

#### Topic description:

Our initial domain is healthy and nutritious food. In modern society, due to various pressures and the social environment influence, people's health deteriorated and they have to pay more attention to their health and dietary intake of nutrients. With in-depth investigation and exploration of the topic in the previous research, we have determined that through mobile and social nutrition applications, people can improve their personal lifestyles and make themselves healthier. Therefore, our team is trying to create a mobile app that allows users to control their daily diet, monitor nutritional content, follow or create a sustainable food cooking or eating plan to achieve a healthy life. The topic I want to focus on this time is whether we should add social features, or focus only on mobile features, or combine the two to get better results.

To focus my reading, I have chosen to understand and investigate articles that focus on introducing and testing applications that have similar functionality or the same purpose. Six articles introduced five software (two articles are focused on the same application), including mobile and PC versions. The software I've chosen has the same purpose as our design idea, which is to help improve users' living standards by following or planning nutritional diet functions. It's important to note that each of the five apps includes at least one aspect of mobile or social, or both. The difference is that all five apps target different users, including students, low-income users, obese patients, malnourished patients, and ordinary users. Thus I can learn as much about the user experience as possible in the exploration space. By reading these six articles, I can explore whether to add social features to our project as well as critically reflect on the strengths and weaknesses of other similar applications, to learn from the experiences and lessons of others to help us improve and enrich our products.

Comber, R., Moynihan, P., & Olivier, P. (2012). (16) Computer-assisted visual assessment for malnutrition: Lower absolute error in assessments of food consumption using novel software application. *Atherosclerosis*, 223(2), 532. <https://doi.org/10.1016/j.atherosclerosis.2012.06.040>

In this article, the author introduces an app called mappmal, which can improve malnutrition and other problems by monitoring patients' diets. The authors downloaded the app to a touch tablet, showed users images of standardized hospital foods and drinks, and monitored patients' diets and dosing to get nutritional percentages and basic information. Their study focused on assessing the usefulness of the software, compared patients who used this app with those who did not use the app but had two different levels of nutritionists. The results showed that using this application were superior to those of trained nutritionists. This software can greatly improve the condition of malnutrition patients. This article is very helpful for my research topic. This software does not have the social function, but still a success. However, the limitation of this software should be taken into consideration. This test sample is only limited to the elderly in hospitals, who have a low demand for social interaction. Moreover, the purpose of this software is more inclined to assist doctors in treatment rather than the users themselves. Therefore, in our following investigation, more in-depth and extensive studies are needed to better understand whether nutrition software in mobile phones works for young and middle-aged people. For the domain and other aspects, this article also has some contributions. Rob and others believe that monitoring by mobile phone software can really improve many chronic human diseases, and through the algorithm of this software, we can calculate and get the nutrient content automatically. This article does not form the basis of my research, however, it is a useful supplement material.

Moreira, R. P. C., Wanner, E. F., Martins, F. V. C., & Sarubbi, J. F. M. (2018). CardNutri: A Software of Weekly Menus Nutritional Elaboration for Scholar Feeding Applying Evolutionary Computation. In K. Sim & P. Kaufmann (Eds.), *Applications of Evolutionary Computation* (pp. 897–913). Springer International Publishing.

The purpose of this paper is to propose and evaluate an application called CardNutri. This app uses evolutionary strategies to design a weekly nutritional menu plan for school students. Searching and using data from the Brazilian national school feeding program (PNAE), the authors considered a number of factors and designed this app that could generate nutritional menus in less than five minutes. Then the Weighted- Sum method was used to evaluate the algorithm and professionals were also invited to evaluate the CardNutri, which showed that the usability of this app was extremely strong and the results exceeded expectations. This paper is very helpful for my research. First of all, I know two information bases about the food nutrition table through this paper: PNAE and TACO (Table of Food Composition). Since no one in our group has professional knowledge of nutrition, it is undoubtedly necessary and helpful for our project to have an authoritative information base. Secondly, this paper introduces the algorithm for automatically generating weekly recipes in detail, that is, the genetic algorithm in artificial intelligence, which provides a new design idea for the "weekly recommendation" function in our project. Thirdly, this article also improves some problems in the software interface, which is a precaution for our design, such as the button distance issue. However, this paper still has some limitations, CardNutri is computer software, which is not very convenient for the users and the aesthetic design of the interface still needs to be improved. Another limitation is that the software is targeted at school students, a large group, so the cost has to be considered. When it comes to our software, individual users won't make spending a priority. In general, the software introduced in this article has many similarities with our team's project and provides us with a lot of experience in our design. Many details and processes are worth learning such as research method, evaluation method and so on.

