

Book Store with Recommendation System

Tarandeep Singh Mandhiratta
Master of Applied Computing
Toronto, Canada
2tarandeep@gmail.com

GitHub repository: [Online Book Store with Recommendation](#)

I. INTRODUCTION

The Internet by far plays a major role in people's life. It has drastically improved the quality of life and the standard of living of so many people. It has widened its branches into many different levels and areas. The e-commerce business is one such branch that has gotten a lot of attention recently. Traditional bookstores are not always accessible; they are limited by their hours of operation, the availability of specific books, their location, and, most crucially, their capacity and the space required to store a large number of books. As a result of these disadvantages, e-commerce sectors have evolved. Such drawbacks have led to the evolution of e-commerce industries related to bookstores. The project is a simple website that includes a variety of books in various categories for consumers to view online.

With the growth of Youtube, Amazon, Netflix, and other similar web services over the last several decades, recommender systems have become increasingly important in our lives. Recommender systems are becoming ubiquitous in our everyday online journeys, from e-commerce (suggest articles to buyers that may be of interest) to online advertising (suggest the suitable contents to users based on their preferences). Recommender systems, in a broad sense, are algorithms that try to propose relevant items to consumers (items being movies to watch, text to read, products to buy or anything else depending on industries). In certain businesses, recommender systems are crucial since they may produce a large amount of revenue or serve as a method to differentiate yourself from rivals. As an example of the importance of recommender systems, Netflix held a competition (the "Netflix prize") a few years ago in which the objective was to create a recommender system that outperformed its own algorithm, with a reward of one million dollars on the line.

The main goal of this project is to make an online book recommendation system and examine the performance of the machine learning algorithm on a publicly available dataset from Kaggle. Weka API is used as the main tool to evaluate and recommend the books from the dataset.

Businesses rely on data scientists to derive insight from their enormous, ever-expanding, diverse set of data in today's Big Data era. Many people think of data science as a job, but it's more accurate to think of it as a way of thinking, a technique of extracting insights through the scientific process.

II. PROBLEM SOLVING AND ALGORITHMS

The Book dataset utilized in this project is available at Kaggle.com . The dataset can be viewed as either classification or regression tasks. This dataset can be used for building book recommendation system as it contains all the information for each book in the dataset. The dataset contains 9 descriptive features and 6238 instances. Books are identified by their respective Title. Moreover, some content-based information is given (Author, Edition, Reviews, Ratings, Synopsis, Genre, Book Category, and Price)

Data cleaning is extremely important before utilizing the data. In this project, the data is preprocessed by identifying and handling duplicate data, anomalous data, and other inconsistencies that could skew the analysis. This will ultimately enhance the performance of the model. The Book dataset will serve as the foundation for our project's book recommendation engine, as it contains all of the necessary data.

Weka implements a relatively complete set of classification algorithms, including many of the most popular. In this project, state-of-the-art unsupervised classification algorithm, k-means algorithm is used. As different descriptive features may impact the classifiers' performance, we clean the data before doing descriptive analysis.

III. PROPOSED SYSTEM DESIGN

System components

- **Login page** - Authentication (Login) has two roles (Admin, Customer)
- **Admin user login** - Allows admin to search a book, view the list of books, add a book, modify a book, and delete a book
- **Regular user login** - Allows a regular user to search a book and view the list of books
- **View (along with Recommended books)** - when a user clicks a book, it will display details of the selected book, on this page we will recommend similar books, related to the item the user is looking for.

Technical tools

Eclipse
 MySql
 Java EE
 Weka API
 Enterprise JavaBeans (EJB)
 JavaServer Pages (JSP)
 WildFly

Dataset source : <https://www.kaggle.com/datasets/anmolkumar/predict-book-prices>

