



Data Science Take Home Project

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Context

Distributors use our sales force automation tools in order to help them track their sales, improve their operations and increase their top line.

We would like to help these distributors maximize their profits by allowing them to identify which merchants they should target.

The specific distributor that we will be analysing is called Dodoma Fresh Milk. They produce dairy products for the entire country of Tanzania. Below is a list of merchants that they service along with meta data that could be useful in determining which of the merchants they should invest resources in.

Problem

1. **Make use of the merchant data set below in order to develop models that will help Dodoma Fresh Milk target the right customers. The goal is to help Dodoma Fresh milk not only increase sales but also to become more efficient in allocating advertising spend.**
2. **Given the payment history that the merchant has and the cities that the merchant operates in, create a credit scoring algorithm that will help the distributor figure out which are the most creditworthy merchants and which ones are not.**

Dataset features

The dataset has the following features:

- **Merchant Id** - This is the unique Identification number that is given to a merchant
- **Annual Revenue** - This is the annual income of the merchant
- **Spending score** - It is the score(out of 100) given to a merchant by Ramani.io, based on the money spent on distributor products and the behavior of the customer.
- **City** - The city that the merchant is located in
- **Most Purchased Product** - In terms of money spent on a particular product, this is the most popular product for that specific merchant. Therefore, this is the most purchased product by that merchant from Dodoma Fresh Milk.
- **Payment score** - It is the score(out of 5) given to a merchant by Ramani.io, based on the ability for the merchant to repay inventory that is purchased on credit. A score of 5 is great , a score of 1 is poor.

Constraints

- Language: Python,R, Scala
- Frameworks/libraries: Tensorflow, Keras, Apache Spark, pandas, numpy, matplotlib, sklearn
- Duration: 5 Days

Submission

When you have completed the project, please upload the code to a repository of your choice and share the clone link with **calvin@ramani.io**

The submission should include a section on how to run the code as well as a write up on what you discovered and how you would advise Dodoma Fresh Milk on which merchants to target.

Dataset

Merchant Id	Annual Revenue (k\$)	Spending Score (1-100)	City	Most Purchased Product	Repayment Score 1-5
1	15	39	Mtwara	Mtindi 500ml	1
2	15	81	Zanzibar City	Fresh Milk 250ml	2
3	16	6	Mtwara	Mtindi 500ml	3
4	16	77	Zanzibar City	Fresh Milk 250ml	4

Merchant Id	Annual Revenue (k\$)	Spending Score (1-100)	City	Most Purchased Product	Repayment Score 1-5
5	17	40	Mtwara	Mtindi 500ml	2
6	17	76	Zanzibar City	Fresh Milk 250ml	1
7	18	6	Mtwara	Mtindi 500ml	2
8	18	94	Zanzibar City	Fresh Milk 250ml	3
9	19	3	Mtwara	Mtindi 500ml	1
10	19	72	Zanzibar City	Fresh Milk 250ml	1
11	19	14	Mtwara	Mtindi 500ml	1
12	19	99	Zanzibar City	Fresh Milk 250ml	4
13	20	15	Mtwara	Mtindi 500ml	5
14	20	77	Zanzibar City	Fresh Milk 250ml	5
15	20	13	Mtwara	Mtindi 500ml	5
16	20	79	Zanzibar City	Fresh Milk 250ml	5
17	21	35	Mtwara	Mtindi 500ml	5
18	21	66	Zanzibar City	Fresh Milk 250ml	5
19	23	29	Mtwara	Mtindi 500ml	5
20	23	98	Zanzibar City	Fresh Milk 250ml	5
21	24	35	Mtwara	Mtindi 500ml	5
22	24	73	Zanzibar City	Fresh Milk 250ml	5
23	25	5	Mtwara	Mtindi 500ml	5
24	25	73	Zanzibar City	Fresh Milk 250ml	5
25	28	14	Mtwara	Mtindi 500ml	5
26	28	82	Zanzibar City	Fresh Milk 250ml	4
27	28	32	Mtwara	Mtindi 500ml	5