Evans, S. H., & Clarke, P. (2019). Resolving design issues in developing a nutrition app: A case study using formative research. *Evaluation and Program Planning*, 72, 97–105. doi: 10.1016/j.evalprogplan.2018.10.010

In this article, the authors describe the research process for developing a nutritious cooking program for low-income families. And illustrates three methods that contribute to improvements in the app: small experiments, surveys, and screen electronic capture. The focus of their research was to assess whether the placement of screen controls in a program affects the effectiveness of use and whether illustrations can properly express or even reinforce the text. This article was very helpful to my research topic. This application has a printing function in the social aspect. When users want to share recipes with others, they can print them out. But I am a little confused about this, why not share it directly with other users through the software? This not only saves time and money, but also expands the user base. For domain respect, I've learned the following points: 1. The position and presentation of buttons and controls on the screen will have a profound impact on the application. 2. Compared with pictures and photos, hand-drawn illustrations can emphasize the details of words and the author's intention. 3. In addition to the main audience, we should also think about whether there are other potential user groups, which may be found in the process of investigation and testing. 4. The article has a 'Lesson Learned' part, mentioned that before designing, we need to consider which platform the software will be launched on. Apple or android? Mobile apps or computer apps? The author tells us 'there are a number of software features that cannot be easily transitioned from one platform to the other'. However, if both the mobile and PC versions are included, we need to consider simultaneous login and information transfer issues. Meanwhile, the problem of strengthening user privacy has to be faced as well. How to ensure the data not to leak is very important. But in this article, it is not mentioned. Therefore, when carrying out our project, we will pay more attention to the processing of user privacy data. This article unselfishly conveys the experience and learning to the readers with its own lessons, and also involves some details that we have not considered in advance, which opens up my mind to some extent.

Clarke, P., Evans, S. H., & Neffa-Creech, D. (2019). Mobile app increases vegetable-based preparations by low-income household cooks: A randomized controlled trial. *Public Health Nutrition*, 22(4), 714–725. <https://doi.org/10.1017/S1368980018003117>

In this article, the authors repeated randomized controlled tests during a 10-week period for a piece of the application called ViggieBooks, which was also described in the previous article (Resolving design issues in developing a nutrition app: A case study using formative research). Using data from the surveys of customer organizations in 15 Los Angeles communities, the authors explored whether the app could encourage users to cook and eat more vegetables. The focus of their study was to evaluate a series of controlled trials, comparing the difference between the standard group and the measurement groups. This article is very helpful to my research topic and to supplement the previous article. When reading the article of Resolving design issues, I have raised many questions, such as: why should the users print out the recipe when they want to share it with others rather than through the phone directly? Wouldn't that waste more paper and cost more? And why should SecretBook be a separate APP rather than integrated that to a function? This article explains my questions. Specifically, the role of social communication in the mobile phone application is discussed. For low-income families, using government printed paper is a more cost-effective way. But for our team, it's better to share directly via mobile. What's more, this article provides data support and confidence for what we are doing, noting that most of the current diet and nutrition applications or websites on the market focus more on weight loss rather than healthy living. This fact proves that we have chosen the right field and direction. The main limitations of this paper are the survey sample is limited to low-income American families and the vegetables are given (targeted). Therefore, the authors point out that after obtaining the results of a significant improvement in the target vegetables, the software needs to be continued to explore whether it affects other vegetables or even foods. In general, this article is a useful supplement to the software, which is very similar to our project.

