Brainstorming, Low Fidelity Prototyping, and Evaluation

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Abstract

This report documents the brainstorming results of possible directions to improving Meetfresh business and creating recommendation-system-related products that generate business value in the sweet food industry. After the brainstorming, 2 ideas were selected, including one customer-side idea (product recommendation) and one business-owner-side idea (store site selection). Verbal prototype, paper prototype, and wireframe prototype were used to represent the solutions. With three rigorous selection criteria, the tradeoff and suitability for users were analyzed accordingly.

Brainstorming Plan

1. Each member needs to come up with at least 10 ideas.
2. The ideas can be subject to help the customer or the business.
3. Think about what the customers really need and what they may not be aware of.
4. Think about what the customers really want from the experience.
5. Think about aspects of the business other than the product.
6. Think about problems that the business may face that are not directly associated with sales or profits.
7. Think about the problems that the business may have in the past, present, or future.
8. Think about what can be improved in the current business model.
9. Think about what data can be used to solve the problems.

Brainstorming Execution

Each member had his/her own individual brainstorming sessions and each had provided at least 10 ideas. A group brainstorming session was used to compare and compile ideas. A summary of the brainstorming sessions is provided below:

1) Customer Side
    a) Create customizable items using customers' input data as recipes. The recipes can then be used to recommend new or existing customers based on their popularity.
    b) Recommend based on what other customers have ordered before.
    c) Recommend based on the most popular items, new items, etc.
    d) Recommend based on items with similar texture, ingredient, taste, etc.
    e) Recommend based on lifestyles of customers.
    f) Recommend based on what the customers' friends have ordered.
    g) Recommend based on the health concerns of the customer.
    h) Recommend items for group ordering.
    i) Recommend side items for deals.
    j) Use of graphics (pictures, texts, layout…) to make the items more appealing.
2) Business Side

a) Analyze the customers' comments on social media, use the NLP technique to extract the complaints and trends. Generate report for the business owner.
b) Introduce new products based on popularity and trends in the area.
c) Recommend new presentations and designs of the products
d) Recommend potential investors and people who may be interested in joining the franchise
e) Recommend locations for new stores based on factors such as population, demographics, income level, etc.
f) Recommend for inventory stockings based on sales, cost, and availability of supplies.

Selection Criteria

The selection criteria we used were:

1. Addressing crucial needs of users. The "users" can come from a wide rage, including customers of Meetfresh, business owner of Meetfresh, or opportunity seekers who are willing to open a new Meetfresh store.
2. Bringing business value. The essential goal of the project is to bring potential value to business development of Meetfresh. The more value we make from the project, the more impact we can make on the growth of Meetfresh.
3. Generalizability. Our aim is not limited to merely finishing a project for Meetfresh. We look beyond and want to make real contributions to the industry. The generalizability of our model/product/website decides how far we can go and how much bigger contribution we can make to this world.

Based on the brainstorming results and our idea selection criteria, we picked two promising directions that need low-fidelity prototyping – product recommendation and store site selection.

Prototype 1: Product recommendation

The first idea we want to develop is to create a recommendation system for customized dessert. We found customers often spend too much time studying or simply give up DIY because they are not familiar with the optional ingredients. We intend to split the whole DIY process and divide it into three parts: main material 1, main material 2 and auxiliary materials. The main ingredient determines the taste of the whole dessert. If customers are unfamiliar with the optional main ingredients, they can click the exclamation mark next to the main ingredient name to learn more about it, or recommend the usual choices of customers' friends or nearby residents according to our recommendation algorithm. The same is true for the choice of accessories.

Besides, when customers finish their DIY dessert, they can record the current recipe in the form of QR code and store it in their accounts. If their friends want to try his works, they only need to send the QR code instead of giving specific instructions by phone or social media. Merchants can analyze customers' taste preferences according to the QR code formula stored in customers' accounts, so as to optimize and expand the quality and diversity of ingredients. You

can also publish KOI's own co-branded formula QR code by cooperating with KOI (Key opinion Influencer). Thereby increasing sales and expanding customer base through fan effect. During this process, our recommendation system can collect more user behavior data and taste preferences, so that new users can see the popularity of different ingredients during DIY, recommend interesting or popular formulas related to specific ingredients.

