

WEB BASED PRODUCT E-COMMERCE RECOMMENDER SYSTEM USING A KNOWLEDGE CASE BASED ALGORITHM

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Abstract: *Understanding customer needs is crucial to gaining and retaining customers in a web store, on online e-commerce applications. In order to ensure a versatile system for e-commerce, the pattern generated by customers when they click icons to select some particular products on an e-commerce website, based on their choice, ought to be studied, recorded and built-up into a database. Data mining techniques can then be applied in mining and analysing information for this database in order to help wholesaler and retailers, improve sales, marketing strategies and product advertisement. In this paper, a conceptualized a framework for determining customers' product choice and factors involved in choosing online commodities is proposed. The system is tailored for phone products.*

Keywords: *Customer, Data Mining, E-commerce, Internet, Products*

1. INTRODUCTION.

The internet has gone a long way in boosting the use of e-commerce in modern day to day buying and selling of goods and services. It is thus easier for most retailers to keep track of the opinions of their customers on the products they sell or advertise to them. It also helps would be customers in making cogent decisions while they are trying to make up their minds about purchasing a product or not. (Archak et. al, 2007). Nowadays, retailers are also capable of sampling the views of customers on products they have bought from their websites. The use of e-commerce has made it easier merchants to provide product reviews to would be customers online, in order to help them in making crucial comparisons between diverse products thereby also helping them in fine-tuning their purchasing decision. The product reviews for diverse products have increased tremendously as more customers are getting attuned to the use of e-commerce websites (Cheung et. al, 2003). Products which are in high demand often have hundreds and thousands of reviews, which can sometimes be overwhelming for the customers to go through sequentially in order to obtain is or her desired information o make a purchase decision. (Gammon et. al, 2005).

In many countries, e-commerce has be the major reason why so many customers purchase their goods and services on-line (Goldberg et. al, 1992). Most retail web sites encourage large compilation of the reviews of different customers. These reviews are a rich source of data for customers and merchants as well. More often than not, before a customer purchases a product on an e-commerce website, he often peruses the information generated from the on-line reviews of other customers. Most e-commerce corporations also make use of information engendered form the on-lin e product review of various customers to improve their relationship with customers, products and marketing strategies. While analysing the reviews of the customers, these corporations often pick out areas that are more frequently commented upon as the main points of focus. These comments however may not necessarily lead to a change the opinions of the customers. For instance customers may complain about the signal

reception of a particular phone while maintaining a high rating for the phone. The design and the speed of the same phone may however not have been repeatedly commented upon by the customers, since the signal connection is more important to most of them. Accessing the important aspects of a product based on the frequency of the comments of the customers on certain aspects of the product is, as such, not a viable method.

Ranking user products based on customer reviews is an essential method to predict a recommender product for a new customer base, hence motivated by such need; this paper proposes a knowledge case based algorithm for searching through regular product list on the web, based on customers rating and reviews.

2. LITERATURE REVIEW

An important application of collaborative, filter-based recommender system is Tapestry. The system depends on the definite opinions of people from a community that is cohesive in nature, such as the workgroup of an office (Goldberg et. al, 1992). However, in a community where the population is large, recommender systems do not depend on each person in the community knowing the others.

Over the years, different types of recommender systems have been developed. Hu and Liu (2004), the developers of the Group Lens study system, proposed an efficient and joint filtering system for a media company. Konstan (1997), presented a system that employs the use of web-based systems and the e-mail, to enable customers in making suggestions on movies and music. The Association for Computing Machinery (ACM) also proposed diverse types of recommender systems. Although these systems have been useful in the past, their extensive use has helped in identifying some of their short-comings, such as paucity of data, those related to high dimensionality and so on.

With the extensive use of e-commerce these days, researchers in the area of business, has promoted the need for individualized marketing (Resnik et. al, 1997). With the use of technology, individualized marketing has enhanced the features of marketing by making it possible to relate with each customer on a personal level. Researchers have therefore suggested the use of the internet as a versatile tool in gaining and retaining the interest of customers. Shafer et al, (1999) also, presented a concise classification of types of recommender systems that are often utilized in e-commerce and how they can be used in gaining the attention and interests of customers by providing individualized relationships with the customers.

3. METHODOLOGY

The Waterfall Software Development Life Cycle (SDLC) model is the methodology approach adopted for this research. SDLC also referred as Linear Sequential Life Cycle model is used for designing, building, and maintenance of information on computer software. SDLC is very famous, easy to use and comprehend, appreciable for small projects. SDLC ensures production of numerous functions in a predictable manner with high quality, fewer resources and time. SDLC comprises of series of phases where output of a phase is used for the input of the next phase. In using SDLC model, the inventors need to have an idea on what to build and should be able to proffer solutions to the problems encountered. Adequate program planning, following SDLC model critically, connotes comprehension of developmental documentation and structure as well as coding. These could assist particular needs of various users, and also enhance easier errors detection Shardanand and Maes (1995).

