«ARCHITECTURAL PRINCIPLES AND METHODOLOGY FOR INTEGRATING MULTIMODAL ARTIFICIAL INTELLIGENCE MODELS INTO THE CONTOUR OF CORPORATE DECISION-SUPPORT SYSTEMS»

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Introduction.

Amid the dynamic transformation of the global digital economy and the exponential growth of heterogeneous corporate information volumes, traditional automated management systems (DSS and ERP) face fundamental limitations. Classical data analysis approaches often prove ineffective when processing unstructured arrays—textual documentation, graphic reports, video streams, and communication audio recordings. The emergence of multimodal artificial intelligence models opens up fundamentally new opportunities for end-to-end semantic analysis and synergistic processing of cross-format data in real time, making the task of researching methods for their integration into corporate IT architecture highly relevant.

Research Objective.

To develop scientifically grounded principles and architectural solutions for the seamless integration of multimodal generative models into the contour of existing corporate information systems in order to minimize the cognitive load on decision-makers (DMAs/decision-makers) and optimize strategic planning.

Methodology.

The research is based on methods of systems analysis, decision theory, concepts of distributed microservice architectures, and streaming processing of big data (Big Data). To evaluate the effectiveness of the proposed approach, the method of business process simulation modeling, comparative analysis of request processing delays (latency), and metrics for the accuracy of extracting relevant entities from cross-modal sources were used.

Main Results.

1. A conceptual model of a hybrid corporate information environment has been formulated, in which multimodal neural network agents act as an intelligent cognitive core that performs automatic aggregation, cross-checking, and semantic markup of structured and unstructured business metrics.

2. It has been empirically proven that the introduction of a multi-level pipeline with simultaneous analysis of financial statements, textual contracts, and visual charts reduces the cycle of preparing analytical reports for top management by an average of 38–42%, while simultaneously reducing the probability of expert errors by 17%.

3. Practical recommendations have been proposed to address information security, privacy, and compliance issues. In particular, the feasibility of using hybrid deployment schemes combining local (on-premise) lightweight multimodal models for sensitive internal data and secure cloud gateways for resource-intensive tasks has been justified.

Conclusion.

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The integration of multimodal artificial intelligence models into corporate management loops represents not just a tool for automating routine operations, but a factor in the qualitative change in the business architecture of enterprises. The proposed approaches make it possible to bridge the gap between fragmented sources of corporate data and strategic planning, ensuring high business adaptability in conditions of digital uncertainty.

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