**Sentimental Analysis on Amazon Ring Video Doorbell.**

Sentimental analysis is the process of detecting positive or negative sentiments in text. By using this analysis we can identify 4000+reviews about one product and help discover if customers are happy. In this NLP project my team and I are going to perform a sentimental analysis on one of the top selling Amazon product Ring video doorbell based on 63156 customer ratings and reviews.

**Team Members:**

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**GitHub Link** : https://github.com/PriyankaGopu/Sentimental\_Analysis.git

**Motivation:**

We have been inspired by sentimental analysis, a kind of data mining where you measure the inclination of people’s opinions by using NLP , text analysis, and computational linguistics. We perform sentiment analysis mostly on public reviews, social media platforms, and similar sites. However, analysis of social media streams is usually restricted to just basic sentiment analysis and count based metrics. This is akin to just scratching the surface and missing out on those high value insights that are waiting to be discovered.

With the recent advances in deep learning, the ability of algorithms to analyse text has improved

considerably. Creative use of advanced machine learning techniques can be an effective tool for

doing in-depth research. Thus, we would like to explore ourselves more on product-based

customer review analysis in one of the world's largest e-commerce websites Amazon. We chose

Amazon Ring Video Doorbell product for sentimental analysis since it has given top ratings and

nearly thousand people's questions were readily answered.

We also believed to classify incoming customer conversation about a brand based on following lines:

1. Key aspects of a brand’s product and service that customers care about.
2. Users’ underlying intentions and reactions concerning those aspects.

**Significance:**

* Sentimental analysis is a proven predictive indicator of customer satisfaction widely applied to voice of the customer materials such as reviews, survey responses , online and social media.
* Discover the customer experience and operational efficiency.
* By using these analysis we can help superior customer service at lower cost
* Identifying key emotional triggers
* Handling multiple customers
* Live insights and quick escalations

Feeling investigation worries about naturally distinguishing opinion or

assessment communicated in a given piece of text. Most earlier work either use earlier

lexical information characterized as opinion extremity of words or view the undertaking

as a message grouping issue and depend on a named corpora to prepare a feeling

classifier. The lacking data that is related with the minority class obstructs making an

unmistakable comprehension of the inborn design of the dataset. Most existing

grouping techniques tend not to perform well on minority class models when the

dataset is amazingly imbalanced, on the grounds that they mean to improve the

general exactness disregarding the overall appropriation of each class.

Our outcomes from sentimental analysis on this product show a normal increment of F consonant exactness score for recognizing both negative and positive feeling over the baselines of unigrams and grammatical form separately. The results could be additionally utilized by expert engineers in the source district to measure the dormant interest for their abilities in different areas and along these lines to focus on the internationalization of their abilities appropriately.

**Literature review**

In "Sentiment Analysis in Amazon Reviews Using Probabilistic Machine Learning," Rain and Callen extended existing work in the disciplines of natural language processing and sentiment analysis to data from Amazon review datasets. It was used to extract characteristics from a bag of words in this investigation. This approach might be used to develop systems that assess diverse collections of data, however it may be more effective with smaller datasets. When dealing with small data sets, the algorithms performed effectively, even when training and testing on dramatically dissimilar commodities. This might be used to evaluate not just various things, but also different features of a same product. To identify whether a review was positive or negative, we used naïve Bayesian and decision list classifiers. They've picked books and written reviews for Amazon's Kindle section. As you can see, the accuracy of Naive Bayes is rather good in both scenarios, for both the book review and the kindle. This is because Naive Bayes is a simple algorithm. This approach employs just the text that has the greatest likelihood of being classified correctly, while decision List does not utilize any of the text that has the highest probability of being classed correctly. The more samples used, the longer it will take decisionList to finish the classification process, and in certain cases, it may be unable to do so at all.

