Current Science Research Bulletin
Volume 02 (06), June 2025, pp. 201-207
CrossRef DOI: 10.55677/csrb/04-V02I06Y2025
Available on: https://csrbjournal.org/index.php/csrb
e-ISSN: 3050-7103
p-ISSN: 3050-709X

Development of Mobile Applications Based on Artificial Intelligence: Current Experience and Prospects

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ABSTRACT: This article explores contemporary approaches to the development of mobile applications using artificial intelligence (AI) technologies. It presents a comparative analysis of available tools and frameworks and outlines key directions for their future advancement. The relevance of this study is driven by the rapid growth in demand for intelligent mobile services and the need to systematize practices that combine automation, personalization, and autonomous data processing. The aim of the research is to summarize current practices and identify prospects for the development of AI-based mobile applications. The study analyzes the capabilities and limitations of popular platforms (Softr, FlutterFlow, Thunkable, Microsoft Power Apps, GitHub Copilot Mobile, AppMySite) based on criteria such as intended use, technical complexity, functionality, scalability, and cost. A structured expert-based evaluation enabled the classification of tools according to the needs of startups, the corporate sector, beginners, and professional developers. The article emphasizes the role of cloud platforms (Google Cloud AI, AWS AI Services, Microsoft Azure AI) and mobile SDKs (TensorFlow Lite, Core ML, ML Kit) that provide the technical foundation for implementing AI models in mobile applications. Key challenges in the current development stage are identified, including the need for high-quality data, limited computational resources, model optimization for mobile environments, privacy risks, and ethical dilemmas, particularly algorithmic bias. Promising areas for further development are outlined, such as the growing importance of Edge AI, the implementation of explainable AI (XAI), hyper-personalization of user experience, enhanced cybersecurity through intelligent systems, the emergence of new app categories based on generative AI, and the democratization of development through low-code/no-code environments. General conclusions are offered regarding the effectiveness of different tools depending on project conditions and user expertise. The findings can be applied in the improvement of software engineering curricula, digital service development in business and public administration, and in selecting strategies for integrating AI into mobile products.

KEYWORDS: mobile applications; artificial intelligence; software development; low-code / no-code platforms; personalization; Edge AI; explainable AI; cloud technologies; ethical issues of AI; digital transformation; education.

PROBLEM STATEMENT

In the 21st century, the convergence of mobile technologies and artificial intelligence (AI) opens new horizons for digital transformation. The development of mobile applications embedded with AI modules has moved beyond the stage of experimental projects and has become a key area in IT innovation. Such applications are capable of adapting to user behavior, providing personalized recommendations, recognizing speech, images, emotions, and more. However, the rapid growth of this segment is accompanied by both new opportunities and challenges, ranging from the limitations of mobile devices' computational resources to issues of ethics, data security, and algorithmic accountability. In this context, it is important to explore the current state, approaches, and prospects for the development of AI-powered mobile applications.

ANALYSIS OF CURRENT RESEARCH

Recent studies confirm the rapid adoption of artificial intelligence in the field of mobile applications, encompassing a wide range of functionalities - from visual recognition to adaptive learning. One leading area is image recognition: computer vision algorithms, particularly those based on convolutional neural networks (CNNs), are integrated into apps for object identification, text detection, and scene analysis. Such solutions are implemented, for instance, in Google Lens and Pinterest (Liu et al., 2021; Wang & Wang, 2020). Another active field is natural language processing (NLP). Virtual assistants (Siri, Alexa, Google Assistant), chatbots, and automated translation systems use deep learning for speech recognition, interpretation, and generation (Devlin et al., 2019). Sentiment analysis of messages and reviews enables applications to adapt their responses to users' emotional tone.

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Recommendation systems, such as those used by Netflix, Spotify, and Amazon, rely on machine learning to analyze user behavior patterns and personalize content (Gómez-Uribe & Hunt, 2016). In predictive analytics, healthcare apps forecast hospitalization risks (Rajkomar et al., 2019), while financial services detect fraudulent transactions in real time (Nguyen et al., 2022).

