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## **APPLICATION OF ARTIFICIAL INTELLIGENCE IN TRAFFIC FLOW MANAGEMENT**

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Urban transportation systems are facing increasing complexity due to rapid population growth, increasing number of vehicles and growing demand for mobility. Traditional road management methods, based on fixed rules and traffic light schedules, are not effective in response to the dynamic and unpredictable nature of modern traffic. In this context Artificial Intelligence (AI) technologies offer a new approach in transportation flow management, providing decision making based on data, adaptation of systems in real time and predictive management. Goal of this paper is to study how AI solutions can improve the effectiveness of traffic management and promote smart and sustainable urban mobility. Main goals of this paper is: analyse existing AI technologies in transportation management, identify their advantages and limitations, and also propose promising directions of AI integration into the urban transportation infrastructure.

Methodology of research is based on analytical review of scientific literature and practical cases, related with implementation of AI in transportation. Machine learning algorithms such as long short-term memory (LSTM), neural networks, reinforcement learning methods and computer vision models including YOLOv3 applied to traffic prediction, traffic light optimization and incident recognition are discussed. A particular focus is on integrating Internet of Things (IoT) and edge

computing infrastructure into transportation systems to enable continuous data collection, local processing and high responsiveness. The organizational and ethical challenges of large-scale AI deployment are also analyzed, including data protection, transparency of algorithmic decisions, and the need for regulatory oversight.

Results of research confirms that AI based systems allow to significantly increase efficiency of transportation flows, reduce travel time, reduce emissions and improve road safety. Examples of implementing intelligent transportation solutions in various cities demonstrate practical effectiveness of AI in adaptive traffic light control, congestion forecasting and resource allocation. However, analysis has also revealed key barriers for broader application, such as lack of protocol standardisation, infrastructure high cost and insufficient institutional readiness for integration. In response to that work proposes an integrated approach to future development based on cross-system interoperability, use of simulation platforms (digital twins) and continuous training of AI on a variety of traffic cases.

As a result of the study, a conceptual framework for an integrated urban transportation management system supported by AI was formed. Such a system must be not only technologically advanced, but also ethically sound and resilient to uncertainty. Further work should be focused on improving the technical components as well as developing interdisciplinary collaboration between engineers, government agencies, and urban planners. The approach proposed in the study supports the formation of a transportation environment that is not only more efficient, but also safer, more fair and adapted to the needs of modern cities.

**Ключові слова:** artificial intelligence, traffic management, smart city, machine learning, real-time systems, adaptive control, urban mobility.

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## **ПІДВИЩЕННЯ ЕФЕКТИВНОСТІ СИСТЕМИ ДОСТАВКИ ШВИДКОПСУВНОЇ ПРОДУКЦІЇ У МІСТІ ДНІПРО**

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Особливе значення транспорту в виробничій сфері полягає в тому, що, з одного боку, транспортна індустрія є самостійною галуззю, що потребує значних інвестицій, а з іншого – виступає продовженням виробничого процесу у рамках обігу товарів і послуг.

Серед різних видів транспорту особливе місце займає автомобільний. Він є високоефективним завдяки своїй мобільності та здатності до швидкої