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Development of Sentiment Analysis Model for Women Entrepreneurs to Enhance the Global Business Operations and Marketing

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Abstract:
Internationally, the basic building blocks of any business are strategic design, planning, and operational excellence. Around the world, women are the strong pillars of the family, society, and nation. As of now, organizational automation is considered for process and policy management. Women entrepreneurs are leading businesses with more efforts to sustain business ventures. Certainly, the research needs to identify the micro-level variables that impact business expansion. For any business growth, marketing and operations need to be in synchronization. Hence, this paper presents the new sentiment analysis model, which can be very useful for empowering urban and rural women. Women can identify the business domain and figure out the possible customer base. On the other hand, female entrepreneurs can identify the customer base and set up a new business domain as a product and service provider. The proposed research also presents the micro-elemental matrix, which can benefit any female entrepreneur in evaluating marketing and operations. As a cutting-edge innovation, this paper presents the new machine learning model for business automation.

Keywords: Sentiment analysis, machine learning, women empowerment, women entrepreneur, business automation

1. Introduction

In the framework of friendly entrepreneurship, the previous study signifies that women are a greater fit for commanding social corporations. On the other hand, the significance of gender in the discipline of social entrepreneurship is underexplored and requires further exploration, forming the pillar of this research [1]. Government services, such as offering funds, practice projects, and tax leisure, can be necessary for accomplishing women entrepreneurs' businesses. As per many studies, government support is useful to women entrepreneurs. On the other hand, rigid government guidelines appropriate to opportunities and toward micro and small-sized companies badly impact women entrepreneurs [2].

Entrepreneurship, described in the literature as a procedure by which citizens, possibly on their own or perhaps inside organizations, carry on with prospects without regard to the assets they actively control," is indicated by extreme resource limitations. Entrepreneurs look at and commence new actions irrespective of the shortage of resources. Women'sWomen's community status is restricted by their cultural conditions. Subsequently, the social situations, together with the above-mentioned competing business ecosystem, may be an essential determinant of the business effectiveness of women entrepreneurs [3]. Women entrepreneurs persist in dealing with the multi-tasking whirlpool and the need for more financial assets, promotion abilities, and support solutions, incorporating poor access to business networks, technological know-how, and digital market segments. Despite the majority admittance of women in specifically male domains, glass ceilings have not been broken [4].

No matter what, self-employment and entrepreneurship have been central to women's economic companies, and women's entrepreneurship is a greatly understudied subject in business profiles. Women have taken part in the business universe; however, they have yet to be included in the prominent narratives of its history [5]. An essential alleviation from entrepreneurship analysis is that there are variations in entrepreneurial actions and demonstrations discovered by women and men entrepreneurs in numerous entrepreneurial activities. Especially looking at new incidents such as COVID-19 forms entrepreneurs' learning where the earlier lessons turned into less use [6]. Nowadays, the commercial community is not merely the area of the male. There has been an exceptional development in the several women who set up and managed a business enterprise in Bangladesh. These kinds of businesses hold manufacturing, trading, and service areas. This study attempted to recognize the instigating elements, entrepreneurial accomplishment level, women entrepreneurs' business tactics, and their ideas [7]. Business Process Management (BPM) is a powerful trade that benefits business processes for managing an organization's operations. The corporations that adopt BPM evaluate their operations and develop them to accomplish extreme edge. Contrary to these traditional strategies, this work suggests merging two leading domains, BPM and Natural Language Processing, for investigating business processes [8].

Corporations use these statistics to evaluate customer behavior and determine growing trends in the industry; however, potential clients look for facts regarding product things. Clients value user-generated data more than the details presented by the business. Subsequently, businesses need to keep an eye on how their products are discussed " in the

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wild". Social media has become a fundamental part of promotion tactics; businesses utilize social media for advertising and analysis of market attractions [9].
Hence, the proposed research aims to incorporate machine learning algorithms for customer sentiment analysis, which can boost women entrepreneurs' businesses.

