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APPLICATION OF LARGE LANGUAGE MODELS IN ENTERPRISE AUTOMATION

ВИКОРИСТАННЯ ВЕЛИКИХ МОВНИХ МОДЕЛЕЙ У КОРПОРАТИВНІЙ АВТОМАТИЗАЦІЇ

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Abstract. *The paper explores the integration of large language models (LLMs) into enterprise automation workflows, focusing on their role in optimizing decision-making, document processing, and customer interaction systems. The study outlines key architectures and implementation patterns, including hybrid solutions that combine rule-based engines with generative AI models such as GPT and Claude. Special attention is given to data governance, privacy, and explainability challenges that arise in large-scale corporate environments. The results demonstrate that LLM-based automation significantly reduces operational costs, increases adaptability of business systems, and paves the way for intelligent digital transformation within organizations.*

Keywords: *large language models, enterprise automation, business process management, intelligent systems, workflow optimization, data governance, artificial intelligence.*

Abstract. *У статті розглядається інтеграція великих мовних моделей (LLM) у системи корпоративної автоматизації, зокрема їх роль в оптимізації процесів ухвалення рішень, обробці документів та системах взаємодії з клієнтами. Окреслено основні архітектурні підходи та шаблони впровадження, зокрема гібридні рішення, що поєднують rule-based механізми з генеративними AI-моделями, такими як GPT і Claude. Особливу увагу приділено проблемам управління даними, приватності та пояснюваності у масштабних корпоративних середовищах. Результати показують, що використання LLM суттєво знижує операційні витрати, підвищує адаптивність бізнес-систем і сприяє розумній цифровій трансформації організацій.*

Key words: *великі мовні моделі, корпоративна автоматизація, управління бізнес-процесами, інтелектуальні системи, оптимізація робочих процесів, управління даними, штучний інтелект.*

Introduction.

The rapid evolution of artificial intelligence has transformed enterprise automation, moving it beyond rigid, rule-based workflows toward systems capable of understanding natural language and adapting to dynamic business contexts. Large Language Models (LLMs) such as GPT, Claude, and Gemini have become central to this shift, enabling automation of not only mechanical but also analytical and cognitive processes once reserved for human experts.

Enterprise automation today covers document processing, customer service, compliance, and decision-making. Traditional approaches like Robotic Process Automation (RPA) improved efficiency but lacked flexibility, requiring constant updates when business logic changed. LLMs, by contrast, interpret unstructured data, infer intent, and generate contextually appropriate responses, supporting adaptive workflows that evolve with organizational needs.

Integrating LLMs into systems such as CRM or financial platforms allows automatic analysis of communication patterns, contract review, and report generation-reducing manual effort while improving knowledge management. Yet, their adoption introduces challenges: data security, explainability, and ethical governance are critical when handling sensitive corporate information.

The goal of this study is to analyze how large language models contribute to enterprise automation, examine architectural strategies and limitations, and identify best practices for their reliable implementation. Properly integrated, LLMs can serve as catalysts for digital transformation and intelligent decision-making within modern organizations.

Main text

Concept of Enterprise Automation and the Role of LLMs

Enterprise automation represents the coordinated use of technologies that reduce human involvement in routine or knowledge-based processes. Traditional automation frameworks relied on pre-programmed logic, deterministic workflows, and robotic process automation (RPA) scripts. While effective for repetitive tasks, these systems struggled with unstructured data, language ambiguity, and contextual reasoning. The emergence of Large Language Models (LLMs) such as GPT, Claude, and Gemini has overcome many of these limitations by enabling automation that understands natural language and adapts to evolving business conditions [1].

LLMs expand the concept of automation from the mechanical execution of steps to semantic understanding and contextual synthesis. They interpret emails, documents, and reports, identify intent, and generate structured responses that integrate seamlessly with enterprise software. This has opened new possibilities in

intelligent document processing, automated analytics, customer communication, and regulatory compliance [2].

Integration Patterns and Implementation Approaches

The integration of LLMs into enterprise ecosystems follows two major approaches - embedded and orchestrated. In the embedded scenario, LLMs are incorporated into existing business tools such as CRMs, ERP systems, or ticketing platforms. Here, the model performs auxiliary roles: summarizing interactions, drafting messages, or classifying user intents. Mulpuri and Mathew [1] describe such a configuration as "Cognitive CRM," where GPT-based modules extend Salesforce by analyzing customer sentiment, detecting dissatisfaction, and generating adaptive replies.

