

**0414 მარკეტინგი და რეკლამა MARKETING AND ADVERTISING**

**AI and the Personalization of User Experience in E-Commerce: Theoretical Foundations, Challenges, and Development Prospects in Georgia**

**Giorgi Kakashvili**

**David Aghmashenebeli National Defence Academy of Georgia**

**E-mail: giorgikakashvili1@gmail.com**

**Ketevan Zhizhiashvili**

**Caucasus International University**

**E-mail: ketevan.zhizhiashvili@ciu.edu.ge**

**Ketevan Nanobashvili**

**Caucasus International University**

**ketevan.nanobashvili@ciu.edu.ge**

**Abstract**

In modern e-commerce, customer experience personalization has become one of the key factors for gaining a competitive advantage. This paper discusses the use of Artificial Intelligence (AI) and Machine Learning (ML) in creating personalized digital environments for consumers. The article reviews the main principles of recommender systems, ethical issues related to data processing, and the influence of the “Segment of One” approach on customer retention and loyalty. The study analyzes the development trends of the Georgian e-commerce market, the practices of local platforms such as Veli.store and Extra.ge, as well as the challenges related to Natural Language Processing (NLP) for the Georgian language. The paper shows that the effectiveness of personalized digital services in Georgia largely depends on high-quality data analytics and compliance with data protection standards.

**Keywords:** Artificial Intelligence, E-commerce, Personalization, Recommender Systems, Customer Experience (UX), Machine Learning, NLP.

**Introduction**

The modern digital landscape is evolving rapidly, and e-commerce is undergoing a significant transformation as well. While the primary challenge of online retail a few years ago was product availability and delivery, today the priority has shifted toward providing customers with the right information accurately and efficiently. In the online space, consumers are confronted daily with an overwhelming volume of products and advertisements, which often complicates decision-making and can even lead to a loss of interest. This is precisely why user experience has assumed such critical importance.

Modern e-commerce platforms strive to offer users an environment tailored to their individual interests and needs one that simplifies finding the desired product and enhances the overall quality of the online service. The aim of this paper is to analyze how personalized approaches influence consumer behavior and experience, and how actively such practices are being implemented in Georgia. The research will employ qualitative analysis and comparative research methods, allowing international experience to be compared against local platforms such as Veli.store and Extra.ge.

**Main Part**

***Machine Learning in Modern Digital Commerce*** - Machine learning represents one of the central pillars of personalization in modern digital commerce. Its core idea is that systems no longer rely on pre-written rules instead, they learn independently by observing user behavior. Over time, they develop a better understanding of what a particular user is interested in and which types of offers they are most likely to respond to. On e-commerce platforms, the most widespread application of this process takes the form of recommender systems. Some of these systems are built on the analysis of product attributes (Content-Based Filtering), where the system focuses on the specific characteristics of the item itself for example, its category, brand, or technical specifications. In such cases, if a user shows interest in a specific product, the system attempts to suggest other options with similar

characteristics. A second approach is oriented around user behavior (Collaborative Filtering). Here, the system seeks to identify people who share similar choices and interests. If two users select the same or comparable products, the system leverages this similarity to generate recommendations for one user based on the experience of the other [1, 2].

Modern platforms frequently combine both approaches, as relying on either one alone does not always yield accurate results. Hybrid models are more flexible and prove especially effective when the system does not yet have sufficient data on a new user. The quality of personalization is directly tied to the volume and diversity of data a system is capable of processing. Contemporary platforms collect not only what a user has purchased, but also their behavior across the website what they browse, where their attention lingers, how long they spend on a given page, and how they search for products. Processing this data in real time is of particular importance, as the system must respond to user actions almost instantaneously. For instance, if a user adds a product to their cart but does not complete the purchase, the platform can quickly adjust its offer, suggest an alternative, or provide additional incentive to encourage a decision. This kind of approach creates a more dynamic and adaptive environment, in which the system continuously adjusts to the user's behavior [2].

In recent years, the marketing industry has seen a significant shift in how it approaches consumer analysis. While the focus traditionally rested on working with broad audience segments, the emphasis today has moved toward individualized engagement. Historically, consumers were divided into defined segments by age, gender, or general interests, for example. However, this approach often fails to capture the unique behavior and needs of each individual. In the modern digital environment, a concept known as the "Segment of One" is becoming increasingly prominent, whereby each user is treated as a distinct entity. The system aims to account not only for broad categories, but also for a specific person's habits, their patterns of activity, their decision-making style, and their individual preferences. As a result of this shift, the digital experience has become far more closely tailored to the individual user, which ultimately strengthens the relationship between the consumer and the platform [3] (Figure 1).

