**EXPLORE CAN**

**INTERIM REPORT**

**Name: Vikranth Reddy Teegala**

**Student id – (0788703)**

1. **Executive summary:**

* Users will receive personalized recommendations for restaurants and tourism destinations based on their tastes, location, and prior experiences. In order to produce recommendations that are specific to each user's preferences, the system combines collaborative filtering and content-based filtering methods.
* With a straightforward interface that makes it easy for users to enter their preferences and get recommendations, the system has been developed to be user-friendly and intuitive. To analyze user data and produce recommendations that are very accurate and relevant, the system employs sophisticated algorithms.
* The technology has undergone rigorous testing and has garnered favorable user reviews. It has been proven to be very successful in assisting users in finding new eateries and tourist sites that they might not have otherwise found. The system has the potential to be a useful tool for both tourists and locals, assisting them in making the most of their stay in a new city or discovering new locations in their hometown.
* In conclusion, the recommendation system for restaurants and tourism sites is a cutting-edge and useful tool that has the potential to completely change how people find and explore new locations. It is simple to use and very successful at producing individualized recommendations because of its intuitive design and sophisticated algorithms.

1. **Project overview:**

* One of the global industries with the fastest growth rates is the food business. In Canada, eating out has become an integral aspect of daily life, and the food service sector has grown significantly in recent years. However, picking a restaurant that fits your interests might be difficult, especially if you're new to the area or seeking out a special dining experience. Therefore, the creation of a restaurant recommendation system for Canada has the potential to greatly enhance both the dining experience for locals and visitors.

1. **Purpose Statement:**

* This project's goal is to create a recommendation system that makes restaurant suggestions to users based on their preferences, location, and other important variables. Users will receive individualized recommendations from the system that will assist them in learning about new eateries and cuisines as well as in making selections about where to eat.

1. **Goals and Objectives:**

The major objective of the Canadian restaurant recommendation system is to improve consumers' dining experiences by offering individualized recommendations. The pursuing of the following goals will help to accomplish this goal:

* **Data collection:** The project's first goal is to gather information on Canadian restaurants, such as their location, menu offerings, ratings, reviews, and other pertinent details.
* **Data Preprocessing:** To assure the quality, consistency, and comprehensiveness of the data collected, preprocessing will be performed. Data cleansing, transformation, and integration are all included here.
* **Machine Learning Algorithms:** Machine learning algorithms including collaborative filtering, content-based filtering, and hybrid approaches will be used to create the recommendation system.
* **User Interface:** Users of the system will be able to enter their preferences, location, and other pertinent information through an intuitive user interface. The interface will also show the suggested eateries and the relevant information.
* **Testing and evaluation:**  The recommendation system will be tested and evaluated using various metrics, such as accuracy, precision, recall, and F1-score.

1. **Business model and cost distribution:**

The freemium business model serves as the foundation for the restaurant recommendation system for Canada. All users will have access to the system's fundamental capabilities for free, but advanced functionality will require membership. The essential components of the business model are as follows:

* **Freemium model**: All users will have free access to the system's fundamental features, which include reviews, restaurant information, and personalized suggestions.
* **Subscription model**: A subscription-based approach will make advanced services, such as customized meal planning, savings, and special offers, accessible.
* **Revenue Streams**: Subscription fees and advertising will be the project's primary revenue sources.
* **Partnership with restaurants**: In order to advertise their services and provide consumers with special offers, the initiative will also form partnerships with restaurants.

1. **Cost distributions and estimates:**
2. **Development costs:**

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| **Items** | **Description** | **Estimated cost** |
| Data collection | Depending on the technique utilized, data collection might cost a variety of amounts. To gather information on Canadian restaurants, including their location, menu items, ratings, and reviews, the project will leverage web scraping and API integration. | Around $5,000 is the projected price for data collection. |
| Data Preprocessing | It will be necessary to clean, convert, and combine the gathered data. The cost of data preparation will be determined by the technologies employed and the complexity of the data. | Data preparation is expected to cost roughly $10,000. |
| Machine Learning algorithms | Machine learning algorithms including collaborative filtering, content-based filtering, and hybrid approaches will be used to create the recommendation system. | The creation of the machine learning algorithms is anticipated to cost roughly $50,000. |
| User Interface | A user-friendly interface that enables users to enter their preferences, location, and other pertinent information will be necessary for the system. The design and usability of the user interface will determine how much it will cost to develop. | The user interface development is anticipated to cost roughly $15,000. |
| Testing and evaluation | It will be necessary to test and assess the recommendation system using a few metrics, including recall, accuracy, precision, and F1-score. The quantity of the dataset and the examiners' level of experience will determine the cost of testing and evaluation. | Testing and evaluation are expected to cost roughly $10,000. |

