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# Customer demographic score

Source Table: **Customer\_Master**

Target Table: **Entity\_score**

**Formula:** Customer demographic score = age\*0.3+occupation\*0.3+education\*0.1+income\*0.1+gender\*0.1+marital status\*0.1

|  |  | **Phase 1** | | **Phase 2** |
| --- | --- | --- | --- | --- |
| **Column** | **Default Weightage** | **More than 30% of null values present** | **Null or Not Null per record** | **Default ordering** |
| age | 0.3 | Set the Customer demographic score = -1 for all the customers | If Null then 0  If Not Null 1 | < 20 → 1  > 20 and < 30 → 2  > =30 and < 50 → 3  > 50 and < 70 → 2  > 70 → 1  1 - High Risk  2- Medium Risk  3 - Low Risk |
| occupation | 0.3 | Set the Customer demographic score = -1 for all the customers | If Null then 0  If Not Null 1 | NA |
| education | 0.1 | Set the value as 0 and readjust the default weightage among the age and occupation features | If Null then 0  If Not Null 1 | < 10 std → 1  > 10 std and < graduate → 2  >=graduate → 3  1 - High Risk  2- Medium Risk  3 - Low Risk |
| income | 0.1 | Set the value as 0 and readjust the default weightage among the age and occupation features | If Null then 0  If Not Null 1 | NA |
| gender | 0.1 | Set the value as 0 and readjust the default weightage among the age and occupation features | If Null then 0  If Not Null 1 | NA |
| marital status | 0.1 | Set the value as 0 and readjust the default weightage among the age and occupation features | If Null then 0  If Not Null 1 | NA |
| **Total** | **1** | If Null then 0  If Not Null 1 | If Null then 0  If Not Null 1 |  |

Eg.

Score = age\*0.3+occupation\*0.3+education\*0.1+income\*0.1+gender\*0.1+marital status\*0.1

Case 1: All the columns with not null values

Customer demographic score = 1\*0.3+1\*0.3+1\*0.1+1\*0.1+1\*0.1+1\*0.1 = 1 \* 100 = 100

Case 2: Income column has > 30% values as null

Readjust the other low weightage columns weights

And set weight of income to zero

Customer demographic score = 1\*0.3+1\*0.3+0\*0+1\*0.13+1\*0.13+1\*0.13 = 0.99 \* 100 = 99

Case3: Particular customers Income column has null values

Customer demographic score = 1\*0.3+1\*0.3+0\*0.1+1\*0.1+1\*0.1+1\*0.1 = 0.9\* 100 = 90

Case 4: age and occupation either one or both have more than 30% values as null

Customer demographic score = -1 for all the customers

Case5: Particular customers multiple columns have null values -eg income and marital status

Customer demographic score = 1\*0.3+1\*0.3+0\*0.1+1\*0.1+1\*0.1+0\*0.1 = 0.8\* 100 = 80

Case6: Particular customers all low weightage columns are null

Customer demographic score = 1\*0.3+1\*0.3+0\*0.1+0\*0.1+0\*0.1+0\*0.1 = 0.6\* 100 = 60

Case7: Particular customers all high weightage columns are null

Customer demographic score = 0\*0.3+0\*0.3+1\*0.1+1\*0.1+1\*0.1+1\*0.1 = 0.4\* 100 = 40

# Profile strength score

Source Table: **profile\_stregth\_score**

Target Table: **Entity\_score**

|  |  |  |
| --- | --- | --- |
| **Column** | **Default Weightage** |  |
| Name | 0.2 | Count (Standardized) |
| Mobile | 0.2 | Count (Standardized) |
| Address | 0.2 | Count (Standardized) |
| Email | 0.2 | Count (Standardized) |
| DOB | 0.2 | Count (Standardized) |
| **Total** | **1** |  |

Higher value means stronger profile.

Step 1: Calculate the occurrence score for each column (Exclude Null value count from this)

(Value of occurrence - min )/(max -min)

Step 2:Subtract the number from 1

Step 3: Round off the number up to 2 decimal places.

Step 4: Assign Value zero to score in case Null

Step 5: Insert into **profile\_stregth\_score** table

Customer\_id

Name\_score number

Mobile\_score

Address\_score

Email\_score

DOB\_score

Eg.

