Annotated bibliography and explanatory statements

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Domain

With the continuous improvement of living standards, the aging of the population has become a trend. As the number of elderly people increase, so does the problem that they have to face. However, the general trend of modern technological innovation is concentrated on some high-tech products whose target costumers are not focus on the elderly. Therefore, we want to do something to raise more care for the elderly, and the domain we want to focus on is 'Smart home for the elderly people.

To explore this domain, there are some aspects we want to learn. First, what kinds of problem the elderly people have to face. Only after fully understanding their needs can we find out solutions to the specific problem. Second, the application of the smart home. We want to learn about the advanced technology applied in this field, taking the needs of the elderly people into consideration, and then inspire the new insights for our target users. Last, we will search for the existed smart product for the old people to learn from their metrics and concept. We wish through the research, we could get enough theoretical foundations to understand the target users physically and mentally, and the particular technology applied to this field.

1. Eating for health: Perspectives of older men who live alone

WHAM, C. A., & Bowden, J. A. (2011). Eating for health: Perspectives of older men who live alone. Nutrition & Dietetics, 68(3), 221–226. https://onlinelibrary-wiley-com.ezproxy.library.uq.edu.au/doi/full/10.1111/j.1747-0080.2011.01535.x

Abstract

Aim: To investigate the perspectives of older, single-living New Zealand men towards healthy eating.

Methods: Twelve semistructured interviews with men aged 75 to 89 years using mixed methods and a general inductive analysis approach. To enrich description, participants were assessed for nutrition risk using a validated questionnaire, Seniors in the Community: Risk Evaluation for Eating and Nutrition, and nutrition knowledge using the General Nutrition Knowledge Questionnaire.

Results: Six of the men were assessed to be at high nutrition risk. Eating alone was the most common nutrition risk factor. The mean score for the nutrition knowledge questionnaire was 58.3 ± 12.7 out of maximum score of 110. Three core themes related to healthy eating practices emerged from the analysis. Firstly, the men were influenced by their individual circumstances. Limited finances and a lack of personal transport were barriers to healthy eating and were partially ameliorated by reliable, support networks. Secondly, a lack of nutrition knowledge and cooking skills impinged on both healthy eating and meal enjoyment. Thirdly, food-related values held by the men impacted eating behaviours positively or negatively.

Conclusion: The present study provides an insight into the perspectives of older men towards their food-related activities. Past experiences shaped their approach towards healthy eating. Community programmes need to identify those at nutrition risk, provide those at need with knowledge and skills and promote meal sharing. Initiatives need to be cognisant of the food-related values, desire for time and effort efficiency and the explicit needs and wishes of older men

Critique

Based on the risk assessment of diet and nutrition of elderly people living alone in New Zealand, this study found that eating alone was the most common nutritional risk factor. After 12 semi-structured interviews and systematic analysis, the following three conclusions are summarized to show why single older men lack of nutrition: first, limited funds and lack of personal transportation are obstacles to the healthy diet, which is improved to some extent by reliable support network. Secondly, lack of nutrition knowledge and cooking skills. Third, men's food-related values have an impact on eating behavior.

This article is of great help to the field we are exploring. The conclusions of this paper provide reasonable support for the field we are exploring. We can learn the needs of elderly users based on the conclusions, so as to carry out the targeted design in the following steps. For example, the problem of transportation is a barrier to the diet of the elderly. We can propose the idea of home delivery and change this situation through the Internet or modern technology. And for the absence of nutritional knowledge, we could consider offering complete recipes or adding personalized features such as customized menus. And so on. This will greatly help us improve and enrich our program effectively.

2. **Poor nutritional status but not cognitive or functional impairment per se independently predict 1 year mortality in elderly patients with hip-fracture**

Zanetti, Gortan Cappellari, Ratti, Ceschia, Murena, De Colle, & Barazzoni. (2019). Poor nutritional status but not cognitive or functional impairment per se independently predict 1 year mortality in elderly patients with hip-fracture. Clinical Nutrition, 38(4), 1607–1612. https://doi.org/10.1016/j.clnu.2018.08.030

Abstract

Hip fractures are strongly associated with mortality in the elderly. Studies investigating pre-disposing factors have suggested a negative impact of poor nutritional, cognitive and functional status on patient survival, however their independent prognostic impact as well as their interactions remain undefined. This study aimed to determine whether poor nutritional status independently predicts 1 year post-fracture mortality after adjusting for cognitive and functional status and for other clinically relevant covariates.

Critique

With the development of society and the continuous advancement of science, people's life expectancy is getting longer and longer, and the aging trend of the world's population is becoming more and more obvious. How to strengthen the elderly health care, delay the aging process, prevent and cure all kinds of common diseases in the elderly, achieve the goal of health and longevity and improve the quality of life has become an important topic that the medical community is studying. Old-age nutrition is an extremely important part of it. Reasonable nutrition helps to delay aging, while malnutrition or over nutrition and disorder may accelerate the process of aging.