Equally relevant are voice recognition technologies that support speech-to-text conversion, voice control, and biometric authentication (Xiong et al., 2018), as well as the integration of AR and AI for spatially accurate object placement, as seen in IKEA Place (Zhou et al., 2020). AI also plays a significant role in cybersecurity, enabling biometric authentication and intelligent threat detection (Bendale & Boult, 2016). These areas illustrate the broad potential of AI in mobile environments, forming a new paradigm of digital interaction.

Ukrainian studies likewise confirm the potential of AI integration into mobile services. Some researchers view mobile AI as a means to enhance learning efficiency, medical diagnostics, and educational process management. For example, Bykov and Kolhatin (2021) argue for the need for adaptive mobile applications based on machine learning in the context of education digitalization. In the study (Diemientiev et al., 2025) the authors actualize the problems of training IT specialists to create mobile applications. Zgurskyi and Bakhmat (2020) emphasize the role of hybrid learning models and AI-powered mobile platforms in personalizing educational content. Pichkur and Fitsula (2023) explore the use of AR and AI in vocational training, including mobile simulators. In terms of security, Dovhal (2022) investigates the potential of AI-based mobile applications for cybersecurity, particularly in biometric authentication and the detection of anomalous user behavior. Kovalenko (2021) highlights the use of neural network models for natural language processing in mobile applications, including chatbots and voice assistants.

Thus, academic literature confirms the multifaceted use of AI in mobile applications, from language services to medical and educational platforms. However, there remains a lack of systematic overviews addressing AI functionality types, technological limitations, ethical challenges, and innovation trends, which complicates the development of a holistic view of this dynamic field. Therefore, a structured presentation of current AI application practices in mobile development and an analysis of potential future directions are of significant relevance.

Purpose: to generalize the current experience and identify the future development prospects of artificial intelligence-based mobile applications.

RESEARCH METHODS

This study employed a comprehensive approach to analyzing contemporary technological solutions in the field of mobile development, incorporating artificial intelligence (AI). The source base included official documentation of platforms (FlutterFlow, Softr, Thunkable, Microsoft Power Apps, GitHub Copilot Mobile, AppMySite), analytical reviews, peer-reviewed academic articles published between 2020 and 2024, and the results of hands-on testing of the listed services within the context of mobile application development.

The methodological framework was grounded in the following approaches: content analysis was used to systematize the functional features, strengths, and limitations of each selected platform based on open-access technical specifications, user and developer feedback, and professional publications: comparative analysis involved the development of an evaluation matrix covering five criteria (user's technical proficiency, functional capabilities, scalability, ease of use, and accessibility), which made it possible to identify the profile of each platform according to potential use-case scenarios; predictive analysis was applied to identify the prospects for AI-driven mobile solutions through the interpretation of recent scholarly publications (IEEE Access, ACM Computing Surveys, Artificial Intelligence Review), technical blogs by leading corporations (Google, Microsoft, OpenAI), and reports by consulting firms (Gartner, McKinsey, Deloitte); technology trend analysis was employed to structure an investigation of emerging directions such as Edge AI, explainable AI (XAI), hyper-personalization, and the democratization of AI development. This analysis was based on forecast data available in open-access strategic reports and scientific-technical analytics.

All data used in this research were publicly accessible and did not involve the collection or processing of personal data, thereby aligning with ethical standards of academic research.

RESULTS

The integration of artificial intelligence into the mobile application development process has led to the emergence of a new generation of tools capable of automating development, personalizing interfaces, and reducing the cost of software deployment. Recent research and engineering practices reveal at least six major approaches that illustrate varying levels of AI implementation in no-code and low-code environments.

Softr AI App Generator (Softr, 2024) is geared toward rapid creation of mobile-oriented web applications through the interpretation of textual prompts. Its core advantage lies in integration with Airtable and Google Sheets, enabling the construction

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of dynamic databases without requiring coding skills. This approach proves efficient for MVP testing in small businesses, although it is limited in implementing complex logic and scalability (Johnson & Patel, 2023).