Prototype 2: Site Selection

This prototype comes from the view of the shop owner. During the investigation of the MeetFresh (MF), we find the shops are only limited to some places. Many people need to drive a long distance to try it and this restrict the promotion of the business. We also find some cases failing to run a MF. The MF is a franchise store and this means we can recommend the location of the shop! Given the similarity to other dessert stores, we expand our horizon to all dessert shops. We think this is a high practical vale business idea. In the following, we will describe how this prototype works.

Verbal prototype

This prototype is web-based. It provides the key information to help the people of interest choose their ideal shop location. When considering opening a store, the first thing is the market. We need to know people's preference for dessert, how many and how much people will spend on dessert, when and how to eat dessert, the popularity among different ages and so on. After this, the next step will be the analysis of the location. A good location should have convenient transportation like the subway(metro) and large parking lot. Big stores, shopping malls, big companies and schools are also good indications of how many people live surround and visit. We can also learn from how the McDonald or Starbucks choose their store locations. The next part is the cost estimation. The prototype should also provide the manpower cost, rent, tax and if possible, the estimated revenue. In order to have an intuitive feeling, the prototype will provide good visualizations of the information above. Finally, the prototype can also generate a report and final score (how ideal is the location) on the selected location.

Paper prototype

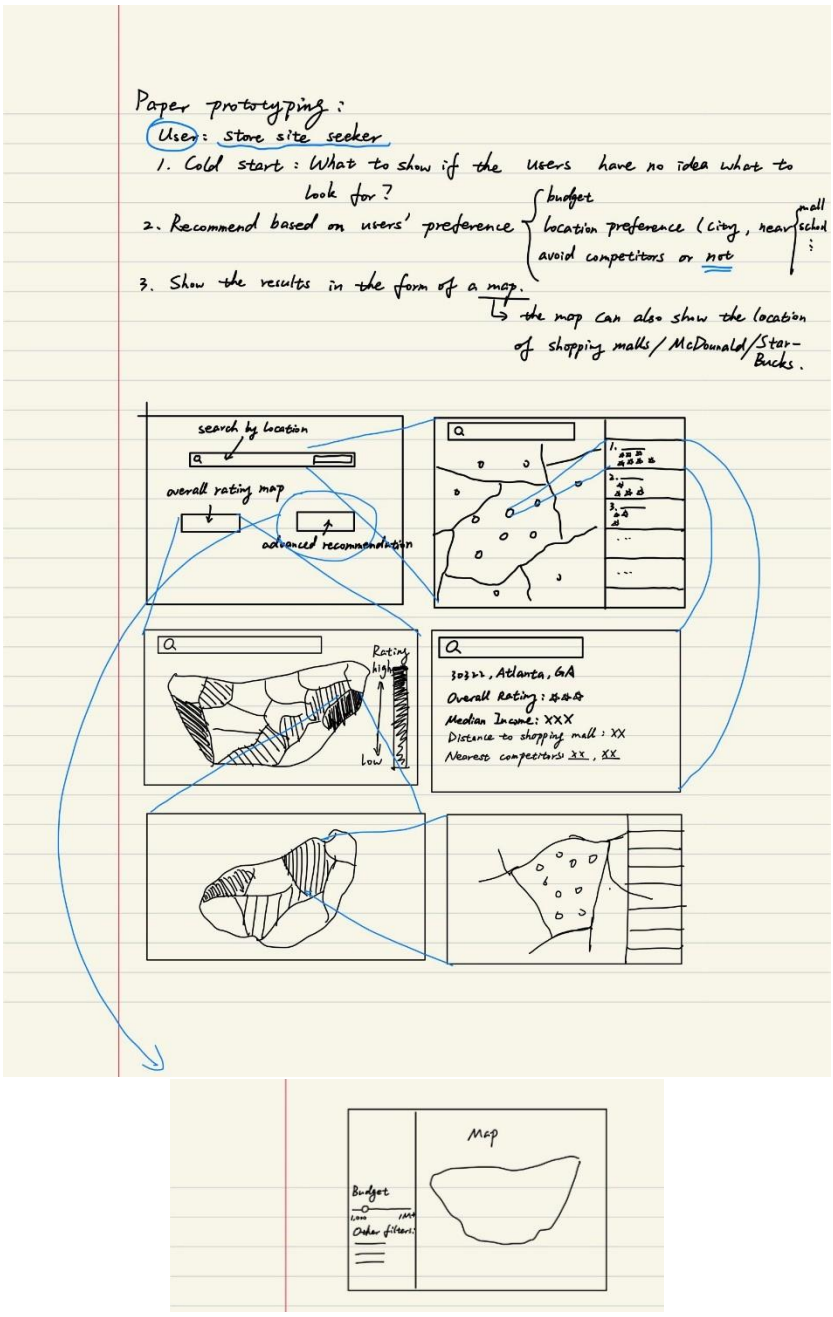

Figure. 1 paper prototype of site selection