Merchant Id	Annual Revenue (k\$)	Spending Score (1-100)	City	Most Purchased Product	Repayment Score 1-5
28	28	61	Zanzibar City	Fresh Milk 250ml	5
29	29	31	Mtwara	Mtindi 500ml	4
30	29	87	Zanzibar City	Fresh Milk 250ml	5
31	30	4	Mtwara	Mtindi 500ml	5
32	30	73	Zanzibar City	Fresh Milk 250ml	4
33	33	4	Mtwara	Mtindi 500ml	5
34	33	92	Zanzibar City	Fresh Milk 250ml	4
35	33	14	Mtwara	Mtindi 500ml	5
36	33	81	Zanzibar City	Fresh Milk 250ml	5
37	34	17	Mtwara	Mtindi 500ml	5
38	34	73	Zanzibar City	Fresh Milk 250ml	4
39	37	26	Mtwara	Mtindi 500ml	5
40	37	75	Zanzibar City	Fresh Milk 250ml	4
41	38	35	Mtwara	Mtindi 500ml	4
42	38	92	Zanzibar City	Fresh Milk 250ml	5
43	39	36	Moshi	Fresh Milk 1ltr	5
44	39	61	Moshi	Fresh Milk 1ltr	5
45	39	28	Moshi	Fresh Milk 1ltr	5
46	39	65	Moshi	Fresh Milk 1ltr	4
47	40	55	Moshi	Fresh Milk 1ltr	4
48	40	47	Moshi	Fresh Milk 1ltr	4
49	40	42	Moshi	Fresh Milk 1ltr	4
50	40	42	Moshi	Fresh Milk 1ltr	5
51	42	52	Moshi	Fresh Milk 1ltr	5
52	42	60	Moshi	Fresh Milk 1ltr	4
53	43	54	Moshi	Fresh Milk 1ltr	3

Merchant Id	Annual Revenue (k\$)	Spending Score (1-100)	City	Most Purchased Product	Repayment Score 1-5
54	43	60	Moshi	Fresh Milk 1ltr	5
55	43	45	Moshi	Fresh Milk 1ltr	4
56	43	41	Moshi	Fresh Milk 1ltr	5
57	44	50	Moshi	Fresh Milk 1ltr	5
58	44	46	Moshi	Fresh Milk 1ltr	5
59	46	51	Moshi	Fresh Milk 1ltr	5
60	46	46	Moshi	Fresh Milk 1ltr	5
61	46	56	Moshi	Fresh Milk 1ltr	5
62	46	55	Moshi	Fresh Milk 1ltr	4
63	47	52	Moshi	Fresh Milk 1ltr	4
64	47	59	Moshi	Fresh Milk 1ltr	4
65	48	51	Moshi	Fresh Milk 1ltr	4
66	48	59	Moshi	Fresh Milk 1ltr	4
67	48	50	Moshi	Fresh Milk 1ltr	4
68	48	48	Moshi	Fresh Milk 1ltr	4
69	48	59	Moshi	Fresh Milk 1ltr	4
70	48	47	Moshi	Fresh Milk 1ltr	4
71	49	55	Moshi	Fresh Milk 1ltr	4
72	49	42	Moshi	Fresh Milk 1ltr	4
73	50	49	Moshi	Fresh Milk 1ltr	4
74	50	56	Moshi	Fresh Milk 1ltr	4
75	54	47	Moshi	Fresh Milk 1ltr	4
76	54	54	Moshi	Fresh Milk 1ltr	4
77	54	53	Moshi	Fresh Milk 1ltr	4
78	54	48	Moshi	Fresh Milk 1ltr	4
79	54	52	Moshi	Fresh Milk 1ltr	4
80	54	42	Moshi	Fresh Milk 1ltr	4
81	54	51	Moshi	Fresh Milk 1ltr	4
82	54	55	Moshi	Fresh Milk 1ltr	4
83	54	41	Moshi	Fresh Milk 1ltr	4
84	54	44	Moshi	Fresh Milk 1ltr	4