In orchestrated architectures, on the other hand, LLMs act as autonomous services connected via APIs or message queues. A central orchestration layer manages communication between models, validates outputs, and logs interactions for auditability. Toxtli and Li [4] demonstrated that such systems can even "automate automation" by generating BPMN process maps compatible with RPA software. Michele et al. [3] further developed this idea by using LLMs to evaluate business process efficiency - identifying redundant operations and suggesting optimization strategies.

Benefits and Practical Applications

LLM-based automation delivers substantial efficiency gains across departments. In customer service, models respond to queries, extract key details, and update CRM entries automatically. In finance, they interpret contracts, detect anomalies, and summarize lengthy compliance reports. Vidgof et al. [2] showed that enterprises deploying LLM-based Business Process Management (BPM) frameworks reduced human involvement in analytical review by up to 40%.

Document-intensive workflows benefit the most. For example, in procurement, an LLM can analyze supplier proposals, highlight contractual risks, and produce comparison summaries. In internal communications, it can extract meeting decisions, generate follow-up tasks, and integrate them into project tracking systems. Singh [5]

notes that hybrid pipelines combining deterministic validation with generative flexibility yield the best performance, balancing creativity with accuracy.

Furthermore, the introduction of LLMs improves **knowledge accessibility** within enterprises. They act as semantic layers atop corporate databases, allowing employees to query information conversationally rather than through complex search syntax. Over time, this capability evolves into an "enterprise memory" - a continuously learning knowledge base that supports strategic decisions and organizational intelligence [6].

Technical and Ethical Challenges

Despite clear advantages, deploying LLMs in corporate environments presents several critical challenges. The first is **data security**: sensitive documents and client records must remain within trusted infrastructure. Public API calls can expose information, so many organizations prefer private or hybrid deployments where models operate on-premises [5].

Another issue is **explainability**. Vidgof et al. [2] emphasize that managers often require transparent reasoning behind AI decisions - a capability still underdeveloped in current LLMs. Black-box behavior complicates auditing and accountability, especially in regulated industries such as banking and healthcare.

Reliability also remains a concern. Toxtli and Li [4] observed that generative models may produce "hallucinations," inventing plausible but incorrect information when faced with ambiguous input. This is unacceptable in mission-critical business contexts. To mitigate this, Michele et al. [3] propose tiered processing pipelines: lightweight models perform initial filtering, while higher-accuracy models handle synthesis and summarization, followed by human validation.

Finally, there are unresolved **ethical and legal questions**. Mulpuri and Mathew [1] highlight that AI-generated content blurs authorship boundaries and introduces potential bias in customer interactions. Enterprises must therefore implement clear governance frameworks defining responsibility for AI outcomes and ensuring transparency in decision-making processes.

Perspectives and Future Development

Future enterprise systems will likely combine LLMs with symbolic reasoning, graph databases, and process mining tools. Singh [5] predicts that domain-specific fine-tuning will lead to specialized corporate assistants optimized for particular industries such as finance, law, or logistics. These systems will not only automate workflows but also continuously learn from organizational data, forming adaptive, knowledge-driven ecosystems.

Another emerging trend is **multi-agent orchestration** - multiple LLMs working collaboratively, each with a defined role such as retriever, summarizer, or verifier. Such architectures enhance both accuracy and interpretability, mirroring human teams that divide analytical tasks among experts. Over time, this will evolve into intelligent “digital departments” capable of autonomously maintaining documentation, monitoring compliance, and generating insights.

As enterprises adopt these systems, a balance must be maintained between innovation and governance. LLMs should augment human expertise, not replace it. Their purpose is to enhance decision-making, reduce manual workload, and transform organizational knowledge into actionable intelligence. When implemented responsibly, large language models will redefine enterprise automation - moving from efficiency tools to cognitive partners that drive continuous digital evolution.

Conclusions.

Large language models have become a cornerstone of modern enterprise automation, transforming how organizations process information, make decisions, and interact with stakeholders. Their integration enables a shift from static rule-based workflows toward adaptive, context-aware systems that learn from data and respond intelligently to changing business conditions. By leveraging natural language understanding, LLMs empower enterprises to automate not only repetitive operational tasks but also analytical and creative functions - from document drafting and customer support to compliance review and strategic planning.

At the same time, the adoption of such models requires careful attention to governance, security, and explainability. Without proper oversight, the risks of data

leakage, bias propagation, or hallucinated outputs may undermine organizational trust in AI-driven systems. Therefore, successful implementation must balance innovation with control - combining LLM capabilities with structured business logic, human supervision, and ethical safeguards.

Overall, the study demonstrates that LLM-based automation is not merely a technological enhancement but a new paradigm for intelligent enterprise systems. When applied responsibly, these models can serve as catalysts for digital transformation, improving efficiency, transparency, and decision quality across diverse corporate domains.

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