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ADVANTAGES AND DISADVANTAGES OF IOS 26

Abstract. The purpose of the work is to analyze, evaluate, and identify the advantages and disadvantages of mobile operating systems.

The methodology used in the work, consists in determining the requirements for modern technologies for using mobile operating systems, which includes studying their advantages and disadvantages, investigated through the prism of updated technical and technological requirements for highly effective innovative information technologies, mediated by the development and improvement of technical means of functioning in the most used industries.

The scientific novelty of the work lies in the study, analysis, comparison and identification of positive and negative criteria for the design, development and implementation of mobile operating systems as significant levers for ensuring efficiency and optimizing functioning in all industries that require mobility of decision-making in modern conditions.

Conclusions. The factors influencing the development trends of mobile operating systems are identified, using the example of the introduction and implementation of iOS 26. The criteria are analyzed and the methods of updating the system in recent years are characterized. The main features of iOS 26 are studied: design, security, and the Apple ecosystem. The features of the updated design were tested and the main characteristics of the updated design were studied, and the quality of the implemented built-in artificial intelligence in the presented updated version was analyzed and assessed. The indisputability of the proposed updated flexible personalization and other elements that deserve analysis are established, and aspects that require further study, expansion, and improvement are identified. Research was conducted on the revolutionary design change of Liquid Glass and the updated operating system version numbering system was studied, and modern accessory security policies were evaluated, namely the control of connected devices in a locked state. Platform unification is being developed: synchronization of the design system between all Apple devices. Based on the criteria-based and phased analysis of the features of iOS 26, Based on key security, design, and ecosystem characteristics, key factors have been updated to ensure the development of a methodology for further improving such mobile operating systems. Considered revolutionary design changes: Liquid Glass as the next stage of interface evolution, where it is determined that iOS 26 represents the first radical redesign of the system since iOS 7, based on a single design language of Liquid Glass. The proposed concept fundamentally changes Apple's approach to visual design, combining elements of glass morphism with dynamic effects. It has been found that unifying visual elements across all applications and system components creates a seamless experience across the entire Apple ecosystem, given the fact that the system also automatically adapts the intensity of effects depending on device performance and accessibility settings. The new operating system version numbering system was investigated and fundamental changes in the operating system branding strategy were identified, reflecting a long-term planning strategy for improving the mobile operating system and a focus on the future.

Key words: system software, artificial intelligence, operating systems, AI functions.

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Алла КАПІТОН, Тамара ФРАНЧУК, Дмитро ТИЩЕНКО, Альона ДЕСЯТКО, Максим СВИСТУН. ПЕРЕВАГИ ТА НЕДОЛІКИ IOS 26

Анотація. Метою роботи є аналіз, оцінка та виявлення переваг та недоліків мобільних операційних систем.

Методологія, використана в роботі, полягає у визначенні вимог до сучасних технологій використання мобільних операційних систем, що включає вивчення їх переваг та недоліків, досліджених через призму оновлених технічних та технологічних вимог до високоефективних інноваційних інформаційних технологій, опосередкованих розвитком та вдосконаленням технічних засобів функціонування у найбільш використаних галузях.

Наукова новизна роботи полягає у дослідженні, аналізі, порівнянні та виявленні позитивних та негативних критеріїв проектування, розробки та впровадження мобільних операційних систем як визначних важелів забезпечення ефективності і оптимізації функціонування в усіх галузях, що потребують мобільності прийняття рішень в сучасних умовах.