For this research work, at the requirement phase, the end users (employer and employees) were interviewed to ascertain their opinion, of the system. In the design phase, the system design and architecture were developed to meet the need of end users using data flow and context diagrams. On the implementation phase, the graphical user interface was created, using PHP, CSS, and HTML with MySQL and JavaScript servers as the database. On the testing stage, the workability of different units were tested, incorporated into the system and maintained appropriately.

3.1 TECHNOLOGY USED

3.1.1 HTML

HTML is an acronym that stands for Hyper Text Mark-up Language; it is a programming language for the web. HTML is a backbone language of any website. It operates on various platforms including CSS and JavaScript for web page effectiveness and efficiency.

3.1.2 CSS

CSS is an acronym that stands for Cascading Style Sheet; it is the document that adds beauty to the web page. CSS is utilized in formatting web page layout, defining table sizes and text styles on the web pages, similar to HTML. The CSS separates the web document contents (using any mark-up language software) from its presentation. CSS not only enables the same HTML to be displayed in varied styles but also put on an option in choosing different rule schemes and styles based on the needs. Many benefits can be derived from CSS, especially: better flexibility and improved content accessibility. Moreover, CSS gives a regime of control over the different presentation of the document features. It assists saving presentation time and reducing the software complexity.

3.1.3 JavaScript

JavaScript is a lightweight and renowned scripting language. JavaScript can be described as World Wide Web (W.W.W) Scripting Language. It combines different Web form validations, functionalities browser detections and formation of cookies among others. JavaScript being is a well-liked and powerful scripting languages, supported most web browsers such as Opera, Firefox and Internet Explorer. It is always used in client-side web development. JavaScript also allows web pages to be dynamic and interactive. It allows most scripting languages, particularly that of Java to be directly implanted into HTML codes.

3.1.4 PHP

The PHP script is an open-source program applied in designing and implementing websites. It is a formidable scripting language that utilized several software technologies like online business software content management application, developmental tools in dynamic websites and chats software custom applications. It can build dynamic and interactive websites which can be inserted directly into the heart of an HTML code. It is compatible with web servers such as, Microsoft's IIS and Apache. PHP can be operated on the web on the server as it tolerates many databases such as MySQL, Generic ODBC and Oracle. MySQL is commonly used among other databases.

3.1.5 SQL

SQL is an American National Standards Institute (ANSI) that allows access and manipulation of the databases. SQL can insert, retrieve and delete records from a database, execute queries update records in a database, create new databases tables, and stored procedures in databases, and set permissions on procedures, tables, and views.

4. RESULTS

Conceptual design depicts the outlines conducted with the use of data flow and case diagrams.

4.1 Process Flow Chart

A process flow chart is a diagrammatic picture that shows the interrelationship among different system entities. In Fig. 4.1 the “Administrator” (Admin) entity is accountable for inserting the details of employer and employees to the application. The Admin and User’s Data Flow Diagrams are hereby shown below:

