DWIT COLLEGE

DEERWALK INSTITUTE OF TECHNOLOGY

Tribhuvan University

Institute of Science and Technology

Used Book Portal Using Content Based Filtering

A PROJECT REPORT

Submitted to

Department of Computer Science and Information Technology

DWIT College

In partial fulfillment of the requirements for the Bachelor's Degree in Computer Science and Information Technology

Submitted by

Prajjwal Sthapit (1806/069)

August, 2016

DWIT College

DEERWALK INSTITUTE OF TECHNOLOGY

Tribhuvan University

SUPERVISOR'S RECOMENDATION

I hereby recommend that this project prepared under my supervision by RITU RAJ LAMSAL entitled **"USED BOOK PORTAL USING CONTENT BASED FILTERING"** in partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Information Technology be processed for the evaluation.

……

Ritu Raj Lamsal

Lecturer

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Tribhuvan University

LETTER OF APPROVAL

This is to certify that this project prepared by Prajjwal Sthapit entitled **"USED BOOK PORTAL USING CONTENT BASED FILTERING"** in partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Information Technology has been well studied. In our opinion it is satisfactory in the scope and quality as a project for the required degree.

…… Ritu Raj Lamsal [Supervisor] Lecturer DWIT College	…… Hitesh Karki Chief Academic Officer DWIT College
…….. Jagdish Bhatta [External Examiner] IOST, Tribhuvan University	…….. Sarbin Sayami [Internal Examiner] Assistant Professor IOST, Tribhuvan University

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Prajjwal Sthapit

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Tribhuvan University

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STUDENT'S DECLARATION

I hereby declare that I am the only author of this work and that no sources other than the listed here have been used in this work.

... ...

Prajjwal Sthapit

Date: August, 2016

ABSTRACT

Used book portal is a web based application which aims to act as a bridge for buyer and seller of used book. This application aims to remove the middle man which is usually a Used Book store owner who takes away the majority of profit without making much a contribution.

Not only that, Used Book Portal will help people who want a certain book to find a cheaper alternative rather than buy a new book. It will also serve the person who has books that he has no use for and make a few bucks.

Used Book Portal uses Content Based Filtering to recommend the users with other books they might be interested in based on the books they have visited.

Moreover, Used Book Portal will make a small difference in saving environment by promoting recycling of book.

Keywords: Used Book, Buyer, Seller, Middle man, Content Based Filtering, recommend

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LIST OF ABBREVIATION

PHP: Hypertext Preprocessor

DFD: Data Flow Diagram

CFD: Context Flow Diagram

CSS: Cascading Style Sheet

HTML: Hyper Text Markup Language

CHAPTER 1: INTRODUCTION

1.1 Background

Books are and always will be one of the best sources of knowledge. Not only that but books also helps people improve their writing skills, expand their vocabulary and their memory power. It scientifically is proven that reading books increase their intelligence by boosting the brain power. It's not like people have started to read books just now. They have been reading since they have learned to recognize letters and words. The period of people reading books doesn't end until the day of demise. Because learning never stops.

Each book people have read served its purpose of adding to their knowledge. Be it books on alphabets, numbers to the books about chemistry, mathematics, people have learned from them and has acted as stairs to higher studies.

Now, the main question is what happens to the book once it serves its purpose. People either pile the book, store it someplace and forget about it or sell it for scrap. The same book can be useful for someone else who is in need of it. So, why not sell them the book and help someone up.

Secondly, when people are in need of a specific book, the first option is to buy a new one. But why to buy a new book and spend more when there may be a person who willing to sell the book they have no use for.

Why not buy a used book from the willing seller at a lower price and save some money? It can financially benefit both the parties.

In the context of Nepal, buying used book is like a tradition and people's first choice is to opt for a used book rather than a new book. People with old books go and sell them at an old book store and get a portion of the original price. While the people who are in need of the same used

book go to the used bookstore and buy the used book for more than what the original seller is paid. The owner of the bookstore makes a substantial profit from it by just storing it.

Used Book Portal is a web-based application. It aims to act as a bridge for buyer and seller of used book and allows them to communicate directly. It eliminates the middle man who is the store owner. Users can post the books they are willing to sell for others to view. Users can also request books that they are needing.

Table 1: Statistical Data of Student in Nepal, 2013

S No.	Level	Number of Students
1	Primary School	4401780
2	Lower Secondary School	1828351
3	Secondary School	896919
	Total	7127050

(Central Bureau of Statistics, 2013)

The above figure showcases the total number of students in Nepal on various level. This data shows that there are many students and the books that the students use will be useless once they graduate from a level. Now, by this data the product will certainly be helpful and effective.

1.2 Problem Statement

People with old and used book have no purpose for them. They take up space and are forgotten. The book can still serve financially as the book can be sold to an interested party for a reasonable price.

A similar dilemma occurs for people searching for a book. Rather than buying a new book, they opt to buy a used book. The used book will cost relatively less than a brand new one.

Firstly, people with the used book are unaware of the availability of willing buyer and vice versa.

Similarly, people who are in search for used book have to roam from shop to shop. It is a hectic task as we have to visit many places for the right book and deal with the middleman rather than the one who is selling directly.

The middle man who is in between the transaction of buyer and seller takes a substantial amount of profit. The direct communication between the buyer and seller can prevent this.