Elli Maria and Yi-Fan[10] released "Amazon Reviews, Business Analytics with Sentiment Analysis," in which they gathered and evaluated sentiment from Amazon reviews in order to construct an Amazon business model. The objective of this essay is to extract sentiment from over 2.7 million reviews and to investigate the commercial implications of such feelings. It's called Amazon product data, and it's the dataset on which our research is based. They assert that the tools they have offered are sufficiently robust to ensure high levels of accuracy. Their selection was more appropriate due to the application of business analytics. Additionally, they focused on understanding emotions in reviews, distinguishing gender based on names, and detecting fraudulent reviews. At the time, Python and R were the most extensively used programming languages.

They mostly used multinomial naive bayesian (MNB) and support vector machine (SVM) classifiers. The classifiers utilized are Multinomial Naive Bayes (MNB) and Support Vector Machine (SVM), which were created using the Python programming language by Joachims et al. (1998). They trained both classifiers using 50% of the data and then tested them with the remaining 50% of the data to assess the classification's accuracy. Both cases are quite precise. Take note that the processing timeframes for the two procedures are radically different. This is because Naive Bayes is a simple algorithm. This technique utilizes just fundamental arithmetic operations, while SVM does not. With an increase in the number of samples, SVM will take an increasing amount of time to finish the classification process, and in certain cases, will be unable to do it at all.

**Objective:**

In order to illustrate that text reviews can be mined through and feature-based feedback can be extracted for any product, a prototype is being developed. This system may be configured to utilize text reviews from any online buying website, such as eBay, Target, or Walmart, with only minimal modifications to the implementation portion. The dataset for the creation of such a system was derived from Amazon reviews and product sales data. Identification of significant aspects of the product is accomplished via the use of Natural Language Processing and text mining methods. The polarity (positive or negative) of each review is determined by using sentiment analysis. The result is generated by the application of machine learning techniques.The objective is by using the Sentiment analysis, which is used to analyze the customer reviews and then it classifies the sentiment as Positive, Negative or Neutral, in order to understand the customer opinion on Amazon Ring Video Doorbell.There are mainly two types of approaches used for

sentiment analysis.

They are:

I, Lexicon-based approach

Ii, Machine learning Based approach

* Here, we are using the second approach i.e Machine learning based approach.
* Machine learning based approach means here we Develop a classification model, which is trained using the pre-labeled dataset of positive, negative and neutral.
* We use NLTK. NLTK stands for Natural Language Toolkit. This toolkit is one of the most powerful NLP libraries which contains packages to make machines understand human language and reply to it with an appropriate response
* NLTK consists of the most common algorithms such as tokenizing, part-of-speech tagging, stemming, sentiment analysis, topic segmentation and named entity recognition. NLTK helps the computer to analyze, preprocess,and understand the written text.

Here, we take the data and then perform the Tokenization, preprocess the data,

* .Feature engineering, Model building and Model evaluation.
* Hence we use both analysis and analytical skills to prove our data is correct .

**FEATURES:**

Amazon Ring Video Doorbell is the one of the most commonly used products in every home to Keep Home &amp; Neighborhood Safe. It is the newest generation, 2020 release – 1080p HD video, improved motion detection, easy installation.There are almost 63,200 reviews for this amazon product. The Smart Security starts at the front door. Using this product we can see, hear and speak to visitors from anywhere. We can completely control it from the Ring app. It works with Alexa. Receives the mobile notifications when anyone presses the doorbell or it triggers the built-in motion sensors. We can adjust motion settings. So that, we can focus on key areas and we only receive notifications when we want. We can Pair with select Alexa-enabled devices to enable announcements and two-way talk for convenient in-home monitoring. There are different configurations like Doorbell only, With Echo Show 5, With Ring Chime, with Ring Stick Up Cam Battery. Powered by the built-in rechargeable battery or connected to existing doorbell wires for constant power. There are three types of video Doorbells. They are: Ring Video Doorbell, Ring Video Doorbell 3, Ring Video Doorbell 4. The Ring Video Doorbell and Ring Video Doorbell 3 are of 2020 release and Ring Video Doorbell is of 2021 release which is the latest.