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Title	Author	Edition	Reviews	Ratings	Synopsis	Genre	BookCategory							
2	The Comp Sir Arthur	Mass Mari	4.4 out of	960	custor	A collectio	Short Stor	Crime, Thriller & Mystery							
3	Learn Doc	Gabriel N.	Paperback	5.0 out of	1	custome	Enhance y	Operating Computing, Internet & Digital Media							
4	Big Girl	Danielle S	Paperback	5.0 out of	4	custome	'Watch ou	Romance							
5	Think Pyt	Allen B. D	Paperback	4.1 out of	11	custom	If you war	Programm	Computing, Internet & Digital Media						
6	Oxford Wi	Redman G	Paperback	4.4 out of	9	custome	Learn and	Linguistic	Language, Linguistics & Writing						
7	Understar	John Berg	Paperback	5.0 out of	2	custome	John Berg	Arts Histo	Arts, Film & Photography						
8	Dance Mu	Rick Snom	Paperback	5.0 out of	1	custome	Dance Mu	Music Boc	Computing, Internet & Digital Media						
9	A Clash of	George R.	Paperback	4.3 out of	117	custor	The secon	Action & /	Crime, Thriller & Mystery						
10	An Era of	I Shashi Th	Hardcover	4.4 out of	550	custor	In 1930, th	Asian Hist	Politics						
11	Doing Just	Preet Bha	Paperback	4.4 out of	6	custome	A Guardia	True Acco	Action & Adventure						
12	Courtney'	Wilbur Sm	Paperback	3.3 out of	12	custom	The brand	Action & /	Romance						
13	A Ring For	Melanie N	Paperback	5.0 out of	1	custome	From no-s	Romance	Romance						
14	Alice's Ad	Lewis Carl	Paperback	4.2 out of	39	custom	Original, €	Short Stor	Action & Adventure						
15	The Natya	Adya Rang	Hardcover	5.0 out of	1	custome	Classical v	Humour (I	Humour						
16	Green Hill	Ernest He	Paperback	3.0 out of	2	custome	Green Hill	Hunting (I	Sports						
17	Anatomy	Chris Lega	Paperback	4.3 out of	5	custome	Anatomy	Sculpture	Computing, Internet & Digital Media						
18	If Truth Be	Om Swam	Hardcover	4.7 out of	558	custor	In the 199	Biographii	Biographies, Diaries & True Accounts						
19	D&AD. Th	D&AD	Hardcover	5.0 out of	1	custome	In 1995, th	Design	Arts, Film & Photography						
20	Three Bill	Martin Mc	Paperback	3.0 out of	1	custome	After mor	Theatre &	Humour						
21	Thirty Day	Norman Li	Mass Mari	4.0 out of	2	custome	What you	Speech	Language, Linguistics & Writing						
22	When Hitl	Judith Ker	Paperback	5.0 out of	2	custome	This semi-	Children's	Biographies, Diaries & True Accounts						
23	The Peng	J. A. Cudd	Paperback	4.6 out of	45	custom	'An indisp	Dictionari	Language, Linguistics & Writing						
24	Based on	. Norm Mac	Paperback	3.5 out of	2	custome	NEW YORI	Biographii	Humour						
25	DC Comic	:DK	Hardcover	4.5 out of	19	custom	DC Comic	Encyclopa	Comics & Mangas						

```
MariaDB [test]> describe book;
```

Field	Type	Null	Key	Default	Extra
BookId	int(11)	NO	PRI	NULL	auto_increment
Title	varchar(200)	YES		NULL	
Author	varchar(100)	YES		NULL	
Edition	varchar(100)	YES		NULL	
Ratings	decimal(3,1)	YES		NULL	
Reviews	bigint(21)	YES		NULL	
GenreId	bigint(21)	YES		NULL	
GenreDesc	varchar(60)	YES		NULL	
Synopsis	varchar(20000)	YES		NULL	
CategoryId	bigint(21)	YES		NULL	
CategoryDesc	varchar(40)	YES		NULL	
Price	decimal(7,2)	YES		NULL	

```
12 rows in set (0.02 sec)
```

```
MariaDB [test]> _
```

```
MariaDB [test]> select BookId,Title,Author,Edition,Ratings,Reviews,GenreId,CategoryId,Price from book limit 10;
```

BookId	Title	Author	Edition	Ratings	Reviews	GenreId	CategoryId	Price
2	Updated - Guru Dutt: A Tragedy in Three Acts	Updated - Arun Khopkar	Updated - Paperback, 7 Nov 2012	4.0	84	360	1	202.93
3	Leviathan (Penguin Classics)	Thomas Hobbes	Paperback, 25 Feb 1982	4.8	6	200	7	299.00
4	A Pocket Full of Rye (Miss Marple)	Agatha Christie	Paperback, 5 Oct 2017	4.1	13	95	6	180.00
5	LIFE 70 Years of Extraordinary Photography	Editors of Life	Hardcover, 10 Oct 2006	5.0	1	263	2	965.62
7	Death on the Nile (Poirot)	Agatha Christie	Paperback, 5 Oct 2017	4.4	72	97	6	224.00
8	Yoga Your Home Practice Companion: A Complete Practice and Lifestyle Guide: Yoga Programmes, Meditation Exercises, and Nourishing Recipes (Sivananda Yoga Vedanta Centre)	Sivananda Yoga Vedanta Centre	Hardcover, Import, 1 Mar 2018	4.7	16	323	11	836.00
9	Karmayogi: A Biography of E. Sreedharan	M S Ashokan	Paperback, 15 Dec 2015	4.2	111	36	3	130.00
11	Battle for Sanskrit: Is Sanskrit Political or Sacred? Oppressive or Liberating? Dead or Alive?	Rajiv Malhotra	Paperback, 20 Jan 2017	4.9	132	26	8	373.00
13	Tai-Pan: The Second Novel of the Asian Saga	James Clavell	Paperback, 1 Jul 1999	4.1	4	1	1	379.00
14	The Art of Shaolin Kung Fu: The Secrets of Kung Fu for Self-Defense, Health, and Enlightenment (Tuttle Martial Arts)	Wong Kiew Kit	Paperback, 15 Nov 2002	5.0	3	26	11	1066.00

```
10 rows in set (0.00 sec)
```

```
MariaDB [test]> _
```

