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Application analysis of data mining in shopping APP

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Abstract. Dingdong Buying Vegetable is a cohort of emerging entities that have swiftly gained prominence within the business domain in recent times. The data mining function of its data platform APP is undeniably linked to the underlying factor contributing to its commercial success. This article examines the fundamental principles, practical manifestations, and pertinent research instances of data mining. It specifically centers on the primary interface of the Dingdong Buying Vegetable APP, scrutinizing its design and distinctive attributes tailored to specific customers. Furthermore, it conducts an in-depth analysis of the correlation between the platform's commercial success and its data mining functionality. The primary aspect in which the data mining function of the Dingdong Buying Vegetable APP is expected to be manifested is through extensive data mining. The process of mining client data and conducting a full comparison and analysis of sales data for all products sold is a highly intricate and exhaustive endeavor. The use of these data mining functions serves multiple purposes. Firstly, it efficiently identifies customers' genuine requirements on the client side, enabling the recommendation of suitable products and fostering customer reliance on the application. Additionally, it facilitates accurate decision-making in marketing products on the product side by comparing and analyzing diverse data pertaining to the sold products. This approach helps prevent the sale of unsought items and effectively minimizes company expenditure.

Keywords: Data Mining, Dingdong Shopping APP, Function, Customer.

1. Introduction

The utilization of data mining in contemporary commercial shopping has experienced a notable surge in popularity and is held in high regard by corporations. Following the use of data mining techniques, a data model is constructed utilizing the acquired data to effectively forecast and align with consumer requirements. This model facilitates the categorization and promotion of products that satisfy customer demands, thus augmenting customer reliance and inclination to make purchases through the application.

Prominent shopping applications that employ data mining techniques encompass JD.com, Taobao, Tmall, among others. Several notable commercial applications have been subject to academic scrutiny. For instance, scholarly investigations have been conducted on the data mining capabilities of the JD e-commerce platform [1], the data mining functionalities of the Taobao shopping app [2], and the data mining functionalities of Tmall [3]. The aforementioned research has put forth many recommendations for enhancing the data mining functionality of e-commerce platform applications.

The aforementioned e-commerce platform applications are characterized by their extensive reach and significant impact. However, there is a dearth of pertinent scholarly investigations pertaining to the correlation between the factors driving the swift advancement of some nascent and swiftly ascending

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home life shopping applications, and the data mining capabilities embedded within their produced applications. The paper utilizes the case of Dingdong Buying Vegetable as a case study to examine the functional qualities of its application, investigate the correlation between its swift growth and app functionalities, consolidate the key factors contributing to its success, and provide insights for comparable applications.

2. Basic concepts and functions of data mining

Data mining is a nascent information processing method that reveals concealed and hitherto undiscovered information from a substantial volume of fragmented and stochastic data. The procedure involves the extraction of information and knowledge that provide potential worth [4].

Data mining possesses several purposes through the analysis and processing of business data within organizations.

The objective is to uncover the business insights inherent in the data. company knowledge encompasses a wide range of topics, such as various company entities, diverse product categories, essential tasks inside a corporation, pricing strategies, identification of potential clients, and effective logistical systems, among other pertinent aspects. Data mining is a valuable technique that can be employed to extract and organize pertinent elements within a commercial organization. By creating a corresponding collection of data, it becomes possible to identify items and evaluate the operational performance of commercial organizations. Another research shows that the transaction review data of JD's six major brands of water heaters was utilized as the basis for research. Text data mining technology was employed to analyze various aspects, including text preprocessing, word frequency statistics, and sentiment analysis. The objective was to examine the disparities between different brands and ultimately offer recommendations to merchants.

The second objective is to the investigation of the internal interrelationships, regulations, and structures inside the dataset. In light of the categorization of the obtained data, the objective is to explore potential interrelationships among various data types. If there are identifiable links between various data types, it is possible to derive specific rules and generate related patterns. Tang et al. conducted a comprehensive analysis of Taobao user behavior characteristics using a large dataset. They employed Weka and R data mining software to effectively utilize the K-Means clustering algorithm in order to depict Taobao users accurately and dynamically. Additionally, they developed a user labelling model and utilized Stata data analysis software to establish a binary logistic regression model for predicting the payment behavior of specific Taobao users. This research effort resulted in the establishment of a payment behavior prediction system [5].