After making sure of the overall input, output and processes of the recommendation in our system (based on the persona, timelines, etc. shown above). We started designing interfaces where we can more easily show our thoughts on the methods of how we are going to collect information from users and implement the models. Figure 1. is the paper prototype we created. The landing page is shown on the top left corner. We have two different choices on the main page: overall rating map and advanced recommendation. Overall rating map corresponds to the popularity based cold start model we have and this function is designed for those who have little

idea about how their dessert shop would be like and those who are interested in the information in a big picture. While users input the address of the area they are interested in and click the other button ‘advanced recommendation’, the website will lead them to another page collecting detailed information from them and provide them a more personalized recommendation result.

We then collected feedback from our potential users using this paper prototype and got many valuable suggestions. Some of the examples of the suggestion include (but not limited): 1. adding the button before each of the filter providing users more flexibility. This would also allow us to collect statistical data about the features users think highly of and make adjustments on the positions how these filters should be displayed. 2. Advanced recommendation results (recommended zipcode and corresponding locations) should be shown in the largest area possible based on the distance filter information input. The rating points can be added to the results so it would be easier for the users to compare. Detailed information should be given after a specific area is clicked by the user. 3. Useful features that could be helpful for site selection are also discussed in the process of collecting feedback. We made changes based on these suggestions and updated the prototype. We created website demo designs to better show the prototype ideas and the details of these updates will be shown in the subsection below.