1.3 Objective

The main objective of the Used Book Portal are:

- Act as a bridge for potential buyers and the willing seller.
- Financially benefit both the parties as the middle man is ruled out of the transaction between them.
- The contact information of the buyer and seller will be present making the interaction process easier.
- The searching of required book will be fast and optimal rather than roam from shop to shop.
- Reuse of old books can save lots of tree and forest eventually making a small effort in saving the earth.

1.4 Scope

As of present, the scope of the application is only limited to used book, not new books. People can post books that they are willing to sell, and any interested buyer can view book and seller's information and contact the seller.

1.5 Limitation

The limitation of the Used Book Portal are:

- The extent of the project is limited to the web application for now.
- Currently, the application targets towards a local audience.
- The buyer will not be able to contact the seller from the application, but the contact information will be provided.
- The buyer will not be able to reserve the book from the application and have to communicate with the seller to do so.

1.6 Report Organization

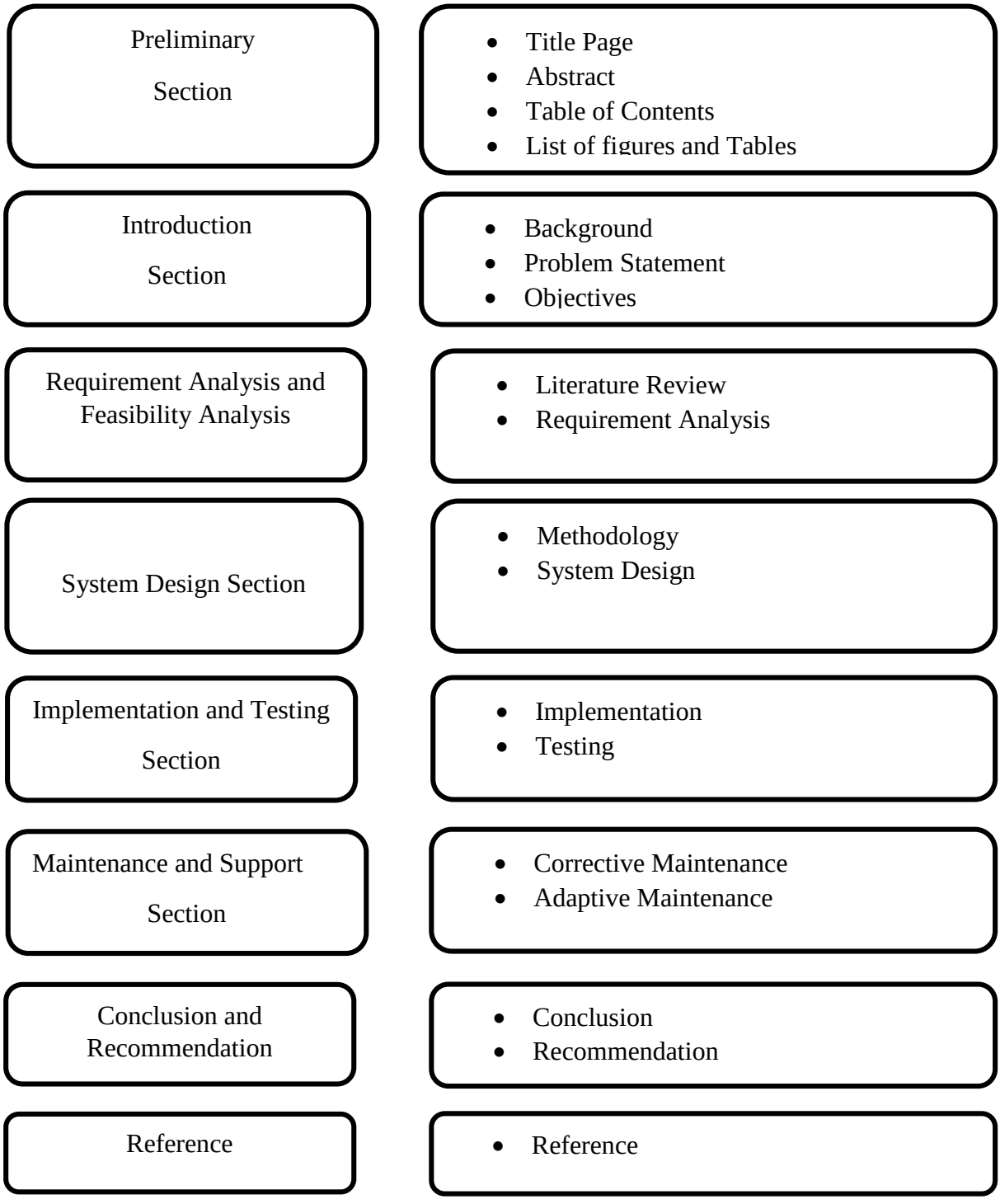

Figure 1: Project Block Diagram

CHAPTER 2: REQUIREMENT ANALYSIS AND FEASIBILITY ANALYSIS

2.1 Literature Review

Internet Exchanges for Used Books

Anindya Ghose wrote in his paper, Internet Exchanges for Used Books, ”Information systems and the Internet have facilitated the creation of used-product markets that feature a dramatically wider selection, lower search costs, and lower prices than their brick-and-mortar counterparts do.” This means that used-book are better and efficiently accessible from a web platform rather than going to a shop. It is evident as the hassle of traveling to many shops just to find the right used-book is eliminated, and we can locate the book and the owner of the book directly. The system also allows finding the specific book from any category. By finding the owner directly from the system does lower the search cost because information of the book owner is provided. It also assists in reducing the cost of the book because the book shop owner is eliminated from the equation.

