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BOOK RECOMMENDATION SYSTEM USING MACHINE LEARNING

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Abstract: In this project, we propose a methodology to leverage Machine Learning (ML) for the detection of web application vulnerabilities. Recommendation System is a software system that suggests similar items to a consumer based on their earlier purchases or preferences from the past. While this is not an efficient way to present books, it is widely being used for its extreme ease associated with it. We built a book recommendation system web application that takes the title and author of a book as input and gives a recommendation as a similar book as output based on the likes and reading pattern of the user. Today as several books are available in the market, it only gets tedious for users to find books to their liking. Book Recommender will solve this problem, thereby making it very convenient for the user, due to interactive web pages that follow this project as it has been deployed into cloud.

***Index Terms* – Books, Recommendation System, Web Pages**

I. INTRODUCTION

1.1 General Introduction

Machine learning is programming computers to optimize a performance criterion using example data or past experience. We have a model defined up to some parameters, and learning is the execution of a computer program to optimize the parameters of the model using the training data or past experience. The model may be predictive to make predictions in the future, or descriptive to gain knowledge from data. The field of study known as machine learning is concerned with the question of how to construct computer programs that automatically improve with experience.

1.1.1 Definition of Machine Learning

A computer program is said to *learn* from experience E with respect to some class of tasks T and performance measure P, if its performance at tasks T, as measured by P, improves with experience.

1.2 Project Scope

Build a Book Recommendation Web Application that takes the title of a book as input and recommends a similar book as output based on the likes and reading pattern of the user.

1.3 Project Purpose

Usually, people get stuck in a situation like which book to read next while many books are available in the market. Problems arise in finding similar books according to their preference due to the inadequate distribution of the books. To overcome this issue, we build a book recommendation system web application that takes the title of a book as input and gives a recommendation of the top five similar books as an output.

1.4 Project Features

The main features of this project are CSRF is that the malicious requests are routed to the web application through the user's browser, hence they might be indistinguishable from intended benign requests which were actually authorized by the user. The CSRF does not require the attacker to intercept or modify user's requests and responses it suffices that victim visits the attacker's website, from which the attack is launched. Thus, CSRF vulnerabilities are exploitable by any malicious website on the Web.

II. LITERATURE SURVEY

2.1 Problem Definition

Build a Book Recommendation Web Application that takes the title of a book as input and recommends a similar book as output based on the likes and reading pattern of the user.

2.2 Existing System

The existing system uses 2 types of variations;

Recommends books based on popularity i.e, the books that are mostly read by other users are recommended. Recommending books based on content. In content based filtering, we make predictions based on the books that the user read previously. It does not mix other users' data. In this as the content has to be examined the system runs slow.

2.2.1 Disadvantages of Existing System

As Following are the disadvantages of existing system:

- Popularity-choice is not always met
- Content based filtering : Title, genre
- (English) –number : Time consuming

2.3 Proposed System

The main idea behind this project is to recommend the top five most

similar books to the user that suits their interests and preferences. The books are suggested to the users using collaborative filtering method. Collaborative Filtering does not take features of the item but focuses more on the user's behavior. It collects other users' feedback for a particular book and the rating appropriately to give recommendations. Collaborative filtering here is implemented using KNN algorithm.

2.3.1 Advantages of Proposed System

- It accurates face detection fast enough and replays with voice output at each time the recognised
- The presence of custom HTTP request headers like X-Requested-With, which cannot be set from a cross-site position.
- The presence of unpredictable anti-CSRF tokens, set by the server into sensitive forms.

➢ **Algorithm**: Random Forest Classifier

III. SYSTEM ANALYSIS

3.1 Introduction

System Analysis is the important phase in the system development process. The System is studied to the minute details and analyzed. The system analyst plays an important role of an interrogator and dwells deep into the working of the present system. In analysis, a detailed study of these operations performed by the system and their relationships within and outside the system is done. A key question considered here is, “what must be done to solve the problem?” The system is viewed as a whole and the inputs to the system are identified. Once analysis is completed the analyst has a firm understanding of what is to be done.

3.2 Feasibility Study

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

3.2.1 Economic Feasibility

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

3.2.2 Technical Feasibility

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirements, as only minimal or null changes are required for implementing this system.

3.2.3 Social Feasibility

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

3.3 Software & Hardware Requirements

Software Requirements specifies the logical characteristics of each interface and software components of the system. The following are some software requirements.