Main page

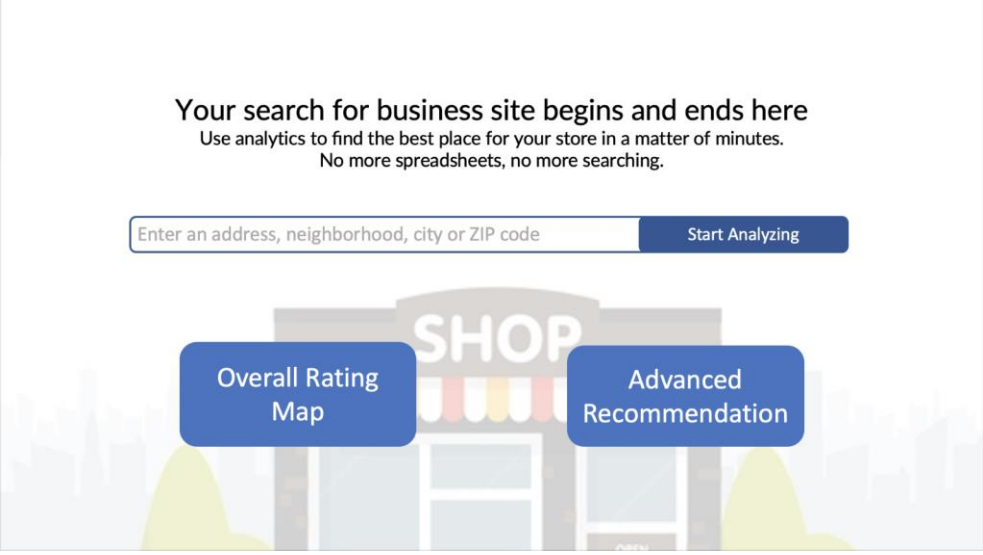

Figure 2. main page design

We provided background information on how this website can help people at the top of the main page. ‘Overall rating map’ and ‘advanced recommendation’ are the two main functions provided on the website. We can either generate a quick result with our cold start model to show the users or lead them to the page collecting data from them (see figure 4 in information input section) after they clicking ‘advanced recommendation’ button. The location information will be collected for advanced recommendation. Users can either input the address of the area they are interested in or we will track their IP address and set the location by default.

Overall rating map page

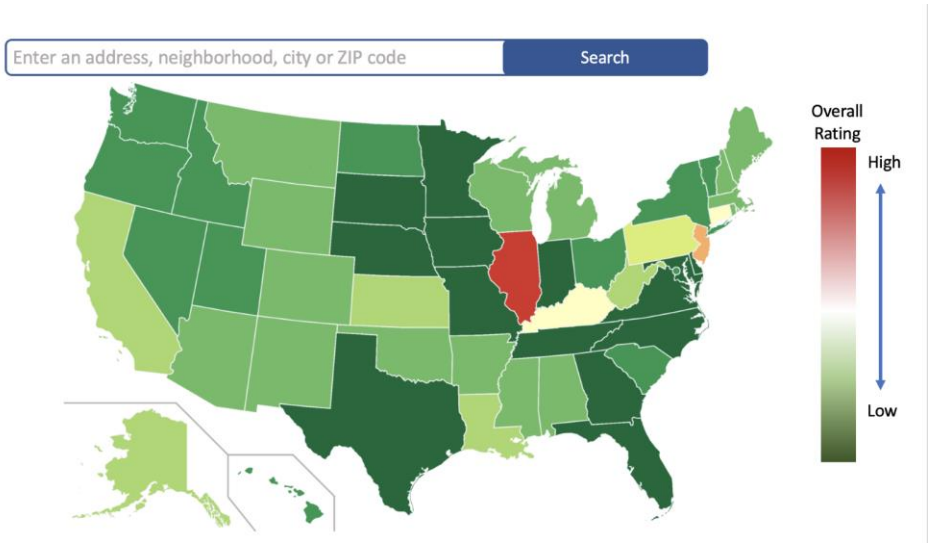

Figure 3. overall rating map page

We will build up a cold start model based on the population, economy, local flavor preference (whether they are dessert lover, etc.) information and give an overall rating countrywide. A more detailed rating map will be shown when people click a specific state.