The third objective is to assist decision-makers in making accurate and informed decisions. Data mining is a process that involves the filtration and refinement of seemingly disparate data, with the aim of extracting important information and knowledge. This process enables decision-makers to gain deeper insights into the given scenario, hence facilitating the making of informed and prudent judgements. In their study, Fu and Wang employed data mining techniques and conducted a SWOT analysis to examine the current state and challenges of precision marketing. They specifically focused on the case of Tmall, aiming to assist e-commerce firms in enhancing their precision marketing models [6].

3. Dingdong Buying Vegetable APP and Its Data Mining Function

3.1. Previous studies about Dingdong Buying Vegetable

Meng and Wang utilized the framework of competitive intelligence to investigate the domestic fresh e-commerce firm Dingdong Buying Vegetable App [7]. Initially, the authors presented an overview of the App's development process. Subsequently, they employed the SWOT analysis method to evaluate the Dingdong Buying Vegetable application. The present analysis highlights the possibilities and problems encountered by Dingdong Buying Vegetable in the competitive market landscape. In light of these findings, pertinent recommendations are put out to guide the future development trajectory of Dingdong

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Buying Vegetable. Furthermore, the survey findings indicate that a comprehensive analysis was conducted, primarily examining the commercial operational model, optimization of consumer service experiences, and innovative technological applications of the preceding warehouse. This analysis aimed to assess the strengths and weaknesses of Dingdong Buying Vegetable and put forth specific recommendations for targeted optimizations. In their analysis, Wang examined the business model of Dingdong Buying Vegetable by considering four key aspects: value proposition, value network, value maintenance, and value realization [8]. The investigation reveals that Dingdong Buying Vegetable is confronted with issues such as a singular profit model and significant uniformity among its categories. Based on the aforementioned findings, the individual put up novel approaches for the prospective fresh food business model inside the neighborhood. Li and Cheng addressed the fundamental concepts and principles of data mining and search engines, and examined the advantages that data mining offers to search engines [9]. In their study, Jiang conducted an analysis of the growing prevalence of network security concerns in relation to data mining technologies [10]. Additionally, the author put up pertinent recommendations aimed at addressing the practical challenges associated with network security. Nevertheless, the aforementioned research has not yet examined the relationship between the data mining capability of the Dingdong Buying Vegetable APP and its swift commercial ascent.

3.2. Layout and Layers of Dingdong Buying Vegetable APP

The icon of Dingdong's shopping app is a red radish with green leaves. There are different categories in the app, and there are also some product recommendations. The main categories include vegetables and bean products, cooked and pre made dishes, seafood, fruits and flowers, etc. For example, vegetable and bean products, clicking on these classifications will provide more detailed classification and vegetables. Because products from different companies will be provided on this app, the source brand will be written in the product description when selling. Click on the interface of a certain product again, and a more detailed description will be presented, such as pictures, others' evaluations, taste, and recommended cooking methods.

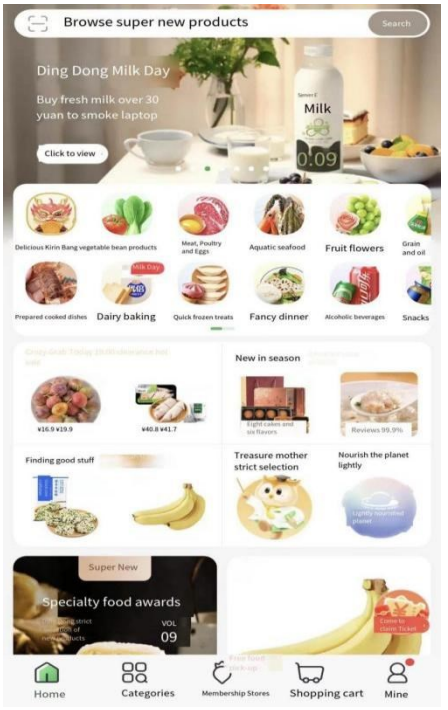

Figure 1. Page of the plateau fresh broccoli in vegetable and bean products.

