

Evaluation Plan

3204 - Individual Project

Project Name : Content and Collaborative based Sinhala Book Recommendation System

Supervisor : Dr. M. G. N. A. S. Fernando

Student Name : P. N. C. Perera

Index No : 19440677

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Brief introduction

A recommendation system is a software application or algorithm designed to suggest list of items automatically and intelligently to users based on their preferences, purchased history, and other relevant factors. It is a common instrument used by businesses to improve customer loyalty and revenues. There are so many recommendation systems available in the market for domains such as Hotels, Movies, Ecommerce items and groceries.

In this research a Sinhala Book recommendation system is presented for Sinhala Book readers. Even though, many English book recommendation systems are available, there are no any recommendation system for Sinhala Books.

The system is implemented using hybrid approach which used content based and collaborative filtering. An online survey was conducted to collect data as no data set found in dataset providers like Kaggle. Python was used as the main language for the implementation along with Python Flask for User interface and MySQL as database management tool.

Evaluation approach

Evaluating a book recommendation system is essential to ensure that it provides meaningful and useful suggestions to users. There are several key metrics and methods available to evaluate the accuracy and the performance of a book recommendation system. The system needs to be evaluated using both quantitative and qualitative approaches as it gives improve the value of the evaluation.

Mainly there will be three approaches for evaluation. The mathematical approach will be carried out by calculating Mean Absolute Error (MAE) to evaluate the implementation of Collaborate filtering. Mean Absolute Error (MAE) is a type of statistical accuracy metrics that is widely used to determine the quality of the recommender system specially when use collaborative filtering. The statistical based approach calculates a numerical score which is then compared with actual rating given by users. The MAE can be easily calculated by using the `mean_absolute_error()` function from Scikit-learn library. The formula for MAE is as follows.

$$\frac{1}{n} \sum_{i=1}^n \text{abs}(y_i - x_i)$$

As per the formula, it calculates the absolute different for each pair and then finally get the mean value as the result. The lower value means a better accurate results while high value means the different of predicted and actual is high.

The above MAE was used to calculate the accuracy of the approach which has a numeric field in our case 'Book Rate'. The data set used for collaborative filtering have the rate field. But as per the data set of books having tags which are used as content does not have any numeric field and therefore MAE cannot be applied for Content based filtering. But since the accuracy gives the correctness of the implemented application, a different approach which only works with text should be used. We integrate Artificial Neural Network (ANN) for the application and predict the recommended book list. The results can be compared and accuracy can be calculated with implemented Content based model.

Dataset and the credibility

The final evaluation will be conducted from a dataset which will be collected via online survey as the implemented system will be used by real user. A feedback questionnaire will be shared to collect user feedback and based on the results which is considered as a private dataset, the evaluation will be conducted.

The targeted audience will be 20 users along with 2 reputed well known authors. Since all the audience used to read books as a habit and authors are experts in the field, no doubt that the data entered by them have any issues and can be taken for the evaluation. If we use public data set for the evaluation there will be a consideration about the creditability of the dataset as it is just a dataset without any proper source.

Qualitative Evaluation

In order to evaluate the quality of the application, the system will be shown to the domain experts in this case book authors. Showing the system and obtaining their feedback will be important not only to evaluate the system but also to identify the limitations and improve the system further as they have the expert knowledge in the fields. By conducting the qualitative evaluation, following criteria are captured and analyzed.

- To evaluate the novelty of the proposed application concept.
- To evaluate the scope of the project.
- To evaluate whether the system provides a solution to the existing problem.
- To identify the limitations of the project
- To evaluate how authors are benefited from the project.

Quantitative Evaluation

This study will use 24 test subjects (12 males and 12 females) A questionnaire was prepared to determine user satisfaction and the quality of the suggested book list for the users. Five-point Likert-scale survey questions were asked. Likert scales have become an essential survey tool to get feedback on a person's opinion or attitude regarding an item. It ranges from polar opposites to complete satisfaction to complete dissatisfaction. Questions were structured to be asked under the categories of accuracy, familiarity, novelty of the book recommendations, and interactivity of the system. An optional question was asked if the user wanted to give any suggestions or feedback for further improving the system. This questionnaire determines whether the implemented system has met the objectives and met the user's requirements and needs.

As a summary, in order to evaluate the collaboration filtering as mentioned earlier Mean Absolute Error which is an inbuilt python library can be used. But for evaluate content-based filtering, since there are not numeric data involved, a different technique had to be used. It is Artificial Neural Networking model and it also can be used to find similarities among items. So, integrating with Neural network and comparing the results prove the accuracy of the implemented system.

Evaluation Questionnaire

How Often Do You Read Books *

- ☐ Everyday
- ☐ Every week
- ☐ Sometimes
- ☐ Rarely
- ☐ Not At All

I think a system is required to find similar books based on users preference or content as I am struggled finding new books similar to books I have read and interested. *

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Stronly Disagree

The implemented system accurately recommend books *

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Stronly Disagree

The system helped me to find new books *

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Stronly Disagree

It is easy to navigate and use the system *

- ☐ Strongly Agree
- ☐ Agree
- ☐ Neutral
- ☐ Disagree
- ☐ Strongly Disagree

What is the most attractive feature of the application *

- ☐ Login and Authenticate
- ☐ Top Rated Book List
- ☐ Most Popular Book List
- ☐ Book Details
- ☐ Reviews from others
- ☐ Recommendation Book List

Overall, I'm satisfied with the recommender system *

- ☐ Strongly Agree
- ☐ Agree
- ☐ Average
- ☐ Disagree
- ☐ Strongly Disagree

I would recommend this Sinhala Book Recommendation system to others. *

- ☐ Strongly Agree
- ☐ Agree
- ☐ Average
- ☐ Disagree
- ☐ Strongly Disagree

Please mention any suggestions or feedback if you have

Your answer _____