Ho, G., Ueda, K., Houben, R. F. A., Joa, J., Giezen, A., Cheng, B., & van Karnebeek, C. D. M. (2016). Metabolic Diet App Suite for inborn errors of amino acid metabolism. *Molecular Genetics and Metabolism*, 117(3), 322–327. <https://doi.org/10.1016/j.ymgme.2015.12.007>

For this article, the author and his team developed an app called Metabolic, and assessed its impact on adherence, metabolic control and quality of life. This application mainly uses the food diet plan as the main therapy to treat the congenital defect of amino acid metabolism. The authors used GMDI to obtain data as a basis for information. GMDI is a North American food database compiled by the genetic metabolic dietitian international technical committee. This article is very helpful to my research topic. The author lists the functions of this software and explains them in detail including the function and content. This software is a socially powerful software that features exporting recipes, adding shortcuts, the same login, one-click sharing and more. The article focuses on these features and highlights the positive impact these features have on them. In contrast, I think these features will also make a positive contribution to our project. However, this paper still has some limitations. First, this application is targeted at patients with metabolic defects, but it can still be concluded the conclusion that a healthy diet can improve the human body's health and lifestyle. Second, the screenshots shown are not very clear or specific, it did not point out what is being discussed in the screen. This creates some confusion for the readers. However, this article, in the discussion section, thoroughly discusses and analyzes the positive impact of mobile nutrition application on human life. In addition to the list of analysis Metabolic Diet App functions, this article is a good support for the areas we explore.

Anwar, M., Hill, E., Skujins, J., Huynh, K., & Doss, C. (2013). Kalico: A Smartphone Application for Health-Smart Menu Selection within a Budget. In D. Zeng, C. C. Yang, V. S. Tseng, C. Xing, H. Chen, F.-Y. Wang, & X. Zheng (Eds.), *Smart Health* (pp. 113–121). Springer Berlin Heidelberg.

Unlike previous articles, this paper confirms that smartphone applications can properly prevent and even control many common chronic diseases of modern people, rather than just targeting a specific field. The authors developed and tested this application based on user requirements, focusing on how to promote healthy eating habits. This article is very helpful to my research topic. First of all, it explains the gap in existing apps in the current market. This clear the direction we need to work towards. Secondly, the system requirements are introduced, which provide a measurement standard for the function of our application. The authors suggest that dietary applications should include three basic functional requirements: monitoring, sharing, and intervention. All three functions are covered by our software so far. In the section of user non-functional requirements, the issue of user privacy is involved, which is a good way to fill the knowledge gap of our team on this issue. The limitation of this article is that the application described in this article is targeted at restaurant food and consumption. And another limitation is the screenshots and aesthetic design. The screen shows only the most basic information, but there must be better visual presentation methods, including text, composition, button controls, color matching and so on. This article will be a useful supplement to our research.

#### Overview statements

These six articles introduce, test, or feedback the five nutrition software, including their algorithm design, usability, and some functionality and interface iterations. Reading these six articles describing software that has similar goals or functions to the projects we are working on has been helpful in the areas we are exploring. First of all, fill in the gaps in our knowledge of nutrient content. Many articles introduced different authoritative nutrition tables and content libraries, which undoubtedly saved us a lot of time to search and investigate and raised the comprehensiveness of our application. Second, it provides a variety of methods and design processes, using the current technology to plan food and recipes. Save us from the lost confusion and guide a new direction. Third, by understanding and learning from the experience and lessons of others, we can absorb and learn from the advantages and avoid a lot of mistakes, which is of great help to the overall development process of our project. However, there is still a weakness. After learning the software designed by others, the thinking is easily limited, and it is difficult to think of new functions or other better expression methods. For further academic understanding in the future, these six articles serve as a link between the preceding and the following, as well as making the theme more specific. They are the extreme appropriate supplementary materials. In the previous survey, we determined that the application of mobile and social nutrition could have a profound impact on users' dietary improvement and nutrient intake. These six articles add to the evidence that nutritional applications are useful for a wide variety of user groups. Next, on the basis of these six articles, I will further explore and evaluate whether mobile or social has a greater impact on users or whether it needs to be used together to achieve a better effect, which will directly determine whether our project has the sharing function.