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Using the example of fresh broccoli from the plateau in vegetable and bean products, this page (Figure 1) provides information on the brand name, product image, approximate weight (500g), and unit price (7.69 yuan/serving). Additionally, the quality characteristics of the product are described, including its suitability for salads, light vegetable dishes, and as a substitute ingredient. Furthermore, the page indicates that a total of 11,400 individuals have purchased this product. The third stage of product presentation involves transitioning from the previous page to the subsequent page, where six product photographs are displayed from various perspectives. These images can be manually turned to reveal different views of the product. The photographs reveal that the product possesses an emerald green colour that is characterised by its delicate and gentle appearance. The lower portion of the image provides comprehensive product details, encompassing information such as the product's origin (Zhangjiakou City, Hebei Province, etc.), recommended storage method (refrigeration), taste profile (crispy and fragrant upon consumption), and suggested cooking techniques (ideal for blanching, salads, or stir frying in combination with meat slices). Following the product description, there are customer reviews available, including favourable reviews that are categorised into distinct types such as "comprehensive", "illustrated", "latest", "portion size", "packaging", "positive", and "very good" ratings.

This application employs a categorization approach that involves categorising products into broader product categories, followed by more precise product subcategories, and finally individual products and their descriptions. This three-level hierarchical strategy is utilised to progressively narrow down and display the products that align with the preferences of customers. By employing a systematic approach of progressively refining and enhancing product categorisation, with an efficient search tool, clients are able to swiftly access the specific products they need. The app's accessibility greatly benefits new clients in swiftly locating it. The primary objective is to employ a sophisticated classification system in order to streamline customers' purchasing requirements, while simultaneously enhancing the efficiency of backend data mining and analysis.

3.3. Data Mining Function of Dingdong Buying Vegetable APP

The application will save and display recommendations on the site based on the repeated purchases made by customers. Simultaneously, the inclusion of recommended products of the same category, specifically those associated with the vegetables or items frequently purchased by the consumer, serves as an indicator of the customer's prospective inclination to make additional purchases. This application serves as a manifestation of the practise of data mining.

Using the case of a female individual named Liu, who is a member of my family, it is observed that she frequently utilises the Dingdong platform for the purchase of various culinary items and snacks. As a result of her child's pronounced affinity for broccoli and beef, her husband's preference for tofu and cucumbers, and her personal inclination for consumables such as ice cream and eggs, she frequently procures these items on a biweekly basis. Initially, Ms. Liu was required to conduct individual searches across different categories in order to locate these products. However, as time progressed, these products gradually assumed prominence as the primary recommended items on Ms. Liu's homepage. Consequently, all products eventually became accessible through the homepage suggestions. In the case of a newly created account, the suggested product categories appear to be arbitrary, lacking any discernible pattern. This can be attributed to the absence of data mining and analysis conducted by the application, which typically enables the provision of personalised recommendations to enhance user convenience. There exists a significant disparity between the information supplied on Ms. Liu's application homepage.

Based on the aforementioned analysis, it is evident that the data mining functionality of the Dingdong Shopping APP primarily operates on the fundamental principle whereby the application's backend system arranges and examines users' purchase types, frequencies, and associated products. Products that exhibit a high frequency of clicks will be given priority in terms of recommendation on the customer's homepage. Additionally, products that are closely associated with the aforementioned product will also be accorded higher priority.

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4. Correlation analysis between the data mining function of Dingdong Buying Vegetable APP and its rapid development

