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COMPARATIVE ANALYSIS OF MODERN MOBILE APPLICATIONS FOR ACCOUNTING AND CONTROL OF MEDICINES IN EVERYDAY LIFE

This paper analyzes the contemporary market of mobile applications for household medication management, focusing on their practical applicability in everyday use. The study examines key functional features, including medication data entry and storage, expiration date monitoring, usage tracking, and reminder mechanisms. A comparative analysis demonstrates that most applications rely predominantly on manual data entry, which adversely affects usability and increases the likelihood of errors. The findings reveal functional limitations in existing solutions and justify the need for automated medication identification approaches within intelligent information systems. Figs.: 3. Tabl. 1. Ref.: 15 items.

Keywords: home medicine cabinet, mobile applications, market analysis, medication management, intelligent systems, automation, multimodal LLMs.

Problem statement. Effective management of medicines in household settings remains a relevant problem due to the lack of systematic control over medication composition, expiration dates, and storage conditions. A home medicine cabinet can be regarded as a collection of medications that requires regular monitoring and record keeping, which determines the need for specialized information tools.

Disorganized medication storage often results in duplication of drugs and the accumulation of expired products. Existing mobile applications intended to address these issues exhibit significant functional limitations, particularly the high labor intensity of basic operations caused by the predominance of manual data entry. This approach reduces system usability and increases the likelihood of errors.

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Despite advances in artificial intelligence, its application in personal medication management systems remains limited. Automated medication identification is either unsupported or implemented using resource-intensive computer vision models, the adaptation of which for mobile devices is challenging. Consequently, the development of adaptive medication identification methods aimed at increasing the level of automation and the reliability of medication records represents a relevant scientific and practical task.

Literature analysis. Recent research in the field of household medical information systems increasingly focuses on the application of artificial intelligence, particularly large language models and their multimodal variants, as universal tools for interpreting textual and visual data [1, 3, 6, 8].

Analyses of mobile applications for medication management reveal a technological gap between available AI methods and their practical implementation: most solutions remain heavily reliant on manual data entry, which reduces usability and increases the risk of errors [5]. Although computer vision techniques demonstrate high recognition accuracy [7, 11], their adoption in mobile applications is constrained by high computational requirements and the need for specialized datasets.

Practical implementations of multimodal approaches have already been demonstrated in related application domains. In particular, in the analysis of financial and accounting documents, multimodal large language models are employed to automatically extract semantically meaningful information from images of paper receipts and invoices, as implemented, for example, in the Billka AI [13] and Receipt Scanner: Smart Track systems [14]. The combination of visual analysis and language-based interpretation in these solutions demonstrates the feasibility of automating data entry processes without active user involvement and suggests the potential for adaptation to medication identification and accounting tasks.

This study aims to analyze the functionality of contemporary mobile applications for home medicine cabinet management and to substantiate the feasibility of employing multimodal large language models for automating medication identification and accounting.

Sample formation and benchmarking criteria.

The study employs a systematic analysis of specialized mobile software solutions. A representative sample of 25 mobile applications intended for medication accounting and home medicine cabinet management was selected.

Applications were retrieved from the Google Play platform, considering the dominance of the Android operating system in the global mobile market (exceeding 70%), which supports the representativeness of the sample [15]. The search was performed using relevant keywords such as *medicine cabinet*, *home pharmacy*, *medication inventory*, *drug expiry tracker*, and *pill reminder*. Included applications provide functionality related to medication accounting, expiration date control, or medication intake management.

The functional capabilities of the selected applications were categorized into five generalized groups: manual data entry and medication accounting (1), medication intake planning (2), reminders and notifications (3), reference and safety-related information (4), and analytics and data exchange (5). The corresponding coding was applied to summarize the results in Table 1.

Table 1

Comparative characteristics of the functionality of mobile applications for home medicine cabinet management

№	Name	Platform	Released on (year)	Main functionality	Automated medication identification
1	2	3	4	5	6
1	Drugs.com Medication Guide	Android, IOS	2013	1, 4	No
2	Medication List	Android, IOS	2025	2, 3, 5	No
3	Expiro - Expiry Date Tracker	Android	2024	1, 3, 5	No
4	RxDateCalc	Android, IOS	2024	1	No
5	Medisafe Pill & Med Reminder	Android, IOS	2012	2, 3, 5	No
6	MyCabinet: Medicine Management	Android, IOS	2023	1, 3, 4, 5	No