He later emphasized on the above point but in a global scale. Globally networked information systems can reduce the search and transaction costs for buyers and sellers to locate and trade products, and can thereby facilitate the creation of technology-mediated electronic exchanges. These exchanges allow sellers to reach a worldwide market easily and allow buyers to locate easily items that frequently would be unavailable in traditional physical stores.

(Anindya Ghose, 2006).

The system can be a greater alternative for a book store be it domestic or global. It overcomes both global and domestic market as it covers both buyer and seller for reaching a worldwide market.

Thus, while brick-and-mortar bookstores have high search costs, limited inventory capacity, limited geographical coverage, and relatively high prices, IT-enabled markets for used books offer low search costs, nearly unlimited (virtual) inventory capacity, global coverage, and—through competition among sellers—relatively low prices. These market characteristics are clearly attractive for consumers. IT-enabled markets for used products are able to aggregate supply and demand over a global marketplace, making it easier for buyers to find sellers and for sellers to find buyers. Because of this, these markets have significant advantages in terms of price, search costs, and selection over physical markets.

(Anindya Ghose, 2006).

The IT-enabled market overcomes the drawbacks of a shop in almost every aspect from storage, cost, and coverage. It makes the finding opposing party easier in a global scale.

The increased variety, low prices, and low search costs available in online used-product markets may attract customers who would have otherwise purchased a new copy of the product. The overall impact of used-book markets on social welfare is overwhelmingly positive.

(Anindya Ghose, 2006).

The system also makes a difference, and impact on the society as the many positive upshots of an IT-based system is appealing to the customer. The customer may then opt for a used-book rather than a new copy.

The Used-Book Trade in the Roman World

It is commonly assumed that the Romans knew a used-book trade much like that of today. In fact, although the Roman world appears to have had a small second-hand book trade, that trade left almost no traces of itself in the surviving sources. It was probably restricted largely to school texts circulating outside the circles of aristocratic readers and writers who provide most of our surviving evidence.

(Starr, 1990)

Content-based Recommender Systems: State of the Art and Trends

Content-based recommendation systems try to recommend items similar to those a given user has liked in the past. Indeed, the basic process performed by a content-based recommender consists in matching up the attributes of a user profile in which preferences and interests are stored, with the attributes of a content object (item), in order to recommend to the user new interesting items. Recommendation algorithms use input about a customer's interests to generate a list of recommended items. At Amazon.com, recommendation algorithms are used to personalize the online store for each customer, for example showing programming titles to a software engineer and baby toys to a new mother.

Content-based recommendation systems try to recommend items similar to those a given user has liked in the past, whereas systems designed according to the collaborative recommendation paradigm identify users whose preferences are similar to those of the given user and recommend items they have liked.

(Pasquale Lops, 2011)

2.2 Technical Overview

Recommendation systems or Recommender system are means used for filtering, sorting, and recommending items. They are efficient tools that overcome the information overload, by providing users with the most relevant information based on their interest.

The goal of a Recommender System is to generate meaningful recommendations to a collection of users for items or products that might interest them. Suggestions for books on Amazon, or movies on Netflix, are real world examples of the operation of industry-strength recommender systems. The design of such recommendation engines depends on the domain and the particular characteristics of the data available. For example, movie watchers on Netflix frequently provide ratings on a scale of 1 (disliked) to 5 (liked). Such a data source records the quality of interactions between users and items. Additionally, the system may have access to user-specific and item-specific profile attributes such as demographics and product descriptions respectively. (Melville, 2010)

Applications of Recommendation System:

Product Recommendations: Perhaps the most important use of recommendation systems is at on-line retailers mainly Amazon. Amazon or similar on-line vendors strive to present each returning user with some suggestions of products that they might like to buy.

Movie Recommendations: Netflix offers its customers recommendations of movies they might like. These recommendations are based on ratings provided by users.

News Articles: News services have attempted to identify articles of interest to readers, based on the articles that they have read in the past. The similarity might be based on the similarity of important words in the documents, or on the articles that are read by people with similar reading tastes. The same principles apply to recommending blogs from among the millions of blogs available, videos on YouTube, or other sites where content is provided regularly.

Content-Based Filtering

Content-based filtering refers to such methods that provide recommendations by comparing representations of content describing an item to representations of content that interest the user pairs. (Melville, 2010)

The systems implementing content- based filtering analyze sets of descriptions and opinion of the items previously rated by the user and build a profile which describes the user interest of the user.

For example, Music Recommendation systems in use web content-based filtering. The increase in multimedia data creates difficulty in searching information within user's desired time frame and according to the interest of the user.

Although the data processing time can be decreased by displaying results of songs which has been searched the most in past and present, this does not ensure that the results displayed matches the preference of the user.

Thus, in this case, content-based filtering can be used. It calculates the similarity between the content of an item (song) and user information, to display the result as per the preference of the user.

(Jong- Hun Kim, 2006)

Advantages and Drawbacks of Content-based Filtering

The adoption of the content-based recommendation paradigm has several advantages when compared to the collaborative one:

- USER INDEPENDENCE - Content-based recommenders exploit solely ratings provided by the active user to build her own profile.
- TRANSPARENCY - Explanations on how the recommender system works can be provided by explicitly listing content features or descriptions that caused an item to occur in the list of recommendations.
- NEW ITEM - Content-based recommenders are capable of recommending items not yet rated by any user. As a consequence, they do not suffer from the first-rater problem, which affects collaborative recommenders which rely solely on users' preferences to make recommendations.