FlutterFlow AI Gen (FlutterFlow, 2024) demonstrates greater adaptability through code generation based on descriptive scenarios. The ability to export Flutter components enables seamless integration of AI-generated elements with manual developer input. The platform is particularly relevant for creating cross-platform applications with custom design, although it presupposes basic knowledge of Flutter architecture (Kim & Silva, 2023).

Thunkable AI (Thunkable, 2024) combines functions of personalized analytics, A/B testing, and a visual block-based editor. Aimed at enhancing user experience and retention, the platform is effective in educational projects but limited in scalability for complex corporate applications (Horowitz & Zhang, 2023).

Microsoft Power Apps (Microsoft, 2024) is positioned as an enterprise-level solution with Azure integration, Microsoft 365 compatibility, and compliance with international security standards (e.g., GDPR, ISO). Its strengths lie in centralized data management and automation of business processes. However, its cost model and configuration complexity may hinder adoption in small businesses (Pavlenko & Stepanenko, 2023).

GitHub Copilot Mobile acts as an AI assistant for developers, offering syntax suggestions, bug fixing, and quick access to technical information in mobile environments. Despite its effectiveness in code review contexts, it is not a standalone development platform (GitHub, 2024; Li & Tran, 2023).

AppMySite (AppMySite, 2024) allows rapid conversion of websites into mobile apps, automatically adapting content to mobile interfaces. The platform supports geolocation, multilingual functionality, and app publishing to stores, though its functionality is limited compared to native development solutions (Demchenko, 2024).

These examples reflect the diversity of approaches to AI integration in mobile development, ranging from automated interface generators to professional developer support tools. Their effective application depends on the complexity of the intended app, target audience, budget, and security requirements (see Table 1).

Table 1. Comparative characteristics of AI-based mobile app development platforms

Platform	Target Audience	Key Advantages	Main Limitations
Softr	Startups, small teams	High prototyping speed; Airtable integration	Limited support for complex business logic
FlutterFlow	Developers, technical teams	Code generation and export; high customization flexibility	Requires knowledge of Flutter architecture
Thunkable	Beginners, educational use	AI analytics, A/B testing; block-based logic	Limited scalability and integration capabilities
Microsoft Power Apps	Enterprise sector	Azure integration, GDPR compliance; centralized data management	High cost; complex setup for small business use
GitHub Copilot Mobile	Professional developers	Intelligent code suggestions; mobile developer support	Serves as auxiliary tool, not a full development environment
AppMySite	Small businesses, content teams	Fast website-to-app conversion; app publishing support	Limited functionality; lacks advanced customization

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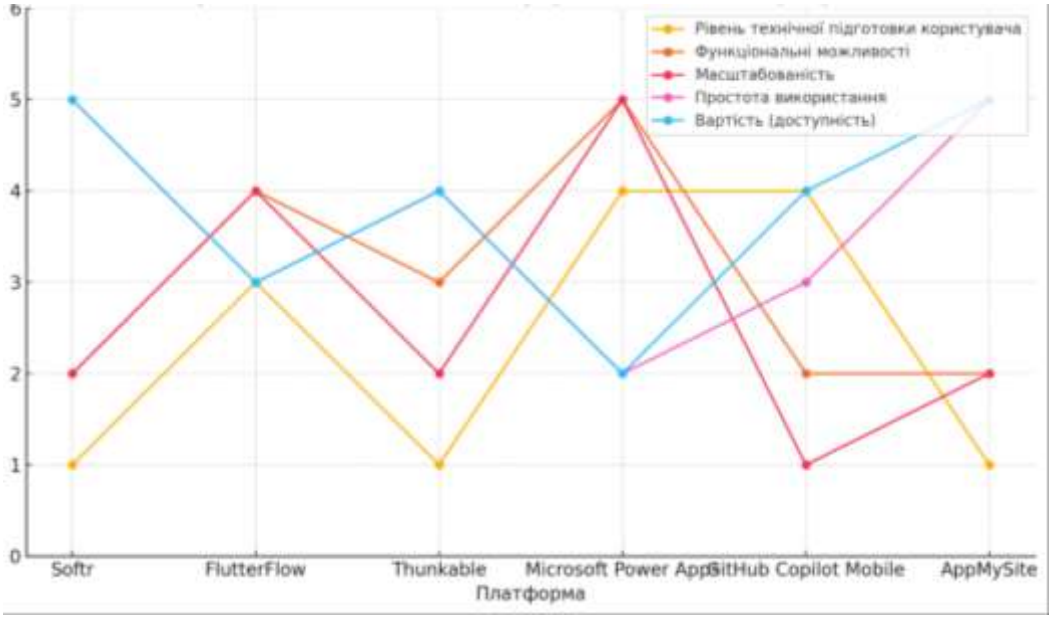

