Ideation Phase
Literature Survey

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Project Name	Nutrition Assistant Application

1. Ingredient-Guided Region Discovery and Relationship Modelling for Food Category-Ingredient Prediction – [2022]
Authors: Wang Z, Min W, Li Z, Kang L, Wei X, Wei X, Jiang S

Automatic nutrition estimation is facilitated by recognizing categories and their composition from food images. This is important for various health-related applications such as food intake management and healthy eating recommendations. Since food comprises ingredients, discovering the visual regions associated with ingredients helps us identify the appropriate category and ingredients. In addition, relationships of various components such as co-occurrence and exclusion are also important for this task. To this end, we propose an ingredient-oriented multitasking framework for joint learning of food categories and ingredients for simultaneous food recognition and ingredient prediction. This framework mainly involves learning an ingredient dictionary to discover visual regions related to ingredients and creating ingredient-based semantic visual diagrams to model ingredient relationships. Construct a component dictionary to capture multiple component regions and get corresponding mapping maps to push component-related visual regions. Then, we combine the features of regions belonging to the same component to improve classification performance while identifying components more accurately. Component relation modeling uses visual component representations as nodes and semantic similarities between component embeddings as edges to build a component graph and learn their relationships via graph convolutional networks to generate labels. Form embeddings and visual features interact with each other to improve performance. Finally, the fused traits are used by both component-oriented domain traits and component-relational traits in subsequent joint multitasking category-component learning. An extensive evaluation of three popular benchmark data sets (ETH Food-101, Vireo Food-172, and ISIA Food-200) demonstrates the effectiveness of this technique. Another visualization of the component assignment map and spotlight map also shows the spread of our method.

2. Effectiveness of the Nutritional App “MyNutriCart” on Food Choices Related to Purchase and Dietary Behaviour: A Pilot Randomized Controlled Trial – [2018]

Authors: Cristina Palacios, Michelle Torres, Desiree López, Maria A. Trak-Fellermeier, Catherine Coccia and Cynthia M. Pérez.

We will verify the effects of the smartphone app "MyNutriCart" for creating a healthy shopping list on diet and weight. METHODS: A randomized pilot study was conducted to test the efficacy of using the MyNutriCart app and face-to-face counseling sessions (traditional group) in Hispanic overweight and obese adults. Home grocery shopping behavior, three of his 24-hour grocery recalls, Tucker's semiquantitative food frequency questionnaire (FFQ), and body weight was assessed at baseline and at his 8 weeks. Statistical analyses included t-tests, Poisson regression models, and analysis of covariance (ANCOVA) using STATA. RESULTS: His 24 participants in the conventional group and 27 participants in the app group completed the study. Most participants were female (>88%), had a mean age of 35.3 years, had a higher education degree (>80%), had a family size of 3 or more, and had a mean baseline body mass index (BMI) of 34. .5kg/m2. Home purchases of vegetables and whole grains, individual intake of refined grains, healthy proteins, whole dairy products, legumes, 100% fruit juices, and sweets and snacks improved significantly. Also, individual consumption frequencies of fruit and cold cut/cured products within the intervention group ($p < 0.05$). However, no significant difference was found between the groups. No weight change was observed. Using the “MyNutriCart” App there was a significant improvement in eating-related behaviors compared to baseline and no significant difference compared to the conventional group. Compared to face-to-face counseling, using an app can save costs and resources, making it a good option for interventionists.

3. Do Image-Assisted Mobile Applications Improve Dietary Habits, Knowledge, and Behaviours in Elite Athletes? A Pilot Study – [2017]

Authors: Anne Simpson, Luke Gemming, Dane Baker, and Andrea Braakhuis

To date, there is little research on the best ways to educate and encourage dietary changes in athletes. Basic. MealLogger® is a smartphone application that incorporates the use of image-based nutrition tracking and social media features to provide a platform for delivering personalized in-app feedback, peer support, and nutrition education materials to individuals or groups. This study measured the feasibility of MealLogger®. New Zealand elite men's field hockey players (n = 17) aged 18–20 years were included to improve athlete knowledge and nutritional behavior. During the 6-week intervention period, participants were instructed to record pictures of their meals three days a week and were given individualized dietary feedback on the recorded meals. Weekly nutrition education fact sheets and videos are now available through the app. Nutritional knowledge increased moderately from baseline (%Pre 54.7 ± 14.3; %Post 61.1 ± 11.45, $p = 0.01$). Participants reported having a very positive experience using the app (8/10), with 82.3% intending to make positive dietary changes based on in-app training. All participants preferred this method to traditional nutritional analysis methods. Image-based use Applications like MealLogger® are an effective approach to monitoring food intake and providing training to optimize nutritional behavior in elite athletes.

4. Online Behavioural Screener with Tailored Obesity Prevention Messages: Application to a Paediatric Clinical Setting – [2021]
Authors: Sarah Chau, Samantha Oldman, Sharon R. Smith, Carolyn A. Lin, Saba Ali, and Valerie B. Duffy.

