AQUASCAN MOBILE APP CAPABILITIES FOR WATER QUALITY MONITORING AND FILTER RECOMMENDATION

Kamolova Moxiniso Farmon kizi
Student at Navoi State University
moxinisokamolova2007@gmail.com
https://orcid.org/0009-0005-4052-4911

Annotation. *This thesis considers the concept of a mobile application called* ***AquaScan*** *designed for water quality monitoring and filter recommendation. The study analyzes the possibilities of using mobile technologies, sensor devices, and modern programming tools to determine the main physicochemical parameters of water. The application allows users to monitor indicators such as pH level, total dissolved solids (TDS), and other water quality parameters. Based on the analysis results, the system provides recommendations on the most suitable water filtration methods. The proposed solution simplifies water quality monitoring, provides users with real-time information, and contributes to the efficient use of water resources.*

Keywords: *water quality, mobile application, environmental monitoring, AquaScan, water filtration, sensor technologies.*

Annotatsiya. *Ushbu tadqiqotda suv sifati monitoringini amalga oshirish hamda foydalanuvchilarga mos filtr tavsiyalarini berishga mo‘ljallangan AquaScan mobil ilovasi konsepsiyasi ko‘rib chiqilgan. Tadqiqotda mobil texnologiyalar, sensor qurilmalar va zamonaviy dasturlash vositalari yordamida suvning asosiy fizik-kimyoviy ko‘rsatkichlarini aniqlash imkoniyatlari tahlil qilingan. Ilova suv tarkibidagi pH darajasi, TDS ko‘rsatkichi va boshqa parametrlarni monitoring qilish hamda olingan natijalar asosida mos filtr turini tavsiya etish imkonini beradi. Taklif etilayotgan tizim suv sifati monitoringini soddalashtirish, foydalanuvchilarga*

tezkor ma'lumot taqdim etish va suv resurslaridan samarali foydalanishga xizmat qiladi.

Kalit so'zlar: *suv sifati, mobil ilova, ekologik monitoring, AquaScan, filtr tavsiyasi, sensor texnologiyalari.*

В данной работе рассматривается концепция мобильного приложения **AquaScan**, предназначенного для мониторинга качества воды и предоставления рекомендаций по выбору фильтров. В исследовании анализируются возможности использования мобильных технологий, сенсорных устройств и современных средств программирования для определения основных физико-химических показателей воды. Приложение позволяет контролировать такие параметры, как уровень pH, показатель TDS и другие характеристики воды, а также формировать рекомендации по выбору подходящих систем фильтрации. Предлагаемая система способствует упрощению мониторинга качества воды, оперативному получению информации пользователями и более эффективному использованию водных ресурсов.

Ключевые слова: качество воды, мобильное приложение, экологический мониторинг, AquaScan, фильтрация воды, сенсорные технологии.

Introduction. Nowadays, problems related to drinking water quality are among the global environmental and social problems. Water is one of the most important natural resources necessary for human life. However, as a result of industrial development, urbanization processes, and improper use of natural resources, water sources are being polluted in many regions. The presence of harmful chemicals, heavy metals, and microorganisms in drinking water can have a negative impact on human health. Therefore, water quality monitoring and effective management of water resources are one of the important areas of modern scientific research [1–3].

In recent years, modern information technologies have been widely used in the creation of environmental monitoring systems. In particular, mobile devices, sensor technologies, and cloud computing systems have made it possible to quickly determine and analyze various environmental indicators. Mobile applications allow users to obtain information in real time, store and analyze monitoring results. Therefore, information systems created on the basis of mobile technologies are considered one of the effective tools for solving environmental problems [1–6].

The use of modern programming technologies is important in the process of creating mobile applications. The Kotlin programming language and other modern platforms are widely used in the development of mobile applications for the Android platform. With the help of these technologies, mobile applications can be ensured to operate stably, quickly, and have a convenient user interface. Also, the modular architecture of mobile applications creates the opportunity to develop software in the future and enrich it with new functions.

Research methodology. Smart technologies and digital monitoring systems are used as an important tool in solving environmental problems. In particular, the integration of digital platforms, sensor devices, and mobile applications in the process of monitoring water resources is yielding effective results. Such systems allow for rapid determination of physicochemical parameters of water, their storage and analysis in a database. Digital monitoring systems play an important role in the rational use of water resources, timely identification of water quality problems, and ensuring environmental safety. Therefore, automation of water quality monitoring and integration with mobile technologies are one of the promising areas of modern scientific research.

This research work proposes the concept of a mobile application called AquaScan, which is designed to monitor water quality and provide users with appropriate filter recommendations (Figure 1). This system provides rapid

information on water quality using mobile technologies, sensor devices, and modern programming tools. The system allows users to determine the main physicochemical parameters of water and draw conclusions about water quality based on them (Figure 2).





Figure 1. Main window of the mobile application. Figure 2. Water analysis section.

Results. One of the main functions of the AquaScan mobile application is to determine important parameters in the water composition. In particular, the pH level, TDS indicator, temperature and other physicochemical indicators of water are analyzed. These indicators are important in assessing the suitability of water for drinking. The analysis results are presented in a graphical and statistical form in the mobile application interface, which allows users to easily understand information about water quality. One of the important aspects of the proposed system is the ability to form a filter recommendation based on the analysis of water composition. Special algorithms analyze data on water composition and recommend the most suitable type of filter to the user. For example, if the water contains excess minerals, a reverse osmosis filter may be recommended. If there is a possibility of microbiological contamination in the water, it is recommended to use ultraviolet sterilization technology. This will effectively purify water and provide users with the opportunity to use high-

quality drinking water. The AquaScan application consists of several main modules. The first module performs water analysis, the second module generates filter recommendations, and the third module stores and analyzes water quality data through the monitoring system. In addition, the system provides users with information about nearby clean water sources and places where filter equipment is sold through the map function. These capabilities allow users to obtain more extensive information about water resources. The proposed AquaScan program is also of great social and ecological importance. With the help of this system, the process of water quality monitoring is simplified, users gain accurate information about water resources, and the ability to prevent water-related diseases increases. In addition, it is possible to contribute to reducing environmental problems through the effective use of water treatment technologies.

Conclusions and recommendations. The AquaScan mobile application is an innovative solution aimed at monitoring water quality and providing users with appropriate filter recommendations. By combining mobile technologies, modern programming tools, and environmental monitoring methods, this system can serve to effectively manage water resources and protect human health.

REFERENCES

1. Senko E.V. Application programming for mobile devices under Android. Moscow, 2017.

2. Adelekan I. Kotlin: Programming na primerax. Saint Petersburg: BXV-Peterburg, 2020.

3. Khalilov Sh. Basics of creating mobile applications. Tashkent: Publishing House of the National University of Uzbekistan, 2021.

4. World Health Organization. Guidelines for Drinking-Water Quality. Geneva: WHO Press, 2022.

5. United Nations. The United Nations World Water Development Report 2023: Partnerships and Cooperation for Water. UNESCO Publishing, Paris, 2023.

6. Abdullayev R., Karimov B. Ecology and water resources management. Tashkent: Science and Technology, 2019.