Merchant Id	Annual Revenue (k\$)	Spending Score (1-100)	City	Most Purchased Product	Repayment Score 1-5
85	54	57	Moshi	Fresh Milk 1ltr	4
86	54	46	Moshi	Fresh Milk 1ltr	4
87	57	58	Moshi	Fresh Milk 1ltr	4
88	57	55	Moshi	Fresh Milk 1ltr	4
89	58	60	Moshi	Fresh Milk 1ltr	4
90	58	46	Moshi	Fresh Milk 1ltr	4
91	59	55	Moshi	Fresh Milk 1ltr	4
92	59	41	Moshi	Fresh Milk 1ltr	4
93	60	49	Moshi	Fresh Milk 1ltr	4
94	60	40	Moshi	Fresh Milk 1ltr	4
95	60	42	Moshi	Fresh Milk 1ltr	4
96	60	52	Moshi	Fresh Milk 1ltr	4
97	60	47	Moshi	Fresh Milk 1ltr	4
98	60	50	Moshi	Fresh Milk 1ltr	4
99	61	42	Moshi	Fresh Milk 1ltr	4
100	61	49	Moshi	Fresh Milk 1ltr	4
101	62	41	Moshi	Fresh Milk 1ltr	3
102	62	48	Moshi	Fresh Milk 1ltr	3
103	62	59	Moshi	Fresh Milk 1ltr	3
104	62	55	Moshi	Fresh Milk 1ltr	3
105	62	56	Moshi	Fresh Milk 1ltr	3
106	62	42	Moshi	Fresh Milk 1ltr	3
107	63	50	Moshi	Fresh Milk 1ltr	4
108	63	46	Moshi	Fresh Milk 1ltr	4
109	63	43	Moshi	Fresh Milk 1ltr	4
110	63	48	Moshi	Fresh Milk 1ltr	4
111	63	52	Moshi	Fresh Milk 1ltr	4
112	63	54	Moshi	Fresh Milk 1ltr	4
113	64	42	Moshi	Fresh Milk 1ltr	4
114	64	46	Moshi	Fresh Milk 1ltr	3
115	65	48	Moshi	Fresh Milk 1ltr	3

Merchant Id	Annual Revenue (k\$)	Spending Score (1-100)	City	Most Purchased Product	Repayment Score 1-5
116	65	50	Moshi	Fresh Milk 1ltr	3
117	65	43	Moshi	Fresh Milk 1ltr	3
118	65	59	Moshi	Fresh Milk 1ltr	3
119	67	43	Dar es Salaam	Mtindi 250ml	3
120	67	57	Dar es Salaam	Mtindi 250ml	3
121	67	56	Dar es Salaam	Mtindi 250ml	3
122	67	40	Dar es Salaam	Mtindi 250ml	3
123	69	58	Dar es Salaam	Mtindi 250ml	4
124	69	91	Dar es Salaam	Mtindi 250ml	4
125	70	29	Dar es Salaam	Mtindi 250ml	4
126	70	77	Dar es Salaam	Mtindi 250ml	4
127	71	35	Dar es Salaam	Mtindi 250ml	4
128	71	95	Dar es Salaam	Mtindi 250ml	4
129	71	11	Dar es Salaam	Mtindi 250ml	4
130	71	75	Dar es Salaam	Mtindi 250ml	3
131	71	9	Dar es Salaam	Mtindi 250ml	3
132	71	75	Dar es Salaam	Mtindi 250ml	3
133	72	34	Dar es Salaam	Mtindi 250ml	3
134	72	71	Dar es Salaam	Mtindi 250ml	3
135	73	5	Dar es Salaam	Mtindi 250ml	4
136	73	88	Dar es Salaam	Mtindi 250ml	4
137	73	7	Dar es Salaam	Mtindi 250ml	4
138	73	73	Dar es Salaam	Mtindi 250ml	4
139	74	10	Dar es Salaam	Mtindi 250ml	4
140	74	72	Dar es Salaam	Mtindi 250ml	4
141	75	5	Dar es Salaam	Mtindi 250ml	4
142	75	93	Dar es Salaam	Mtindi 250ml	4
143	76	40	Dar es Salaam	Mtindi 250ml	4
144	76	87	Dar es Salaam	Mtindi 250ml	4
145	77	12	Dar es Salaam	Mtindi 250ml	4
146	77	97	Dar es Salaam	Mtindi 250ml	4