Students Book Store

Username

Password

Login

Signup

Students Book Store

Welcome, admin Log O

ID : Price : Title : Author :

Add Search

ID	Title	Author	Price	Genre	Rating	Reviews	Actions
2	Updated - Guru Dutt: A Tragedy in Three Acts	Updated - Arun Khopkar	202.93	Zoology	4.0 / 5.0	84	V E D
3	Leviathan (Penguin Classics)	Thomas Hobbes	299.00	International Relations	4.8 / 5.0	6	V E D
4	A Pocket Full of Rye (Miss Marple)	Agatha Christie	180.00	Contemporary Fiction	4.1 / 5.0	13	V E D
5	LIFE 70 Years of Extraordinary Photography	Editors of Life	965.62	Photography Textbooks	5.0 / 5.0	1	V E D
7	Death on the Nile (Poirot)	Agatha Christie	224.00	Creative Writing & Composition	4.4 / 5.0	72	V E D
8	Yoga Your Home Practice Companion: A Complete Practice and Lifestyle Guide: Yoga Programmes, Meditation Exercises, and Nourishing Recipes (Sivananda Yoga Vedanta Centre)	Sivananda Yoga Vedanta Centre	836.00	Sports Training & Coaching	4.7 / 5.0	16	V E D
9	Karmayogi: A Biography of E. Sreedharan	M S Ashokan	130.00	Biographies & Autobiographies	4.2 / 5.0	111	V E D
11	Battle for Sanskrit: Is Sanskrit Political or Sacred? Oppressive or Liberating? Dead or Alive?	Rajiv Malhotra	373.00	Asian History	4.9 / 5.0	132	V E D
13	Tai-Pan: The Second Novel of the Asian Saga	James Clavell	379.00	Action & Adventure	4.1 / 5.0	4	V E D
14	The Art of Shaolin Kung Fu: The Secrets of Kung Fu for Self-Defense, Health, and Enlightenment	Wona Kiew Kit	1066.00	Asian History	5.0 / 5.0	3	V E D

Students Book Store

localhost:8080/bookstore/viewBook?bookId=2

Title : Updated - Guru Dutt: A Tragedy in Three Acts

Author : Updated - Arun Khopkar

Edition : Updated - Paperback, 7 Nov 2012

Price : 202.93

Genre : Zoology

Category : Action & Adventure

Rating : 4.0

Reviews : 84

Synopsis :

Updated - A layered portrait of a troubled genius for whom art was not merely a thing of beauty but a vital part of living itself.
Selling Points: The original Marathi book won the National Award for Best Book on Cinema (in 1986), now available for the first time in English.
The Book: Guru Dutt is now named along with the masters of world cinema—Orson Welles, Mizoguchi, Hitchcock, Jancso, Ophüls—for his innovative cinematic form and his deep humanism and compassion. In Guru Dutt: A Tragedy in Three Acts, renowned film-maker and scholar Arun

Recommended Books (4)

