Style Guidelines for Final Year Project ReportsRecommendation System

Final Year Project Proposal

Session 2018-2022

A 4th Year Student

A project submitted in partial fulfilment of the

COMSATS University Degree

of

BSc. (Hons.)BS in Computer Science / Software Engineering (CUI)



Department of Computer Science

COMSATS University Islamabad, Lahore Campus

13 February 2021

**Project Registration**

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| --- | --- | --- | --- | --- | --- | --- | --- |
| Project ID (for office use) | | |  | | | | |
| Type (Nature of project) | | | [✓] **D**evelopment [ ] **R**esearch [ ] **R**&**D** | | | | |
| Area of specialization | | | Mobile App Development, Web App Development, Machine Learning, Natural Language Processing, Reinforcement Learning | | | | |
| **Project Group Members** | | | | | | | |
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# Plagiarism Free Certificate

This is to certify that, I am \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ S/D/o \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, group leader of FYP under registration no CIIT/\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/LHR at Computer Science Department, COMSATS Institute of Information Technology, Lahore. I declare that my FYP proposal is checked by my supervisor and the similarity index is \_\_\_\_\_\_\_\_% that is less than 20%, an acceptable limit by HEC. Report is attached herewith as Appendix A.

**Date:** 12 Feb, 2021 **Name of Group Leader:** Ibad Ahmad Signature**:** \_\_\_\_\_\_\_\_\_\_\_\_\_

**Name of Supervisor:** Ms. Kanza Hamid (Lecturer, Computer Science) **Co-Supervisor (if any):** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Designation:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Designation:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Signature:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Signature:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Approval of FYP Management Committee**

Committee Member 1: Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[ ] Accept [ ] \*Defer [ ] \*Reject Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\*Remarks: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Committee Member 2: Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[ ] Accept [ ] \*Defer [ ] \*Reject Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\*Remarks: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Convener: Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[ ] Accept [ ] \*Defer [ ] \*Reject Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\*Remarks: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Abstract**

Our project is a generic recommendation system, which will be varying and adopting in the environment with the passage of time. In this project, our aim is to provide an online recommendation system service, which people can use to make their experience a lot better on contrary to their experience with some other service like Google. To find a correct, economical and at the same time easily accessible service is very important and needed for users but it is not an easy job today as there are whole lot of sources which are not among those which can be reliable.

Today most recommendation applications are not as much intelligent and up to date as needed for users to suggest and help them in finding appropriate service that matches with the user requirement. Information mismatch have a great negative impact on such recommendation applications. To make a personalized recommendation application for providing useful and effective online services, we need user reviews from online communities and up to date information from module databases.

**Table of Content**

|  |  |  |
| --- | --- | --- |
| Index | Topic | Page Number |
| 1 | Introduction | 05 |
| 2 | Motivation & Scope | 07 |
| 3 | Related Work | 08 |
| 4 | System Architecture | 09 |
| 5 | Goals and Objectives | 09 |
| 6 | Individual Tasks | 10 |
| 7 | Gantt chart | 11 |
| 8 | Future Work | 12 |
| 9 | Tools & Technologies | 12 – 13 |
| 10 | References | 13 |

**Introduction**

In industries like e-commerce, retail, news-group or music apps, recommendation system models are one of the most important aspects in customer retention. Presenting to the users what might interest them most, is crucial. Also, identifying the most attractive content, and getting customers hooked to specific contents could result in significant revenues to the company.

Based on various data entities including user details, interests, trending content, etc. models are built to recommend the most relevant content to customers. Companies like Spotify, Netflix, and HBO use sophisticated recommendation systems for video and song recommendations. Targeted marketing is a segment of recommendation systems.

Starting with the basic idea, Recommendation system is sort of data filtering method, in which on the basis of certain parameters you show certain data to user from database. The parameters can be rating, prices/rates, accessing comfort, nearby one etc. In simple words, Recommendation systems provide that information which directs the users to only that information which best meets their needs and preferences.

Now our goal is to create a recommendation system which will suggest its users about multiple things like hospitals, restaurants, hotels etc. depending on the different parameters like ratings, remarks/feedback and the list goes on. On the other hand, system must be able to be adaptive with new parameter’s value which can help the system to remain up to date with the future recommendations.