Score = Name\*0.2+Mobile\*0.2+Address\*0.2+Email\*0.2+DOB\*0.2

Case 1: All the columns with not null values and respective score appx 1

profile strength score = 1\*0.2+1\*0.2+ 1\*0.2+1\*0.2+1\*0.2= 1 \* 100 = 100

Case 2: Any one column value is null / missing and others are present with respective score appx 1

profile strength score = 0\*0.2+1\*0.2+ 1\*0.2+1\*0.2+1\*0.2= 0.8 \* 100 = 80

Case 3: Multiple columns value are null / missing and others are present with respective score appx 1

profile strength score = 0\*0.2+0\*0.2+0\*0.2+1\*0.2+1\*0.2= 0.4 \* 100 = 40

Case 4: Any one column value is one of the highest occurring and others are present with respective score appx 1

Same as Case 2

Case 4: Multiple columns value are highest occurring and others are present with respective score appx 1

Same as Case 3

Case5: Score values are not equal to 1 or 0

profile strength score = 0.8\*0.2+0.5\*0.2+ 0.3\*0.2+0.12\*0.2+0.9\*0.2= 0.542 \* 100 = 54.2

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# Product Engagement score

Source Table: **product\_engagement score**

Target Table: **Entity\_score**

|  |  |  |
| --- | --- | --- |
| **Column** | **Default Weightage** | **Default** |
| Number of distinct products | 0.25 | Count (Standardized) |
| Total number of products | 0.25 | Count (Standardized) |
| First product age | 0.25 | Value in months (Standardized) |
| Latest product age | 0.25 | Value in months (Standardized) |
| **Total** | **1** |  |

Approach Same as Profile strength score

Ex-

Score = Number of distinct products\*0.25+Total number of products\*0.25+First product age\*0.25+(1-Latest product age\*0.25).

Note:-Above formula is valid for intermediate table

And final formula for calculation in last column is

Score = Number of distinct products\*0.25+Total number of products\*0.25+First product age\*0.25+Latest product age\*0.25

Case 1: All the columns with not null values and respective score appx 1

Product Engagement score=

# Device score(Channel specific)

Source Table: **Transaction**

Target Table: **Entity\_score**

**At account level**

**Readjust weight if type of devices used and/or Type od OS information is not available**

|  |  |  |
| --- | --- | --- |
| **Column** | **Default Weightage** | **Default** |
| Number of distinct Device used | 0.25 | Count (Standardized) |
| Total Distinct of MCC used | 0.25 | Count (Standardized) |
| Type of Device used | 0.25 | Devices will be graded |
| Type of OS used | 0.25 | Latest will have best score |
| **Total** | **1** |  |

Score:-Number of distinct Device used\*0.25+Total Distinct of MCC used\*0.25+Type of Device used\*0.25+Type of OS used\*0.25

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# Digital Engagement score

Digital Engagement score =

Expected value range of stats w.r.t other customers of channel +

Expected value range of stats w.r.t other customer of channel + location +

Expected value range of stats w.r.t other customer of channel + location + demographic segment +

Expected value range of stats of the given channel wrt other channel +

Expected value range of stats of the given channel wrt other channel + location + demographic segment +

YOY or MOM % of usage of this channel

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# Merchant Engagement Risk score(Channel Specific)

Risk Score of the merchant-MCC, customers are using frequent and high amounts. (past 1 year data)

1. Get Top 5 distinct MCC based on high frequency
2. Get Top 5 distinct MCC based on high Amount
3. Get Top 5 distinct MCC based on high Average (Amount/Frequency)
4. Get the combined distinct MCC list from 1,2 and 3
5. Refer MCC reference table and get Risk for MCC listed by Step 4
6. Assign Value 3 to High, 2 to Medium and 1 to Low Risk
7. Add the values Step 6 and divide by distinct MCC count of step 4

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# Merchant Comparative score

Risk Score of the merchant-id customers are frequently and high amount using w.r.t other customers of the bank

1. Get Top 5 distinct merchant\_id based on high frequency
2. Get Top 5 distinct merchant\_id based on high Amount
3. Get Top 5 distinct merchant\_id based on high Average (Amount/Frequency)
4. Get the combined distinct merchant\_id list from 1,2 and 3

# customer vulnerability score

Weighted average of all the above scores