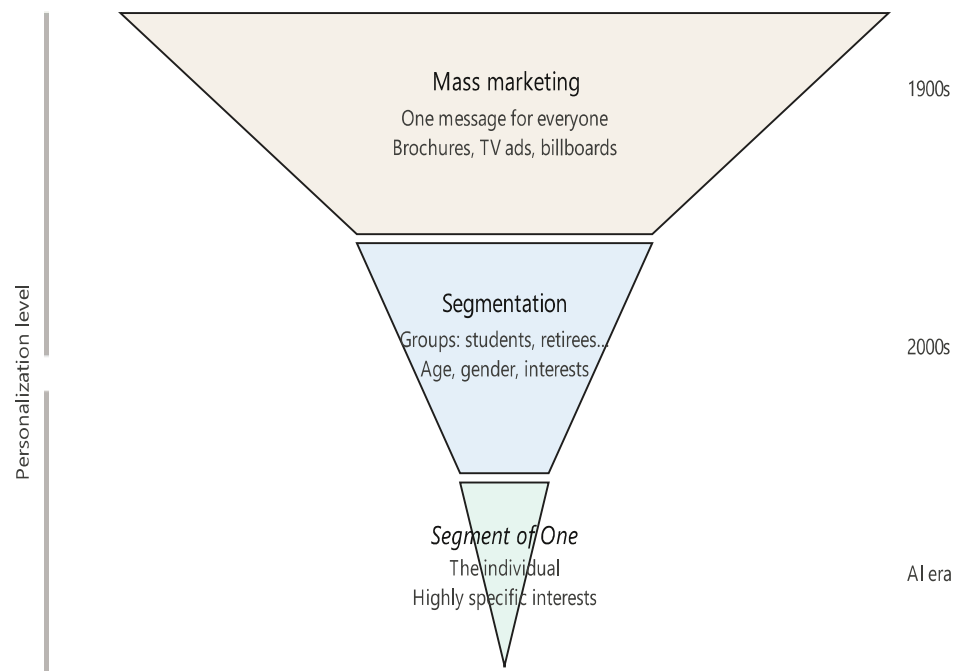
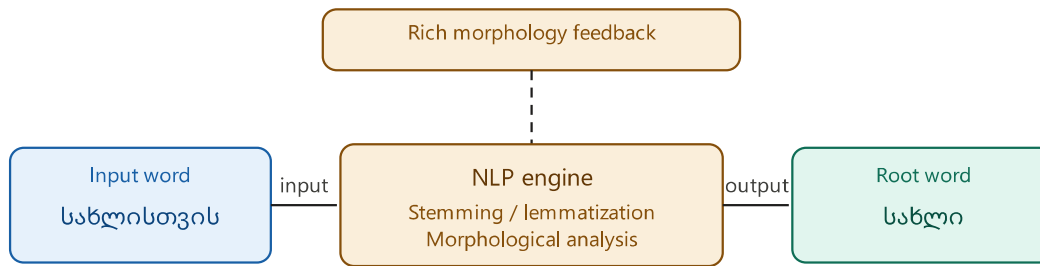


Figure 1: Segment of One

The scope of personalization extends well beyond simply creating a comfortable environment for the user. In modern e-commerce, it exerts a measurable impact on key business metrics such as conversion rates, customer





Challenge: Georgian has 7+ cases, 9 verb tenses —  
 one word can appear in many surface forms (სახლი, სახლს, სახლებს...)

Figure 2: Georgian NLP workflow

Another promising frontier involves the advancement of virtual assistants and chatbots. Fast, seamless, and automated communication has become a baseline expectation for modern digital interaction. In this context, technological infrastructure and Natural Language Processing (NLP) support for the Georgian language are of paramount importance; natural, fluent interaction in the user's native language substantially enhances the overall customer experience.

For the local business sector, the central challenge remains effective data governance and the development of sophisticated analytical systems. The caliber of personalized services depends heavily on the precision with which data is collected, processed, and applied. Concurrently, it is imperative to uphold stringent data privacy standards and ethical principles, as consumer trust remains the most critical currency in the digital ecosystem.