Nonetheless, content-based systems have several shortcomings:

- LIMITED CONTENT ANALYSIS - Content-based techniques have a natural limit in the number and type of features that are associated, whether automatically or manually, with the objects they recommend.
- OVER- SPECIALIZATION - Content-based recommenders have no inherent method for finding something unexpected. The system suggests items whose scores are high when matched against the user profile, hence the user is going to be recommended items similar to those already rated.
- NEW USER - Enough ratings have to be collected before a content-based recommender system can really understand user preferences and provide accurate recommendations. Therefore, when few ratings are available, as for a new user, the system will not be able to provide reliable recommendations.

(Pasquale Lops, 2011)

2.3 Related Works

Many sites around the world serve the purpose of circulating used book. Here are few of the sites that are currently famous:

- Better World Book: "Better World" isn't just a name — for every purchase made on BetterWorldBooks.com, a book is donated to someone in need. These online booksellers also partner with libraries and college campuses to collect used books, many of which are donated to literacy nonprofits around the world. (Wood, 2016)
- BookMooch: BookMooch.com is basically free. Once you sign up, you enter a list of the books you have that you'd like to give away, and make a wish list of the books you'd like to get. When someone requests one of your books, you ship it to them, earning you one point. You can then use your point to request a book from someone else. (Wood, 2016)
- ThriftBooks: Washington-based ThriftBooks.com has a commitment to helping the environment, partnering with libraries and other vendors to ensure that used books wind up in good hands rather than in the trash. Any items they receive that they can't sell go directly to a recycling plant. Their prices are extremely low. (Wood, 2016)
- Half: Owned by eBay, Half.com is sort of like an all "buy it now," media-only version of the popular auction site (no bidding here). They have all kinds of books (as well as music, games, and movies), but textbooks are especially easy to find here. You can choose to rent or buy textbooks. If you buy, when your semester's over you can sell that Chem 101 textbook and get some cash back. (Wood, 2016)

Recommender system has been widely used in recent days, especially in the field of e-commerce. Listed below are some of the popular application based which uses recommendation algorithm.

- Amazon.com: Amazon.com is the largest internet based retailer of US. It uses recommendations as a targeted marketing tool in many email campaigns and on most of its websites' pages. Clicking on "Your Recommendations" link clients are directed to a page where they can filter their recommendations by product line and subject area, rate recommended products and rate their previous purchase. Our shopping cart

recommendations offer product suggestions to the clients based on the items in their shopping cart.

(Linden, 2003)

- Netflix: Netflix is the world's leading internet television network with over 81 million members in 190 countries. It has a massive database of TV shows, movies, documentaries, etc. It recommends videos to the user by the shows they watch, their ratings on previously watched shows, etc. Netflix have been using the algorithm, CineMatch. Netflix offered a prize of one million dollars for the first algorithm that could beat its own recommendation system by 10%. The prize was finally won in 2009, by a team of researchers called "Bellkor's Pragmatic Chaos," after over three years of competition.

(Koren, 2009.)

- Youtube: Youtube is best known for streaming videos of any category. It has been able to recommend the users with videos based on their previous history, interest, search etc.

2.4 Requirement Analysis

Functional and non-functional

The functional and non-functional requirements addressed by the application are listed below in the Table 2.

Table 2: Functional and Non-functional Requirement

S.N	Functional Requirement	Non-functional Requirement
1.	User Registration	1. The user can register using a valid email address. 2. Only one account can be created to with an email address. 3. The user must provide information like contact number, address etc.
2.	User login	1. The user can login with valid username and password.
3.	Book Upload	1. The user can upload book that they are willing to sell. 2. The user should insert valid book information in the provided fields.
4.	Book View	1. The user can view a certain book they are interested in. 2. The user can view the seller's information also.
5.	Request Book	1. The user should insert valid detail of book being requested.