Висновки. Визначено фактори впливу на тенденції розвитку мобільних операційних систем, на прикладі представлення та впровадження iOS 26. Проаналізовано критерії та охарактеризовано методи оновлення системи за останні роки. Досліджено основні особливості IOS 26: дизайн, безпека та екосистема Apple. Протестовано особливості та вивчено основні характеристики оновленого дизайну, проведено аналіз та оцінено якість впровадженого вбудованого штучного інтелекту в представленій оновленій версії. Встановлена безперечність запропонованої оновленої гнучкої персоналізації, та інші елементи, що заслуговують аналізу та визначено аспекти, що потребують подальшого вивчення, розширення та вдосконалення. Проведено дослідження щодо революційної зміни дизайну Liquid Glass та вивчена оновлена нумерація версій операційної системи, оцінена сучасна політика безпеки аксесуарів, а саме контроль підключених пристроїв у заблокованому стані. Проналазована уніфікація платформ: синхронізація дизайн-системи між усіма пристроями Apple. На основі проведеного критеріального та поетапного аналізу особливостей IOS26, спираючись на ключові характеристики безпеки, дизайну та екосистеми оновлено ключові фактори, що повинні забезпечувати розробку методик подальшого вдосконалення подібних мобільних операційних систем. Розглянуто революційні зміни дизайну: Liquid Glass як наступного етапу еволюції інтерфейсу, де визначено що iOS 26 представляє перший кардинальний редизайн системи з часів iOS 7, заснований на єдиній мові дизайну Liquid Glass. Запропонована концепція принципово змінює підхід Apple до візуального дизайну, поєднуючи елементи скломорфізму з динамічними ефектами. Встановлено, що уніфікація візуальних елементів між усіма додатками та системними компонентами створює безшовний досвід використання всієї екосистеми Apple, з урахуванням того факту, що система також автоматично адаптує інтенсивність ефектів залежно від продуктивності пристрою та налаштувань доступності. Досліджено нову систему нумерації версій операційної системи та визначено фундаментальні зміни в стратегії брендингу операційної системи, що відображає стратегію довготермінового планування вдосконалення мобільної операційної системи та орієнтацію на майбутнє. Проаналізовано шляхи синхронізації з іншими продуктами компаній-розробників, що є логічною для користувачів і розробників, що спрощує планування сумісності та розробку кросплатформних додатків у майбутньому.

Ключові слова: системне програмне забезпечення, штучний інтелект, операційні системи, AI функції.

Introduction. Apple recently officially released iOS 26, which has drawn the attention of the IT community, as it is undoubtedly the most notable system update in recent years. The main features of iOS 26: design, security, and Apple's ecosystem are the focus of our research. It is the updated design, built-in artificial intelligence, flexible personalization, and other elements that deserve analysis. The objective of this work is to obtain a complete analysis of the features of IOS26, based on key security, design, and ecosystem characteristics.

Analysis of recent research and publications. The indisputability of constant updating and modernization of modern mobile devices in accordance with the requirements of the time does not require proof. A number of scientists, including Franchuk T., Tyshchenko D., Desiatko A., Karpunin I., Sas N., Stepashkina K., Karpunin I., Zakharov R., Moskalenko V. analyze problems and solve issues of designing mobile operating systems [3, 7, 10, 11]. Other researchers study the issues of mobile operating systems from the perspective of reviewing the latest versions and justifying the timeliness of their implementation and further development. We also examined the revolutionary change in the design of the liquid crystal display, and the updated version numbering system of the operating system. We analyzed a new additional security policy, namely the management of connected devices in a locked state [1, 2, 4–6, 8, 9]. Also analyzed platform unification: design synchronization of the design system between all Apple devices. Research on the analysis, design, and development of mobile operating systems, potential problems with mobile platforms, is in demand and periodically becomes the focus of theoretical and practical research by IT researchers [9].

Main part. First, let's look at the revolutionary design changes: Liquid Glass as a new stage in the evolution of the interface. iOS 26 represents the first radical redesign of the system since iOS 7 (2013), based on a single design language of Liquid Glass. This concept fundamentally changes Apple's approach to visual design, combining elements of glass morphing with dynamic effects that create a "living" interface. The new design is characterized by the use of translucent elements with blurring effects that resemble the behavior of liquid glass. By unifying visual elements across all apps and system components, Apple creates a seamless experience across the entire ecosystem, and the system automatically adapts the intensity of effects based on device performance and accessibility settings. The updated liquid glass icons now feature a multi-layered structure

with dynamic lighting that changes depending on the angle of the device. Each icon is more voluminous and interactive, responding to long-press with expanded context menus with smooth animations. The system automatically generates appropriate effects for third-party applications, ensuring visual consistency. New screen transition animations are based on the physical principles of fluid motion, creating natural and intuitive interactions. The Control Center and Notification Center now have a modular structure with individual “glass” panels that can be moved and resized. Dynamic lighting of the interface automatically adjusts to the time of day and lighting conditions, using data from the ambient light sensor and TrueDepth camera [1, 2, 4–6, 8, 9].

Second, let's examine the new operating system version numbering system. Apple is abandoning sequential numbering (iOS 18, 19, 20) in favor of a system based on the year of release, which marks a fundamental change in the operating system's branding strategy. iOS 26 actually means the 2026 version, even though it was released in 2025, reflecting Apple's long-term planning and focus on the future. Synchronization with other Apple products (macOS, watchOS, tvOS) now becomes completely logical and understandable for users and developers. All operating systems receive the same numerical year designation, which simplifies compatibility planning and cross-platform application development [1, 2, 4–6, 8, 9].