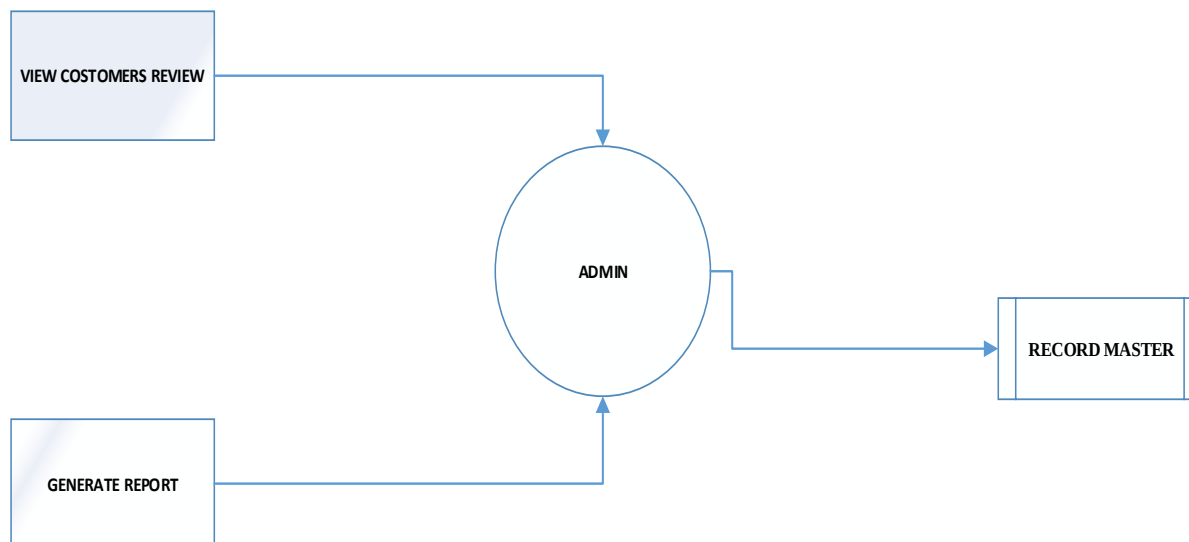


Figure 4.1: Admin Data Flow Diagram

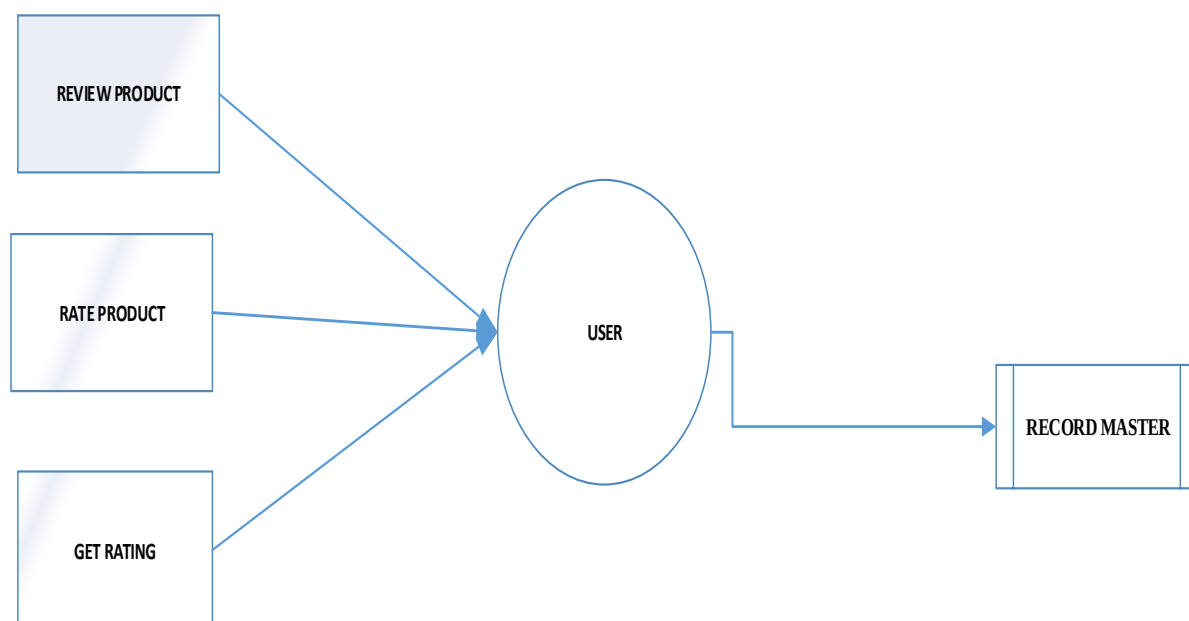


Figure 4.2: User’s Data Flow Diagram

4.2 Flow Chart

Flowcharts are conventional representations of sequences or procedures. The main purpose of using flowcharts is to enable individuals to have template or point of reference while working on a scheme or design (Hill et al, 1995).