1	2	3	4	5	6
7	Meds & Pill Reminder MyTherapy	Android, IOS	2015	1, 3, 5	No
8	Cute Pill: Medication Reminder	Android, IOS	2021	1, 2, 3, 5	No
9	Medication Reminder & Tracker	Android	2013	1, 2, 3, 4, 5	No
10	Medication Reminder	Android	2017	1, 2, 3	No
11	TakeYourPills Pill Reminder	Android	2018	1, 2, 3, 4, 5	No
12	Pill Reminder & Health Tracker	Android	2022	1, 2, 3, 4, 5	No
13	Pharma Stock	Android, IOS	2025	1, 3	No
14	Medicine Cabinet	Android	2021	1, 3, 5	Barcode scanning
15	Personal Medicine Cabinet	Android	2023	1, 2, 3, 4, 5	No
16	Meds & Pill Reminder: CareAide	Android	2021	1, 2, 3, 5	No
17	Digitale Hausapotheke	Android, IOS	2016	1, 2, 3, 5	Barcode scanning
18	ApothekenApp	Android, IOS	2023	1, 2	No
19	memedi – my medicine companion	Android	2023	1, 4, 5	No
20	Hausapotheke.app	IOS	-	1, 3, 5	Barcode scanning
21	AIFA Medicinali	Android, IOS	2022	1, 3, 4	No
22	MedsDate - Scadenza Medicinali	Android	2025	1, 3	No
23	Dosecast - Pill Reminder App	Android, IOS	2012	1, 2, 3, 4, 5	No
24	Pillarium: Home Medications	Android, IOS	2023	1, 5	No
25	PharmaSafe	Android	2025	1, 5	No

The platform structure of the analyzed sample is shown in Fig. 1. Of the 25 applications, 13 (52%) are cross-platform, 11 (44%) are Android-only, and 1 (4%) is iOS-only. This distribution supports the selection of Android as the primary platform for further analysis.

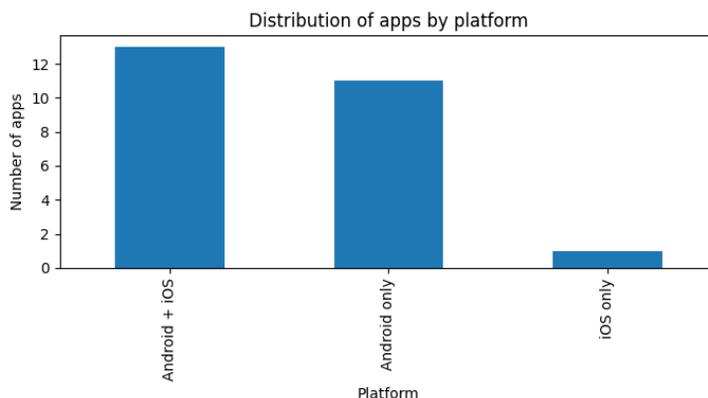


Fig. 1. Platform distribution of mobile applications for medication management

The study spans the period 2012 – 2025, allowing an assessment of the evolution of functional approaches in mobile pharmaceutical systems. As shown in Fig. 2, the period 2012-2018 is characterized by a low release intensity, with an average of one application per year, indicating an early stage of market development.

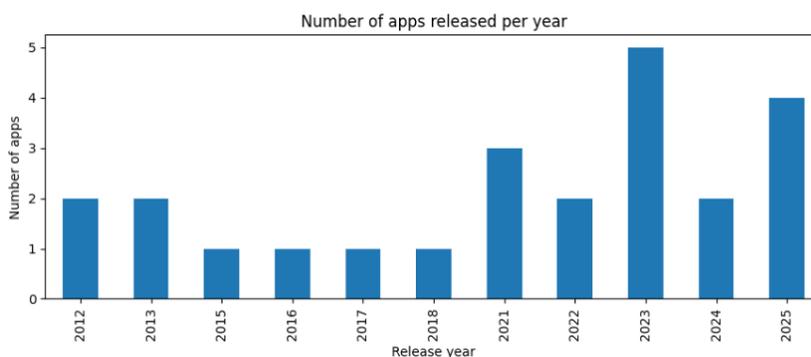


Fig. 2. Distribution of the analyzed mobile applications by release year

The highest release activity occurred in 2021-2023, with 10 applications introduced, including 5 in 2023. Although six additional applications were released in 2024-2025, their functional capabilities largely mirror earlier solutions and remain focused on traditional medication intake control. This discrepancy highlights a technological gap between market growth and functional innovation, supporting the need for multimodal intelligent approaches.

Comparative characteristics of functionality.

The comparative analysis was conducted based on the data presented in Table 1 and covers 25 Android-oriented mobile applications. The dominant functional focus is medication intake control: at least 10 applications support reminder mechanisms, complex dosing schedules, and maintenance of medication intake history.

Home medicine cabinet management functions are implemented in 8-9 applications and are primarily limited to inventory tracking, stock level control, and expiration date monitoring. In most cases, expiration tracking relies on manual date entry, and automated mechanisms are absent.

Manual data entry is the primary method for registering medications. Barcode scanning is supported by only a few applications and is restricted to reading package identifiers. No intelligent or AI-based mechanisms for automated medication identification were identified in the analyzed sample.

Analysis of dominant application functional orientations.

Based on the data in Table 1, the main functional approaches of mobile medication management applications were identified. The quantitative distribution by functional orientation is shown in Fig. 3.

Medication intake monitoring applications constitute the largest group (10 of 25), followed by home medicine cabinet management applications (9). Hybrid and other functionally specialized applications each account for 3 solutions. This distribution highlights the predominance of intake-focused applications over comprehensive medication management solutions.