Figure 1. Evaluation of platforms across five criteria (user expertise, functionality, scalability, usability, and cost)

The conducted analysis allows for a series of generalizations regarding the appropriateness of using specific AI platforms based on the project context. For creating minimum viable products (MVPs) in small businesses or startups, Softr and AppMySite are the most suitable platforms, as they enable rapid application deployment without requiring deep technical expertise. These tools are especially relevant when the speed of hypothesis testing and cost minimization are critical.

For more complex solutions requiring high levels of customization, FlutterFlow presents an effective choice. It integrates AI-powered automation with the flexibility of manual refinement through exported Flutter components. However, using this platform assumes a certain level of technical competence, limiting accessibility for non-specialists.

In enterprise environments, where security, scalability, and integration with internal systems are critical, Microsoft Power Apps is recommended. It aligns with international security standards and demonstrates effective performance within the Microsoft ecosystem. Nevertheless, its configuration complexity and licensing costs render it less suitable for small business contexts.

For professional developers, GitHub Copilot Mobile serves as an AI-powered assistant that supports coding processes and accelerates routine operations. However, it does not replace a full-fledged development environment. Conversely, Thunkable targets beginners and educational initiatives, offering a user-friendly low-code interface, though it has limitations in terms of integration and performance.

Summarizing the findings presented in Table 1, it can be concluded that platform selection must be grounded in a balance between user technical expertise, product functional requirements, and resource constraints.

Analysis of current trends enables the identification of several key vectors in the future development of mobile applications powered by artificial intelligence. First, an increase in the integration of AI functionalities into mobile services is anticipated, progressively transforming AI from an optional enhancement into a standard component essential for delivering competitive user experiences.

One of the leading technological trends is the advancement of Edge AI, where data processing occurs directly on the mobile device without continuous reliance on cloud infrastructure. This approach reduces latency, improves performance, and enhances the confidentiality of user data (Guo et al., 2023). This trend will be further driven by advances in mobile processors and the deployment of energy-efficient deep learning models.

Simultaneously, there is a growing demand for explainable artificial intelligence (XAI). Enhancing interpretability mechanisms for AI decision-making aims to improve application transparency, foster user trust, and adhere to digital ethics principles (Adadi & Berrada, 2018).

In the development process of mobile applications, AI is increasingly serving as a tool for automating code generation, testing, and optimizing interaction logic (Marienko & Kovalenko, 2023). This lowers the technical barrier for entry into mobile development (Zhou et al., 2024). In this context, democratization of access to AI through low-code/no-code platforms becomes especially relevant, enabling non-technical users to create intelligent solutions.

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Hyper-personalization is also expected to intensify. Through adaptive interfaces and content tailored to individual behavioral patterns, mobile services will provide unique interaction experiences, particularly in domains such as education, healthcare, and digital marketing (Kuflik et al, 2021).

A particularly important development is the emergence of AI-powered security tools. The integration of real-time monitoring systems, anomaly detection, and cybersecurity mechanisms is projected to grow, particularly in finance, healthcare, and public administration (Nguyen et al., 2022). New categories of mobile applications will emerge, entirely built on AI-such as virtual mental health coaches, creative environments for generative content, and autonomous digital assistants with high contextual adaptability.