### Conclusion

In conclusion, personalization in modern e-commerce has established itself as one of the most significant drivers of improved user experience. A digitally tailored environment streamlines the discovery of desired products, increases the efficiency of online services, and strengthens the relationship between the consumer and the platform. The case of Georgia demonstrates that the local market is gradually evolving and actively working to adopt contemporary digital practices.

Despite the challenges that remain particularly in the areas of Georgian Natural Language Processing (NLP) and the relatively limited scale of available data Georgian platforms and banking ecosystems are making meaningful strides in developing user-centric services. Looking ahead, the continued advancement of personalization is likely to intensify competition within the Georgian market and position user experience as one of the critical determinants of business success.

### References

1. Joshi, A. V. (2023). *Machine Learning and Artificial Intelligence*. 2nd Edition. Springer, Cham. <https://doi.org/10.1007/978-3-031-29622-2>.
2. Ricci, F., Rokach, L., & Shapira, B. (2022). Recommender Systems: Techniques, Applications, and Challenges. In: *Recommender Systems Handbook*. Springer US, pp. 1–35. [https://doi.org/10.1007/978-1-0716-2197-4\\_1](https://doi.org/10.1007/978-1-0716-2197-4_1).
3. Kotler, P., & Armstrong, G. (2020). *Principles of Marketing (18th Edition)*. Pearson Education Limited. ISBN 9781292341132.
4. Kumar, V., & Reinartz, W. (2018). *Customer Relationship Management: Concept, Strategy, and Tools*. 3rd Edition. Springer Texts in Business and Economics. Springer, Berlin, Heidelberg. ISBN 978-3-662-55381-7.
5. Law of Georgia on Personal Data Protection. (2023). No. 3320-IIIrs. Legislative Herald of Georgia, 14/06/2023. Available at: <https://matsne.gov.ge/ka/document/view/5826891>
6. TBC Capital. (2023). *E-commerce in Georgia. Sector Analysis*. [https://tbccapital.ge/static/file/202308180748-e-commerce\\_eng\\_08.2023.pdf](https://tbccapital.ge/static/file/202308180748-e-commerce_eng_08.2023.pdf)

7. Pariser, E. (2011). The Filter Bubble: What the Internet Is Hiding from You. Penguin Press. ISBN 9781594203008.
8. Melikidze, D., & Gamkrelidze, A. (2024). Homonym Sense Disambiguation in the Georgian Language. arXiv preprint. <https://arxiv.org/abs/2405.00710>

**ხელოვნური ინტელექტი და მომხმარებლის გამოცდილების პერსონალიზაცია ელექტრონულ კომერციაში: თეორიული საფუძვლები, გამოწვევები და განვითარების პერსპექტივები საქართველოში**  
**გიორგი კაკაშვილი**  
**ქეთევან ჟიჟიაშვილი**  
**ქეთევან ნანობაშვილი**

#### **რეზიუმე**

თანამედროვე ელექტრონულ კომერციაში მომხმარებლის გამოცდილების პერსონალიზაცია კონკურენტული უპირატესობის ერთ-ერთ მნიშვნელოვან ფაქტორად იქცა. ნაშრომში განხილულია ხელოვნური ინტელექტისა (AI) და მანქანური სწავლების (ML) გამოყენება მომხმარებელზე მორგებული ციფრული გარემოს ფორმირების პროცესში. სტატია მიმოიხილავს სარეკომენდაციო სისტემების ძირითად პრინციპებს, მონაცემთა დამუშავებასთან დაკავშირებულ ეთიკურ საკითხებსა და „სეგმენტაცია ერთისთვის“ (Segment of One) მიდგომის გავლენას მომხმარებლის შენარჩუნებასა და ლოიალობაზე. კვლევის ფარგლებში გაანალიზებულია საქართველოს ელექტრონული კომერციის ბაზრის განვითარების ტენდენციები, ადგილობრივი პლატფორმების Veli.store და Extra.ge პრაქტიკა, ასევე ქართული ენის ტექნოლოგიურ დამუშავებასთან დაკავშირებული გამოწვევები. ნაშრომი აჩვენებს, რომ პერსონალიზებული ციფრული სერვისების ეფექტიანობა მნიშვნელოვნად არის დამოკიდებული მონაცემთა ხარისხიან ანალიზსა და მომხმარებლის მონაცემების დაცვის სტანდარტებზე.

**საკვანძო სიტყვები:** ხელოვნური ინტელექტი, ელექტრონული კომერცია, პერსონალიზაცია, სარეკომენდაციო სისტემები, მომხმარებლის გამოცდილება (UX), NLP.