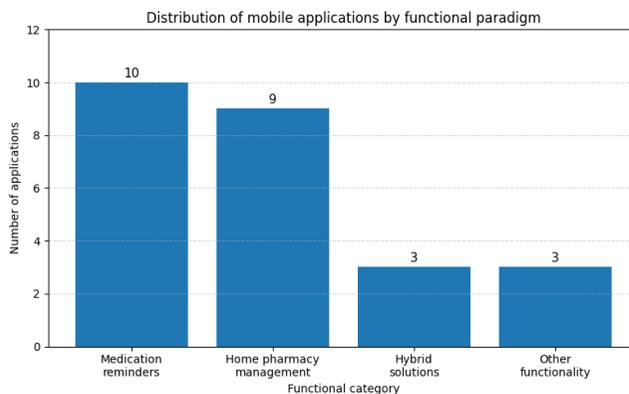


Fig. 3. Distribution of mobile applications by functional orientation

Analysis of support for home medicine cabinet management.

The analysis indicates that support for home medicine cabinet management is limited and primarily restricted to maintaining lists of medications and manually entering expiration dates. Inventory management, stock level control, and automatic notification mechanisms are implemented in only a small number of applications and do not constitute an integrated management process. Medication entry is predominantly manual, while the use of barcode scanning or packaging images is sporadic and not accompanied by automated identification.

Review of methods for medication data entry and identification.

In 22 out of the 25 analyzed mobile applications, manual data entry is the primary mechanism for recording medication information. Barcode scanning support (EAN-13, Data Matrix) is implemented in only three applications and is limited to reading package identifiers without automated data interpretation. Image-based identification methods or optical character recognition are not employed in the analyzed sample.

Assessment of the level of solution intelligence.

The assessment indicates that the analyzed mobile applications do not employ artificial intelligence methods to automate medication accounting or identification. Implemented functionalities rely on deterministic approaches, including manual data entry, fixed processing rules, and identifier matching against internal databases.

The integration of multimodal approaches that combine visual analysis of medication packaging with textual data processing is absent in the analyzed sample. Large language models, computer vision techniques, or their combinations are not utilized.

Conclusions. This study analyzed 25 mobile applications for medication management, primarily targeting the Android platform. The findings indicate that the market is dominated by applications focused on medication intake control, while solutions designed for comprehensive home medicine cabinet management remain limited.

Most applications rely on manual or semi-automated data entry methods. Inventory management and expiration date monitoring functions are generally auxiliary and are not integrated into a unified management system. Intelligent medication identification methods, including image-based analysis or multimodal models, are absent in the analyzed solutions.

Overall, the results reveal a gap between the current level of artificial intelligence development and the functional capabilities of contemporary mobile applications for household medication management. This gap justifies the need for the adoption of intelligent approaches to automate medication identification and accounting processes.

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У роботі проаналізовано сучасний ринок мобільних застосунків для обліку лікарських засобів у побутових умовах з урахуванням їх практичної придатності для щоденного використання. Розглянуто функціональні можливості найбільш поширених рішень, зокрема введення та зберігання даних про лікарські засоби, контроль термінів придатності, відстеження використання і реалізацію механізмів нагадування. У межах роботи проведено порівняльний аналіз застосунків, за результатами якого виявлено переважну залежність від ручного введення інформації користувачем. Встановлено, що такий підхід знижує зручність експлуатації та підвищує ймовірність помилок при введенні даних. За результатами аналізу зроблено висновок про наявність функціональних обмежень у наявних рішеннях і обґрунтовано доцільність пошуку підходів до автоматизації процесів ідентифікації лікарських засобів у межах інтелектуальних інформаційних систем. Іл.: 3. Бібліогр.: 15 назв.

Ключові слова: домашня аптечка, мобільні застосунки, аналіз ринку, інформаційні системи, облік лікарських засобів, автоматизація, інтелектуальні технології, LLM.

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Comparative Analysis of Modern Mobile Applications for Accounting and Control of Medicines in Everyday Life / Datsok Y., Yakovleva O. // Herald of the National Technical University "KhPI". Series of "Informatics and Modeling". – Kharkiv: NTU "KhPI". – 2026. – № 1 (15). – P. 168 – 177.

The paper analyzes the modern market of mobile applications for accounting of medicines in domestic conditions, taking into account their practical suitability for daily use. The functionality of the most common solutions is considered, in particular, the entry and storage of data on medicines, control of expiration dates, tracking of use and the implementation of reminder mechanisms. Within the framework of the work, a comparative analysis of applications was carried out, according to the results of which a predominant dependence on manual input of information by the user was revealed. It has been established that this approach reduces ease of use and increases the likelihood of errors in data entry. Based on the results of the analysis, it is concluded that there are functional limitations in the available solutions and the expediency of finding approaches to automating the processes of identification of medicines within intelligent information systems is substantiated. Figs.: 3. Refs.: 15 items.

Keywords: home medicine cabinet, mobile applications, market analysis, medication management, intelligent systems, automation, multimodal LLMs.