Information input

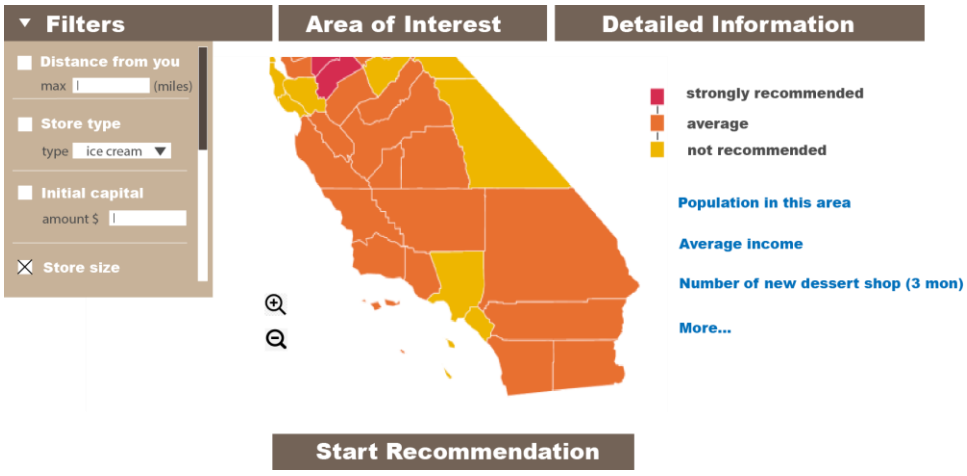

Figure 4. information input page

When users want a more personalized, accurate recommendation. This page will guide the users to select and input detailed information on the features they are interested in. We have a box on the left of each filter and users can anti-select the features they don't care about or they don't have too much information on. The middle part of this page shows an area of interest map based on the location information collected from the main page. Users can change the area of interest by updating the information in filter if the area shown is not are they are thinking about

opening a shop in. Detailed information that could be helpful for the users to know the basic information on the area is listed on the right-hand side. After finishing filter input and viewing the information, users can click ‘start recommendation’ at bottom for detailed recommendation results.

Advanced recommendation results and detailed information

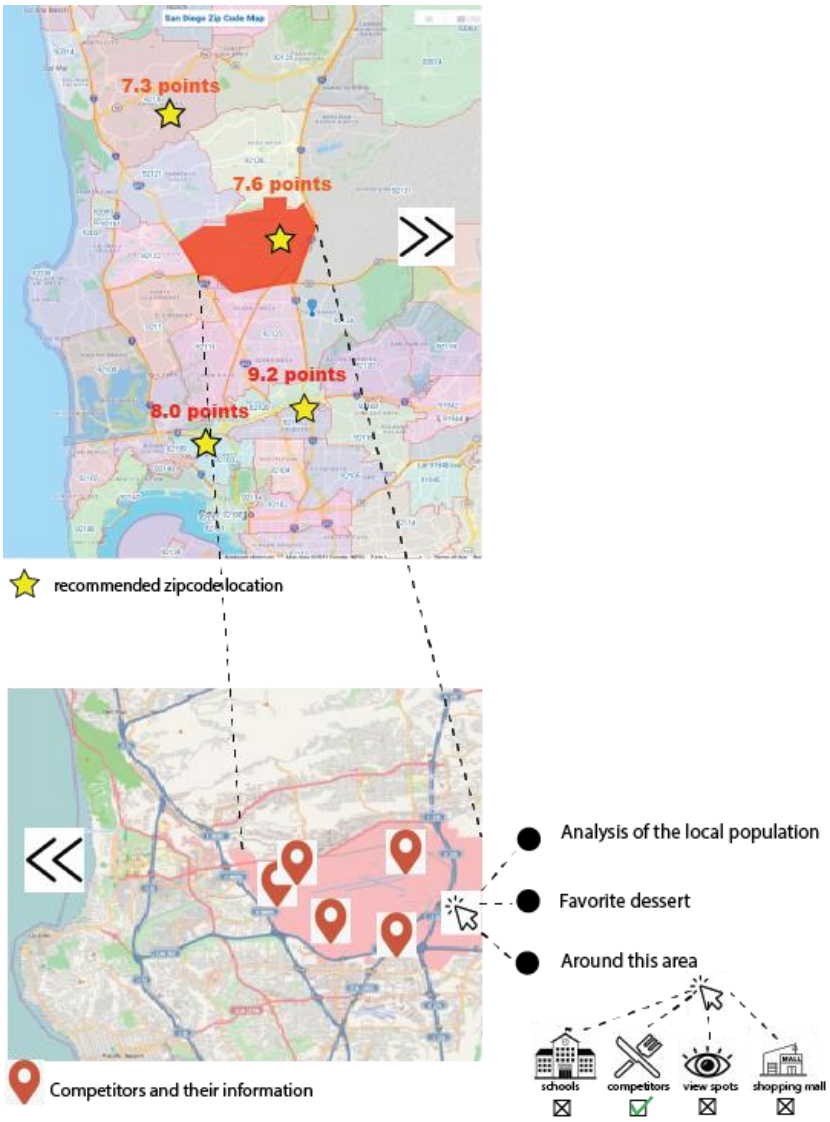

Figure 5. advanced recommendation results

Figure 5 shows the results of advanced recommendation. The granularity of the location will be zipcode area. We will provide 3-5 zipcode and label their locations and ratings based on the filter information collected. The figure above in figure 5 shows the first part of the recommendation results. When users click on one specific area, another page will show up