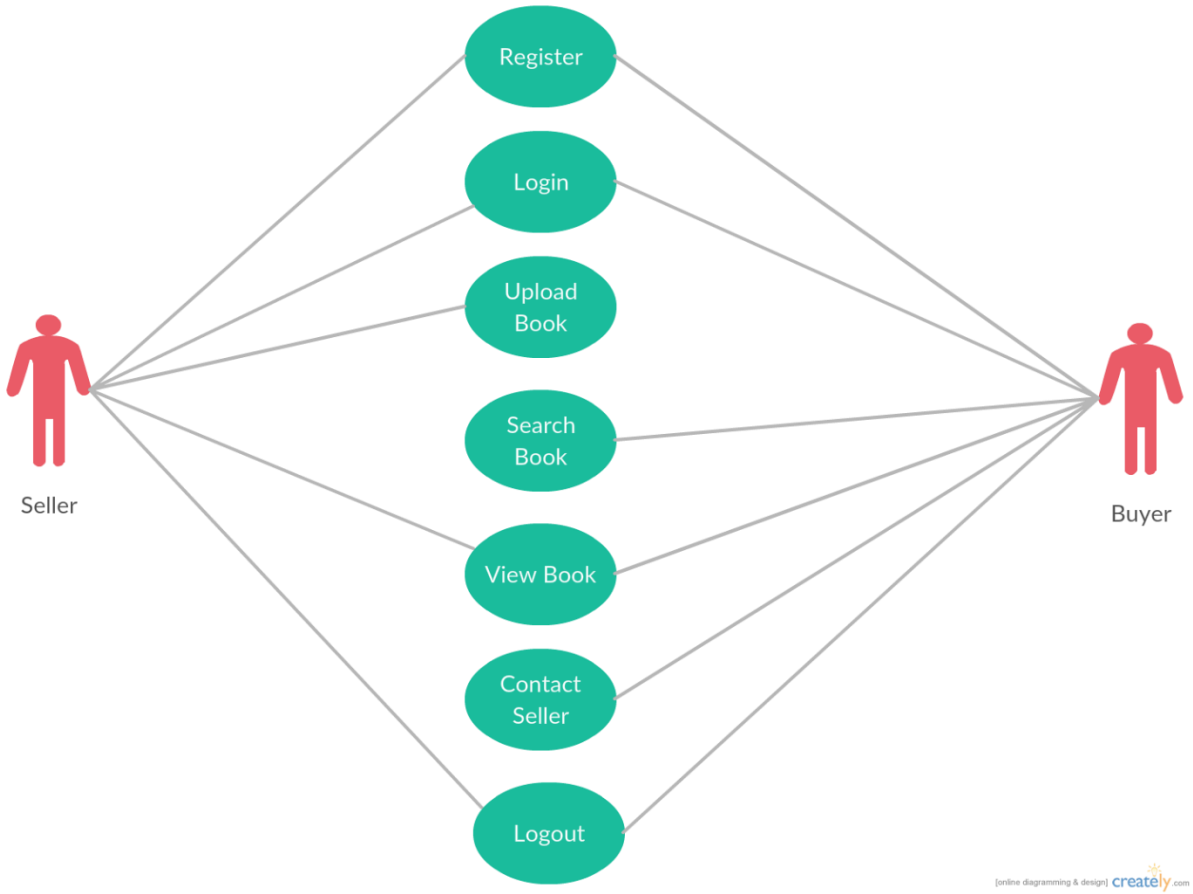

Figure 2: Use Case Diagram

As shown in Figure 2, the end user can create a new account by registering to the application. The email address should be valid and unique for each user.

The registered user can log in to the application by entering their valid username and password.

Upon logging in to the application, the user can perform any task that is made available to the user by the application. The user can post a book to sell, search a book from the application, view detail of a specific book and request any book.

2.5 Feasibility Analysis

2.5.1 Technical Feasibility

The application uses 2-tier architecture. The buyer and seller are the end users of the application. The server keeps and serves the information added by seller. The application provides information regarding books and seller to an interested buyer. The application can be accessed from anywhere at any time with an internet connection. Thus, it is technically feasible.

2.5.2 Operational Feasibility

Used Book Portal is a web based application. It uses HTML/CSS, Bootstrap, and JavaScript at the front end and PHP, MySQL at the back end. It is based on client-server architecture and needs the internet connection to access information. It is supported on both Windows and Linux platform. All of the technology required by the application are available and can access freely making it operationally feasible.

2.5.3 Economic Feasibility

The cost of developing the application is minimal. The cost associated while building the application were:

- Internet usage
- Development time

The users can use this application free.

CHAPTER 3: SYSTEM DESIGN

3.1 Methodology

The application is built using the waterfall model. First, various other applications related to the project were searched on the internet. Many related works on the domain were found like Better World Book, BookMooch, Half. These sites were examined to get better knowledge regarding the method of transaction and requirement for the project.

Other related works were also explored in the context of Nepal. Sites like Sastobook.com, Mandalabookpoint.com were encountered but are only oriented towards new books. Similarly, Hamrobazar.com has only a small section of used book which is rarely used.

The domestic market was also studied to understand the traditional transaction. Various used bookstores were visited to enquire about the transaction process.

Based on all action done above, the requirements for the project was outlined.

The algorithm used in this application is Content Filtering. Various papers were studied regarding other applications using the algorithm.

3.1.1 Algorithm Used

Content Based Recommendation is the main algorithm used for recommending the books. A content-based filtering system selects items based on the correlation between the content of the items and the user's preferences as opposed to a collaborative filtering system that chooses items based on the correlation between people with similar preferences. PRES is a content-based filtering system. It makes recommendations by comparing a user profile with the content of each document in the collection. The content of a document can be represented with a set of

terms. Terms are extracted from documents by running through a number of parsing steps. First all HTML tags and stop words (words that occur very often and cannot be used as discriminators) are removed. The remaining words are reduced to their stem by removing prefixes and suffixes [Porter 1980]. For instance the words “computer”, “computers” and “computing” could all be reduced to “comput”. The user profile is represented with the same terms and built up by analyzing the content of documents that the user found interesting. Which documents the user found interesting can be determined by using either explicit or implicit feedback. Explicit feedback requires the user to evaluate examined documents on a scale. In implicit feedback the user’s interests are inferred by observing the user’s actions, which is more convenient for the user but more difficult to implement.