• Coding Language	:	Python
• Tool	:	PyCharm, Visual Studio Code
• Database	:	SQLite

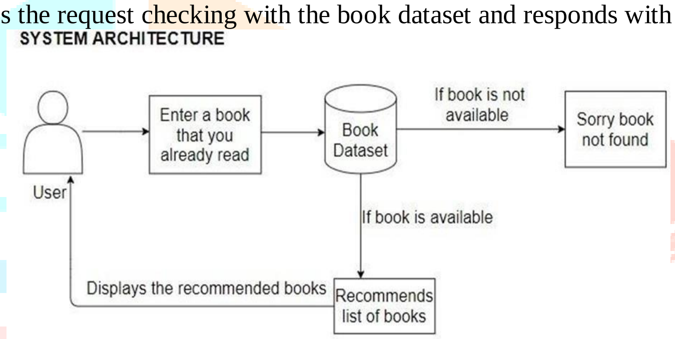
Hardware interfaces specify the logical characteristics of each interface between the software product and the hardware components of the system.The following are some hardware requirements.

□ System	:	Intel Core i5.
□ Hard Disk	:	1 TB.
□ Monitor	:	15’’ LED
□ Input Devices	:	Keyboard, Mouse
□ Ram	:	4 GB

IV. SYSTEM DESIGN

4.1 Project Architecture

The System architecture represents the design process that identifies the subsystems which constitute the framework and system for control and communication. Its intention is to establish the overall structure and interactions of a software system. We describe the system architecture of the book recommendation system. The user requests the book on the client-side, the system processes the request checking with the book dataset and responds with new similar recommendations.



4.2 Description

This Recommendation System is a software system that suggests similar items to a consumer based on their earlier purchases or preferences from the past. RS examines massive data of objects and compiles a list of those objects that would fulfill the buyer's needs. Today as several books are available in the market, it only gets tedious for users to find books to their liking. Book Recommender will solve this problem, thereby making it very convenient for the user due to the interactive web pages. To achieve this, there are two major categories of methods they are Content-Based Filtering method and the Collaborative Based Filtering method.

4.3 UML Diagrams

Design is concerned with identifying software components specifying relationships among components. Specifying structure and providing blue print for the document phase. Modularity is one of the desirable properties of large systems. It implies that the system is divided into several parts. In such a manner, the interaction between parts is minimal clearly specified. Design will explain software components in detail. This will help the implementation of the system. Moreover, this will guide the further changes in the system to satisfy the future requirements. The purpose of the design phase is to plan a solution of the problem specified by the requirement document. This phase is the first step in moving from problem domain to the solution domain. The design of a system is perhaps the most critical factor affecting the quality of the software, and has a major impact on the later phases, particularly testing and maintenance. The output of this phase is the design document. This document is similar to a blueprint or plan for the solution, and is used later during implementation, testing and maintenance.
The UML is a language for

- Visualizing
- Specifying
- Constructing
- Documenting

These are the artifacts of a software system-intensive system.

V. IMPLEMENTATION

5.1 Installation of Anaconda3

- Download the Anaconda installer.
- Go to your Downloads folder and double-click the installer to launch. To prevent permission errors, do not launch the installer from the Favourites folder.
  Note: If you encounter issues during installation, temporarily disable your antivirus software during install, then re-enable it after the installation concludes. If you installed for all users, uninstall Anaconda, and re-install it for your user only.
- Click Next.
- Read the licensing terms and click I Agree.
- It is recommended that you install for Just Me, which will install Anaconda Distribution to just the current user account. Only select an install for All Users if you need to install for all users' accounts on the computer.
- Click Next.
- Select a destination folder to install Anaconda and click Next.
- Install Anaconda to a directory path that does not contain spaces or Unicode characters.
- Choose whether to add Anaconda to your PATH environment variable or register Anaconda as your default Python. We don't recommend adding Anaconda to your PATH environment variable, since this can interfere with other software. Unless you plan on installing and running multiple versions of Anaconda or multiple versions of Python, accept the default and leave this box checked. Instead, use Anaconda software by opening Anaconda Navigator or the Anaconda Prompt from the Start Menu.
- Click Install. If you want to watch the packages Anaconda is installing, click Show Details.
- Click **Next**.
- After a successful installation you will see the "Thanks for installing Anaconda" dialog box:
- If you wish to read more about Anaconda.org and how to get started with Anaconda, check the boxes "Anaconda Distribution Tutorial" and "Learn more about Anaconda". Click the Finish button.

5.2 Creation of Files in Spyder

You can either open Spyder through Anaconda or open Spyder directly.