(bottom figure in figure 5) and a zoomed in map is shown on the page providing more details of the area. The choices of information that would be helpful for the potential shop owners will pop up when placing the mouse cursor on the area. One of the information listed in the figure is 'around this area', which will show the location of schools, shopping malls, competing dessert shops and view sights in the area. Like what we did for filter selection, users can focus on some of this information by selecting or anti-selecting. For example, we have competitors selected (box below the icon) and the distribution of the competing stores can be seen on the map. People might repeat this process by going back to the upper result page and selecting another area for further details. The arrow buttons on the website will allow them to do so easily.

Results

The second prototype (store site selection) gained more positive feedback from the prototyping step. It satisfied the three criteria: Addressing crucial needs of users (business owner), bringing crucial business value, and have the generalizability to be extend to various types of store site selection (not limited to dessert store, but could also be shopping mall, restaurant, etc.). After many iterations of prototyping in different forms (including verbal, paper, and wireframe), we derived a more sophisticated overview about the prospect of the site selection idea, made clear of the major functionalities that need to be achieved, and started the initial data collection step (see Appendix A). Now we are ready to continue our journey to the next step – data collection, model construction, and high-fidelity prototyping.

Appendix A - Datasets

- Demographics
- Traffic (bus stops, parking space,etc)– Dengcheng
    - Chicago "L" - https://data.cityofchicago.org/Transportation/CTA-System-Information-List-of-L-Stops/8pix-ypme
    - NYC subway - https://data.cityofnewyork.us/Transportation/Subway-Stations/arq3-7z49
    - Washinton DC Metro: https://data.imap.maryland.gov/datasets/120913815e11405c9c8996b63a65087d/explore?location=38.943072%2C-77.091050%2C10.99&showTable=true
    - Miami Dade:
        - https://www.miamidade.gov/transit/WebServices/Transit_XML_Data_Feeds.pdf
        - https://www.miamidade.gov/transit/WebServices/TrainStations/?StationID=
    - LA Metro: https://developer.metro.net/gis-data/
    - Massachusetts Bay Transporation Aurhority:
        - https://mbta-massdot.opendata.arcgis.com/datasets/MassDOT::rapid-transit-stops/explore?location=42.186112%2C-71.042550%2C9.39&showTable=true

- Location:
    - Big store (Costco) - Dengcheng
    - shopping mall – Dengcheng
    - school(区分公立和私立) - Dengcheng
        - https://nces.ed.gov/programs/edge/Geographic/SchoolLocations
    - 写字楼 (中高层建筑，7楼以上，企业，公司规模) liankun (company list $500)
    - Starbucks (bing) : https://www.kaggle.com/datasets/azha123/starbucks-store-loacation-dashboard?resource=download
    - McDonald location (bing) : https://www.kaggle.com/datasets/ben1989/mcdonalds-locations
    - Dessert stores (Bing) : https://towardsdatascience.com/yelp-reviews-analysis-for-bubble-tea-shops-f23094d3d32d
- Competitor distribution (number of competitors near a location)
- Local people's preference（行业报告) Liankun (market report $1000)
- Real estate related information （房价）Liankun (scrape)
- Economic development direction (GDP and median wage going up or down?) (Bing)
- Tax rate (Bing) : https://taxfoundation.org/publications/state-corporate-income-tax-rates-and-brackets/