(Robin van Meteren)

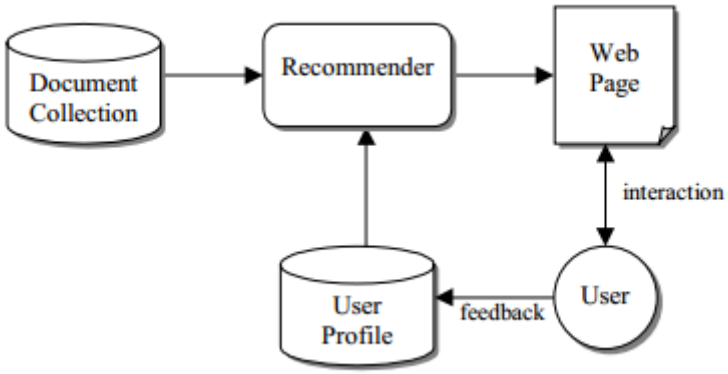

Figure 3: PRES Architecture

Figure 3 shows the PRES architecture. A user profile is learned from feedback provided by the user. The recommender system compares the user profile with the documents in the collection. The documents are then ranked on the basis of certain criteria such as similarity, novelty, proximity and relevancy and the best ranked documents appear as hyperlinks on the current web page.

3.2 System Design

3.2.1 Entity Relationship Diagram

An Entity-Relationship (ER) Diagram is a type of flowchart that illustrates how “entities” such as people, objects or concepts relate to each other within a system.

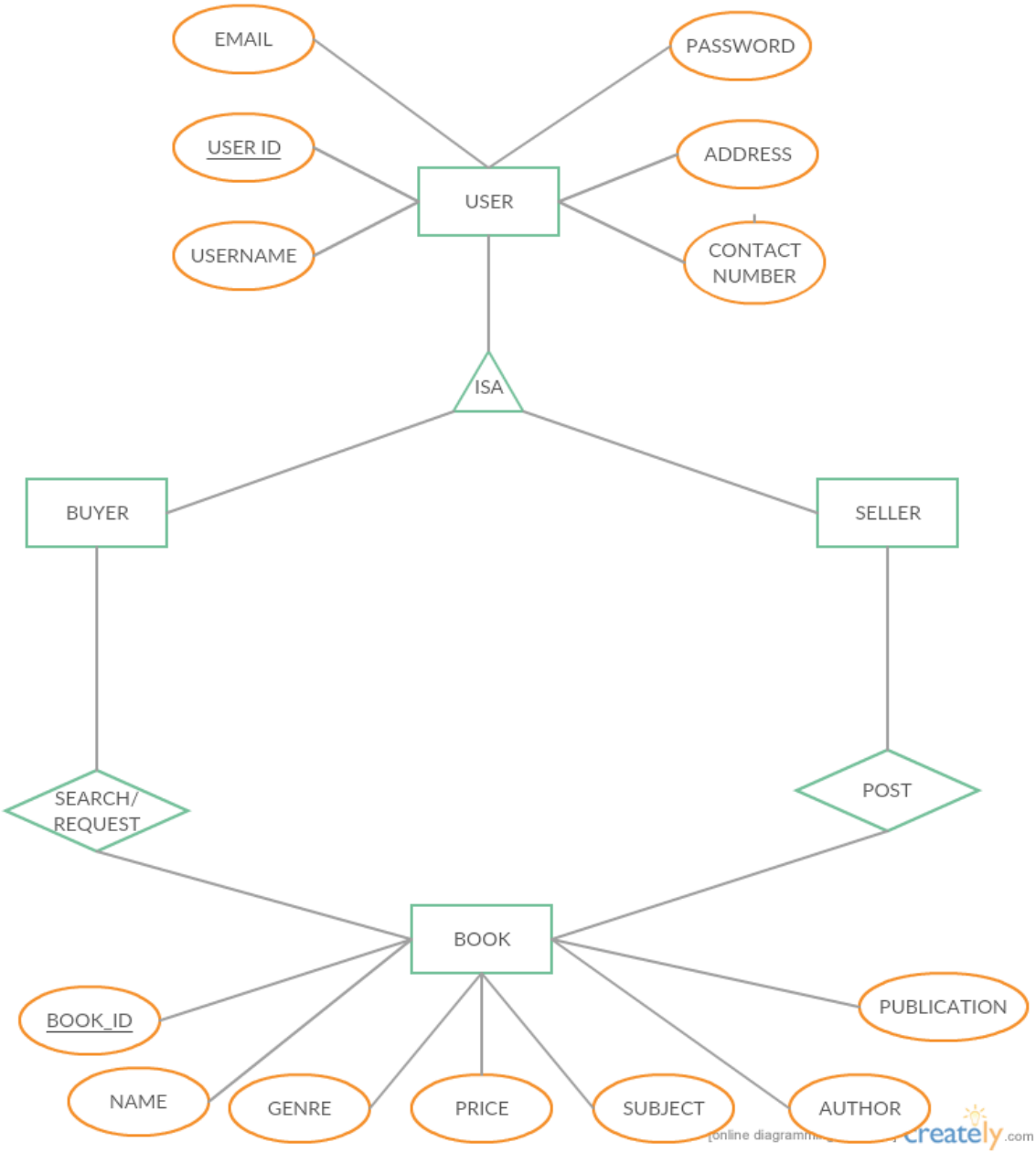

Figure 4: ER Diagram of Application

In the case of the project, there are two main entities; User and Book.

The User entity is then distributed to two other entities, Buyer, and Seller. Both the entities share the attributes of the User entity.

Book is the next main entity which has a vital relationship with both Buyer and Seller. Buyer can Search and Request for a book. Meanwhile, Seller can Post a book they are willing to sell.

3.2.2 Context Flow Diagram

The Context Diagram shows the system under consideration as a single high-level process and then shows the relationship that the system has with other external entities.