Open Anaconda using either of the following 2 methods:

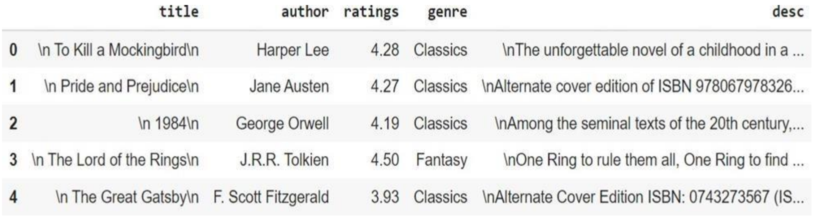
- Searching it on the Cortana search bar located on the bottom left of screen and choose "Anaconda Navigator"
- Click Windows start menu on the bottom right. Find the "Anaconda3 (64bit)" folder. A drop-down menu will appear. Click Anaconda Navigator. Launch Spyder (you can close Anaconda after as it is not needed anymore) Open Spyder using either of the following 2 methods:
- Searching it on the Cortana search bar located on the bottom left of screen
- Click Windows start menu on the bottom right. Find the "Anaconda3 (64bit)" folder. A drop-down menu will appear. Click "Spyder".
  a. Create a new file to save or use the default "temp.py" file opened when Spyder starts by clicking "File" on the top menu bar then clicking "Save as".
  b. Navigate to your "Documents" folder.
  c. Name the file whatever you want but you should try to choose an informative name.
  d. Click save.
  e. Same steps can be followed to create html file in Spyder.

5.3 Running Files Using Anaconda Prompt

1. From the Start menu, search for and open "Anaconda Prompt"
2. Switch to your Python file's directory. Type cd and a space, then type in the "Location" address for your Python file and press Enter.
3. Enter the "python" command and your file's name. Type in python file.py where file is your Python file's name.
4. For example, if your Python file is named "script", you would type in python script.py here.
5. Press Enter. Doing so runs your command and opens your Python file via your computer's installed Python program.
6. After running the file, the Anaconda prompt displays host IP address.
7. Copy the IP address displayed into browser and press Enter.
8. Then it displays the webpage of the project.

VI. CODING SPECIFICATIONS

Once we have created our front-end, we start writing the Flask program to make scheming web applications relatively easy. After the model runs successfully in the localhost, it's time to deploy it into a cloud called Heroku. Set up an account with Heroku. Next to Heroku, select GitHub, enter the name of the repository, and click on search. Once your username and repository appear, click connect. Then select the pined branch and click deploy. Press on the view button to see the deployed app on Heroku.



	title	author	ratings	genre	desc
0	\n To Kill a Mockingbird\n	Harper Lee	4.28	Classics	\nThe unforgettable novel of a childhood in a ...
1	\n Pride and Prejudice\n	Jane Austen	4.27	Classics	\nAlternate cover edition of ISBN 978067978326...
2	\n 1984\n	George Orwell	4.19	Classics	\nAmong the seminal texts of the 20th century,...
3	\n The Lord of the Rings\n	J.R.R. Tolkien	4.50	Fantasy	\nOne Ring to rule them all, One Ring to find ...
4	\n The Great Gatsby\n	F. Scott Fitzgerald	3.93	Classics	\nAlternate Cover Edition ISBN: 0743273567 (IS...

VII. TESTING & VALIDATION

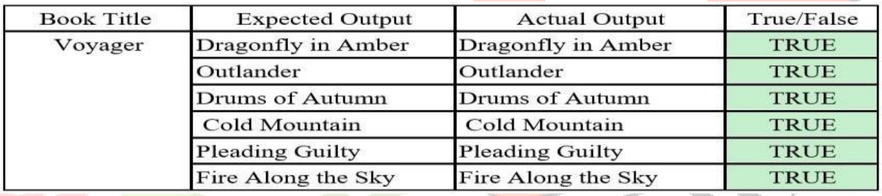
7.1 Introduction

Software validation is achieved through a series of tests that demonstrate conformity with requirements. Validation succeeds when software functions in a manner that can be reasonably expected by the customer. Here line by line checking is used to find errors. Comment line facility is used for checking errors. Testing is necessary for the success of the system. During testing, program to be tested is executed with a set of test data and the output of the program for test data is evaluated to determine if the programs are performing as expected. Validation means checking the quality of software in both simulated and live environments. System validation ensures that the user can in fact match his/her claims, especially system performance. True validation is verified by having each system tested.