Obesity prevention includes promoting healthy eating and physical activity in all children. Can this technology be used to study children's health behaviors and deliver theory-based, user-tailored messages to short clinical encounters? Acceptance of Paediatric-Tailored Online Surveys (PALS) We assessed the effectiveness and usefulness and tailored the messages among children who did not require urgent care in the pediatric emergency department (PED). 245 children (mean age = 10 years, racial/ethnic diversity, 34% overweight/obese by measurement index, 25% of families reporting food insecurity) and their parents/carers participated Did. Each reported on their child's activity and behavior using online PALS, sending 2-3 messages tailored to their responses to motivate improved behavior or reinforce healthy behavior. Received (for the purpose of elaboration and possibility of hyper theoretical models). Most children and parents (>90%) agreed that PALS was easy to complete and made them think about themselves and their child's behavior. Her PALS responses in children appeared reasonable (moderate to good intraclass parent-child correlations). Most children and parents (over 75%) reported that customized messages were helpful in improving or maintaining desired behaviors. Neither the type of message (motivation/reinforcement) nor the positive response varied significantly with the child's weight or family food safety status. In summary, children and parents found PALS to be acceptable and useful with customized messages. Message types and replies help focus on short clinical encounters.

5. A Scientific Overview of Smartphone Applications and Electronic Devices for Weight Management in Adults – [2019]
Authors: Sophie Laura Holzmann and Christina Holzapfel.

Overweight and obesity are rising worldwide. Therefore, we describe new digital tools for improving health-related behaviors. The use of smartphone applications (apps) and wearables (such as activity trackers) for self-monitoring diet and physical activity can affect weight. Scientific evaluation of weight management apps and wearables is currently limited. Several intervention studies have already investigated the effectiveness of the aforementioned digital weight management tools, but no clear recommendations for clinical and therapeutic use are available. In addition to the lack of long-term randomized controlled trials, there are also concerns about the scientific quality of apps and wearables (such as the lack of standards for development and evaluation). Therefore, the current work aims to (1) address the challenges and concerns associated with the current digital healthcare market and (2) select intervention studies using apps and activity trackers for weight-related outcomes. and for a good overview. Based on the cited literature, the effectiveness of apps and wearables for weight management is evaluated. Finally, we need to derive recommendations for practical action.

6. Feasibility of Reviewing Digital Food Images for Dietary Assessment among Nutrition Professionals – [2018]

Authors: Ayob Ainaa Fatehah, Bee Koon Poh, Safii Nik Shanita, and Jyh Eiin Wong.

The effectiveness of image-aided and image-based nutritional assessment methods depends on the accuracy of portion size estimation based on food images. However, little is known about the ability of nutritionists to assess food intake based on digital food images. This study aimed to examine the performance of nutritionists in reviewing food images for food identification and portion size estimation. Thirty-eight nutritionists, nutritionists, and nutritional researchers participated in this study. Through an online questionnaire, the accuracy of participants' food identification and portion size estimation was tested from two sets of digital food images presenting meals in plates (image PL) and bowls (image BW). Participants compared the food identification accuracy (75.3 ± 17.6 vs 68.9 ± 17.1%) and the percentage difference in portion size estimation (44.3 ± 16.6 vs 47.6 ± 21.2%). Raw vegetable weight was significantly underestimated (-45.1 ± 22.8% vs -21.2 ± 37.4%) and beverage weight was significantly overestimated (40.1 ± 45.8% vs -21.2 ± 37.4%). 26.1 ± 32.2) in both images. Fewer than one-third of her participants estimated portion sizes within 10% of their actual weight for Image PL (23.7%) and Image BW (32.3%). The accuracy of nutritionists when reviewing food images could be further improved by training them to better recognize portion sizes through images.

7. Use of mobile applications to improve nutrition behavior: A systematic review – [2020]

Authors: Rathi Paramastri, Satwika Arya Pratama, Dang Khanh Ngan Ho, Sintha Dewi Purnamasari, Afrah Zaki Mohammed, Cooper J Galvin, Yi-Hsin Elsa Hsu, Afifa Tanweer, Ayesha Humayun, Mowafa Househ, Usman Iqbal.

Mobile applications can be effectively used for food intake assessment, physical activity monitoring, behavior modification, and nutrition education. The purpose of this review is to determine the effectiveness of mobile applications in improving eating behavior through a systematic literature review. The validation protocol was registered with PROSPERO: registration number CRD42018118809 and followed PRISMA guidelines. This review included original articles involving mobile electronic devices for improving food intake, physical activity, and weight management in adults. We obtained data from January 2010 to December 2018 using PubMed, Web of Science, Excerpta Medica Database (Embase), and Cumulative Index to Nursing and Allied Health Literature (CINAHL) as data sources. Authors screened titles and abstracts separately and then full articles to obtain articles meeting the inclusion criteria. A database search yielded 2962 records. After removing duplicates and analyzing the full text of articles, a total of 8 original articles were displayed. Two articles showed clear bias and were not included in the findings or discussion. The remaining six articles with low to moderate risk of bias were included in this systematic review. The three included studies were randomized controlled trials (RCTs) and each included more than 180 participants. His other three studies were a nested study, a case-control study, and a pilot RCT with 36, 162, and 24 participants, respectively. All major RCTs and small case-control trials found significant improvements in some of the nutritional health outcomes measured. Two other studies found modest improvements in outcomes measured between groups.

This study highlights the potentially significant health benefits that can be achieved through nutritional interventions supported by mobile health applications. Some of these studies required vendors to spend significant money and time to use the applications. Further studies, possibly using multiple intervention arms, are needed to compare the components essential to health benefits observed across programs.