Team Name:

Team Members:

**Introduction:**

In today's contemporary world, individuals are increasingly health-conscious and are committed to incorporating nutritious foods into their daily meals. A quality food recipe not only showcases the authentic flavors of the ingredients but also encourages a well-balanced diet and the adoption of a healthy lifestyle. The importance of making informed food choices cannot be overstated, as the adage goes, "health is wealth." However, there are instances when people may be unfamiliar with the ingredients needed for a particular recipe or might acquire ingredients without knowing how to prepare a dish that incorporates them. Hence, it becomes crucial for individuals to possess knowledge about which ingredients harmoniously come together to create delectable recipes. Nonetheless, making recipe selections solely based on the components involved can prove to be a daunting task, particularly for those new to cooking. Recommender systems, a prevalent feature in contemporary internet services, offer a valuable solution by assisting users in navigating vast collections of items and aiding them in making informed choices [1]. These systems routinely present users with an array of enticing options, simplifying the process of selecting their preferred items from the entire assortment. Recommender systems have proven their utility in various scenarios, including facilitating decision-making and influencing user behavior [2, 3].

This project delves into the intricacies of selecting appropriate dishes for cooking, given the vast array of Indian and other culinary options that can be crafted using similar ingredients. Indian cuisine stands out for its extensive assortment of dishes, shaped by the availability of locally sourced spices, herbs, vegetables, and fruits. To tackle this challenge, we introduce a personalized recipe recommendation system that relies on cosine similarity. This system offers tailored suggestions for food items or menus that align more closely with the individual preferences and dietary restrictions of users. Our initial assessment clearly indicates that a personalized recipe recommendation system, which also provides ingredient recommendations for recipes, can substantially elevate customer satisfaction. In summary, this project has the potential to benefit users by supplying meal ideas tailored to their taste preferences and nutritional requirements, reducing food wastage by proposing recipes that utilize leftover ingredients, and encouraging healthier eating habits through suggestions of nutritionally balanced recipes. Furthermore, it holds the promise of benefiting businesses in the food industry by increasing customer engagement and loyalty, furnishing valuable insights from data analytics, and enhancing overall customer satisfaction.

**Anticipated Technologies:**

* Python
* Machine Learning
* HTML

**Method/Approach:**

The methodology employed in this study follows a structured approach encompassing multiple steps for the analysis and recommendation of recipes. Initially, the study begins by importing pertinent libraries for data analysis and processing, followed by the loading and cleansing of data from a CSV file. Subsequently, feature histograms are generated, and the refined data is then archived for further use. In the process of suggesting food items based on ingredient identification, open-source software libraries like pandas[4], NumPy[4], and mlxtend[5] are harnessed. Next, an in-depth examination of ingredient popularity within the recipes is conducted, leading to the preparation of input and output data required for the recommendation algorithm. This entails the conversion of the ingredients list into a transaction encoder array and the encoding of food dish names. Both the transaction encoder and label encoder are preserved for subsequent utilization. Finally, a recommendation algorithm founded on cosine similarity is meticulously crafted to propose food dishes based on a provided list of ingredients.

**Estimated Timeline:**

Depending on the project's scale, resources, and complexity, different timelines might be developed for recipe recommendation projects. A general estimated timeline with stages is shown below:

* **Project Planning, Data Collection and Preparation (3 weeks)**
* **Recommender System Development (3 weeks)**
* **Testing and Evaluation (5 weeks)**

**Anticipated Problems:**

The development and deployment phases of a recipe recommendation system can be difficult tasks, and different difficulties may occur. Several issues with a recipe suggestion system are foreseen, including Data availability, **Diverse User Preferences and Privacy Concerns in terms of collection and analysis.**

References

1. Shani, G., & Gunawardana, A. (2011). Evaluating recommendation systems. *Recommender systems handbook*, 257-297.
2. Isinkaye, F. O., Folajimi, Y. O., & Ojokoh, B. A. (2015). Recommendation systems: Principles, methods and evaluation. *Egyptian informatics journal*, *16*(3), 261-273.
3. Pathak, B., Garfinkel, R., Gopal, R. D., Venkatesan, R., & Yin, F. (2010). Empirical analysis of the impact of recommender systems on sales. *Journal of Management Information Systems*, *27*(2), 159-188.
4. McKinney, W. (2010, June). Data structures for statistical computing in python. In *Proceedings of the 9th Python in Science Conference* (Vol. 445, No. 1, pp. 51-56).
5. Raschka, S. (2018). MLxtend: Providing machine learning and data science utilities and extensions to Python’s scientific computing stack. *Journal of open source software*, *3*(24), 638.
6. https://www.kaggle.com/code/vaishnavivenkatesan/indian-food-varieties/input