Model Development Phase Template

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Name	Shahrukh Dilawar Sanadi
Project Title	Restaurant Recommendation System
Maximum Marks	5 Marks

Model selection Report:

Model	Description
Content-Based Filtering	Content-basedfilteringrecommendsrestaurantsbycomparinguserpreferences (e.g.,cuisinetype,pricerange,dietaryrestrictions)withrestaurantattributes.It focuses on similarities between items and the user's profile without relying on other users' data. This method is effective for users with unique tastes butmay strugglewithlimiteduserprofiles(coldstart).
Collaborative Filtering	Collaborative filtering leverages the preferences of similar users to make recommendations.Ituseshistoricalratingsandreviewstoidentifypatterns. This modeliseffectiveindiscoveringnewitemsbutcansufferfromsparsityandcold start problems if data is limited.
Hybrid Recommendation Model	This combines content-based and collaborative filtering to overcome the limitationsofeachmethod.Byintegratingbothuserpreferencedataandbehavior ofsimilarusers,hybridmodelsimproverecommendationaccuracy,diversity,and scalability. It is particularly useful in scenarios with large, sparse datasets like restaurantrecommendations.

Matrix Factorization	Matrix factorization techniques decompose the user-item interaction matrix into latentfeatures,capturingunderlyingpatternsin user preferences. SingularValue Decomposition(SVD)isacommonapproach.Itiscomputationallyefficientand workswellforlargedatasetsbutrequiresenoughratings.
DeepLearning (Neural Networks)	Neural networks can be used to build recommendation systems by learning complex,non-linearrelationshipsbetweenusersandrestaurantsfromrichfeature sets including reviews, preferences, and metadata. While powerful, they require large datasets and are computationally intensive.

Conclusion:

ModelSelected	
Hybrid Recommendation Model	The hybrid model was selected because it addresses the limitations of both content-basedandcollaborativefilteringapproaches.Iteffectivelyhandlesthecoldstartand sparsity issues by integrating multiple data sources such as user profiles, restaurant attributes, and behavioral data. This results in more personalized, diverse, and accurate recommendations, making it highly suitable for a restaurant recommendationsystemwithvaryinguserpreferencesanddataavailability.