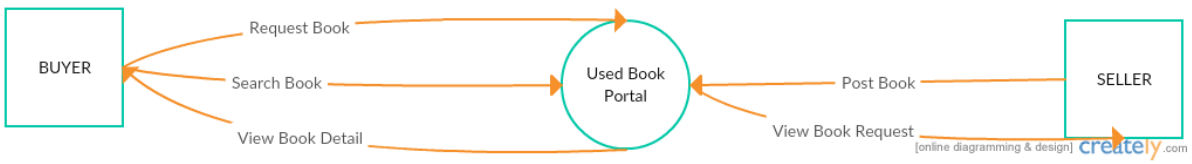

Figure 5: Context Flow Diagram of Application

Regarding the project, Used Book Portal is the primary Process which is connected to the External entities Buyer and Seller. Based on their request, they get necessary response or outcome.

3.2.3 Data Flow Diagram

A data flow diagram (DFD) maps out the flow of information for any process or system.

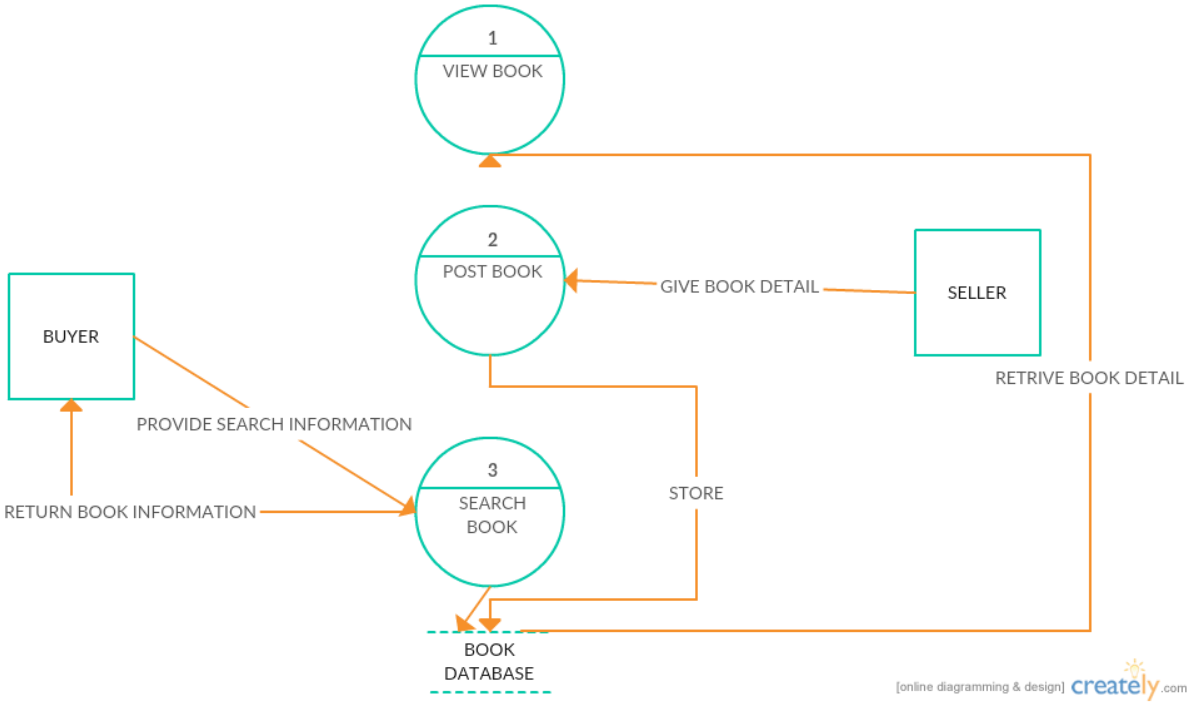

Figure 6: Level 1 DFD of Application

The Figure 6 explains flow of data between entity and process in the application. Regarding the project, there are mainly three processes which work under the Used Book Portal. Process are View Book, Search Book, and Post Book. External entities like Buyer and Seller access the process to get what is needed. Book database is the Data Source which is connected to both External entities and Process.

CHAPTER 4: IMPLEMENTATION AND TESTING

4.1 Implementation

Used Book Portal is a web based application. It is a bridge which helps connect the buyer and seller directly without going through a middle man. Based on the requirements gathered, necessary fields and functions for the programs were decided. Information fields for books which carried the required information of the book was finalized. Similarly, User information fields was also finalized to hold information of the Buyer and Seller. Database was also built simultaneously using MySQL.

Based on the analysis and existing sites around the world, functions for the system was developed and tested. PHP language was used to build functions for User Authentication, Data Submission, View Book Details with the help of PHP Storm. Design of the system was made using HTML, CSS, Bootstrap etc.

4.1.1 Tools used

PHP

PHP (Hypertext Preprocessor) is a popular general-purpose scripting language that is especially suited to web development. It is a server-sided language which is fast, flexible and pragmatic.

PHP was used to develop all functions which the system runs. Every function from signup, login/logout, insert book, search book, view book detail, request book are developed in PHP using PHP Storm.

Creately

It is the diagramming and designing software to design various technical diagrams like flowcharts, Gantt charts, UML designs, DFD, ER Diagram and many other diagram types.

In the project, all the technical diagrams including Use Case diagram, ER diagram, DFD are built using creately.com.

HTML/CSS

HTML (Hyper Text Mark Up Language) and CSS(Cascading Style Sheet) has been used to give the view of the application or website. All the pages of the application is designed using this language. Data is show by the help of HTML/CSS.

