DINING HALL APP FOR THE UNIVERSITY OF MICHIGAN

INTRODUCTION

It is far too difficult for students to navigate information about the University of Michigan dining halls. With the currently offered Michigan App, students can only see details of one dining hall at a time, and the subpar organization of the app makes it a tedious process to navigate to each dining hall page. Furthermore, there are no search or filter functions—much to the detriment of students who have dietary restrictions or are in search of a specific food item. Additionally, the app provides no assistance to students in choosing menus or remembering meals they enjoyed: with no way to save preferred food items or stay informed on what is popular, students are left on their own in deciding meals from an intimidating array of options. A dining hall app with added search and filter functionality, as well as a rating system and recommendation algorithm, would benefit students in meal planning and improve the dining hall experience. The purpose of this paper is to propose a plan of implementation for such an app. This paper expands on the reasons for needing this app in Section 1 and investigates methods of implementation in Section 2.

DISCUSSION

Section 1: Rationale for App

The Michigan App is currently the primary method students use to view dining hall information. Due to the app's nature as a central hub for campus information, the dining hall widget is just one of many features on the app's crowded interface. In order to see dining hall information, the user must first click "M Life", then "Dining Favorites", then manually select dining halls to add to their favorites, navigate back, then click the correct dining hall from the list of favorites. In total, this tiresome process requires 5 clicks to see the information of one specific dining hall. If the dining hall is located nearby, or has already been favorited by the user, then the number is reduced to 2 clicks ("M Life", then the dining hall)—still 1 more click than it needs to be. The layout of the information is similarly tedious to navigate: For example, if a user is vegan, they must scroll through a dining hall's menu and scan each menu item for the "vegan" label; their selection is cluttered up by non-viable food items. Similarly, if a student is in the mood for their favorite dining hall food—say, tomato soup—then they must look through a separate menu for each dining hall until they find it. A new dining hall app with a search bar, a filter feature, and a more user-friendly interface would solve these navigation issues and increase student satisfaction with the dining hall experience.

We could further expand beyond the scope of the current app by incorporating a rating and recommendation system into the new app. With seven dining halls and varying menus, the University's dining hall provides hundreds of options for each meal—a prime environment for decision fatigue to set in. A rating system allowing students to rate, save, and revisit their past favorites would help them to make decisions based on previous preferences, thereby facilitating decision-making for meals. A recommendation system would similarly increase the ease of selecting food at dining halls by recommending foods and dining halls based on the user's saved preferences. By prioritizing personalization to each user, the new app will drastically improve the overall student experience with campus dining.

Section 2: Methods

Our first step in implementing the new app will be to carry over relevant information from the current dining hall widget of the Michigan App. This information includes operating hours, capacity, menus, and nutritional information, all of which will be organized by dining hall. Following this, we can modify the implementation from the old system to be used as a skeleton for the new app. We will modify the app interface to minimize the number of clicks for the user to navigate the system; this can be achieved by making the dining halls directly accessible from the homepage. The proposed interface of the app's homepage is seen in Figure 1.