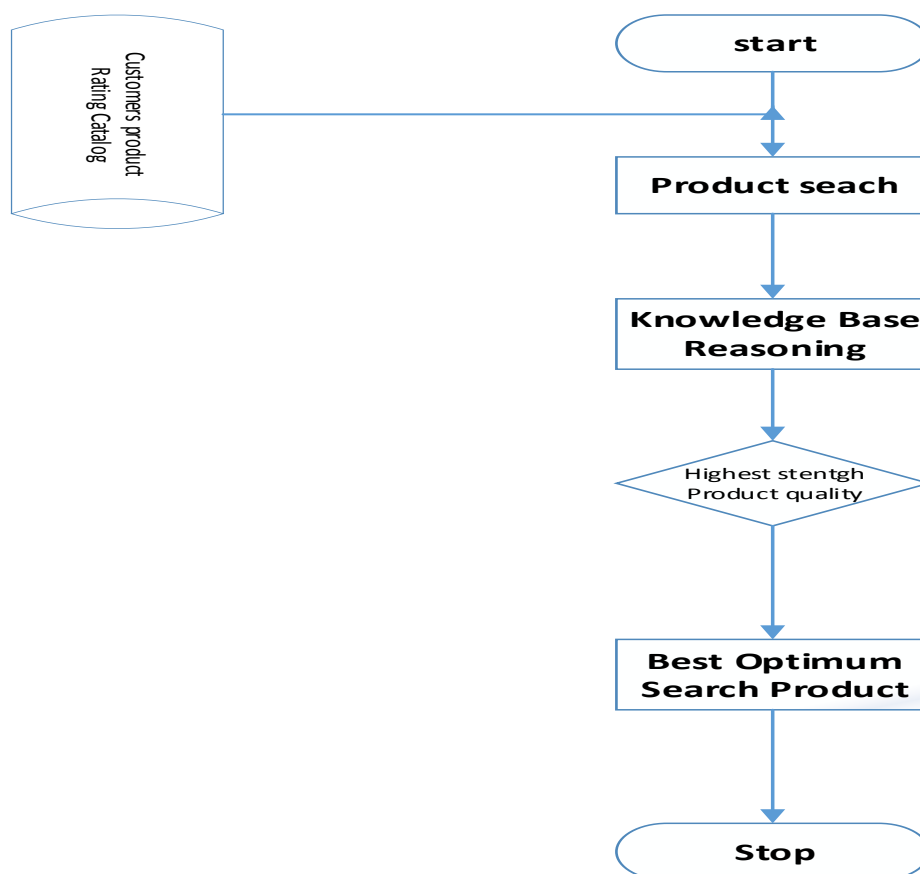


Figure 4.3: System Flow Chart

4.3 Database Design

The database plays a significant role in virtually all facets of computers usage such as E-library, E-law, E-business, E-commerce, E-engineering, E-medicine, and E-education. MySQL databases owned by Oracle are utilized in designing database back-end of a system. It is open source and free, but licensed. It is well suitable for small and medium web pages and also supplies SQL database. It is mostly accessible on any assigned hosting packages and could be easily launched in Windows and Linux environments. The database structure for the system is enumerated below:

Table 4.1: Admin Table

1. Admin

Parameters	Variables	Results
Id	Int(11)	No
User	Varchar(50)	No
Pass	Varchar(50)	No

Table 4.2: User Table

2. User

Parameters	Variables	Results
id	int(11)	No
Name	varchar(50)	No

School	varchar(50)	No
Level	varchar(50)	No
Gender	varchar(50)	No
Phone	varchar(50)	No
Battery	int(11)	No
Size	float	No
Image Quality	int(11)	No
Sound	int(11)	No
Processor	int(11)	No
Wireless	int(11)	No

5. SYSTEM IMPLEMENTATION

For testing the consistency, efficiency and correctness of this application, the implementation module was simulated using a local host with Apache server. Various interfaces are highlighted in the screen shots.

5.1. User's product rating form

The figure and table below allows the user to rate a product based on the following parameter options:

Table 5.1: User's Phone Rating parameters

1	Battery Life
2	Screen Size
3	Image Quality
4	Sound
5	Processor
6	Wireless

Institution :
Name of institution

Level :
Enter your level

Gender :
☐ Male ☐ Female

Phone:
Choose.....

Phone Model :
Enter the phone model

1.AVERAGE BATTERY LIFE

☐ Excellent (2 days duration)
☐ Very Good (11/2 days- 1day)
☐ Good (16-24hours)
☐ Fair (9-17 hours)
☐ Poor (6-8hours)
☐ Very Poor (less than 6 hours).

2. Screen Size

Figure 5.1: User's Phone Rating Form

5.2 Users searching options

The figure bellows shows the searching options which can be used to check the rating results of different products.

At least one Phone or one Parameter options must be selected:

Select phone:

☒ Tecno	☒ Samsung
☒ iphone	☒ Blackberry
☒ Microsoft Lumia	☐ Nokia
☐ Infinix	
☒ Gionee	
☐ Sony Ericson	

Parameter options:

☒ Average Battery Life
☒ Screen Size
☒ Image Quality
☒ Sound Quality
☒ Processor
☒ Wireless

SEARCH

Figure 5.2: User's Phone Search Options

5.3 Search result interface

The figure bellows presents the results analysis of a product is shown below:

E-COMMERCE

SEARCH PHONE

GLAM SHOPPING

PHONES RATED BY (battery) ,(size) ,(imagequality) ,(sound) , (processor) ,(wirless)

S/N	Rating score	Phone	Phone Model	Phone Brand Image
1	32.5	gionee	P2S	
2	31.5	Blackberry	Z10	

Figure 5.3: Sample Phones rating result

6. CONCLUSION

This application was developed with the use of PHP, with HTML, CSS, MySQL and JavaScript as the backend database. The system ensures uniform accessibility to the web

browser and is capable of running on various operating systems. The system is a practical solution for a Phone E-commerce recommender, as it tends to give customers a wide prior information of the product they could purchase online from the accumulations of others customers' review.

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