A significant shortcoming of existing sentiment analysis tools when it comes to the problem of new products is that the text collected automatically has only a small number of insightful elements while simultaneously including a huge amount of useless information. It is common for users' subjective, distinctive, and emotional experiences to be connected with the noisy information they get. Furthermore A person's sentiments are naturally subjective from person to person, and they might even be completely unreasonable at times. An individual's sentiment toward a brand or product may be influenced by one or more indirect causes; for example, someone who is having a bad day may tweet a negative remark about something about which they otherwise had a fairly neutral opinion may be having a bad day because they are feeling down. In this case, we are able to solve this issues by choosing a product that has been in the market for sometime. We also chose the product based on a good number of positive reviews which makes it less likes to have sentiments based on irrationality.

By applying sentimental analysis to this product we can derive analysis and analytical conclusions.

**Related Work(Background):**

The approach of sentimental analysis to the data from the amazon review datasets, we can extract more effective characteristics, features of a same product. This is used to evaluate positive or negative decision list classifiers. The more samples that is used the longer it will take the decision list to finish the classification process. We have taken 64000 reviews for amazon ring product with features like reviews, prices, description and ratings,

**Dataset:**

We have derived the result.xls dataset for amazon ring product.

Details design of features:

There are three types of video doorbells

1. Ring video doorbell
2. Ring video doorbell 2020 release
3. Ring video doorbell 2021 release

By applying the sentimental analysis to all these products based on the good number of positive reviews. We can derive analysis and analytical conclusions.

**Analysis:**

By Analyzing the reviews of all the three types of amazon ring product, we can conclude which product is the most customer friendly. It is common for user's subjective, distinctive and emotional experiences to be connected with the noisy information they get. It is naturally subjective from person to person.

**Implementation:**

The source code contains pip install bs4, lxml, request, selenium. We have imported beautiful soup which is a python library for extracting data out of html and xml files. It works with web driver <https://www.amazon.com>. Generating url from search term <https://www.amazonringvideodoorbell.com.> It works with favorite parser to provide idiomatic ways of navigating, searching and modifying the parse tree.

**Preliminary results:**

With the preliminary result, we can conclude that amazon ring video doorbell 2020 release has achieved 4.7 ratings out of 5 stars which is the median value calculated out of 67643 reviews. The median price range is also calculated as 99$.

**Project Management:**

Project management is the use of specific knowledge, skills, tool and techniques to deliver something of values to people. In this project, we tried to help people understand the best amazon ring product.

**Implementation status report:**

**Work Completed:**

**Description:**

We have completed the python code to derive the reviews from the amazon website of the amazon ring video doorbell product. We have been inspired by sentimental analysis to measure people's opinion by using NLP and Text analysis.

**Resposibility:**

Priyanka Gopu – Worked on Introduction, Significance and literature review and Worked on the Source code

Vijaya Maneesha Reddy Duggimpudi – Worked on the Objective and Features and Worked on source code

Manvitha Reddy Karra – Worked on Motivation and references and Worked on source code.

**Contributions:**

Priyanka Gopu – 33.5

Vijaya Maneesha Reddy Duggimpudi – 33.5

Manvitha Reddy Karra – 33

**Work to be completed:**

**Description:**

From the derived dataset, we have to imply more analytical and analysis skills to achieve in finding the most customer friendly amazon ring product.

**Responsibility:**

Priyanka Gopu – Analysis, Analytics and Data Visualization

Vijaya Maneesha Reddy Duggimpudi - Analysis, Analytics and Data Visualization

Manvitha Reddy Karra - Analysis, Analytics and Data Visualization

**Issues/Concerns:**

We have faced the difficulties in deriving the dataset.

Complications in filtering the data.

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