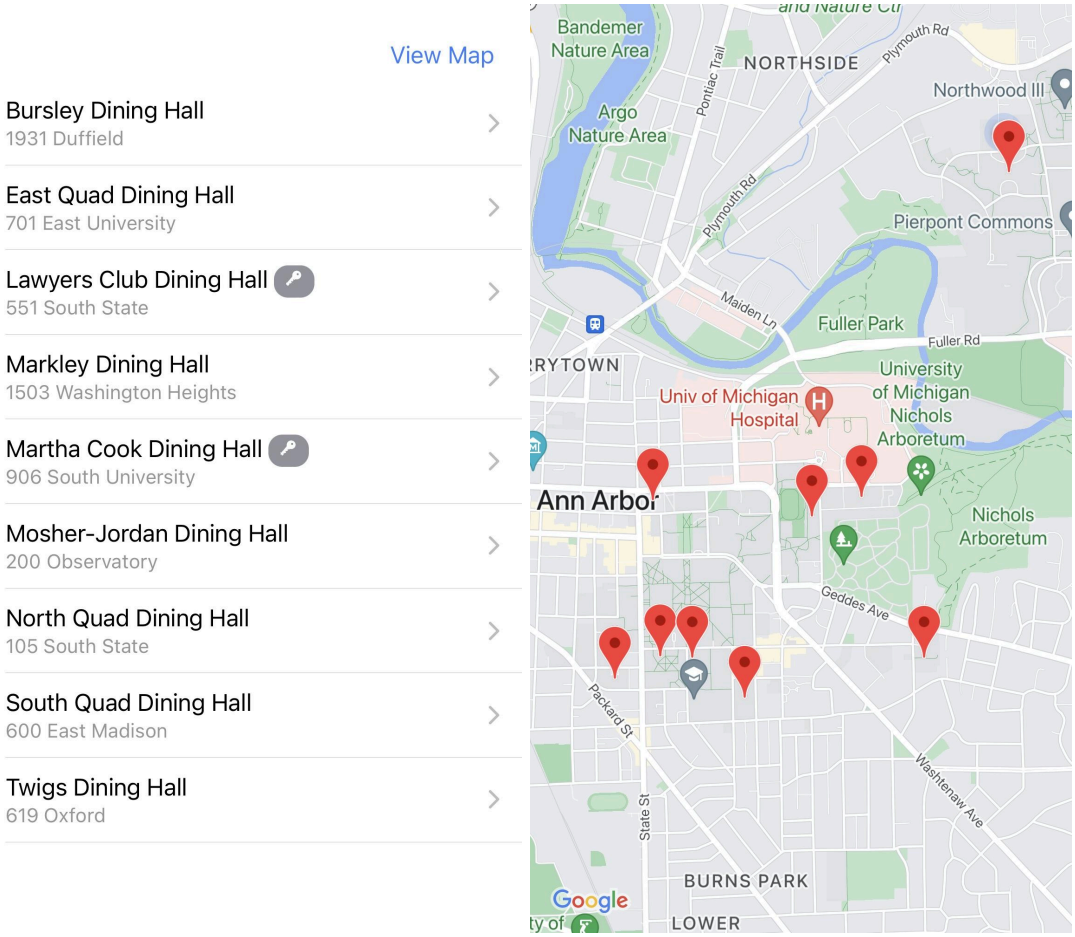

Figure 1. Two alternate views of the home page of the dining hall app. Source: University of Michigan app.

As seen in Figure 1 above, the home screen of the app will allow the users to access the menu of each dining hall in one tap, as opposed to two or five. By reducing the clunkiness of navigating the system, it facilitates a smoother user experience. The user will be able to toggle between a list view and a map view for the homepage, and the view selection will be saved so that the user does not have to re-select their preferred view each time they open the app (e.g., if the user switches the view to be the map view, the homepage will display the map view for future times that the user opens the app; if the user then switches it to the list view, the homepage will display the list view from that point on).

A crucial change we will be making from the old app is that the user will be able to see all the dining hall information on the homepage, rather than having to click on a separate page of each dining hall. This will be done by putting the information of each dining hall into a collapsible panel: when the user clicks the name or location of a dining hall (on the list or map views of the homepage, respectively), the panel will expand to display the information of that dining hall. This will allow users to scan different dining halls with ease and even view the information of multiple dining halls at once.

To further improve the user experience, we will implement new features, including filter functionality, a search bar, and a rating system. The user will be able to select certain filters based on dietary preferences and restrictions in order to tailor the menu to their needs; these filters will range from overall dietary restrictions, such as vegan or halal, to elimination of specific ingredients, like shellfish or peanuts. Similar to the homepage views, these filter preferences will be saved so that the user doesn't have to re-select them each time they use the app. The search bar will allow users to search across all dining halls for a specific food item, making it far easier to find a food one is craving. The rating system operates by allowing the user to rate each food item from 1 to 5 stars, to make it easier to remember which foods they liked and didn't like. Foods on menus will also be organized by these ratings, with higher-rated foods appearing near the top and lower-rated foods appearing at the bottom. These ratings will also be incorporated in our last additional feature, which is the recommendation system.

To build the recommendation system, we must first gather food preferences from a test group of users. This can be done via a survey asking participants to rate each food on the dining hall menu. We can then build prototypes of the model by following two different approaches. The first approach follows the methodology outlined in Ifada et al.'s study (2020): after training the model on the collected user rating data, it will predict ratings for new foods such that a user will be recommended foods that received high ratings from other users with similar food preferences as them. The second approach will use the methods described in the study by Li et al. (2018) to implement an alternate recommendation model that takes into account multiple attributes of each food (in Li et al.'s study, the attributes were spice level, ingredients, and price). In our implementation of this system, we can measure additional suggested factors such as food ingredients, time of meal, healthiness of food, and balanced nutrition; rankings will be assigned to each item on the menu based on these factors. With both models, the foods with the highest computed rating predictions will be displayed to the user. To perform user testing of these recommendation systems, we can divide test participants into three groups: one group for each model and one control group to use the app without any recommendations. By measuring user satisfaction based on different systems and comparing the results, we would be better equipped to determine the best way of implementing a recommendation algorithm for users.

CONCLUSION

By implementing a campus dining hall app with the extended functionality and user-friendly interface described in this paper, the University of Michigan can improve students' experience with the dining halls by providing a crucial means of accessing dining hall information. It is important to note that due to the constraints of this initial report, it was not feasible to explore certain avenues that might otherwise have benefitted the design for this app. These unexplored directions include alternate interfaces, research into what types of interfaces would be preferred

by students, methods of implementing the alternate map view, and research into implementing a database to store user ratings. In the future, we could implement and test alternate interfaces with test groups to see which would be most preferred by users, using evaluation surveys to assess user satisfaction. Furthermore, I was only able to explore two recommendation algorithms in this report. By looking into and implementing prototypes of other recommendation methods in the future, and subsequently getting user feedback comparing the different prototypes, we could better determine the most optimal recommendation system for the app. Additionally, we could expand on the recommendation by determining how to recommend specific dining halls, in addition to the food recommendation system. If we decide to further pursue the ideas outlined in this paper, I suggest more thoroughly looking into optimal app interfaces, methods of implementation for databases and maps, and alternate recommendation model techniques. If these steps are followed, I believe that further investigation into these solutions and methods is viable and would be beneficial to realizing the proposed product.

References

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