Appendix B - Brainstorm ideas

- Use the location, weather, time, and local temperature to recommend.
- Deploy the MeetFresh to more platforms
- For the new users, free try some signature samples
- Analysis the feedback from the comments, use the NLP technique to extract the pain point and trend. Use this information to update the system. Generate report to stakeholder
- Accumulate the MeetFresh Information from the social median. Use the CV and NLP to analysis. Use this information to update the recommendation system. Generate report to stakeholder
- Analysis the other popular desserts (Not Meetfresh) and provide the new ideas (including taste, ingredient and appearance) for the new product development.
- For the new user, the big pain point is the "cold start taste". Try to use the some words and picture which can indicate the taste the dessert.
- In the customized menu, come up different pictures and descriptions when choosing different ingredients.
- Cooperate with the fit app and recommend after the exercise.
- Content based recommendations
- Customer based recommendations (gender, race)
- Friends recommendation (refer bonus)
- Customize the size of the dessert
- Recommend membership

- Voice base recommendation.
- Weekly, monthly plan
- Personalized combo
- Accept customer's expectations and develop new dessert
- Recommend the food with similar texture, taste, ingredient … (e.g. pudding --> grass jelly)
- Change the recommended items based on the feedbacks from online and offline customers
- Platforms and new customers for advertisements
- Recommend to those whose friends had meetfresh before
- A series of different ways to describe the items (pictures, text, the features that are important to the customers, the layout preference...) and use different combination of these pictures and text to attract customers.
- Recommend items based on user's habits (drinks with caffeine/ refreshing dessert in work time...)
- New desserts that are popular in the area.
- Other desserts customers ordered together with
- Potential investors that might be interested in opening a new meetfresh store
- Cities and positions that would be suitable for opening new store (dessert preference, Asian population, average income, community nearby). Some revenue and rating info needed.
- Staff based on their text on their social media (personality)
- Music, decoration in the store (how long customers are willing to stay in store)
- Sort by popularity or number of sales or rating
- Filter for wanted / unwanted ingredients
- Filter for texture and taste (sticky or refreshing, cold or hot, solid or liquid, sweet or not)
- Picture-based recommendation (products that look like the ones that you tried before)
- Filter based on level of healthiness or Calorie
- Filter for food that does not cause your allergy
- Recommend based on demographic info (gender, age, occupation, etc.)
- Rating prediction (LSTM based, incorporating both short-term trend and long-term memory)
- Maintaining the balance – how to recommend the best product for different customers while also keeping the sales ratio to be steady. 因为要考虑到库存问题.
- Group recommendation – What to recommend when a company wants to buy 100 bowls for its employees?
- "Your friend Amy bought this." Keeping records of purchase history and link to social media.
- Explicitly Categorize: Asian's favorite, California's favorite, etc → can be tags.
- Recommendation for the side – Do you want a cup of milk tea in companion?
- Collecting data based on search logs

- Ingredient’s illustration tag.
- Webpage for customized dessert.
- Interactive webpages include materials and ingredients’ images.
- Encoding DIY dessert via QR code.
- QR code can be share to other consumer and can be decoded by store to processing.
- Analysis DIY dessert and expand ingredients’ categories for various flavor demanding.
- Categorized customers’ DIY desert with different features, such as low calories, sweet, party supply etc.
- Hold DIY dessert race to attract new customer from social media and develop new products basing champion recipe.
- Develop dessert package for customers far from store according to their purchase record.
- Create discussion broad allow Meet Fresh fans talking about their DIY desserts.
- Recommend for ingredient suppliers based on location and customer base
- Recommend for inventory stockings based on sales, cost and availability of suppliers
- Recommend for working procedures based on item popularity
- Recommend for the elimination of nonprofitable items or hard to make item
- Recommend for work station arrangement for more lean processing of orders
- Recommend for replacement ingredients for the ones that is hard to come by
- Recommend for replacement ingredients to attract foreign customers
- Recommend for trending flavors or presentation
- Recommend for extra items to make a deal combo