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Dynamic data visualization and clickstream data analytic for e-commerce

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Abstract

Nowadays web is becoming an important pathway for reaching customers and prospects; Click stream data generated by online platforms and websites has become another important enterprise data source. Every minute thousands of customers do shopping through e-commerce web sites around the world. Huge amounts of click stream data are generated from customers' use of e-commerce websites. It has become crucial to understand user behavior from click stream data and to estimate purchase intention. This paper discuss the traditional approaches for operating on B2C E-Commerce as well as some recent applications of Data visualization tools and techniques in E-Commerce sector and also the development of a 2D interactive visual interface for processing large online product catalogs with search preferences.

Keywords: E-Commerce, click -stream data, data visualization tools

Introduction

What does exactly stand of ‘clickstream’?

Click-streams captured the user’s taps and clicks. When user start surfing the browser in a specific website or application. It may be an e-commerce website or application so here visitors or clients clicks on many aspects or fields, by taking an example of ecommerce websites which host smartphone brands. So here user’s main motive is to buy the product from that site or get an assumption of certain cost or features. As the client clicks anyplace in the website page or applications, the activity is logged inside Clickstream data ^[1]. A click path or clickstream is the sequence of hyperlinks one or more website visitor’s follows on a given site, presented in the order viewed ^[3]. As simple as it sounds for recording every click a customer made, so that we can use clickstream data for modeling user behavior, gaining valuable customer insights. Clickstream analysis commonly refers to analyzing click data and website optimization along with data visualization. Such analysis is typically done to extract insights into website visitor behavior especially social-media or e-commerce websites, also in some daily use based monitoring application.

The 2D visual structure of the product

In this paper, we discuss the use of dynamic graph visualization. We aim to develop high-quality catalog interfaces in terms of readability, understandability and comprehension by upgrading a broken 1D interactive space (a series of textual lists placed in many pages) to an overall navigational graph visualization. This 2D visual structure of the product catalog addresses the product navigation problem and allows buyers to visually browse through the entire product catalog with a sense of “Information Space”. It can quickly track the subset of a huge product hierarchy based on the focus of the user, and provides buyers with a series of dynamic visual maps for guiding online shopping activities in the visualization ^[2].

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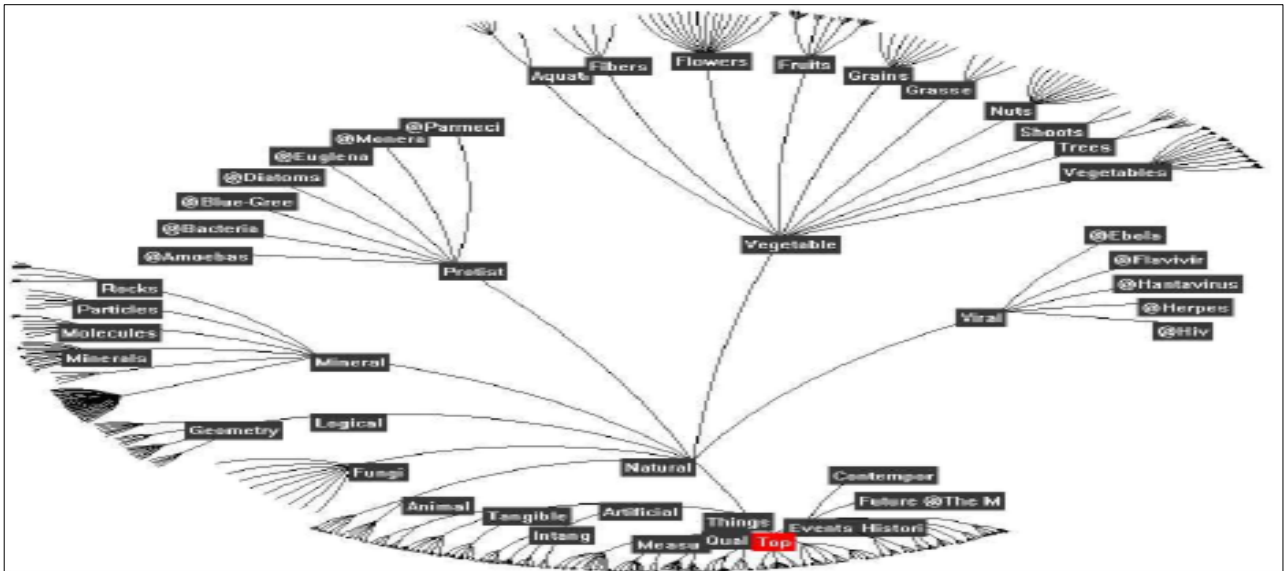


Fig 1: A hyperbolic Tree of Natural Elements and Environment.

The framework of data visualization

Product Database: A relational database used to store product information, including all data fields and attributes associated with a particular product that are available for sale in the online shop. Product Catalog: A content management system that assembles, indexes, aggregates and normalizes product information from the product databases, and quickly distributes the product information. Product Detail Display A web page generated on the server side by a scripting language. It retrieves the appropriate product entry from the database table in corresponding to the mouse-click on a particular graphic node in the visualization. It then displays selected attributes of one or more products [2].

