Machine Learning Model that Helps Small Businesses Grow

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Abstract

In this report, we are using Machine Learning model. There is a misunderstanding since ages of this "Data Science "world that machine learning model can only be used when it comes to "Big Businesses" or "Large Scale Market" So, here we would clear this thought machine learning model would be one of the ideal model to accelerate the small scale business.

Small scale business requires the consistency of customers as well as retaining the customers is the actual deal! Mostly it is observed that promotion of such businesses is done in the locality of the owners itself, which is considered as plus factor.

Small case business, unfortunately cannot afford to reduce the cost of products, because income or we could say finance is the basic requirement to keep the business on.

Small case business give one assurance of the quality of the product since one cannot afford the loss of business nor customer and small case business tend to give variety of remedies for the single product, which may not be seen in large scale business since they are focus maximum kinds of products.

So, this machine learning model could help small scale business for their growth by making a balanced relationship between the customer's need and cost of the products of the company.

1.Problem Statement

Starting with the initial and exact important point, that is "Growth". Small scale business usually has the crisis when it comes to their customers and vendors. These businesses require a consistency of customers, as small business may or may not have that much of the capital or finance and one firm condition for the promotion, they cannot afford for the cost reduction. Ideal price to be set for the product, which would benefit in two ways; firstly, the business shouldn't suffer and secondly if must be an ease for the customer to buy the products.

Using this machine learning technique, they can set a proper cost of product and also maintain their customer

2. Market/Customer/Business Need Assessment

For improving revenue of business, one has to set an ideal rate so that the business goes well and a good return get in. There must be a balanced relationship between

cost of the product and customer's need and acceptancy and for this one requires ML model, so that one can take a beneficial decision about their business.

3. Target Specifications and Characterization (your customer characteristic)

The basic requirement of company right from day one is company should be profitable. In order to make company more profitable we have to retain our clients. In small case business company should not take the revenue more than 10% from one client instead of that company should take revenue from more numbers of clients so that company does not depends only on one client. This Technique help to take the decision about cost of product as well as maintain customers. So that they can earn more profit. By analyzing the customer behavior, they can also improve their service according customer satisfaction.

4. External Search (online information sources/references/links)

https://www.marketingevolution.com/marketing-essentials/ai-markeitng

https://towardsdatascience.com/how-can-support-vector-machines-help-grow-a-small-business-8e71561616ea

https://bernardmarr.com/how-can-small-businesses-use-big-data-here-are-6-practical-examples/

5. Bench marking alternate products (comparison with existing products/services)

E-commerce giants like Amazon, Flipkart have been using affinity analysis to perform customer behavior analysis, which identifies purchasing habits of customers and uses this information to cross-sell and up-sell relevant items. But this technique would also be beneficial when applied to the small businesses since most of the daily needs and other essentials are still being bought from these shopkeepers and vendors.

6. Applicable Constraints (need for space, budget, expertise)

We have to sell product at different cost prices to analyze the customer behavior after getting sufficient data we can build model

Data Collection from shopkeepers and vendors

● Continuous data collection and maintenance

● Lack of technical knowledge for the user

● Taking care of seasonal product

7. Business Opportunity

Many businesses are not clear with their pricing of a product and how to retain their customers. In each small business one desired to turn their temporarily customers into regular customers. According to demand of customers and behavior every time one has to make production.

Small case business is very specific about their product. They exactly know what is the gap between the customer's need and other large-scale business not fulfilling their need, hence probability of success of small case business increases.

During pandemic many people shift their business from offline mode to online mode hence it becomes easy to increase the no of customers and provide best service to the customers. Machine Learning model can be used to find trends in customers behavior which can in return help to grow a business. In order to grow business, we need machine learning models with the help of machine learning model we can advertise our product on many popular ecommerce websites and grow our business.

Finally, Business is all about sharing our best product and make the customer's life better. Business gives us the opportunity to serve in the world and add values in the others life.

8. Final Product Prototype (abstract) with Schematic Diagram

The final product is a service that provides small businesses with detailed information on what price they have to sell their product so that increasing of price not effect on customers and they also are in benefit with retain their customers.

The service implementation of machine learning model and associated to technique on the dataset of transactions collected from the shopkeepers/vendors

- Decide a price suitable for that product and count how many customers are come to buy that product.
- Repeat this same technique after increasing/decrease the cost of product and see how many customers are come to buy that product
- Repeat this procedure for some suitable prices and observe customer behavior according to price

Collect this data of on what price how many customers are gave good or bad response maintain this record, after collecting sufficient data we can use model to set a proper price according to customer behavior.

