

VESMART- Creating a recommendation engine for a C2C virtual marketplace

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Abstract -

A college student can come into possession of a lot of things(drafter, reference books, et cetera) over the course of their college years, that are, in the future, no longer required. There are no places to sell said items, and the new students always require them.

Our project will help solve these problems. The project will be an online community-based platform that will let people buy or sell their things ranging from their books, to their electronic items.

Everyone will be able to create an account using their google accounts. Prospective sellers can create ads and sell their products, while everyone else can search for their desired products. People will also be able to leave their comments on the seller's profiles, informing everyone of their experience in buying that person's product. The project will allow online chats, uploading product images, various privacy settings, and a complaint system. It will be a virtual marketplace for the college.

I. INTRODUCTION

A college student can come into possession of a lot of things(drafter, reference books, et cetera) over the course of their college years, that are, in the future, no longer required. There are no places to sell said items, and the new students always require them.

Also, people staying away from their homes often find it difficult to get roommates and end up staying alone, or staying with strangers. VesMart will help solve these problems. The project will be an online community-based platform that will let people buy or sell their things ranging from their books, to finding their roommates.

Recommender systems play vital role in helping online users to find relevant information by suggesting information of potential interest to them. It helps user to find things that are interesting , narrow down the set of choices and to explore the space of options by giving suggestions. We aim to create on-campus peer-to-peer marketplace, where students can buy and sell anything at their college marketplace, right from books, novels, stationery products, electronics, musical instruments. The platform also gives opportunity to students to find flatmates, all within a peer-to-peer marketplace.

II. REQUIREMENTS

For defining the requirements of the project

capabilities, features or attributes of the project are required. Requirements are then decided to determine which requirements to include and exclude from the project. Depending on that requirements are classified into two categories Functional and Non-functional requirements.

A. Functional Requirements

Documentation of functional requirements defines the functionality of a system or one of its subsystems. It depends upon the, expected users, the type of software and type of system where the software is used.

The functional requirements of our project are as follows:

- i.* Recommendation engine should be able to give accurate product list.
- ii.* The recommendations should be reflected on the homepage when the user logs in.

There are mainly three users depending on privileges being granted having different functionalities. They are:

1. System admin:
 - 1) He can authenticate users.
 - 2) He can add or remove users.
 - 3) He can remove (inappropriate) ads if reported by the user.
2. User (Buyer):
 1. He will be able to search for any products.
 2. He will be able to add products to cart.
 3. He will be able to have real time chat with the seller.
3. User (Seller):
 1. He can post Ad of the products with its description, image and price.
 2. He can edit and delete ads.

B. Non-Functional Requirements

i. Performance Requirements:

1. The system shall accommodate high number of ADs and users without any fault.
2. Responses to view information shall take no longer than 5 seconds to appear on the screen.

ii. Maintainability

The system will be easy to maintain by administrators. The system's database backup will be taken every month.

iii. Security Requirements:

- 1) System will use secure database
- 2) Users can just read information but they can edit or modify only as per rights granted to them.
- 3) Organizational admin can edit or update

changes of his own organization

- 4) System will have different types of users and every user has access constraints

iv. Error handling:

This portal shall handle expected and unexpected errors in ways which would prevent loss of information and long downtime period.

v. Business requirements:

1. Standards
2. Legislation

vi. User friendliness:

The system should have a good user interface. The novice user can simply follow the instructions to use the system without special computer technique.

III. RECOMMENDATION ENGINE

Recommendation Engine is a black box which analyses some set of users and shows the items which a single user may like.

Examples of their working:

- 1) Facebook uses a recommender system to suggest Facebook users you may know offline. The system is trained on personal data mutual friends, where you went to school, places of work and mutual networks (pages, groups, etc.), to learn who might be in your offline & online network.
- 2) When you fill out your Taste Preferences or rate movies and TV shows, you're helping Netflix to filter through the thousands of selections to get a better idea of what you might like to watch.
- 3) Amazon's algorithm crunches data on all of its millions of customer baskets, to figure out which items are bought together frequently, which leads to huge returns- for example, if you buy an electrical item, and see a recommendation for the cables or batteries it requires beneath it, you're very likely to purchase both the core product and the accessories from Amazon.

We will be providing recommendations based on following three factors:

i. Demographic

Here, the user's demographic information (viz branch, semester, etc) will be checked and the items relating to that information will be retrieved from the database and displayed to the user.

ii. Cart Information

Here, the user's past and present cart information, i.e.

the history of their cart additions will be checked and the items' categories (viz books, educational, etc) will be taken into account. This will then be the key in the data mining algorithms to find the appropriate suggestions for the user.

iii. Exam Timetable

The website will access the exam timetable and recommend the books regarding the upcoming exams (typically, three days before the exam)

IV. FILTERING TECHNIQUES

Filtering techniques help in building accurate and successful recommender systems.

i. Collaborative Filtering Technique

It's also known as social filtering, filters information by using the recommendations of other people. It is based on the idea that people who purchased certain items in the past are likely to purchase them again in the future. A person who wants to visit a new place might ask for recommendations from friends. The recommendations of some friends who have similar interests are more trustworthy than recommendations from others. This information is used in the decision on which movie to see.^[4]

ii. Content Based Filtering Technique

Content-based filtering recommends items based on a comparison between the content of the items and a user profile. The content of each item is represented as a set of descriptors or terms. The user profile is represented with the same terms and built up by analyzing the content of items which have been seen by the user.^[4]