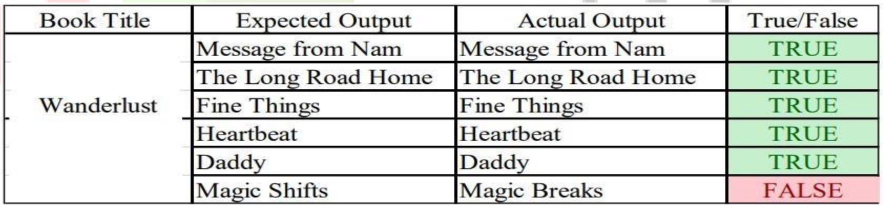
7.2 Testing

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub-assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of tests. Each test type addresses a specific testing requirement.

7.3 Test Cases

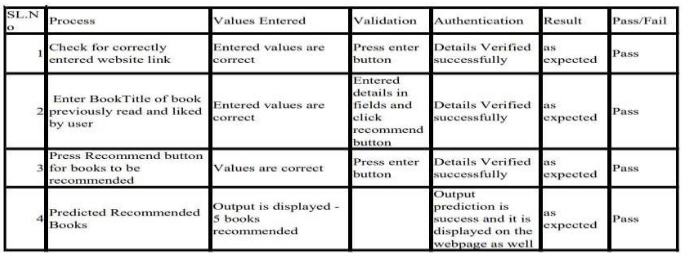


Book Title	Expected Output	Actual Output	True/False
Voyager	Dragonfly in Amber	Dragonfly in Amber	TRUE
	Outlander	Outlander	TRUE
	Drums of Autumn	Drums of Autumn	TRUE
	Cold Mountain	Cold Mountain	TRUE
	Pleading Guilty	Pleading Guilty	TRUE
	Fire Along the Sky	Fire Along the Sky	TRUE



Book Title	Expected Output	Actual Output	True/False
Wanderlust	Message from Nam	Message from Nam	TRUE
	The Long Road Home	The Long Road Home	TRUE
	Fine Things	Fine Things	TRUE
	Heartbeat	Heartbeat	TRUE
	Daddy	Daddy	TRUE
	Magic Shifts	Magic Breaks	FALSE

7.3.1 Classification



SL.No	Process	Values Entered	Validation	Authentication	Result	Pass/Fail
1	Check for correctly entered website link	Entered values are correct	Press enter button	Details Verified successfully	as expected	Pass
2	Enter BookTitle of book previously read and liked by user	Entered values are correct	Entered details in fields and click recommend button	Details Verified successfully	as expected	Pass
3	Press Recommend button for books to be recommended	Values are correct	Press enter button	Details Verified successfully	as expected	Pass
4	Predicted Recommended Books	Output is displayed - 5 books recommended		Output prediction is success and it is displayed on the webpage as well	as expected	Pass

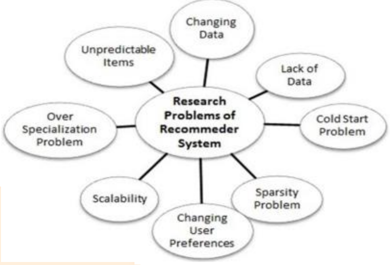
VIII. CONCLUSION AND FUTURE SCOPE

8.1 Conclusion

The project has been developed successfully, and the performance of the system has been found accurately. The system provides a platform to view similar recommended books to a book that the user has entered. The books are recommended to the users. The system is efficient in recommending similar book details, reduces the user's workload to know the number of similar books available, and keeps the readers open. This system saves the time of the user. Today as several books are available in the market, it only gets tedious for users to find books to their liking. Book Recommender will solve this problem by making it very convenient for users due to interactive web pages that follow this project as it has been deployed into the cloud.

8.2 Future Scope

The New features could be added to this project to make this project more productive, reusable, and flexible, including adding new books to the database from time to time, ratings, and managing users. Recommendation systems are information filtering systems combined with customer and commercial applications. Recommender systems are a handy tool utilized to guide the selection process easier for users. The implemented book recommendation engine is an efficient system to recommend Books for e-users. It heavily relies on the ratings that the users gave to the recommendation engine. So, the fear whether the rating and feedback given is genuine or not lies a major issue to be solved yet.


Changing Data
Unpredictable Items
Lack of Data
Research Problems of Recommeder System
Over Specialization Problem
Cold Start Problem
Scalability
Sparsity Problem
Changing User Preferences

IX. REFERENCES

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