14. Code Implementation/Validation on Small Scale: -

How we can use machine learning model in small Business, Here we taken sunflower selling business as example

```
In [26]:    1  # import requared libraries
            2  import numpy as np
            3  import pandas as pd
            4  from sklearn.model_selection import train_test_split
            5  from sklearn.metrics import classification_report, confusion_matrix, accuracy_score
            6  from sklearn.svm import SVC
            7  import seaborn as sns
            8  import matplotlib.pyplot as plt
```

```
In [2]:     1  # read data
            2  df=pd.read_csv('F:/Feynn/occ-svm-main/data.csv')
            3  df
```

Out[2]:

	Product	response
0	3.48	1
1	6.33	1
2	5.17	1
3	0.97	2
4	6.11	1
...	...	...
195	4.81	1
196	5.45	1
197	3.47	1
198	6.58	1
199	6.55	1

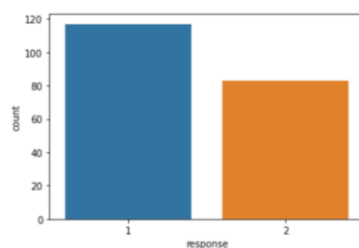200 rows × 2 columns

```
In [12]:    1  df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200 entries, 0 to 199
Data columns (total 2 columns):
 #   Column     Non-Null Count  Dtype
---  ------     --------------  -----
 0   sunflower  200 non-null    float64
 1   response   200 non-null    int64
dtypes: float64(1), int64(1)
memory usage: 3.2 KB
```

EDA

```
In [16]:    1  sns.countplot(x='response',data=df)
```
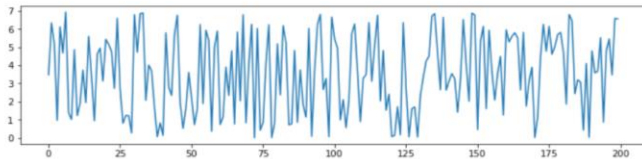
Out[16]: <AxesSubplot:xlabel='response', ylabel='count'>

response

In [5]: ▶ 1 df['Product'].plot(figsize=(12,3))

Out[5]: <AxesSubplot:>

In [6]: ▶ 1 X = df.drop('response',axis = 1)
        2 y= df['response']

In [7]: ▶ 1 X,y

Out[7]: (Product
       0   3.48
       1   6.33
       2   5.17
       3   0.97
       4   6.11
       ..   ...
       195   4.81
       196   5.45
       197   3.47
       198   6.58
       199   6.55

       [200 rows x 1 columns],
       0   1
       1   1
       2   1
       3   2
       4   1
       ..
       195   1
       196   1
       197   1
       198   1
       199   1
       Name: response, Length: 200, dtype: int64)

Split the data into train and test

In [6]: ▶ 1 X_train, X_test, y_train, y_test = train_test_split(X,y,train_size=0.7)

Fit SVM model

In [7]: ▶ 1 svclassifier = SVC(kernel='linear')
        2 svclassifier.fit(X_train,y_train)

Out[7]: SVC(kernel='linear')

In [8]: ▶ 1 y_pred = svclassifier.predict(X_test)

Fit SVM model

In [7]: ▶ 1 svclassifier = SVC(kernel='linear')
        2 svclassifier.fit(X_train,y_train)

Out[7]: SVC(kernel='linear')

In [8]: ▶ 1 y_pred = svclassifier.predict(X_test)

In [9]: ▶ 1
        2 b=confusion_matrix(y_test,y_pred)
        3 print(classification_report(y_test,y_pred))

              precision   recall f1-score   support

           1   1.00   1.00   1.00   31
           2   1.00   1.00   1.00   29

    accuracy   1.00   60
   macro avg   1.00   1.00   1.00   60
weighted avg   1.00   1.00   1.00   60

Result

In [10]: ▶ 1 b

Out[10]: array([[31, 0],
               [0, 29]], dtype=int64)

In [11]: ▶ 1 accuracy_score(y_test,y_pred)

Out[11]: 1.0

GitHub link

[rahulbf3569](#)/[Machine-Learning-Model-that-Helps-Small-Businesses-Grow](#)

15. Conclusion

Through Above scenario, we learned how to implement One-Class Classification (OCC) using Support Vector Machines (SVM) and created a model that can predict the response of customers based on how much I lowered the price of product. Any Small Business scenario with a product and customers works for this model and valuable information about customer behavior can be revealed. This SVM model can point out where an owner needs to focus on and what they need to market to optimize their business.