UDK 659.1:004.41

DEVELOPMENT OF A MOBILE APPLICATION FOR PERSONALIZED MONITORING AND CORRECTION OF VITAMIN LEVELS IN THE HUMAN BODY

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Abstract: This study presents the development of a mobile application designed to provide personalized monitoring and correction of vitamin levels in the human body. Inadequate vitamin intake can lead to various health issues, and there is a growing need for tools that enable individuals to track and optimize their nutritional intake. The application utilizes data input by the user, including dietary habits, health indicators, and lifestyle, combined with an integration of wearable devices to monitor vital signs. Machine learning algorithms are applied to predict potential vitamin deficiencies and recommend individualized corrective actions, such as dietary changes or supplements. The system includes a feedback loop where users input post-correction data, allowing the application to refine its recommendations over time. Preliminary testing with a focus group of users demonstrated the app's potential to predict deficiencies and improve vitamin balance through personalized recommendations accurately. The system offers a scalable solution for individuals seeking optimal health through customized nutritional monitoring.

The modern lifestyle often leads to nutritional deficiencies, particularly vitamins, which are crucial for maintaining health and preventing diseases. Despite the widespread availability of supplements and fortified foods, many individuals still need essential vitamins. This issue is exacerbated by the need for personalized guidance on vitamin intake, resulting in overuse, underuse, or misdirected supplementation. Existing methods for monitoring vitamin levels are typically manual or require laboratory tests, which could be more practical for daily tracking. To address this gap, we propose developing a mobile application capable of continuous and personalized monitoring of vitamin levels using user data and wearable technology inputs.

This study focuses on designing an intelligent system that helps users maintain optimal vitamin levels through real-time monitoring and tailored recommendations. Our primary goals include developing a user-friendly interface, integrating data from various sources, and creating algorithms for processing and providing actionable feedback to users. For this, the mobile application development followed a multi-step process, including user requirements analysis, system design, implementation, and testing.

The application integrates several core components: a dietary tracking system where users input their daily food intake; wearable device integration to collect heart rate, physical activity, and sleep patterns; and a machine learning-based recommendation engine that analyzes user data to predict potential vitamin deficiencies. The application was built on a cross-platform development framework to ensure accessibility on both Android and iOS devices.

The machine learning algorithms were trained on a dataset of dietary records and known deficiency patterns, allowing the system to provide tailored recommendations. A focus group of 50 participants was recruited for testing, where users tracked their diet and health metrics for six weeks. The system's predictions were compared to blood tests measuring vitamin levels to assess accuracy.

This research advances the field of personalized healthcare by combining nutritional science with wearable technology and machine learning to deliver a solution that monitors and adjusts an individual's vitamin levels in real-time. While existing health applications often focus on general fitness or calorie tracking, this application explicitly targets the optimization of vitamin intake, providing a more specialized service. The system's novelty lies in its ability to dynamically adjust recommendations based on ongoing user feedback, allowing for continuous improvement in accuracy and effectiveness. Additionally, integrating dietary data and physiological metrics from wearable devices provides a comprehensive view of an individual's health, ensuring that recommendations are based on various health indicators.

The scientific novelty of this research lies in integrating real-time data analytics with personalized health recommendations through a mobile platform. While many existing health apps focus on general wellness, this application explicitly addresses the gap in personalized vitamin tracking, providing users with accurate, tailored advice. The system’s ability to dynamically adjust recommendations based on continuous input from wearable devices and other health metrics represents a significant advancement in personalized health monitoring. The modular architecture of the application also facilitates future enhancements, such as including additional biomarkers for a more comprehensive health analysis.

Thus, the developed mobile application demonstrates the potential to significantly improve the management of individual vitamin levels through personalized monitoring and recommendations. Initial testing shows that users are more informed about their nutritional status and can proactively adjust to prevent deficiencies. Further research will focus on expanding the application's functionality to incorporate additional health metrics and improve the accuracy of its predictive algorithms. The system provides a practical solution for improving public health outcomes by offering a personalized, user-friendly tool for maintaining optimal vitamin levels.

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