Another crucial trend is the enhancement of accessibility through AI. Features such as automatic transcription, voice control, and image description generation will make applications more inclusive for individuals with visual, auditory, or motor impairments (Raj et al., 2023).

Thus, the future of AI-based mobile applications is closely linked to increasing technological complexity, rising demands for ethics and transparency, and the expansion of opportunities for both users and developers, regardless of their technical backgrounds.

DISCUSSION

The results of the comparative analysis of platforms for developing mobile applications using artificial intelligence (AI), along with the outlined future prospects, enable several key conclusions regarding the current state and improvement directions of this technological domain. On the one hand, low-code/no-code tools (such as Softr, AppMySite, and Thunkable) foster the democratization of development and ensure access to innovation even for specialists with limited technical backgrounds. On the other hand, tools such as FlutterFlow, GitHub Copilot, and Microsoft Power Apps require a higher level of competence but offer broader capabilities for scalability, customization, and integration with cloud and enterprise systems.

It is worth noting that the technological ecosystem for AI-based mobile application development is rapidly evolving. Cloud platforms such as Google Cloud AI, AWS AI, and Azure AI provide quick access to pre-trained models and APIs, significantly simplifying the implementation of complex functionalities in mobile environments. Simultaneously, mobile SDKs, such as TensorFlow Lite, ML Kit, and Core ML, play a crucial role in the advancement of Edge AI, allowing data processing to occur directly on the device. This approach is essential for optimizing app performance and reducing the risks associated with transferring sensitive data to the cloud.

However, along with its advantages, the mobile AI sector faces several technical and ethical challenges. A central concern is access to high-quality training data-an issue that demands considerable resources and compliance with regulatory requirements. Limitations in mobile computing resources, energy consumption issues, and the need for model optimization impose further constraints on application functionality.

Equally significant are the ethical risks related to algorithmic bias, personal data processing, and the transparency of decision-making. In this regard, explainable artificial intelligence (XAI) emerges as a promising research direction, as it enhances user trust and mitigates potential negative social consequences (Adadi & Berrada, 2018). Another challenge is the shortage of qualified personnel, which hinders the large-scale deployment of mobile AI solutions in industrial and enterprise contexts (Pokryshen, 2024).

The financial dimension also remains relevant. Despite the availability of free or freemium tools, the high cost of customized solutions, especially those involving proprietary models and cloud computing, makes some platforms less accessible for educational institutions and small businesses.

In summary, the current toolkit for AI-based mobile application development demonstrates significant diversity. However, its effective application requires a flexible combination of technological readiness, resource availability, and a thorough understanding of the ethical and social dimensions of implementation. Future research should focus on optimizing models for mobile environments, developing interpretable and fair algorithms, and launching educational initiatives to train a new generation of AI-literate professionals.

CONCLUSION

This study conducted a comparative analysis of current platforms and tools for developing mobile applications with artificial intelligence and identified key prospects for their evolution. The findings support the following generalizations. AI-based mobile platforms exhibit considerable variation in development approaches-from no-code solutions for rapid prototyping to flexible frameworks with deep customization capabilities. The selection of a specific tool should depend on the technical proficiency of the development team, functional requirements, scalability needs, and available resources. The integration of AI into mobile

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applications is becoming a standard feature in domains such as personalization, voice control, natural language processing, recommender systems, and cybersecurity. The role of Edge AI is expected to grow, enhancing autonomy, performance, and personal data protection.

Current technological platforms (e.g., Google Cloud AI, AWS AI, Azure AI, TensorFlow Lite, ML Kit, Core ML) provide essential infrastructure that supports the deployment of AI functionalities in mobile environments for both professionals and beginners. At the same time, several barriers remain prominent: limitations in mobile computing power, the need for large volumes of high-quality data, ethical challenges related to model transparency and fairness, and the shortage of AI-competent professionals. The future development of AI-based mobile applications will likely emphasize hyper-personalization, accessibility, algorithmic transparency, and wider adoption among developers with low technical entry thresholds. This trend opens new opportunities across educational, healthcare, commercial, and social sectors.

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