ID	Title	Author	Price	Genre	Rating	Reviews	Actions
4910	Screenplay: The Foundations of Screenwriting	Syd Field	559.00	Writing Guides	4.4 / 5.0	79	V E D
5192	The Anatomy of Story: 22 Steps to Becoming a Master Storyteller	John Truby	818.00	Writing Guides	4.3 / 5.0	32	V E D
5667	How to Write Movie in 21 Days	Viki King	450.00	Writing Guides	4.2 / 5.0	3	V E D
5902	Zen Pencils--Creative Struggle: Illustrated Advice from Masters of Creativity	Gavin Aung Than	721.00	Visual Arts	4.2 / 5.0	3	V E D

```
server.log - Notepad
File Edit Format View Help
2022-04-17 15:04:19,234 DEBUG [bookstore.ejb.BookStatelessBean] (default task-2) Retrieving Book
2022-04-17 15:04:19,234 INFO [bookstore.repository.BookRepository] (default task-2) BookRepository.findByParams() : Params : {PriceEnd=, btnSearch=, BookId=, param_act
2022-04-17 15:04:19,236 INFO [stdout] (default task-2) Hibernate: select * from Book where 1=1 and Title like '%pocket%' and Author like '%Oxford%'

2022-04-17 15:04:19,260 DEBUG [bookstore.ejb.BookStatelessBean] (default task-2) Books retrieved : 4
2022-04-17 15:04:19,261 DEBUG [bookstore.service.BookServiceImpl] (default task-2) Inside BookService.searchBooks() : Books : 4
2022-04-17 15:04:19,261 DEBUG [bookstore.servlet.ListBooksServlet] (default task-2) Inside ListBooksServlet() : bookList : [Book
[bookId=863, title=Oxford Learner's Pocket English Dictionary: Student Book (Advanced), price=160.0, author=Oxford, edition=Paperback, 15 May 2008, reviews=108, ratings
Those who want a command over English Language, this pocket dictionary is perfect for them. End number of words are written in the dictionary and along with them the d1
About the author:
Oxford Learner's Pocket English Dictionary: Student Book (Advanced) was published by Oxford University Press as student's edition in 2008. It is available in paperback.
[bookId=1331, title=Oxford Learner's Pocket Thesaurus, price=175.0, author=Oxford Dictionaries, edition=Paperback, 7 Jul 2010, reviews=10, ratings=4.1, synopsis=A handy
[bookId=2282, title=Pocket Oxford English Dictionary, price=262.0, author=Oxford Dictionaries, edition=Hardcover, 18 Jul 2013, reviews=184, ratings=4.2, synopsis=The Pc
The paper quality and word count are pretty high. Oxford English Dictionary are the world's most trusted dictionaries.
The book is a very reliable source and a lifelong guide for the readers. The book is easily available on Amazon .in.
About the author
The Oxford English Dictionary is a descriptive dictionary of the English language, published by the Oxford University Press. Oxford Dictionaries Online is a website prc
[bookId=6920, title=Oxford Learner's Pocket Phrasal Verbs and Idioms, price=104.0, author=Oxford, edition=Paperback, 17 Apr 2013, reviews=33, ratings=4.0, synopsis=Lear
2022-04-17 15:04:44,747 DEBUG [bookstore.servlet.ListBooksServlet] (default task-2) Inside ListBooksServlet.doPost()
2022-04-17 15:04:44,747 DEBUG [bookstore.servlet.ListBooksServlet] (default task-2) Inside ListBooksServlet.extractParameters()
2022-04-17 15:04:44,748 DEBUG [bookstore.servlet.ListBooksServlet] (default task-2) Inside ListBooksServlet.extractParameters() : params : {PriceEnd=, btnSearch=, BookI
2022-04-17 15:04:44,748 DEBUG [bookstore.servlet.ListBooksServlet] (default task-2) Inside ListBooksServlet() : params : {PriceEnd=, btnSearch=, BookId=863, param_actic
2022-04-17 15:04:44,748 DEBUG [bookstore.service.BookServiceImpl] (default task-2) Inside BookService.searchBooks() : params : {PriceEnd=, btnSearch=, BookId=863, param
2022-04-17 15:04:44,750 DEBUG [bookstore.ejb.BookStatelessBean] (default task-2) Retrieving Book
2022-04-17 15:04:44,750 INFO [bookstore.repository.BookRepository] (default task-2) BookRepository.findByParams() : Params : {PriceEnd=, btnSearch=, BookId=863, param_
2022-04-17 15:04:44,752 INFO [stdout] (default task-2) Hibernate: select * from Book where 1=1 and BookId = 863 and Title like '%pocket%' and Author like '%Oxford%'

2022-04-17 15:04:44,757 DEBUG [bookstore.ejb.BookStatelessBean] (default task-2) Books retrieved : 1
2022-04-17 15:04:44,758 DEBUG [bookstore.service.BookServiceImpl] (default task-2) Inside BookService.searchBooks() : Books : 1
2022-04-17 15:04:44,758 DEBUG [bookstore.servlet.ListBooksServlet] (default task-2) Inside ListBooksServlet() : bookList : [Book
[bookId=863, title=Oxford Learner's Pocket English Dictionary: Student Book (Advanced), price=160.0, author=Oxford, edition=Paperback, 15 May 2008, reviews=108, ratings
Those who want a command over English Language, this pocket dictionary is perfect for them. End number of words are written in the dictionary and along with them the d1
About the author:
Oxford Learner's Pocket English Dictionary: Student Book (Advanced) was published by Oxford University Press as student's edition in 2008. It is available in paperback.
```