*
   Example: A transaction database has following records of *S* transaction
   S1 = { i1, i2, i3, i4}
   S2 = {i2, i4, i5, i6}
   S3 = {i4, i2, i7, i9, i10....}
   S4 = {i4, i11, i10...}
   S5 = {i4, i20, i30, i40}
   Where S1, S2, S3...Sn are n unique transaction and i1, i2, i3...im are m unique items.
   If we look at the transactions closely, we can easily say that if someone buys item i2 he/she also buys item i4 because all the transactions of i2 have i4 in it (S1, S2, S3), however wise-a-versa is not true. Meaning, when someone buys i4, it is not necessary that he/she will buy i2.
   Another subtle correlation is between i10 and i4. When someone buys i10 it is seen that i4 is also bought along, but wise-a-versa is not true.

   Complexity of the problem further increases as user selects more than one item in his shopping cart and you need to find the such items that correlate with *all* the selected items. (In the above example, if user selects i1 and i2 at once, you will have to find correlations of both i1 and i2 and suggest those items to the user that are correlated with either i1 **OR** i2. If X is a set of items correlated with i1 and Y is a set of items correlated with i2, then $X \cup Y$ *(X union Y)* is the set of items correlated with either i1 and i2. Essentially, the problem translates into finding union between the multiple sets.)

   Further complexities arise when you have to find the correlations between the selected items and suggest only those items that correlate with all the selected items (In the above example, if user selects i1 and i2, you will have to find only those items that are closely correlated with both i1 **AND** i2. If X is a set of items correlated with i1 and Y is a set of items correlated with i2, then *X intersection Y* is the set of items correlated with i1 AND i2. Essentially, the problem translates into finding intersection between the multiple sets)

   Handling all such complexities using naive computing techniques is computationally expensive and error prone. Moreover, it becomes almost impossible to provide the **real time** suggestions as the computation has to finish accurately before user leaves the shopping page. Providing the meaningful suggestions with least possible latency to multiple users at a time is a challenging task and naive computing techniques invariable fail as load increases on the system.

2. When user selects certain items in his shopping cart, challenge is finding any such superset which may already exist as a package covering all the items in the shopping cart so that user gets all the items at a cheaper rate (besides, the user may get certain additional items at lower or same cost as a result of pre-packaged goodies)

   Doing this computation in a naive way is computationally expensive, error prone and never likely to finish in real time.

3. Sometimes, users select unusual combinations of items together i.e. the combination of items selected is not seen before in the database or has been rarely seen. System is expected to alert the user about such unusual selection and possibly suggest a correction.

Proposed Solution

Cogniyug showed extremely promising results for solving all the problems listed above.

1. With its patent pending pattern mining algorithm at core, Cogniyug quickly found possible correlations with all the required statistical details so as to make appropriate recommendations in real time.
2. Cogniyug was able to detect the super sets of the items covering the selected items so that #2 mentioned above can be quickly solved.
3. With knowledge of patterns, Cogniyug can quickly find *odd or rare* combinations. Moreover, Cogniyug could suggest correction based on #1 above.

Future direction

It is expected to develop a strong integration with XYZ Inc and Cogniyug in such a way that

1. Cogniyug exposes its interface to XYZ Inc using secured APIs
2. Cogniyug continuously consumes all the data and keeps mining the new patterns in real time as user transact on XYZ Inc.'s portal.

Does it apply to you?

If you are a retailer and have historic records of your transactions, we would be keen to perform a free PoC (Proof of Concept) based on your data. We perform free PoCs on your premises OR in our cloud environment. Please feel free to write to us on info@techlineage.com to initiate talk about a free PoC.

Data Privacy

You data privacy is our top priority. We comply with your data privacy requirements by signing the necessary NDAs or other documents.