2. Literature Study

We focused on the techno-socio literature studies to analyze the technology used to improve women's business promotions.
The author performed an unsupervised sentiment analysis model that leverages the Polarity Rank algorithm, and a sentence reliance chart is recommended to forecast the sentiments of women in IT. The main goal is to determine categories of customers with prevalent characteristics (community and job role) who had diverse emotions, as well as look into the effect of Diversity Equity and inclusion (DEI) programs on participants' career fulfillment [10]. The outcomes from many of these initiatives can be utilized as a client base that can be analyzed for micro-level studies.
According to the research review, the development of online marketing and the breakthrough of social communities have permitted customers to effectively explore brands/products/services, assess them, express their perspective on them, and even give those grades. Due to the surge of trusted data online, the evolving business environment requires attention to understanding and drawing out important information [11].
Academia and industry are paying attention to Artificial intelligence (AI) methods and approaches to analyze and learn how businesses can attract insights from the considerable online data. As the industry is powered by public views, and social media in the present day gives a stimulating base to reveal ideas and views, businesses and policy-makers can use the natural language processing (NLP) concept of AI to evaluate public emotions [12]. According to the author, realizing the client's behavior and beliefs is crucial for encouraging client fulfillment in promotion research. Client dialogue with client support services with the aid of social network channels gives a wealth of details for understanding client beliefs [13].

In another study, the author accumulated customer ranking statistics from the Yelp website and only cleaned the preliminary data set to include insurance testimonials. Following cleaning, the filtered summary texts were scored as positive, neutral, or negative emotions, and the AFINN and Valence Aware Dictionary for Sentiment Reasoning (VADER) sentiment methods were utilized to rate those emotions. Aside from that, the recent analysis implements five supervised machine learning processes to split client rankings of insurance companies into three sentiment communities [14]. Entrepreneurs employ sentiment analysis to understand better their customers using what is known as the voice of the customer. Realizing client emotions, values, and causes is important for more successful marketing to specific communities. Sentiment analysis is the process of finding, evaluating, and categorizing as negative (−1), neutral (0), or positive (+1) the emotions expressed by individuals in any text data kind [15].

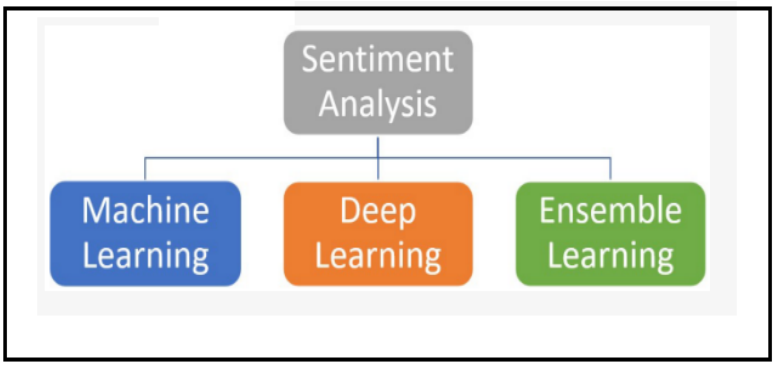

Fig. 1: Classifiers for Sentiment Analysis

Data pre-processing is a crucial stage in the sentiment analysis method, as it allows the standardization of the text data and clears away any unimportant or noisy components. This stage can consist of approaches like stemming, lemmatization, the stripping of stop words, and special characters. The cleansed text data are then altered into features given to the classifier for sentiment auguration. The classifiers applied in sentiment analysis can be classified into three categories: machine learning, deep learning, and ensemble learning [16].

3. Methodology

The proposed methodology focuses on data pre-processing, data classification, and utilization. We used a machine learning algorithm for processing the Tweeter dataset, which comprises the social networking customer feedback about

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various products and services. To extract the sentiment text from customer feedback, we developed a strategy of Sentiment Bag-of-Word, which stores the positive and negative impressions about the product.
Further, as shown in Fig. 2, we activated the analysis model, which further validates the customer sentiments and appreciation sent to positive feedback customers. For negative product feedback, data will be sent to the respective company/sales manager for business improvements.
The proposed research helps the entrepreneur enhance operational excellence by identifying customer fulfillment. This method also contributes to a positive marketing strategy by appreciating customers with product discounts, free products, referral perks, etc.

Fig. 2: Proposed Sentiment Analysis Model

We analyzed text mining using social network software, and the results are presented in the next section of this paper.

4. Result Analysis

We considered the network of 40 customers to identify the single product feedback. We used the new "sentiment bag-of-words" method, as shown by green dots in Fig. 3, the overall customer network.

