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MIS716 –Artificial Intelligence for Business -Trimester 1 Assignment 1

Table of Contents

[1. Executive Summary 1](#_Toc68271471)

[2. Introduction 1](#_Toc68271472)

[3. Techniques 1](#_Toc68271473)

[3.1 Aspect level sentiment Analysis 1](#_Toc68271474)

[3.2 Personalisation through AI Chatbot 2](#_Toc68271475)

[3.3 AI based recommender system 3](#_Toc68271476)

[3.4 Targeted Email marketing using predictive analysis 4](#_Toc68271477)

[4. Summary of Techniques 5](#_Toc68271478)

[5. Conclusion and Recommendations 7](#_Toc68271479)

[References 7](#_Toc68271480)

# Executive Summary

In this report, we discuss some of the features of Vera Lee and the techniques to improve the technological side of business by using the AI solutions suggested.

Vee Lee is the key to enhance the user experience of Vera Lee’s customers. To improve Vee Lee, we need to collect data from the customer using our new intelligent AI based chatbot which will collect real time data and analyse in instantly. It will not only help to upscale the sales but also market more products to the customers. Secondly, the aspect level sentiment analysis (Satuluri Vanaja & Belwal, 2018) should be used to provide powerful insights after sales for further improvement in the feedback for the improvement of the service and user experience. Furthermore, the AI based recommender system can be used to upselling or cross selling which will depend on the data from the chatbot, and the data bases already installed in the data warehouse. For marketing, targeted audience is best way to spend the right amount on the right people who have more probability to buy the products which are being sold by Vera Lee. The right technique for this is to target the selected audience and advertise through email. By implementing these techniques, we can expect to see a major positive change in the business.

# Introduction

The largest E-commerce seller is Amazon, and they are constantly using Artificial intelligence to improve their system and the user experience. As the industry report of Amazon (Amazon.com, 2003: 77-79) suggests that the targeted marketing by creating a personalized shopping experience for each customer is key for the success of any online business.

As the world in moving towards Artificial Intelligence and automation, Vera lee has already taken first step towards the success of their brand after the setback in pandemic time. The software Vee Lee has a lot of potential, but it is still in early stage. Vee Lee should be used separately in each case such as marketing, sales and post-sale. Here, we suggest how this technology can be implemented to gain the maximum output from this new technology.

# Techniques

## Aspect level sentiment Analysis

Vee lee has an advantage of collecting big data from the data warehouse. This data can be stored in the form of text from multiples sources like customer reviews, feedback, social media or discussion. It is a Natural Language processing technique which extract emotion and categories the emotions into three parts such as positive, negative and neutral (Satuluri Vanaja & Belwal, 2018). The Figure 1 explains the process of how the customer reviews can be transformed into only three categories.

After gathering and processing the data, this can be used to create the dashboards which will help the company to analyse the post-sale reviews in no time.

Diagram

Description automatically generated

Figure 1 : (Satuluri Vanaja & Belwal, 2018). Aspect-Level Sentiment Analysis on E-Commerce Data. Proceedings of the International Conference on Inventive Research in Computing Applications (ICIRCA 2018).

## Personalisation through AI Chatbot

Chatbots are being widely used in e-commerce to help customers with the basic navigation through the website. We propose an intelligent personalised chatbot Vee Lee which will be the additional feature to help customers to make a personal profile and suggest the products by collecting the real time data from the chat. It will be done in three steps (F. Abbattista, M. Degemmis, O. Licchelli, P. Lops, & Zambetta, 2001).

1. Profile Extraction
2. Personalization
3. Discovery of preference, need or interest of the customer

As the customer enters the website, it will engage into the conversation with the customer and will keep on extracting the data and storing into data base. The next step would be personalization which means if the customer is looking for a specific designer, it will show him the range of the designs from the same designer. The advantages of using this approach are making the shopping experience more pleasing for users and getting customer trust and confidence as if they are regular customer, they do not have to insert the same information again, but the system is aware of their choices already and are suggesting the products accordingly.

We, now, explain by an example (Figure 2 and 3) of how this personalisation will work and how the customers can benefit from it. It will not only help upscale the business but also the sales will be increased if the customers find quickly what they are looking for.

Text, letter

Description automatically generated

Figure 2: An example conversation between bot and user.