V. TOOLS & TECHNOLOGIES

A. Tools

The various tools that will be requiring in the system are as follows:

i. Weka

Waikato Environment for Knowledge Analysis (Weka) is a widely used tool of machine learning software written in Java. It is free software licensed under the GNU General Public License.

ii. XAMPP

It stands for Cross-Platform (X), Apache (A), MariaDB (M), PHP (P) and Perl (P). It's a free and open source cross-platform web server solution stack

package developed by Apache Friends,¹ consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl programming languages. It is a simple, lightweight Apache distribution that helps developers to create a local web server for testing and deployment purposes.

iii. UML

The Unified Modeling Language (UML) is a general-purpose, developmental, modeling language that provides a standard way to visualize the design of a system.

B. Technologies

The various technologies that will be requiring in the system are as follows:

i. HTML

HyperText Markup Language (HTML) is the standard markup language for creating web pages and web applications.

ii. CSS

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language.

iii. SQL

Structured Query Language is a domain-specific language used in programming and designed for managing, storing and retrieving data held in a relational database management system (RDBMS).

iv. PHP

PHP is a server-side scripting language designed for web development and it is also used as a general-purpose programming language.

VI. ARCHITECTURAL DIAGRAM

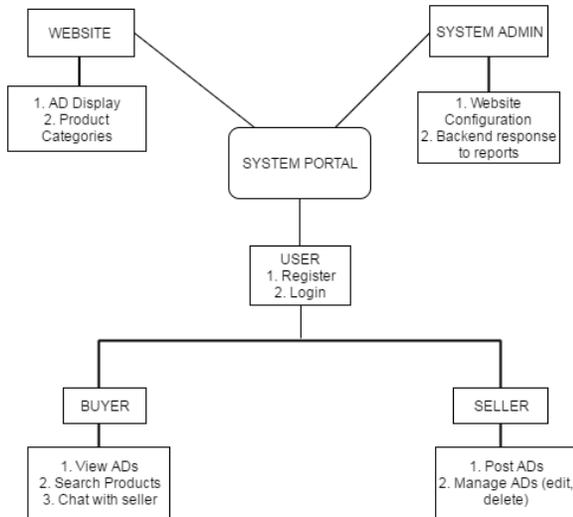


Figure 1: Architectural Diagram



Figure 2: Recommendation Architecture

This architecture represents the conceptual design of the project. It consists of the following stages:

1. Dataset:

This information is forwarded to the next stage for data preprocessing

2. Data preprocessing:

In this stage, the data set is cleaned and refined for any incomplete, inconsistent or noisy data. The tasks involved are

1. Data Cleaning
2. Data Transformation
3. Data Reduction

3. Recommendation Engine:

Item-to-item collaborative filtering algorithms will be applied on the dataset to identify strong and weak relationship between products.

VII. LITERATURE SURVEY

A. Empirical Study of Consumers' Purchase Intentions in C2C Electronic Commerce

C2C is growing rapidly for several reasons. First, the C2C model provides an online transaction platform for individual buyers and sellers. Second the C2C model has received widespread support from major Internet users because of the ease of interactions between users. Third, C2C online transactions have no time and space restrictions compared with traditional models, so they maximize the probability

of transactions and help identify the real value of the merchandise.

However, despite the fact that e-commerce is becoming increasingly important in business, lack of intention to purchase has become a main barrier in the development of electronic commerce. Thus, effective measures are needed to promote consumers' intentions to purchase in online consumer to consumer (C2C) stores. This paper postulates that five factors, the perceived ease of use of the website, perceived usefulness of the website, vendor competence, introduction and recommendations of third parties, and vendors' attitude toward customers, influence consumers' intentions to purchase in online C2C stores and this intention directly leads to their action to purchase from online C2C stores.^[1]

B. Design and Realization of Chatting Tool Based on Web

Real-time chatting system using HTML5 and WebRTC technologies based on B/S architecture model is presented in this paper. System includes basic information management module, chatting communication module and space management module. HTML5 and WebRTC should be supported by system client side, and server side. Text chatting is realized through adopting WebSocket based on TCP protocol.

- 1) Basic Information Module: Information required for registration is very simple, only including username, password, branch, year and more information could be gradually improved.^[2]
- 2) Chatting Communication Module: Text chatting could be realized through HTML5+WebRTC technology. In chatting information module, Tomcat 7 is adopted on server side for realizing WebSocket. Server side monitors client side connection and process client side information.^[2]

C. Amazon.com recommendations: item-to-item collaborative filtering

Most recommendation algorithms start by finding a set of customers whose purchased and rated items overlap the user's purchased and rated items. The algorithm aggregates items from these similar customers, eliminates items the user has already purchased or rated, and recommends the remaining items to the user. Two popular versions of these algorithms are collaborative filtering and cluster

models. Other algorithms- including search-based methods and our own item-to-item collaborative filtering- focus on finding similar items, not similar customers. For each of the user's purchased and rated items, the algorithm attempts to find similar items. It then aggregates the similar items and recommends them.^[3]

VIII. REFERENCES

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