Jiachun Tang

jiachun5@illinois.edu

CS410: Text information System

# Overview of Design Food Recommendations System

## Introduction

The algorithm of the recommendation system is widely used in daily life, such as advertisements, TikTok videos, and daily items. It is important to achieve an accurate and stable recommendation system when it comes the environments that are desired. In order to achieve this goal, designing a algorithm and logics on the ranking system is necessary in the whole process, Including target setting, training data preparation, feature selection and screening, and model training and optimization. The model can be extended to semantic relevance models.

## Tool

There are many tools that are widely used, including PyTorch, NumPy, MeTa, and natural language processing applications will be associated with these tools. For example, the NumPy gives a series of package of the usage of scientific computing, same as the TensorFlow.

## Design

There are many approaches of implementing an algorithm to make a ranking system. For example, the **BM25** is a ranking system to search and estimate the relevance of documents to a given query.[1] Like the BM25, design a specific ranking system on Food recommendation system, it also requires some same approach while it also is happening in BM25 and TF-IDF[2], etc. There are several key points needs to be pointed out here. First, the factors, in this case, it is more desirable to give some factors which can influence the ranking system. The number of points of a dish, how many people like it, and the number of comments how many customers would like to give a comment on a dish. Even the number of views, if the menu is worked based on some digital platform, how many costumers would like to open the specific dish with more details coming. Or it is also worthy to record the number of the dish to be remake, which means there could be something not good happened. Therefore, design a reasonable and legitimate factors system can help and improve the ranking system. At this moment, the score model could be built furthermore with those factors. Next stage, we could think about whether we

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[1] https://en.wikipedia.org/wiki/Okapi_BM25

[2] https://en.wikipedia.org/wiki/Tf-idf

want to update our ranking system over the time, and what can be impacted in the process. The answer obviously is yes. We want to have the feedback coming from the customer and make some changed upon those comments or other advice. So again, should we make those factor stable or varied. If there are already to many negative comments with one dish, should we lower the factor to keep the score not to be over lowered than other also receiving a few negative comments dishes. There are also could be some extra feature can be applied in this case. What should we recommend to customer? The KNN algorithm has been used to provide automatic recommendations to users on additional content.[3]

## Challenge

There are also some challenges is that split out words like good, delicious, fancy, etc. as positive words. On the opposite, finding out those words like bad, unhealthy, not yummy as negative words in the ranking system. A discriminative model can be more easily distinguished and automatically add points or points, or a generative model is better to classify those same category words. Somehow discriminative classifier[4] model engaged with machine learning can provide accuracy with the situation, but it is not 100% unbiased or highly unbiased. It also can result in an uncomplete ranking model

## Solution

It is wise to use several different training models and meanwhile providing the ground system (the truth), by human judgement. Even though there are tremendous, or comment should be reviewed by people, but the human resources involved, the factor of readjustment to those biased situation could be readjusted again. In addition, the intervention of multiple models can also avoid unwanted situation happened to some extent.

[3] https://www.ibm.com/topics/knn
[4] https://medium.com/@akankshamalhotra24/generative-classifiers-v-s-discriminative-classifiers-1045f499d8cc

Reference

1. *The approach of BM25*, https://en.wikipedia.org/wiki/Okapi_BM25

2. *The definition of TF-IDF*, https://en.wikipedia.org/wiki/Tf-idf


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4. *Generative Classifiers V/S Discriminative Classifiers*,
   https://medium.com/@akankshamalhotra24/generative-classifiers-v-s-discriminative-classifiers-1045f499d8cc