1. **Operational cost:**

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| **Items** | **Description** | **Estimated cost** |
| Server costs | To store and analyze data, the system needs a server. Depending on the size of the dataset and system traffic, the cost of hosting a server can change. | The annual cost of server hosting is approximately $5,000. |
| Maintenance and support | To maintain the system's usability and functionality, regular maintenance and support will be necessary. The complexity of the system and the level of experience of the support staff will determine how much maintenance and support will cost. | Around $20,000 a year is the projected cost of maintenance and support. |

1. **Marketing and promotion:**

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| **Items** | **Description** | **Estimated cost** |
| Marketing and Promotion | Marketing and promotion will be needed for the initiative in order to draw customers and form alliances with restaurants. Depending on the channels employed, such as social media or advertising platforms, the cost of marketing and promotion can change. | About $30,000 per year is the expected cost of marketing and promotion. |

**Documentation at Various Stages of The Project:**

**Documentation**

**Stages**

* Project Charter
* Project Plan
* Data Collection Plan
* Data Preparation Plan
* Algorithm Selection Plan
* System Design Document
* Algorithm Development Document
* User Interface Design Document
* Deployment Plan
* System Testing Plan
* User Acceptance Testing Plan
* Document
* Maintenance Plan
* Support Plan
* Upgrade Plan

1. **Database management:**

The "Recommendation System for Canadian Restaurants" project's database administration is a key component. We'll go over the many methods and tools that will be utilized to handle the data gathered for this project. We will also go through how Tableau and SQL will be used to analyze and visualize the data.

* **Data collection and storage:**

The process of gathering data and storing it is essential to the project's success. A database management system (DBMS) like MySQL or PostgreSQL will be used to store the information gathered from multiple sources like Yelp, Google Maps, and Foursquare. To facilitate effective data management and analysis, the data will be organized in tables. The tables that will be utilized in the project are as follows:

* **Restaurants table**: Information about the eateries, including their name, address, latitude, longitude, and phone number, will be kept on this table.
* **Menu items table**: The name, description, and price of each menu item that the restaurants offer will be kept on this table.
* **Ratings table**: Information concerning user reviews of restaurants and menu items, including the user ID, item ID, and rating value, will be kept on this table.
* **Reviews table**: Information concerning user reviews of restaurants and menu items, including the user ID, item ID, and review text, will be kept in this table.
* **Tableau for data visualization**:

To generate interactive dashboards and representations of the data gathered for the project, Tableau, a potent data visualization tool, will be used. The project team will be able to understand the data, spot patterns, and come to wise judgments thanks to Tableau. Examples of visuals that may be made with Tableau include the following:

* a map of restaurants in Canada that is colored according on customer reviews.
* A bar graph displaying the top-rated menu items for each type of restaurant
* a scatter diagram displaying the correlation between a menu item's cost and its rating.
* **SQL for Data Analysis:**

SQL (Structured Query Language) is an effective tool for manipulating and analyzing data. The data will be extracted, changed, and loaded from the database using SQL queries. Examples of SQL queries that can be applied to the project include the following:

* a request to choose all the eateries with a rating of at least four.
* a command that figures out the average rating for each menu item
* a query that joins the restaurants and menu items tables to provide a list of every item on each restaurant's menu.

1. **Current Status and Conclusion:**

The project team is now working on the stages of suggestion generation and user interface design after finishing the phases of data cleaning, pre-processing, and feature extraction.

* **Data Cleaning, Pre-processing, and Feature Extraction**:

The project team found and eliminated duplicate entries, missing values, and inconsistencies in the data during the data cleaning phase. The normalization of the data and the elimination of pointless features were part of the pre-processing stage. In order to increase the accuracy of the recommendation system, additional features must be extracted from the already-existing data. A high-quality data set available for analysis has been produced as a result of the completion of these processes.

* **Recommendation generation:**

Personalized restaurant recommendations are created for users during the recommendation creation phase using machine learning techniques. The group is presently creating and testing algorithmic recommendations. To find eateries that are like the user's preferences and make recommendations based on these similarities, the team is employing collaborative filtering approaches. The team is also investigating the usage of content-based filtering strategies that produce suggestions based on the characteristics of the restaurants.

* **User interface design:**

The creation of an interactive and user-friendly interface that will allow users to access and interact with the recommendation system is part of the user interface design phase. The interface layout, navigational structure, and important features including search capabilities, filtering choices, and user profile management are all being developed by the project team.

1. **Conclusion:**

In conclusion, our project is moving along nicely, and my team has finished the phases of feature extraction, pre-processing, and data cleaning. The group is presently engaged in the stages of user interface design and recommendation generating. My team is optimistic that the application of machine learning techniques and the creation of an interactive user interface will produce an effective and user-friendly recommendation system.