This hybrid recommendation system is truly hybrid, using both switching and cascade hybrid recommend system design concepts.

To put it simple, combining the user-based model and baseline model to predict normal user-business pairs (these users and businesses could be found in training data). using content-boosted CF to solve the cold start problem.

When predicting the score to normal user-business pairs, I use the baseline model as the primary model, the score generated by the baseline model will be refined by the user-based model result. since I found the user-based model is much sensitive when ground truth score is low. so I will amplify the weight of the user based model when it comes to the lower score (like 1.0, 2.0).

Given the shortage of useful information about user and business, I cannot directly predict the new item's score. So I built a friend network to help me predict the result. Finding new user's friends and sorting these people by some criteria, I use these filtered friend's review_scores to predict this new user's result.

So based on different situations, use different recommenders to make a prediction. This is the switching hybrid. And when process normal user business pairs, using multiple recommenders to generate the result score. This is the cascade hybrid.