

Customer Feedback Analysis using Machine Learning

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Abstract

In this project I have proposed the Idea of Customer Feedback Analysis using Machine learning and Artificial Intelligence to improve the quality of products which are produced by small businesses or start-up companies. Small or Medium Businesses and Start-up companies now-a-days are rapidly growing not only in India but also in so many countries across the world. And they are contributing so much of revenue towards their nation. But most of these Businesses and companies are getting shutdown within less time due to the quality of products or services they provide to customers and not concentrating on the feedback of customers. Feedbacks are one of the important aspects of a growing or successful business. Feedbacks not only help you to understand your mistakes but also your strengths and mistakes. In the long run, good feedbacks can help you market your products on its own and drive your sales in huge numbers from various unexpected sources.

In this project I have created a machine learning predictive model which can predict whether a customer liked a product or service of a company based on the reviews and rating given by the customer.

“We all need people who will give us feedback. That's how we improve.” – BILL GATES

1. Problem Statement

The problem statement is to apply Customer Feedback Analysis in order to analyse the Feedbacks of the customers on various products and services and make decisions from it. We know that sometimes Negative Feedback also helps companies to improve the quality of products by rectifying their mistakes over the product. There will be large number of feedbacks we get from the customers and it is difficult to judge whether a customer liked a product or not based on the reviews and ratings. And through this project I have created a Model which can take reviews and ratings as input and predicts whether it is liked by the customer or not and analyse the feedback for the improvement of product generation and sales.

2. Market/Customer/Business need Assessment

Without any dispute, Small and Medium Businesses are one of the key drivers behind this growth story. This sector, comprising of manufacturing, infrastructure, service industry, food processing, packaging, chemicals, and IT, has emerged as the most vibrant and dynamic engine of growth of Indian economy over the past few decades. Number of SMEs in

India: The number is estimated to be at 42.50 million, registered & unregistered together. A staggering 95% of the total industrial units in the country. SME & Employment opportunity: Employs about 106 million, 40% of India's workforce. Next only to the agricultural sector.

3. Target Specifications

Through this project a machine learning model is created which predicts whether a customer likes a product/service or not, offered by the company. And by analysing the feedback data which is given by the customers, a company can identify their mistakes over the product and resolving the issues helps them to improve their service. Feedback is the most important feature for the companies for their improvement, growth and Long Running ability in the society.

4. External Search

The sources that have been used to collect the information are described below-

1. <https://www.evoma.com/business-centre/sme-sector-in-india-statistics-trends-reports/#:~:text=Number%20of%20SMEs%20in%20India,only%20to%20the%20agricultural%20sector.>
2. <https://www.startupyo.com/feedbacks-for-small-businesses/>
3. <https://www.sentisum.com/customer-feedback-analysis>
4. <https://getthematic.com/insights/customer-feedback-analysis-how-to-analyze-feedback/>

In this feedback analysis project, I have assumed the company to be leading restaurant group and the dataset is-

<https://www.kaggle.com/datasets/suraj023/restaurant-reviews-dataset>

5. Benchmarking

Most of the MNC's and Biggie companies uses this feedback analysis to analyse the feedback data given by their customers to develop their strengths and insights. We all know that **Amazon** is an American multinational technology company which focuses on e-commerce, cloud computing, digital streaming, and artificial intelligence. When they launch a new product in their site, they always try to gather the feedback about the product and try to improve their product's quality and to continue their company's legacy. Recently they have launched Amazon Alexa. Alexa is Amazon's voice AI. Alexa lives in the cloud and is happy to help anywhere there's internet access and a device that can connect to Alexa. Making Alexa part of your day is as simple as asking a question.

They are developing Alexa from 2013 and always tried to reach customer satisfaction by knowing their response. And these type of feedback services makes a company from small to a biggie.

6. Applicable Patents

- [Feedback and Sentiment Analysis method](#)
- [Feedback and Likelihood Prediction Technique](#)

7. Applicable Regulations

- 1) Consumer Protection Act (2019).
- 2) Data Protection and Privacy Regulations (Consumers).
- 3) The Copyright Act (1957).
- 4) The Patents Act (1970).

8. Applicable Constraints

- 1) Data (feedback) Collection from Customers.
- 2) Continuous Feedback collection and maintenance.
- 3) Required More Tech (Data Science and Data Analyst) Teams for operating and processing the data.
- 4) Requires Advanced Technology for upgrading day-by-day.