Though nutrition means a lot to the elderly, the lack of understanding of nutrition and their own body condition and the limited mobility make it hard to satisfy the needs of nutrition. From this, I want to design a smart kitchen for the elderly. First, it can monitor their physical condition and then show a list of recommended menu. Then it will prepare the food after the users order their dishes.

3. Artificial intelligence and modern home design

Song, J., & Li, Y. (2018). MATEC Web of Conferences, 227. https://doi.org/10.1051/matecconf/201822702004

Abstract

With the development of economy and technology and the continuous development of scientific and technological intelligence equipment, artificial intelligence has begun to enter modern home design. Artificial intelligence can greatly reduce the daily operating time and energy cost and promotes the optimization of life quality. If we say artificial intelligence's engagement in modern home design is an irreversible trend, and the living interest of people is changed gradually by machine, intelligence emotion replaces gradually, this is perhaps a double-edged sword. The purpose of this paper is to identify the advantages of artificial intelligence application in modern home design and reflect upon its disadvantages of artificial intelligence, and look out on the prospects of the future of artificial intelligence.

Critique

With the continuous development of artificial intelligence, AI has penetrated into every aspect of people's lives, thus we wondered whether AI could be helpful in the food lifestyle field we explored. This article explains this well and gives us a lot of inspirations. The paper mainly describes the innovations of artificial intelligence in the modern home field and compares the advantages and disadvantages of these designs. This article is a new direction for us-- to apply artificial intelligence to the furniture, such as the modern kitchen, so as to improve people's eating habits and could make our life better. There are some new ideas generated from this direction: The automatic kitchen ventilator which could display the specific recipe when people cooking; the intelligent refrigerator which can remind the users whether the food has expired; the cutting board that can accurately weigh the food and the voice control system to control the fire level that can be applied at any time especially when people cooking.

However, at the same time, the article mentioned the disadvantages that artificial intelligence appliances are facing currently: high cost, high technical requirements, lack of true feelings and weak pertinence in maintenance, strong independent

initiative, and other problems. Therefore, while coming up with novel ideas to provide convenient life for the public, we should think more about these problems and how to better solve or avoid these problems. For example, more from the perspective of customers, people-oriented or focus on developing and privacy issues. Only in this way can artificial intelligence get better development in the future market.

4. Pervasive intelligence system to enable safety and assistance in kitchen for home-alone elderly

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Wai, A. A. P. A., Biswas, J. K., Shanthini Devi, S., & Panda, S. K. (2011). Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) (Vol. 6719, pp. 276–280). https://doi.org/10.1007/978-3-642-21535-3_41

Abstract

With growing aging population, elderly with physical or cognitive impairments may end up staying alone at home. Kitchen is generally the most vulnerable place at home as mishandling of devices or improper kitchen activities could lead to hazardous and life threatening situations. In this paper, we have proposed pervasive intelligence system that augment existing kitchen environment with sensors, actuators and processing intelligence. We have first identified possible safety issues and, then deploy sensors to recognize what happened and actuators to control kitchen settings. We have developed 3-stage processing with hierarchical inference approach to determine abnormalities in the kitchen. According to the severity of abnormalities, the proper appliances control or reminder escalation to appropriate personal will be issued to alleviate or minimize the undesirable consequences.

Critique

Inspired by other articles, we began searching for articles related to the modern home. This article focuses on an intelligent kitchen designed for the elderly. With the development of science and technology, the aging population and the elderly living alone are becoming more and more serious, and the elderly have higher and higher requirements for safety and well-being. So it is necessary to consider the safety and health of the elderly at home alone in the kitchen.

The general design concept of the intelligent kitchen in this paper is based on the hierarchical reasoning method of the multimodal sensor, which can reliably reason the abnormal and dangerous conditions and environment of the elderly. I think this article is helpful for our preliminary investigation in two ways. First, in the initial design, we should identify specific target users. This article is designed for the elderly, and our project should also have its own target users, so as to be designed according

to some specific conditions. The range of research should not be too large, either conducive to the investigation, and can not guarantee the quality. Secondly, the rational use of sensors will achieve unexpected results. In this article, sensors are used to measure distance. However, both acoustic, photoelectric and thermal sensors can be reasonably used and converted, so we need to open our minds. For example, the visual chopping board is an idea I proposed before, it could use a gravity sensor to display the exact weight of the food being cut.

5. Intelligent Packaging for the Future Smart Kitchen

Yam, K. L. (2000). Intelligent packaging for the future smart kitchen. Packaging Technology and Science, 13(2), 83–85.
https://doi.org/10.1002/1099-1522(200003/04)13:23.0.CO;2-7

Abstract

This paper introduces the concepts of intelligent packaging and the future smart kitchen. A case study is presented to illustrate the important role of intelligent packaging in providing the consumer with higher food quality, better convenience and safety in cooking packaged foods using a microwave/convective oven.

