Individual Project Report

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Individual reflection of project journey:

Many restaurants have switched to an online pdf menu in this covid 19 pandemic, but the menu is not easy to read and use, because most of it was not designed for online usage, so we decided to create this contactless menu for restaurants.

During the project development, I realized that recommending food based on APIs creates great delay if the wifi connection is not stable or other factors, and seeing the great potential of TensorFlow light, I also wanted to develop a model that can be run and trained on the user device.

After learning Cognitive Systems about NLP, I learned that the tf-idf Indexing can be used for comparing the similarity of 2 documents, then I got an idea of applying the same on dishes, the document is a bag-of-words and dishes is a bag-of-ingredients, for the document we can use the frequency of the words as a weight of how important the word is in the document. So does ingredients, we can use the ingredient weight to indicate how important the ingredient is in the dish. The words that appear in many documents are considered less important, this rule also applies to ingredients, for instance, “Salt” appears in almost all the dishes, which is less important when comparing the similarity. So I designed the algorithms to create a tf-idf vector representation of dishes, and use a simple Cosine Similarity to compare the similarity of 2 dishes and recommend 6 dishes that are similar to the selected dish.

For the Complementary dish recommendation, it is challenging, because of the limited data that we can get. After some discussion, we decided to use order and order count to do a simpler recommendation. Which works quite well and the model keeps involving overtime.

Our team had a lot of discussion and idea-sharing during the entire process, it’s very helpful to hear different ideas and suggestions. We can’t achieve this without teamwork.

Personal contributions:

- Implemented an on-device machine learning for our contactless menu.
- Implemented the clustering method to recommend and sort similar dishes based on tf-idf indexing and cosine similarity.
- Implemented complementary dish recommendation by discovering the relationship from the order history(Association rule learning).
- Added offline support for the menu.
- Developed the user interface.
- Deployed the frontend project to firebase.
- Writing project report
- Video recording for tech explanation

What learned is most useful for you:

I think one of the important things that I learned from this project is that how and when to apply a similar formula or models to similar situations.

Another learned is how to design a proper solution or model based on use cases. For this project, we need to provide low latency(offline model and training, offline caching), low maintenance fee(offline model and training, offline caching, offline menu updates), increase the overall order amount(dish recommendation), contactless(online menu).

How you can apply the knowledge and skills in other situations or your workplaces:

When I see similar issues in the future, I would most likely know which solution or model might be suitable for other cases.