Now if we talk about the basic parameters, these are as following

* Rating
* Reviews
* Distance
* Price

**Motivation and Scope**

Since we are living in the 3rd world country and are among a developing one’s in Asia. We don’t have recourses that can cover up the mass requirements. There are hundreds of thousands of cases weekly that are unable to get even first aid timely, especially those who are lying in or near to rural areas. Pakistan’s population, which belongs to this section reported to be 63.09% in 2019, which is a shocking stat itself.

One of the many examples we can remember from time is of Muniba Mazari. The idea to cite the previous example is that, there are several cases of these contexts where the population is unable to find the emergency service just because of the unawareness and no helping hands that can lead them to desired output. Our aim is same, to provide that sort of application, which will be able to guide with best possible source of help, that user can imagine or desire at runtime.

This application will cover most of the modules that we counter in normal day ranging from

* Hotels
* Libraries
* Restaurants
* Hospitals

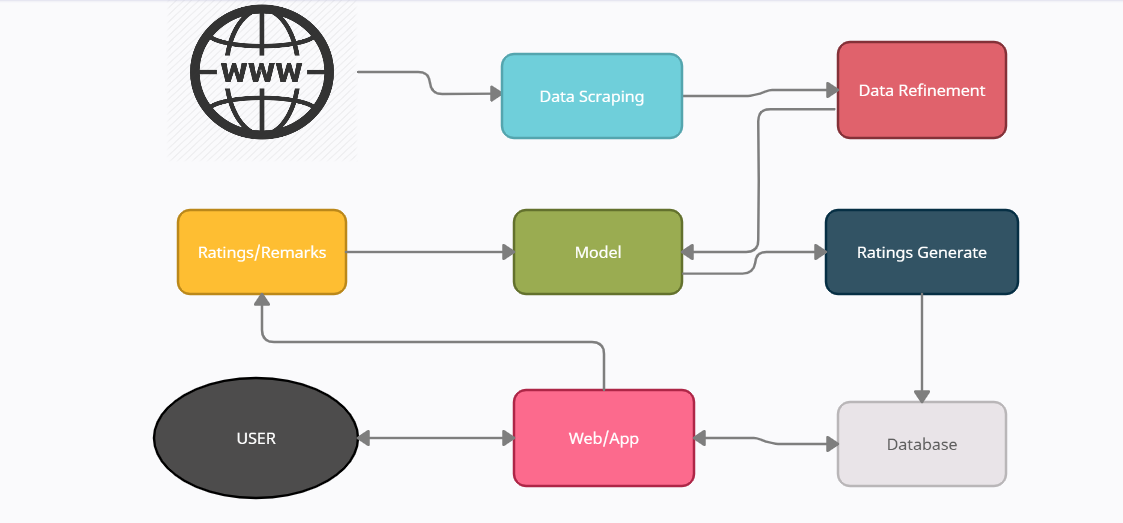
Furthermore, user can apply filters as per their use. In future, more modules can be added to this system as user requirements increase and so do filters. Here are the modules that can be added as an extension of this project.

* Shopping Centers
* Petrol Pumps
* Mechanics

**Related Work**

* A few years ago, Netflix organized a challenge “Netflix Prize”, where they invited people to build a better recommender system than what they had in return for prize money.[1]
* There is an article on "Analytics Steps" named "What Are Recommendation Systems in Machine Learning?”[2] This article helps to understand the types of Recommendation systems in the market. On the other hand, according to some articles like 1 on "Medium.com" named "Introduction to recommender systems,"[3] there are 2 major approaches i.e. Collaborative & Content base, and explained in detail in that article. Collaborative is the one under which our project lies. If we talk about the related work, which falls under the category of the Collaborative Filtering type, there are many like Food Panda to recommend good food nearby, similarly booking.com recommend best hotels to its user according to budget, ratings, etc. Each of that platform is single task specific recommender but our goal is to develop single platform for all such type of recommendations.
* Our Supervisor Ms. Kanza Hamid has already supervised a similar type of project named ‘Doctor in Hand’ which was a static application that recommends best doctors in town along the appointment booking section for the user.

**System Architecture**

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**Goals and Objectives**

* To make it easy and effective for users to get best recommendations nearest to their location and easily accessible.
* To develop such application that will automate the function of finding the appropriate recommendation according to user requirement, thus bring easiness, save time and efforts needed to find a best suitable suggestion.
* To develop such intelligent recommendation system that performs accurately and efficiently and help users to know about the authentic, best, affordable, nearest hospitals, restaurants, hotels etc. whom which they can trust or prefer.
* To create a model, that will vary time to time in order to acquire excellence in further recommendations.