MySQL

MySQL is an open source RDBMS that relies on SQL for processing the data in the database. MySQL can be used to execute queries in database.

MySQL has been used to create the database and perform query in it from the functions. It has been used to store data of User and the book.

4.2 Testing

Test Case Id: 1

Test Case Description: User Registration

Table 3: Test Case 1

Precondition	Input Data	Steps	Expected Outcome	Actual Result	Result
Should be in registration page.	E-mail, Username, Password, Full Name, Address, Contact,	1. Enter all required and valid information. 2. Press registration button.	User must get new account to the application.	User gets new account to the application.	Pass

Test Case Id: 2

Test Case Description: User Login

Table 4: Test Case 2

Precondition	Input Data	Steps	Expected Outcome	Actual Result	Result
Should be registered to the application.	Username, Password	1. Enter valid username and password. 2. Press Log In button.	User must successfully login to the application.	User gets logged into the application.	Pass

Test Case Id: 3

Test Case Description: Insert Book

Table 5: Test Case 3

Precondition	Input Data	Steps	Expected Outcome	Actual Result	Result
User should be logged in.	Title, Author, Category, Price, Description, Image	1. Enter valid and required information. 2. Press Insert button.	Book must successfully be posted in the application.	Book is posted in the application.	Pass

Test Case Id: 4

Test Case Description: Request Book

Table 6: Test Case 4

Precondition	Input Data	Steps	Expected Outcome	Actual Result	Result
User should be logged in.	Title, Author, Description, Image	1. Enter valid and required information. 2. Press Insert button.	Request must successfully be posted in the application.	Request is posted in the application.	Pass

Test Case Id: 5

Test Case Description: View Book Detail

Table 7: Test Case 5

Precondition	Input Data	Steps	Expected Outcome	Actual Result	Result
User should be logged in.		1. Click on the book detail button	Book detail and buyer detail must successfully be viewed.	Book detail and buyer detail is displayed.	Pass

Test Case Id: 6

Test Case Description: Search Book

Table 8: Test Case 6

Precondition	Input Data	Steps	Expected Outcome	Actual Result	Result
User should be logged in.	Title, Author, Category	1. Enter valid and required information. 2. Press Search button.	Searched book must be displayed.	Searched book is displayed.	Pass

CHAPTER 5: MAINTENANCE AND SUPPORT

The application will be maintained and updated over the period of time and necessary support will be provided to adapt the system to the future needs. Some of the strategies are:

4.1 Corrective Maintenance

Corrective maintenance is done to correct any problem occurs. This states how and when the application will be maintained. So, if any error takes place in the hosted application, then a copy of the application from the server with the error will be kept and then replaced with the corrected once. Maintenance will be performed as soon as error is encountered.

4.2 Adaptive Maintenance

This kind of maintenance is done to catch up with the existing systems and technologies. This maintenance will be performed based on the advancement of the competing application. It will be done to keep up with my competition at the domestic level. This maintenance is also essential for the survival of the application. Further features will be added to the application to make it more complete, well-rounded and user-friendly.

CHAPTER 6: CONCLUSION AND RECOMMENDATION

4.1 Conclusion

This application's primary objective to help the potential buyer find the necessary book that the seller is willing to sell. It aims to make the transaction direct between the buyer and seller removing the middle man. It seeks to help people find the necessary book and people to help others get the book.

The expected objective of the project is met which is to help the buyer and seller to communicate directly.

6.2 Recommendations

This application can still better as further feature can be added to the application. Feature like instant message, chat can be added.

REFERENCES

Anindya Ghose, M. D. (2006). *Internet Exchanges for Used Books:An Empirical Analysis of ProductCannibalization and Welfare Impact.*

Asanov, D. (2011). *Algorithms and Methods in Recommender System.* Berlin Institute of Technology.

Central Bureau of Statistics. (2013). *Statistical Year Book 2013.* Central Bureau of Statistics.

Ekstrand, M. D. (2010). ollaborative Filtering RecommenderSystems.

Jong- Hun Kim, U.-G. K.-H. (2006). *Content-Based Filtering for Music Recommendation Based on Ubiquitos Computing.* Incheon, Korea: Department of Computer Science anf Engineering Inha University.

Koren, Y. (2009.). The BellKor solution to the Netflix grand prize.

Larry Page, S. B. (1994). *The Anatomy of a Large-Scale Hypertextual Web Search Engine.* Stanford University.

Linden, G. (2003). Amazon.com Recommendations. Item-to-Item Collaborative Filtering. 1-5.

Melville, P. (2010). Recommender Systems. *Recommender Systems*, 1.

Pasquale Lops, M. d. (2011). Content-based Recommender Systems: State of the Art and Trends. *Recommender Systems Handbook*.

Robin van Meteren, M. v. (n.d.). *Using Content-Based Filtering for Recommendation.*

Starr, R. J. (1990). *The Used-Book Trade in the Roman World.* Classical Association of Canada.

Wood, K. (2016). *15 Best Online Bookstores for Cheap New and Used Books*. Retrieved from http://www.lifehack.org: http://www.lifehack.org/articles/money/15-best-online-bookstores-for-cheap-new-and-used-books.html

Xiaoyuan Su, T. M. (2009). *A Survey of Collaborative Filtering Techniques.* Florida: Department of Computer Science and Engineering, Florida Atlantic University.