Merchant Id	Annual Revenue (k\$)	Spending Score (1-100)	City	Most Purchased Product	Repayment Score 1-5
147	77	36	Dar es Salaam	Mtindi 250ml	4
148	77	74	Dar es Salaam	Mtindi 250ml	3
149	78	22	Dar es Salaam	Mtindi 250ml	3
150	78	90	Dar es Salaam	Mtindi 250ml	3
151	78	17	Dar es Salaam	Mtindi 250ml	3
152	78	88	Dar es Salaam	Mtindi 250ml	4
153	78	20	Dar es Salaam	Mtindi 250ml	4
154	78	76	Dar es Salaam	Mtindi 250ml	4
155	78	16	Dar es Salaam	Mtindi 250ml	5
156	78	89	Dar es Salaam	Mtindi 250ml	5
157	78	1	Dar es Salaam	Mtindi 250ml	5
158	78	78	Dar es Salaam	Mtindi 250ml	5
159	78	1	Dar es Salaam	Mtindi 250ml	5
160	78	73	Dar es Salaam	Mtindi 250ml	3
161	79	35	Dar es Salaam	Mtindi 250ml	4
162	79	83	Dar es Salaam	Mtindi 250ml	4
163	81	5	Dar es Salaam	Mtindi 250ml	4
164	81	93	Dar es Salaam	Mtindi 250ml	4
165	85	26	Dar es Salaam	Mtindi 250ml	4
166	85	75	Dar es Salaam	Mtindi 250ml	4
167	86	20	Dar es Salaam	Mtindi 250ml	4
168	86	95	Dar es Salaam	Mtindi 250ml	4
169	87	27	Dar es Salaam	Mtindi 250ml	4
170	87	63	Dar es Salaam	Mtindi 250ml	4
171	87	13	Dar es Salaam	Mtindi 250ml	3
172	87	75	Dar es Salaam	Mtindi 250ml	3
173	87	10	Dar es Salaam	Mtindi 250ml	3
174	87	92	Dar es Salaam	Mtindi 250ml	3
175	88	13	Dar es Salaam	Mtindi 250ml	4
176	88	86	Dar es Salaam	Mtindi 250ml	4
177	88	15	Dar es Salaam	Mtindi 250ml	4

Merchant Id	Annual Revenue (k\$)	Spending Score (1-100)	City	Most Purchased Product	Repayment Score 1-5
178	88	69	Dar es Salaam	Mtindi 250ml	4
179	93	14	Dar es Salaam	Mtindi 250ml	4
180	93	90	Dar es Salaam	Mtindi 250ml	4
181	97	32	Dar es Salaam	Mtindi 250ml	3
182	97	86	Dar es Salaam	Mtindi 250ml	4
183	98	15	Dar es Salaam	Mtindi 250ml	5
184	98	88	Dar es Salaam	Mtindi 250ml	5
185	99	39	Dar es Salaam	Mtindi 250ml	5
186	99	97	Dar es Salaam	Mtindi 250ml	5
187	101	24	Dar es Salaam	Mtindi 250ml	5
188	101	68	Dar es Salaam	Mtindi 250ml	5
189	103	17	Dar es Salaam	Mtindi 250ml	5
190	103	85	Dar es Salaam	Mtindi 250ml	5
191	103	23	Dar es Salaam	Mtindi 250ml	5
192	103	69	Dar es Salaam	Mtindi 250ml	5
193	113	8	Dar es Salaam	Mtindi 250ml	5
194	113	91	Dar es Salaam	Mtindi 250ml	5
195	120	16	Dar es Salaam	Mtindi 250ml	5
196	120	79	Dar es Salaam	Mtindi 250ml	4
197	126	28	Dar es Salaam	Mtindi 250ml	3
198	126	74	Dar es Salaam	Mtindi 250ml	4
199	137	18	Dar es Salaam	Mtindi 250ml	4
200	137	83	Dar es Salaam	Mtindi 250ml	4