**Individual Tasks**

|  |  |  |  |
| --- | --- | --- | --- |
| **Task Description** | **Group Members** | | |
| Ibad Ahmad | Haseeb Yaseen | Wahaj Hafeez |
| **Data Collection** | ✓ | ✓ |  |
| **Data Pre-processing** | ✓ | ✓ | ✓ |
| **Data Visualization** | ✓ |  | ✓ |
| **Applying NLP** | ✓ | ✓ | ✓ |
| **Database Modelling** |  | ✓ | ✓ |
| **Machine Learning Algorithms** |  | ✓ | ✓ |
| **Reinforcement Learning** | ✓ | ✓ | ✓ |
| **Native App Development** | ✓ | ✓ |  |
| **Desktop App Development** | ✓ |  | ✓ |
| **Report Writing** | ✓ | ✓ | ✓ |

**Gantt chart**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Task Description** | **Months** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **FEB** | | | | **MAR** | | | | **APR** | | | | **MAY** | | | | **JUN** | | | | **JUL** | | | | **AUG** | | | | **SEP** | | | | **OCT** | | | | **NOV** | | | |
| Information Gathering |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Data Scrapping |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Data Analysis & Refinement |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Database Development |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Model’s selection |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Apply NLP, ML Techniques |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Testing Phase |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Web Development(Front End) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| App Development(Front End) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Web Development(Back End) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| App Development(Back End) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| System Testing |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Report Writing |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Future Work**

To make this application more useful and attractive for the people to use it and get benefit from it, following are some points that are in our mind to include in this application in future:

* Integrate more modules over the time according to their need.
* Add the functionality of online booking to save the time and the effort required to get appointment or booking by visiting.
* Make blog within application where ranked publish their experience and reviews to aware the people about the latest insights

**Tools and Technologies**

* **Python**

It will be used for training, training phase of the model, and for data scrapping using its libraries like Tensorflow, Keras, Pandas, Numpy, beautifulSoup, Sciekit-Learn etc.

* **Google Colab or Kaggle Kernels**

It provides a GPU support for models training and testing freely. Will be a massive asset since the second and third model require the Deep Learning which takes hours and days depends upon the problem statement on CPU’S. So the GPU support is mandatory

* **JavaScript**

JavaScript, often abbreviated as JS, is a programming language that conforms to the ECMAScript specification. JavaScript is high-level language, often just in time compiled, and multi-paradigm. It has curly-bracket syntax, dynamic typing, prototype-based object-orientation, and first-class functions. For web and native app development, we will use JavaScript libraries like node js, express js and react native

* **React JS**

React is an open-source, front end, JavaScript library for building user interfaces or UI components. Facebook and a community of individual developers and companies maintain it. React can be used as a base in the development of single-page or mobile applications

* **Node JS**

Node.js is an open-source, cross-platform, back-end JavaScript runtime environment that runs on the Chrome V8 engine and executes JavaScript code outside a web browser.

* **Express JS**

Express.js, or simply Express, is a back end web application framework for Node.js, released as free and open-source software under the MIT License, designed for building web applications and APIs. It has been called the de facto standard server framework for Node.js.

* **MongoDB**

MongoDB is a source-available cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with optional schemas. MongoDB was developed by MongoDB Inc. and licensed under the Server Side Public License.

* **React Native**

React Native is an open-source mobile application framework created by Facebook, Inc. It is used to develop applications for Android, Android TV, iOS, macOS, tvOS, Web, Windows and UWP by enabling developers to use React's framework along with native platform capabilities.

**References**

**[1].** Netflix Prize

<https://www.thrillist.com/entertainment/nation/the-netflix-prize>

**[2].** What Are Recommendation Systems in Machine Learning?

<https://www.analyticssteps.com/blogs/what-are-recommendation-systems-machine-learning>

**[3].** Introduction to recommender systems

<https://towardsdatascience.com/introduction-to-recommender-systems-6c66cf15ada>

Appendix A

*Include here the 1st page of Turnitin Report*

Every supervisor has his/her own Turnitin account. If not then supervisors are requested to get the account from Library as soon as possible.