German Jordanian University

School of Applied Technical Sciences

Department of Mechatronics Engineering

ME-555: Machine Intelligence

Term Project Proposal

Credit Card Cancelation Prediction

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❖ Problem definition

Customer retention is important in a variety of businesses as acquiring new customers is often more costly than keeping the current ones. Therefore, churn prediction has attracted great attention from both the business and academic worlds.

We found a dataset for this topic by a bank manager that is facing an issue that more and more consumers are canceling their credit card services.

So, we are going to make a ML project that can predict who would cancel their credit card so that the bank would go out of their way and deliver decent support and influence consumers' choices in the opposite direction.

The main purpose of this project is to maintain the number of customers by making a useful pattern of their behavior based on the dataset we have; we will try to take the process on its simplest scale by classifying the Dataset that contains 10.000 customers' information and make conclusions from it so the model will warn us before any customer may cancel their card.

We will use around 75% for learning purposes, the other 25% we will try to find the accuracy of our model.

❖ Data description

We obtained a dataset about this topic from Kaggle, and this dataset contains around 10,000 customers, these are the information that is contained:

1. CLIENTNUM
2. Attrition_Flag
3. Customer_Age   : 26-73
4. Gender   : Male (M) and Female (F)
5. Dependent_count : 0-5
6. Education_Level   : High school, Graduate, Uneducated, Unknown, College, Post-Graduate , or Doctorate.
7. Marital_Status.   : Married, Single, Unknown, or Divorced
8. Income_Category : $120K +   , $80K - $120K , $60K - $80K, $40K - $60K , Less than $40K , or unknown.
9. Card_Category   : Blue, Gold, or Silver
10. Months_on_book : 13-56
11. Total_Relationship_Count: 1-6
12. Months_Inactive_12_mon: 0-6
13. Contacts_Count_12_mon : 0-6
14. Credit_Limit   : 1438.3 - 34516
15. Total_Revolving_Bal   : 0 - 2517
16. Avg_Open_To_Buy   : 3-34516

17. Total_Amt_Chng_Q4_Q1 : 0 - 3.397

18. Total_Trans_Amt   : 510 - 18484

19. Total_Trans_Ct   : 10 - 139

20. Total_Ct_Chng_Q4_Q1   : 0- 3.714

21. Avg_Utilization_Ratio   : 0 - 0.999

22. Naive_Bayes_Classifier_Attrition_Flag_Card_Category_Contacts_Count_12_mon_Dependent_count_Education_Level_Months_Inactive_12_mon_1:
7.664×10^{-6} - 0.99958

23. Naive_Bayes_Classifier_Attrition_Flag_Card_Category_Contacts_Count_12_mon_Dependent_count_Education_Level_Months_Inactive_12_mon_2 :
0.00041998 - 0.99999

