

## Abstract

Currently, obesity is on the rise globally with predictions to continue rising until 2030. Adopting a healthy diet and increasing physical activity are key strategies to reduce the risk of obesity. However, there are significant challenges in adhering to a diet, including the monotony of food choices and difficulty in maintaining motivation. This research aims to develop a user-centered dietary recommendation system that addresses these challenges by introducing serendipity into the diet planning process. Serendipity in this context refers to generating unexpected yet relevant food recommendations, thereby enhancing user engagement and satisfaction. The system uses content-based recommendation techniques, including TF-IDF, Cosine Similarity, and K-Means clustering, to provide personalized dietary suggestions based on individual health profiles, calorie needs, and food preferences. The evaluation of the system involved user testing with 11 participants, where user satisfaction was measured using a Likert scale. Most users (mode of 5 out of 5) expressed strong satisfaction with the recommender system. Additionally, A/B testing demonstrated an improvement in user engagement and dietary adherence, with more mode values of 5 in the evaluation of the second version of the web where users could adjust the similarity values. The evaluation of the system demonstrated that incorporating serendipity into recommendations significantly improves user experience and adherence to dietary plans. The findings highlight the potential of serendipity to transform dietary adherence, making the dieting process more enjoyable and sustainable.

Keywords: Content-Based Recommendation System; Serendipity; TF-IDF; Cosine Similarity; K-Means