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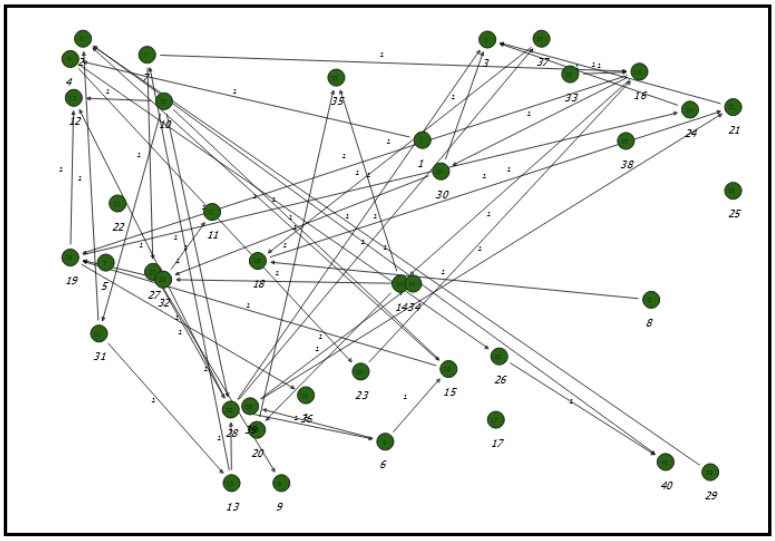

Fig. 3: Customer participation

Further to the execution of the proposed model, Fig. 4 shows the green dots as positive product feedback from customers, and red triangles show negative product feedback based on sentiment extracted from the social network portal.

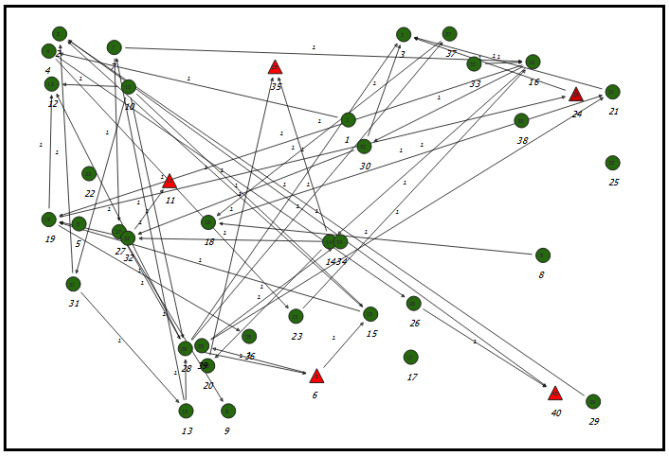

Fig.4: Positive and negative sentiment extraction analysis

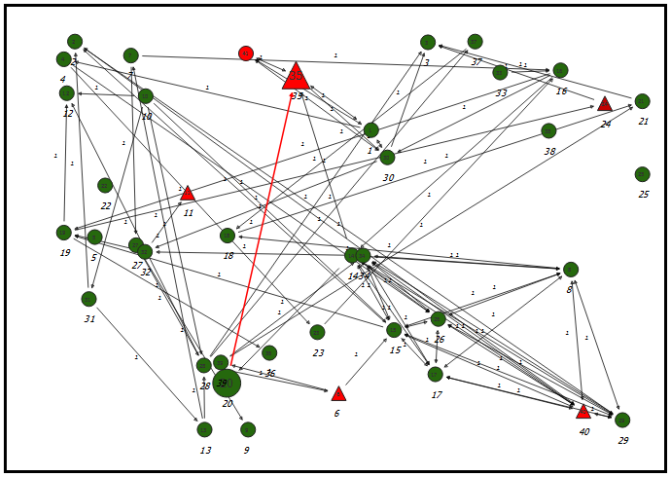

Fig. 5: The key influencer identification for negative customer feedback

As shown in Fig. 5 above, the sentiment classification can identify the key influencer who initiated the negative product feedback, traversing to other customers' replies.

5. Conclusion

According to the proposed methodology, sentiment analysis is an important variable for operational enhancement and positive marketing for any entrepreneur. The methodology extracted sentiments from customer feedback keywords like happy, satisfied, disagree, angry, upset, etc. Based on the machine learning classifier, the final positive and negative product feedback is processed, which is helpful for the company's operations and marketing managers. The proposed research can be further developed as a future scope considering transfer learning.

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