9. Business Opportunity

Now-a-days In India so many small and medium businesses and start-ups are being started and more employment opportunities are available. But the only thing is that these companies are being shutdown in very less time because of their lack of concentration on their products and people's opinion on their service. Positive feedback on a product only, gives a company long life in the society. Companies should always think to increase their product/service quality to meet customer requirements and Expectations.

So collecting the feedback and working on it, gives company a clear vision to improve their quality and performance, helps to minimize the errors made by the companies And also gains a huge fame and extra orders in the market, which results in the company growth.

10. Concept Generation

This concept is generated from the point of view of customers and also being successfully implemented in now-a-days. The company which prefers it's customers first than money will be the most successful one. And choosing machine learning for this project will be the best choice as Artificial intelligence is rapidly growing these days and has a better scope in the future. And for this project we will have to work more on Data related things which is easier through Machine learning. Machine learning has many Predictive Algorithms which can be used in these data related problems to predict the results.

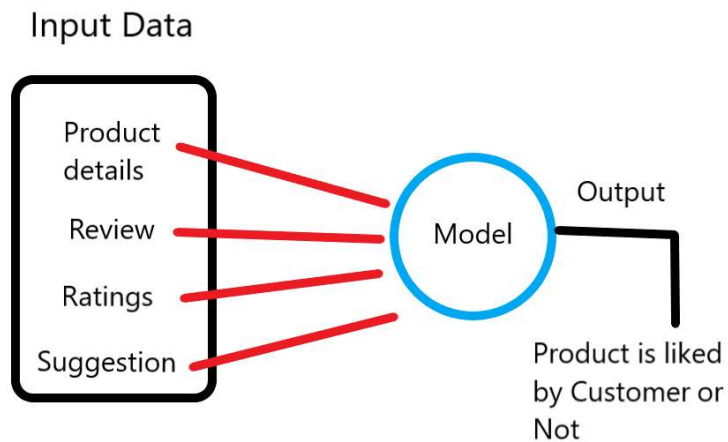
11. Concept Development

The product I am proposing is Customer feedback Analysis. The product can be used to predict whether a product is liked by the customer or not. It will use a machine learning model which will be trained on a dataset which contains of Product details, Customer reviews, Customer Ratings, Suggestions etc. The machine learning model will analyse the data and draw inference from it to estimate the likelihood of the product. Hence in this way the company can be aware that if their products have any disadvantages and problems and can try to reduce the problems.

12. Final Product Prototype

The final product of this project will be a web application which will provide the Small and medium Businesses and start-up companies with the analysis of the quality and Likelihood of their products. It will also identify the disadvantages and mistakes of the product. And helps to overcome those mistakes.

The Schematic Diagram for the machine learning model will be as follows –



13. Product Details

13.1) How does it work?

The final product of this project will be a web application which will take the data of product details, Customer Reviews, Customer Rating and suggestions etc. and finally predicts whether the customer liked the product or disliked it. Firstly a Machine learning Model is created using the dataset, and the dataset will be divided into training data and testing data and the model will be trained using training data.

After the model is trained, then testing data is used to calculate accuracy score of the model. And then we can pass new input data to get the predicted results.

13.2) Data Sources

The data required for this project can be acquired using feedback forms or from other public sources like Kaggle etc.

13.3) Algorithms and Frameworks

Web application can be developed using HTML, CSS, JavaScript and Flask Framework.

Whereas the Machine Learning Algorithms used are:

- 1) Gaussian Naïve Bayes Algorithm
- 2) Decision Tree Classifier
- 3) Random Forest Classifier.

13.4) Team

The Team required to develop this project will be as follows –

- 1) Web Developer.
- 2) ML Engineer.
- 3) Data Analyst.

14. Code Implementation on a Small Scale

I am submitting my GitHub repository link below in which I have done a small scale implementation of the Feedback Analysis and Likelihood predictor in Python.

GitHub Link – <https://github.com/danushtokala/Customer-Feedback-Analysis>

15. Conclusion

A Small and medium business or start-up company's growth and development is always dependent on the customers satisfaction and likelihood on their products or services. And collecting the opinions of the customers as feedback is always a good thing which can tell us whether the product is good or bad and it is worth or not. This helps us to determine the advantages and disadvantages of the products/services. And through all this feedback, company can modify the product to reach customer expectations and growth of the company simultaneously increases.