Critique

In this information age, whenever smart homes and smart kitchens are mentioned, most people always think of remote control via the network. Thoughts are easily limited to automation. But this article gives us a new direction to make the kitchen smarter, through the QR code on the packaged food. When we use a microwave oven to heat packaged food, we can use the scanner on the microwave to scan the QR code on the food package to get information about the food, such as food production and transportation information, heating mode and time. In this way, the user not only can ensure the quality of the food but also does not have to worry about how to heat different food. This will also eliminate the trouble of reading food instructions for people with dyslexia or people of different languages.

The QR code, which can provide more information about the product, brings me a series of new insights to make the kitchen smarter. It can also alert the user of the allergens or taboo food. The machine in the kitchen can connect to your health condition and alert any dangerous food to you. From this, I want this machine to be a refrigerator because the food is stored there and can be easily monitored. Besides the function mentioned above, a common situation came to my mind that we always forget what we left in the refrigerator. In the corner, a piece of meat can be left there for months or even years; a juice or yogurt can easily expire the best-before date. Therefore, I want the refrigerator to show a list of the food contained on a screen, at the same time, it can remind us of the food close the best-before day.

6. Designing robots for the elderly: Appearance issue and beyond

Wu, Y.-H., Fassert, C., & Rigaud, A.-S. (2012). Designing robots for the elderly: Appearance issue and beyond. Archives Of Gerontology And Geriatrics, 54(1), 121–126. https://doi.org/10.1016/j.archger.2011.02.003

Abstract

This paper provides the results of three focus groups organized in the framework of the ROBADOM project, aiming at designing a service type assistive robot for the elderly with mild cognitive impairment living at home. The main objective of these focus groups was to give some recommendations to engineers in charge of the design of the robot's appearance. Results showed that although many humanoid robots were criticized by most participants, some small creative humanoid robots were appreciated. However, beyond the issue of the robot appearance, many ethical and social issues were raised. These focus groups offered an opportunity for participants to discuss the very idea of an assistive robot and to challenge some implicit preconceptions of the roboticists. Finally, we discuss how assistive robots could be designed considering the social context of the elderly and how to implicate the elderly as future end-users in the design process.

Critique

The aging population is an important issue that today's society has to face. Elderly are often accompanied by various diseases, inconvenient movements or audition problems, which makes them face inconveniences and difficulties in their lives. Plus the increasing complexity of modern technology products, this makes older people face greater challenges. However, technology is a double-edged sword. If we can design some products for the problems faced by the elderly, this will undoubtedly bring changes to the lives of the elderly and make their lives easier and healthier. This is the reason why I did this research.

This article confirms and complements my thoughts. Older people not only need physical assistance to help them live independently but also need spiritual companionship to meet their social needs. For the former, I can develop some simple and practical robots to help them complete some complicated or labor-intensive activities; I can also do some monitoring robots to monitor the household supplies or the health of the elderly, so as to ensure the supply of household necessities and timely help. For the latter, some rehabilitation robots and social robots can work. They are more like old people's pets or friends to accompany them and even can do psychological counseling. Not only that, but the elderly may also be able to contact their friends for some entertainment through robots. In addition, I learned that the elderly are not appreciated the human-like robots. On the contrary, some small and cute robots are very popular.

Overview statement

For our domain, we conducted a series of literature search and filtering. Finally, the above six articles were determined. Six works of literature are connected with the field we explore through three aspects respectively. The first and second articles explain why we need to explore this field, understand the real problems behind it, and the harm caused by nutritional problems of food lifestyle to the elderly living alone. The existing problems include population aging, healthy aging, social isolation, and food value. Once we identified the requirements, we started thinking about how to change this. Therefore, we turned our attention to the field of the smart home. The third article generally summarizes the innovative applications of smart home in recent years and the current situation, including its advantages, problems and challenges. The last three literatures link smart home with nutrition problems of the elderly and explain how smart home applications change the food lifestyle for the elderly at present. Two of them are about smart kitchens and one is about robots designed for older people.

After reviewing the literature, we found that smart kitchen is a good choice to solve the problem of food style for the elderly. There are many things that can be improved, and we are constantly coming up with new ideas during our research. For example, smart refrigerators can remind users whether food has expired and the correct way to keep it; the tracking system can display complete menus or customized recipes according to the user's personal situation; and the smart chopping board, which can display the weight of the food during cut so that users can follow the daily diet, and so on.

During our search, more than once, we strayed off the domain we choose. In the early stage, we chose a lot of literature on artificial intelligence but ignored the target users. After communication with the tutor, we found the problem and finally decided to support our project with the above six references. In the following investigation and exploration, we will continue to think about the related issues of food lifestyle of elderly people living alone, and persist to conduct research in terms of both breadth and depth, so as to lay a solid foundation for future projects.