Graphical user interface, application

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Figure 3: The results after the personalisation of the profile

## AI based recommender system

Once the customer enters the e-commerce stores, Vee Lee is able to collect the data from the customer profile. Data can be collected through the chatbot we suggested to implement before, or the data can be from different sources such as web browsing history or product search history. If we want to provide customers with different personal options in the shopping, AI bases recommender systems with recommendation techniques have been widely applied, those are already being considered as the one of the important methods of personal service in e-commerce experience. The personalized AI based recommender systems present different items for customers according to different tastes. Also, these systems could not only reduce the searching time for the items which customer is looking for, but also enhance Vera Lee sales by making browsers into customers, increasing cross-sell and building the loyalty of the customers (Scharer, et al 2001).

(K. Wei et al. 2007) studies three methods of recommender systems:

* Collaborative filtering approach
* Content based filtering approach
* Hybrid filtering approach

These approaches are used but these all have some disadvantages as not all the recommended products can be liked by the customer. By analysing the potential of the company, we suggest to go-ahead with the hybrid filtering which is illustrated by the figure below.

Diagram

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Figure 4 Hybrid recommender system

## Targeted Email marketing using predictive analysis

Internet advertising expects to advance items or brands through at least one types of electronic media. email is one of the significant electronic advertising media. In this media, the pace of opened messages is a basic factor to assess the adequacy of focused showcasing through email. In the event that a framework can anticipate the opened rate for a promoting email before it is conveyed to the beneficiaries, that could be exceptionally useful to the sender to improve the adequacy of the marketing.

This study (Luo et al., 2015) suggests utilizing a learning model for anticipating the "open" and "unopen" of targeted email marketing. This model depends on the highlights removed from the messages and the customer profiles. Two arrangement strategies are looked at for anticipating whether an email composed will be opened by a likely beneficiary or not. They are the Decision Tree classifier and the SVMs classifier. The outcomes show that the Decision Tree classifier performs better taking all things together in every situation.

The accuracy of this model is 80%. This model can benefit us if we enhance Vee lee to collect more data so the predictive model accuracy could be improved. Once the accuracy is over 90%, we can easily predict our audience to market the products where we can achieve more impact on the sales rather than spending money on the marketing blindly. Once we know which type of audience is making an effect on the sales, we can do targeted email marketing for further improvement in sales.

# Summary of Techniques

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| AI Technique | Data sourcing | AI Application | Business Context | Benefits and Limitations |
| Aspect level sentiment analysis | Customer reviews, social media feedback,  Discussion of forums | Transforming the uncategorised text data into meaning form. | This technique will be used for analysis of post-sale reviews.  Analysis of post-sale reviews will be used to improve the services like delivery time or the product quality. | The insights will be easy to read and understand to save time and focus more on the business side of the products rather than technical side. The only set back is that the data is taken from different sources so the authenticity of data will be unknown as web as enormous amount of data that can be manipulated by anyone. |
| Personalisation through AI chatbot | Real-time data collection through chatbot | It is used as Intelligent Virtual Assistant.  It is used in technologies like IBM Watson for intelligent chatbots. | It will be used for cross selling and upselling by reviewing the customised personal profile by our system. | Benefits include customer satisfaction and less load on the human assistants. The set back is some people do not provide information to the chatbots and prefer to speak to someone on the chat or phone. |
| AI based recommender system | Chatbot, Browsing history, product search history | Analysis and prediction of future data. | It will used for upscaling and boost the sales of the business by suggesting more products relevant to the customer’s search. | It will enhance the user experience for shopping, but we need huge amount of data for better results. Since it is using machine learning so the results would improve but the speed will gradually reduce. |
| Targeted Email marketing using predictive analysis | Data warehouse, Email database | Classification of data to make a model for prediction. | This technique serves two purposes   1. Budget management by selecting the relevant audience for the marketing. 2. Cross-selling through targeted audience which have more probability to purchase the product. | The huge amount of sum spent on marketing and advertising will be saved and company can invest in new technologies.  The set back is the accuracy of this model which is only 80% but with more data and new algorithms this can be improved overtime. |

# Conclusion and Recommendations

It is clear that Vera Lee is in the right direction to implement AI solutions in the business. The AI software Vee Lee is still in its early stage and needs a bigger data set to reach a conclusion about the effectiveness of AI solutions. The current model we suggest implementing is about 80% accurate and uses machine learning algorithms to predict the data. With increase in the data, the model will become accurate but further improvement can be made by using graphical data bases which consumes less space and provide more efficient results.

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