4.1. Rapid development of Dingdong Buying Vegetable Company

Dingdong's initial commercial venture in the procurement of vegetables is primarily focused on community-oriented services, encompassing the establishment of physical service stations, provision of residential cleaning services, dry cleaning of garments, and community meal delivery. In the year 2017, the organisation initiated a process of service transformation and ventured into the realm of online grocery shopping for households. Consequently, the organisation had an official rebranding, adopting the name "Dingdong Shopping". The Dingdong Shopping application was formally introduced in May 2017. At present, Dingdong Buying Vegetable mostly offers a range of fresh food items, including vegetables, fruits, seafood, and daily essentials, to the local community inhabitants. Based on statistical data, it can be observed that during the initial quarter of 2021, the mean monthly activity of Dingdong's vegetable procurement service amounted to 6.9 million. Dingdong Buying Vegetable has successfully expanded its operations over a span of five years, establishing a network of 1136 front-end warehouses in 36 locations nationwide. Additionally, the company maintains 40 urban processing centres in 14 cities. Dingdong Shopping has emerged as the most prominent front-end warehouse in China. In the month of March 2021, the combined purchasing costs of Dingdong, a fresh food supplier, were predominantly attributed to direct producers and base cooperatives, accounting for more than 75% of the total. This figure was derived from a pool of over 1600 suppliers. Dingdong Buying Vegetable formally filed its initial public offering (IPO) listing application with the United States Securities and Exchange Commission on June 9, 2021, and subsequently commenced trading on June 29, 2021. The aforementioned data suggests that Dingdong Buying Vegetable has had significant growth within a relatively short period of five to six years.

4.2. Correlation between Dingdong Buying Vegetable's success and its APP data mining function

Dingdong Buying Vegetable's rapid development can be attributed to several factors, such its market positioning, service philosophy, marketing strategy, and the use of its APP data mining function. Our primary area of concentration revolves around the correlation between the data mining capabilities and the level of commercial success achieved.

The data mining breadth of the Dingdong Buying Vegetable APP is extensive. Dingdong intends to employ data mining techniques in various domains, including order management, inventory management, and supply chain management, specifically in the context of vegetable procurement. The platform leverages data mining techniques to analyze customers' existing orders, enabling the reasonable prediction of future orders. This facilitates effective inventory demand planning, ultimately leading to enhanced customer happiness through improved operational efficiency.

One notable aspect is the extensive nature of the data mining carried out by the Dingdong Buying Vegetable APP. The primary focus lies in doing comprehensive data mining analyses on individual clients, encompassing their browsing patterns, duration of attention, purchasing behaviors, feedback regarding service satisfaction, and the price range within which they make their purchases. By employing data mining techniques, the platform can enhance its ability to analyze the unique tastes and requirements of each client, subsequently providing tailored product recommendations that align with their specific demands. For instance, when the platform's data mining techniques extract the price range of a customer's regular purchases, the primary recommendations provided by the platform tend to fall within the same price range as the customer's past purchases. In this manner, clients will not be provided with suggestions for things that exceed their affordability, nor will they endorse products that are priced below their perceived value. This phenomenon not only exhibits a significant augmentation in client expenditure, but also enhances customer contentment. The rise in consumption can be attributed to the surge in offline prices of the products acquired by clients, whilst the boost in customer happiness stems from the affordability and alignment of recommended products with their preferences.

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One additional feature of the Dingdong Shopping APP entails its capability to conduct comparative analysis of the sales revenue across all available products. The application use data mining techniques to analyze the comparative sales performance of different products, distinguishing those with higher sales from those with slightly lower sales. In this manner, the utilization of historical data can facilitate the determination of purchase quantities while making product procurement decisions on the platform. This significantly diminishes the likelihood of excessive purchases and insufficient sales, resulting in cost savings.

5. Conclusion

In the current era of rapid information technology advancement, it holds immense importance for commercial organizations to leverage state-of-the-art information technology, particularly data mining techniques, to enhance their marketing concepts, plans, and service levels. The primary focus of the Dingdong Buying Vegetable app lies in its data mining capabilities, which encompass extensive data mining, in-depth customer data mining, and complete comparison and analysis of sales data for all its products. The utilization of these data mining functions not only proficiently identifies the genuine requirements of customers on the client side, provides appropriate product recommendations, and fosters a feeling of trust and reliance on their application, but also effectively compares and analyses diverse data pertaining to the sold products on the product side. This enables accurate identification of product variety and quantity, mitigating the occurrence of unsold items and effectively reducing the company's expenditure costs. Regrettably, this study has been limited in its capacity to do a comprehensive and in-depth inquiry. However, it is suggested that the utilization of questionnaires in future research endeavors could enhance the overall quality and scope of the survey.

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