Project Proposal - FoodXcess

General topic of subject

Reducing food wastage by building an application for users to discover alternative ways to handle ingredient surplus instead of leaving them to rot.

Problem/Question

The main problem or question that I am tackling here is “how can we fully utilise the redundant ingredients that we have on hand”, it can also be interpreted as “reducing food surplus” in a more general sense. I think most of us have encountered the situation where we have some ingredients that are going to expire soon, but we have no idea on what to cook with that, and the ingredients eventually rot and get wasted. This inspired me to think about an application to deal with it, as the amount of food wasted this way is uncountable.
Below are the few functions that I expect my application to have in order to tackle the problem:

- Using computer vision, recognise the ingredient from the picture and provide a list of recipes that uses the ingredients.(Meal planning)
- Food sharing within the community
- Have physical food collection point for people to drop off ingredients that are redundant, and people may use the app to locate the food collection point nearest to them

What others have done in the area before

OLIO, which is a food and household items sharing application. Their way of sharing items with neighbours is kind of similar with the one that I have thought about, which is allowing the donor to create listings for things that they do not want, and users nearby will be able to view the listings available. If the user is interested with the listing, the system will allow the user to engage with the donor regarding the listing.

NoWaste, a food inventory app used for expiration reminders and has a meal planning feature, which helps reduce waste.

There are other food waste apps available, but these two are the ones that have the most similar concept to mine, which are food sharing and meal planning. However, the ingredient recognition using computer vision and recipe suggestions that I will be focusing on is still the stand out feature that other applications do not possess.

Challenges and interesting parts of my projects

1. Lack of experience in mobile development. I have done a few web development projects during my internship, hence I believe that the webpage version of the application would not cause that big of a problem.
2. Finding a suitable computer vision library, datasets to train the model and error handling when the model can't recognise the ingredients.
3. Finding suitable recipes and adding them into the recommendation list.
4. Internal search for recipes containing specific ingredient.
5. **Interesting part/ Optional feature**: Determining multiple ingredients from one picture, and find recipe that uses them

Methods to solve problem mentioned above

1. The easiest way to overcome this will most likely be using django-rest-framework and developing the mobile version as a webview application. However, I am more keen to code the native application using React.
2. Might need to try out a few different libraries to see which one suits the project best. Already found a few datasets that are useful, but will need to research more on the datasets available, so that the model could recognise as many ingredients as possible. Worse comes to worst, I may use an existing recognition data set for a prototype of the app. (Already found datasets for fruits, but still looking for datasets of other raw ingredients, e.g. onion etc.)
3. Could use recipes online, and brings the user to the selected recipe on the respective website, but will need to filter suitable recipes manually.
4. Add ingredients “tags” to each recipe, to improve the performance of internal search for recipe.
5. May be an additional feature that I can add in the later part of the project once I get the main functions of the app working

Timeline for major milestone

Autumn Term:
Week 4 - Start developing the backend for the system, try out different computer vision models and find datasets that are suitable.
Week 5 - Create roles such as admin(manage recipes and listing) and user(manage own listing)
Week 6 - Create recipe and listings models. Users should be able to create, view, edit and delete their own listing.
Week 7 - Project Inspection Week
Week 8 - Allow the manual search for recipes/dishes.
Week 9 - User should be able to interact with other user’s listing
Week 10 - Start developing the frontend of the web page.

Week 11 - Integrate the CV model to the web page and recipe recommendation should be working, complete the MVP for the web version of the project, with the main function working

Spring Term:
Week 1 - Start developing the mobile version of the application
Week 4 - Add chat function for users to engage with each other
Week 6 - Add user rating function
Week 7 - Optimise performance of the application
Week 10 - Internal test
Week 11 - Project submission