NAME: DAMILARE SADIQ
SUPERVISOR: USAMA SHAID
DEPARTMENT: DATA SCIENCE

UNIVERSITY OF GLOUCESTERSHIRE
SCHOOL OF COMPUTING AND TECHNOLOGY

SALES GROWTH THROUGH SENTIMENT ANALYSIS

OPTIMIZING CUSTOMER SATISFACTION AND SALES FORECASTING THROUGH SENTIMENT ANALYSIS OF AMAZON PRODUCT REVIEWS

1. INTRODUCTION

This research aims to employs sentiment analysis to examine Amazon customer opinion on product reviews to identifying key factors that impact customer satisfaction with descriptive analysis and using predictive analysis to forecast the sales trend. Analysing unstructured textual reviews and ratings provides actionable insights in enabling Amazon and other merchants to make data-driven decisions in product development, marketing, and inventory management.

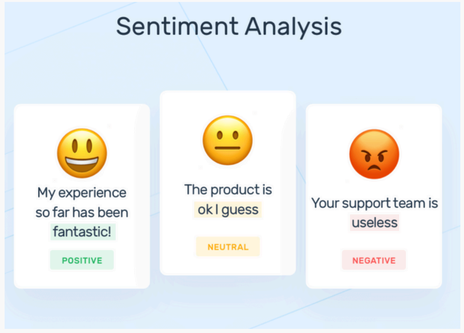

Fig 1: Customers reaction in sentiment analysis (AIM Technology).

2. PROBLEM STATEMENT

The challenging task of extracting valuable insights from the large diverse amount of customer review which are mostly unstructured and vary significantly in tone, context, and detail is the focus of this study. Accurately assessing customer emotions and predicting sales patterns are further complicated by the changing market dynamics along with additional influences like social media and seasonal variations.

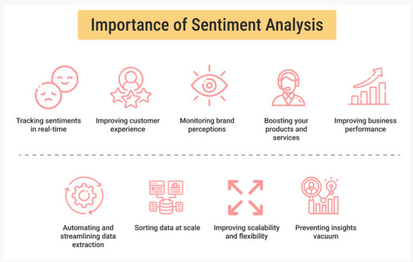

Fig 2. Importance of Sentiment Analysis (needl ai).

AIMS AND OBJECTIVE

- To develop and evaluate advanced analytical tools to better understand Amazon customer reviews.
- To utilise exploratory, descriptive, and predictive methodologies to analyse customer sentiment and feedback.
- NLP and data analysis models will be employed to extract insights.
- These insights will support improved strategic decision-making and precise forecasting of sales trends.
- To addresses the needs of businesses to adapt in a competitive, rapidly evolving market by making data-driven decisions based on customer feedback.

3. LITERATURE REVIEW

In order to overcome unstructured data issues, context dependence, and sales forecasting gaps, key literature places a strong emphasis on sentiment analysis and NLP with descriptive and predictive analysis to understand the flow of the feedback and trends of the sale..

SENTIMENT ANALYSIS

The review explores sentiment analysis in e-commerce, focusing on techniques, challenges, and improving decision-making.

DESCRIPTIVE ANALYSIS

Determines consumer trends and e-commerce trends; impacts strategic choices

EDA & PREDICTIVE ANALYSIS

Aids in identifying the factors impacting purchasing, trend forecasts, and insights.

NATURAL LANGUAGE PROCESSING (NLP)

This review explores NLP advancements, sentiment analysis processes, and consumer feedback impacts on e-commerce and insurance, emphasizing business adaptation and ethical analytics for improved customer satisfaction.

ETHICS ISSUES

Exploring data privacy, algorithmic bias, transparency, and potential misuse, ensuring responsible handling of sensitive data and fair, unbiased model development.

4. METHODOLOGY

The research employs sentiment analysis for the polarity of text, utilising natural language processing, descriptive analysis and machine learning techniques to analyse trends and forecast sales patterns.

SENTIMENT ANALYSIS

The polarity of the customer's opinion which include the text reviews and ratings will be gotten in setiment anlysis.

Fig 3: Kausar, M.A. et al. show sentiment analysis approach.

DATA COLLECTION

Data from sales data, ratings and reviews will be gathered in an ethical manner from open source, using both organised and unstructured formats.

DATA CLEANING

Data will be cleaned where all the special character will be removed and make it ready for analysis.

FEATURE EXTRACTION AND NLP

Unstructured text will be standardised and organised using NLP preprocessing techniques, preparing it for better modelling and analysis.

WORD CLOUD

Word cloud of the reviews will be be gotten where significant text information in the text reviews will be displayed.

Fig 5: Kausar, et al show the word cloud of reviews.

DESCRIPTIVE ANALYSIS

Customer sentiments and patterns in the reviews will be compiled and examined using descriptive analytics.

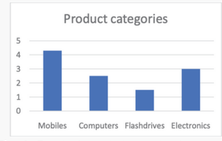

Fig 4: Pankaj et al show the impact of descriptive analysis in some products.

CLASSIFICATION & EDA

The reviews will be classified and visualised base on the sentiment scores.

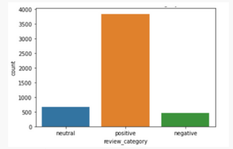

Fig 6: Kausar, et al show the distribution of a sentiment reviews.

PREDICTIVE ANALYSIS & EVALUATION

The goal of predictive modelling is to use sophisticated machine learning algorithms to produce forecasts of sales based on review data and evaluate the model prediction result.

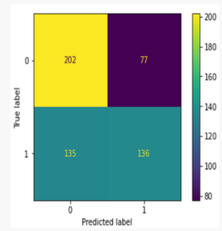

Fig 7: Gupta et al show evaluation of a ML model confusion matrix

5. CONCLUSION

This study will help improve inventory management, customer satisfaction, and strategic marketing decision making in e-commerce companies by providing e-commerce information on customer sentiment and sales trend.

REFERENCES

- Birjali, M., et al, 2021. Knowledge-Based Systems, 226, p.107134.
- Pankaj, P. and Soni, N., 2019, Amazon product reviews. (COMITCon) (pp. 320-322). IEEE.
- Dey, S., et al, 2020, sentiment analysis on Amazon product reviews. (IC3A) (pp. 217-220). IEEE.
- Bhatt, A., et al 2015. Classification and sentiment analysis. International Journal of Computer Science and Information Technologies, 6(6), pp.5107-5110.
- Kausar, M.A., et al 2023. Sentiment Classification. Engineering, Technology & Applied Science Research, 13(3), pp.10849-10855.
- Gupta, K., et al 2023. Approach of sentimental analysis using ML. Revue d'Intelligence Artificielle, 37(1), p.1.