❖ Samples

Marital_Status	Income_Category	Card_Category	Months_on_book	Total_Relationship_Count	Months_Inactive_12_mon	Contacts_Count_12_mon	Credit_Limit	Total_Revolving_Bal	Avg_Open_To_Buy	Total_Amt_Chng_	Total_Trans_Amt	Total_Trans_Ct	Total_Ct_Chng_Q	Avg_Utilization_Ratio	Count_12_mon	unt_12_mon_
Married	$60K - $80K	Blue	39	5	1	3	12691	777	11914	1.335	1144	42	1.625	0.061	9.34E-05	0.99991
Single	Less than $40K	Blue	44	6	1	2	8256	864	7392	1.541	1291	33	3.714	0.105	5.69E-05	0.99994
Married	$80K - $120K	Blue	36	4	1	0	3418	0	3418	2.594	1887	20	2.333	0	2.11E-05	0.99998
Unknown	Less than $40K	Blue	34	3	4	1	3313	2517	796	1.405	1171	20	2.333	0.76	0.00013366	0.99987
Married	$60K - $80K	Blue	21	5	1	0	4716	0	4716	2.175	816	28	2.5	0	2.17E-05	0.99998
Married	$40K - $60K	Blue	36	3	1	2	4010	1247	2763	1.376	1088	24	0.846	0.311	5.51E-05	0.99994
Married	$120K +	Gold	46	6	1	3	34516	2264	32252	1.975	1330	31	0.722	0.066	0.00012303	0.99988
Unknown	$60K - $80K	Silver	27	2	2	2	29081	1396	27685	2.204	1538	36	0.714	0.048	8.58E-05	0.99991
Single	$60K - $80K	Blue	36	5	2	0	22352	2517	19835	3.355	1350	24	1.182	0.113	4.48E-05	0.99996
Single	$80K - $120K	Blue	36	6	3	3	11656	1677	9979	1.524	1441	32	0.882	0.144	0.00030251	0.9997
Unknown	$120K +	Blue	31	5	3	2	6748	1467	5281	0.831	1201	42	0.68	0.217	0.00019094	0.99981
Married	$40K - $60K	Blue	54	6	2	3	9095	1587	7508	1.433	1314	26	1.364	0.174	0.00019751	0.9998
Single	$80K - $120K	Blue	36	3	6	0	11751	0	11751	3.397	1539	17	3.25	0	4.78E-05	0.99995
Unknown	$60K - $80K	Blue	30	5	1	3	8547	1666	6881	1.163	1311	33	2	0.195	9.61E-05	0.9999
Married	Less than $40K	Blue	48	5	2	2	2436	680	1756	1.19	1570	29	0.611	0.279	0.00011382	0.99989
Unknown	$80K - $120K	Blue	37	5	1	2	4234	972	3262	1.707	1348	27	1.7	0.23	6.35E-05	0.99994
Single	$80K - $120K	Blue	36	6	2	3	30367	2362	28005	1.708	1671	27	0.929	0.078	0.00023623	0.99976
Married	$80K - $120K	Blue	34	4	4	1	13535	1291	12244	0.653	1028	21	1.625	0.095	0.00014953	0.99985
Married	$40K - $60K	Blue	56	2	2	3	3193	2517	676	1.831	1336	30	1.143	0.788	0.00017468	0.99983
Married	Unknown	Blue	37	6	1	2	14470	1157	13313	0.966	1207	21	0.909	0.08	5.51E-05	0.99994
Divorced	$60K - $80K	Blue	42	5	2	0	20979	1800	19179	0.906	1178	27	0.929	0.086	5.70E-05	0.99994
Married	Less than $40K	Blue	49	2	3	3	1438.3	0	1438.3	1.047	692	16	0.6	0	0.99616	0.00384
Married	$40K - $60K	Blue	33	4	2	1	4470	680	3790	1.608	931	18	1.571	0.152	6.92E-05	0.99993
Single	Less than $40K	Blue	36	3	3	2	2492	1560	932	0.573	1126	23	0.353	0.626	0.00020735	0.99979
Married	$80K - $120K	Blue	42	4	2	3	12217	0	12217	1.075	1110	21	0.75	0	0.00021042	0.99979
Single	Less than $40K	Blue	28	6	1	2	7768	1669	6099	0.797	1051	22	0.833	0.215	5.72E-05	0.99994
Unknown	$40K - $60K	Blue	46	4	1	2	14784	1374	13410	0.921	1197	23	1.3	0.093	5.03E-05	0.99995
Married	$60K - $80K	Blue	56	3	3	2	10215	1010	9205	0.843	1904	40	1	0.099	0.00018558	0.99981
Single	Unknown	Blue	34	5	2	2	10100	0	10100	0.525	1052	18	1.571	0	0.00012144	0.99988
Married	$40K - $60K	Blue	42	6	0	0	4785	1362	3423	0.739	1045	38	0.9	0.285	7.66E-06	0.99999
Married	$80K - $120K	Blue	33	3	2	3	2753	1811	942	0.977	1038	25	2.571	0.658	0.00021834	0.99978
Married	$60K - $80K	Blue	48	2	5	1	2451	1690	761	1.323	1596	26	1.6	0.69	0.00012458	0.99988
Married	$60K - $80K	Blue	36	4	1	2	8923	2517	6406	1.726	1589	24	1.667	0.282	5.78E-05	0.99994
Married	Less than $40K	Blue	38	5	2	3	2650	1490	1160	1.75	1411	28	1	0.562	0.00018612	0.99981
Married	$80K - $120K	Blue	49	6	2	2	12555	1696	10859	0.519	1291	24	0.714	0.135	9.77E-05	0.9999
Single	Less than $40K	Blue	36	4	2	1	3520	1914	1606	0.51	1407	43	0.483	0.544	6.26E-05	0.99994
Married	Less than $40K	Blue	36	6	2	3	3035	2298	737	1.724	1877	37	1.176	0.757	0.00019864	0.9998
Married	Less than $40K	Gold	36	2	3	3	15433	0	15433	0.865	966	22	1.2	0	0.00035532	0.99964
Unknown	$40K - $60K	Blue	49	3	3	2	3672	886	2786	1.32	1464	28	0.556	0.241	0.00016883	0.99983