**LITERATURE SURVEY**recommending restaurants based on user rating and preferences.

**Introduction**

Recommending restaurants based on user preferences and ratings has become a key feature in modern food discovery platforms. With the growing popularity of mobile applications and online review systems like Yelp, Google Reviews, and Zomato, users can choose from a vast array of restaurants. The challenge, however, lies in matching these options with the specific tastes, dietary restrictions, and preferences of individual users**.**

**Conceptual Definitions of Recommending restaurant using user preference and rating.**

A Recommendation System is a type of information filtering system that seeks to predict a user’s preferences and suggest items that are likely to be of interest to them.

* **1990s: Emergence of Recommendation Systems**
  + Early systems developed in the context of information retrieval and filtering.
  + Collaborative filtering techniques introduced, recommending items based on user interactions.
* **1994: Group Lens Project**
  + The Group Lens project pioneered user-based collaborative filtering to recommend Usenet articles.
* **Late 1990s: Content-Based Filtering**
  + Content-based filtering gained traction, recommending items based on the characteristics of previously liked items (e.g., genre, features).
* **2000s: Hybrid Models**
  + Hybrid recommendation systems combining collaborative filtering and content-based approaches became popular to address limitations like cold start problems.
  + Major platforms like Amazon and Netflix implemented hybrid models to improve recommendation accuracy.
* **2006: Netflix Prize**
  + The Netflix Prize competition spurred innovation in recommendation systems by encouraging improvements in prediction algorithms using matrix factorization.
* **2010s: Deep Learning & AI Integration**
  + Advanced techniques like deep learning and neural networks began being used, enabling complex user-item interaction modeling.
  + Systems became capable of processing unstructured data (reviews, images) to improve personalization.
* **Present Day: Contextual and Personalized** **Recommendations**
  + Modern recommendation systems integrate AI, deep learning, and contextual awareness to offer real-time, personalized suggestions in diverse industries such as e-commerce, streaming, and dining.

**Components of Recommending Restaurants**

From the definitions provided, several key components of recommending system can be identified:

**1. User Preferences**

User preferences refer to the tastes, interests, and behaviours of individuals that guide their choices or selections. In recommendation systems, user preferences can be collected explicitly through ratings, likes, or reviews or inferred implicitly through clicks, browsing history, or purchases. Preferences can be static or dynamic.

**2. Item**

An item is the entity being recommended in the system. It could be a product (e.g., books, electronics), a piece of content (e.g., movies, music), or a service (e.g., restaurants, travel packages). The characteristics of an item, such as its genre, price, or category, are essential in determining how well it matches a user’s preferences.

**3. User Profile**

A user profile is a collection of data that represents the preferences, behaviours, and attributes of a user within the system. It could include age, location, past interactions (e.g., reviews, ratings), and inferred preferences like genre preferences based on browsing history. The user profile is essential for personalizing recommendations.

**4. Collaborative Filtering (CF)**

Collaborative filtering is one of the most common recommendation techniques, which works by leveraging the preferences of other users to predict what a specific user might like. It operates on the assumption that if two users have agreed on a set of items in the past, they are likely to agree in the future. There are two main types of collaborative filtering:

* **User-based CF**: Recommends items that similar users have liked.
* **Item-based CF**: Recommends items similar to those the user has liked in the past.

**5. Content-Based Filtering (CBF)**

Content-based filtering is another recommendation approach that makes suggestions based on the features or characteristics of items. It relies on the idea that users will prefer items that are similar to those they have liked before.