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Recommendations to Increase the Customer Interaction of E-commerce Applications with Web Usage Mining

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***Abstract*—Web mining uses data mining methods to extract knowledge from web applications. It is used in e-commerce to track client browsing behavior. The issue with e-commerce is that we only know about our customers once they place an order. The primary goal of this endeavor is to identify a viable option to continue operating a profitable online store by better understanding customers. The research project aims to identify customer preferences and purchase behaviors so that improvements can be made to e-commerce platforms based on these findings. Web usage mining enables the seller to monitor, investigate, and identify patterns from compiled data to create a fundamental statistical foundation for decision-making. To properly use web usage mining, it is necessary to collect qualitative visitor data, which enables researchers to determine whether a visitor has viewed a product repeatedly, added it to their wishlist before making a purchase, or bought it during a particular season, etc. A limited number of publications were found in this domain, and most of the work was done with limited data like user clicks, navigation paths, etc. In this research, event listeners have been added to the e-commerce application to capture user actions and behavior towards a specific product on the application. Four classification algorithms experimented with the event data and identified the most effective algorithm to develop the prediction model. Users' purchasing patterns and buying behaviors were analyzed and identified using the model developed with the Random Forest classification algorithm. Recommendations for the e-commerce applications were developed according to the identified user behavior and purchasing patterns. This strategy will lead the e-commerce industry to a profitable economic point by increasing the effectiveness of the application.**

Keywords— Recommendations for E-Commerce, Web Usage Mining, E-Commerce

I. INTRODUCTION

This research was conducted to increase the effectiveness of e-commerce applications by giving recommendations with web usage mining techniques. Most current use cases of web usage mining implementations on e-commerce platforms use only the client and server log files to identify and predict user interests and behaviors. So, these log files include limited data attributes such as date, time, IP address, path, etc., and the server and client log files would destroy when particular situations like the server restart. Most researchers made the user interests predictions by only considering log files path data. These user navigational patterns observed from path data are not enough to accurately identify user interests and behaviors.

In this research, data collection was enhanced by capturing user interaction with the e-commerce platform through the user events and maintaining a database with those events data for further analysis. Then using machine learning, recommendations were made through in-depth user interest, behavior pattern identification, and prediction with classification machine learning models.

A. Web Mining

Web mining employs data mining tools to automatically locate and extract information from papers and web services [1].

Web mining pursues the same goals as conventional data mining by looking for and recovering meaningful patterns from large data sets. Big data are utilized as data sets for web mining. Web data includes information, documents, structures, and profiles. It is built on two ideas: process-based and data-driven, both of which are based on frequently used data. Web mining aims to draw knowledge from data on the internet. Data gathering, data selection before processing, information discovery, and knowledge analysis are typical steps in the web mining process.

B. Web Usage Mining

The automatic finding and analysis of patterns in data generated or gathered as a result of user interactions with Web resources on one or more Web sites are referred to as web usage mining [1]. A collection of sites, items, or resources often accessed by groups of people with requirements or interests is typically how the patterns are represented.

The total web usage mining process can be broken down into three interconnected steps, similar to the usual data mining methods: data collection and preprocessing, pattern identification and pattern analysis.

C. E-Commerce Applications

Electronic business is known as e-commerce which deals in products and services on the internet and through electronic media [2]. E-commerce refers to conducting business through the internet and information technology, such as Electronic Data Interchange (EDI). Furthermore, e-commerce refers to trading goods or services between a seller and a client via a vendor's website. The portal offers credit card, debit card, and EFT (Electronic fund transfer) payment options and utilizes a digital shopping cart or shopping basket system. From another point of view, e-commerce uses digital information processing and electronic communications in commercial transactions to build, change, and redefine connections for value creation