Tools and Technologies

Markov chains work best with sequential data – which is exactly what clickstream data is. Let us first quickly get an overview of the Markov process and the Markov Chain [5]. The Markov process is a stochastic process satisfying the Markov property of memory lessness. Simply put – it is a random process in which the future is independent of the

past, given the present. A Markov chain is a Markov process that describes the sequence of possible events, in which the probability of each event is completely dependent on the state attained in the previous event.

Clustering the Clickstream Data

We will perform k-means clustering with 2 centers. During clustering, we notice that the average length of clickstreams varies with each cluster. This implies that the algorithm clusters the clickstreams based on the number of actions performed by the user during the given session.

Architecture

In this paper, we also discuss about the architecture to build complete solution of streaming processing and analyzing click-stream data. It includes many tools of big data technologies. The information is collected from online learning portal or website [1]. Hadoop is a trending method to store and process large data-sets otherwise SQL is also used to store the data.

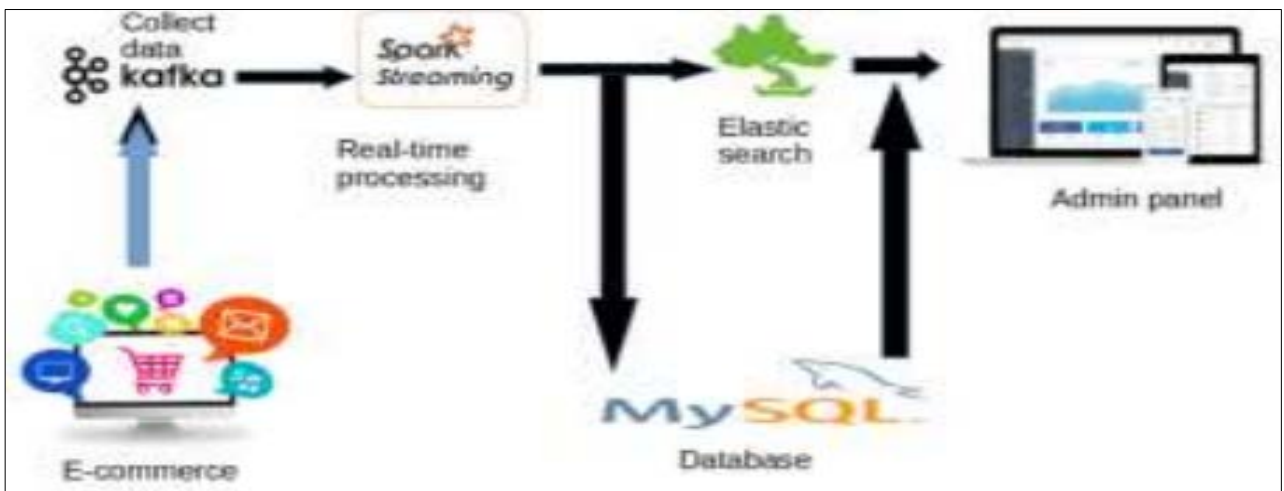


Fig 2: Architecture

Click stream analytic has several benefits

Click-path optimization: Using click-stream analysis, organizations can gather and analyze information to find in

which arrange visitors are going by pages in site. Through activity analysis, which will identify with the way the client takes when exploring through the website, web advertisers

can follow key measurements that influence the client experience, for example, the total number of pages served to the client, how quick page's heap, the measure of information transmitted. We can differentiate among the customer and make a separate view for valuable and potential customer. Customer Segmentation is one of the Key aspects of the Clickstream analyzing. It is a main motive to encourage the customers for next visit. Web resource allocation – Clickstream analysis advertisers which ways on the site are utilizing progressively and which ones are most certainly not. This data empowers organizations to arrangement the arrangement of site assets where they are required most with a specific end goal to-enhance the client encounter on the site ^[1].

Conclusions

In this paper discussed about the clickstream data and analyzing user behavior from them, also the used technique and procedure are relevant to any real-time data analysis. At the end collected data from website has been analyzed by using Elastic Search and reported using Kibana. In conclusion, Elastic Search is better tool for analysis of real time JSON type of data because it is fast in indexing, searching, and applying query. In the near future, this is a trend that will gain strength and popularity as our clients look at our capability in delivering operations using our well-established network of delivery centers. The traditional presentation of product catalogs provides buyers only a series of textual lists placed in several separate pages for navigation. The cost of this is an increase in the buyer's cognitive effort spent in learning the overall structure of product hierarchies during the navigation. This navigation mechanism also requires a high rate of click-through for the navigation, as the navigational structure of the product category was implicitly presented in many separate pages. The parent-child relationships in the product hierarchies were presented by embedded hyperlinks that the navigator cannot see directly. Some alternative techniques that have been proposed attempt to provide users with a 2D interaction space that gives users an overall view of the product hierarchies for the navigation of product catalogs. A typical example of such techniques is the Hyperbolic Tree Browser. While these techniques effectively deal with catalogs of moderately large size, they do not help where the product catalog (such as a dynamic or a distributed catalog) is not completely known. Further, this technique predefines the geometry and generates views that are extracted of geometry layout. This means that changing views is a geometrical operation and not a logical operation. The user naturally thinks of the logical relations in the product hierarchies, not in terms of the system.

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