Third, let's define the indisputability of enhanced protection against tracking: an expanded system for counteracting fingerprinting. Improved protection against tracking links and blocking access to identifying information of the device represents a comprehensive system of protection against modern methods of digital surveillance. The system automatically recognizes and removes tracking parameters from URLs, blocks access to unique device identifiers, and masks browser-specific features. Special attention is paid to protection against cross-site tracking and fingerprinting through Canvas API, WebGL, and other web technologies. Randomization of User-Agent strings and system parameters is done dynamically for each web session, making it impossible to create a stable digital fingerprint of a device. The system generates plausible but different combinations of browser, operating system, and hardware characteristics for each site visit. This includes masking information about the screen, time zone, system language, and installed fonts. Dynamically changing browser fingerprints on each request uses advanced machine learning algorithms to generate realistic yet unique profiles. The system takes into account real-world device statistics to create plausible combinations of characteristics that do not arouse suspicion in tracking systems. In addition, protection against timing attacks and JavaScript performance analysis for hardware identification are implemented.

Apple's use of proxy servers to mask IP addresses has been expanded and optimized to provide the fastest and most reliable connection. The new Private Relay architecture uses distributed servers in different geographical locations to ensure optimal traffic routing. The system also includes protection against DNS tracking through the use of encrypted DNS requests and DNS server rotation [1, 2, 4–6, 8, 9].

Fourth, a new accessory security policy deserves analysis: monitoring connected devices in a locked state. Additional permissions for using accessories connected via cable while the phone is locked represent a new paradigm for protecting against physical access to the device. The system now requires explicit user confirmation to activate any new USB accessories connected to a locked iPhone. Of particular importance are restrictions on devices that can initiate data transfers or establish network connections, including charging stations with additional functionality. Time limits for unknown connections automatically disable suspicious accessories after a certain period of inactivity or when there is no user interaction. The system keeps a detailed log of all connections with timestamps, device type, and interaction pattern for further security analysis. Users receive notifications about all attempts to connect unknown devices, with the ability to permanently block specific types of accessories. Protection against forensic tools from law enforcement and private companies becomes more effective thanks to a new system for identifying suspicious equipment. iOS 26 can recognize characteristic signatures of known hacking tools and automatically block their access to the system. The system also introduces additional delays and checks for any attempts to access the file system via the USB interface [1, 2, 4–6, 8, 9].

Fifth, the analysis requires unification of platforms: synchronization of the design system between all Apple devices. The single Liquid Glass design language is applied across all Apple platforms, creating an unprecedented level of consistency in the user experience across devices in the ecosystem. Developers can now use identical interface components on iPhone, iPad, Mac, Apple Watch and Apple TV, greatly simplifying the process of creating cross-platform applications. The system automatically adapts the dimensions, proportions, and behavior of elements to the specifics of each device, while maintaining visual and functional identity. Common interface components across all apps include unified buttons, menus, input forms, modals, and navigation elements with identical animations and behaviors. This means that skills learned using one app automatically transfer to all other apps in the Apple ecosystem. Reducing the adaptation time when switching between devices is achieved by having identical interaction logic and visual cues across all platforms. A user who has learned to work with new features on an iPhone can instantly apply that knowledge to an iPad or

Mac without additional training. Simplified training and support are made possible by a single help and documentation system across the Apple ecosystem. Users can use a single set of training materials across all devices, and support can provide universal solutions to problems.

Conclusions. Today, it is undeniable that, based on theoretical and practical research, iOS 26 can be considered not only as a new, modernized version of the mobile operating system, but also as the next, unlike any other, step in the development of modern mobile devices. Liquid Glass interface, built-in Apple Intelligence, smart tools for communication, photos, calls and even games make the system noticeably more modern. Analyzed ways to synchronize with other products from development companies, which is logical for users and developers, which simplifies compatibility planning and cross-platform application development in the future. The indisputability of enhanced protection against tracking is substantiated: an expanded anti-fingerprinting system. A new additional security policy proposed by developers: monitoring connected devices in a locked state, was investigated and its main potential problems were identified. Promising directions of the analysis environment and further study of the issues of platform unification are established: synchronization of the design system between all devices.

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