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ALGORITHM FOR CREATING A DATABASE USING ARTIFICIAL INTELLIGENCE METHODS.

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Annotation. *The integration of artificial intelligence (AI) into database management and design has significantly enhanced the efficiency and accuracy of data organization, analysis, and storage. This article presents an algorithm for forming databases using AI techniques, focusing on machine learning, clustering, and data mining methods. The proposed algorithm automates the process of structuring and managing large datasets, improving the decision-making capabilities of database systems. By employing AI models, such as neural networks and support vector machines, the algorithm adapts to evolving data patterns and ensures optimal organization of information. This work explores the underlying AI principles used in database formation, highlights the key benefits, and outlines challenges in applying these technologies to real-world database systems.*

Keywords: *Artificial intelligence, Database formation, algorithm, machine learning, Data mining, clustering, neural networks, support vector machines.*

Аннотация. *Интеграция искусственного интеллекта (ИИ) в управление и проектирование баз данных значительно повысила эффективность и точность организации, анализа и хранения данных. В этой статье представлен алгоритм формирования баз данных с использованием методов ИИ, с упором на методы машинного обучения, кластеризации и добычи данных. Предлагаемый алгоритм автоматизирует процесс структурирования и управления большими наборами данных, улучшая возможности принятия решений в системах баз данных. Используя модели ИИ, такие как нейронные сети и машины опорных векторов, алгоритм адаптируется к развивающимся шаблонам данных и обеспечивает*

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оптимальную организацию информации. В этой работе исследуются базовые принципы ИИ, используемые при формировании баз данных, выделяются ключевые преимущества и излагаются проблемы применения этих технологий в реальных системах баз данных.

Ключевые слова: *искусственный интеллект, формирование баз данных, алгоритм, машинное обучение, добыча данных, кластеризация, нейронные сети, машины опорных векторов.*

The rapid expansion of data in various fields has placed significant pressure on traditional database management systems (DBMS), which often struggle to efficiently manage, organize, and analyze large volumes of information. Artificial intelligence (AI), with its advanced techniques in machine learning, data mining, and pattern recognition, offers promising solutions to overcome these limitations.

AI-based methods provide dynamic and adaptive approaches to database formation, enabling systems to learn from data, predict trends, and optimize structures without extensive manual intervention. These capabilities allow databases to become more intelligent, automated, and capable of handling unstructured and evolving data more effectively.

This article discusses the development of an algorithm for database formation using AI methods. We focus on the integration of machine learning algorithms, such as clustering, neural networks, and support vector machines, to structure data in an efficient and effective manner.

Machine learning is a fundamental tool for creating intelligent databases. In the context of database formation, supervised learning techniques can be used to classify data into predefined categories, while unsupervised learning methods, such as clustering, can automatically group similar data points without prior labeling. For example, k-means clustering is widely used to categorize data into meaningful clusters, facilitating better organization in databases.

Additionally, supervised learning algorithms like decision trees, support vector machines (SVMs), and random forests can improve data classification by

ISSN 3060-4567

recognizing patterns in complex datasets. These models help automate the data entry process and optimize database design, reducing manual errors and increasing efficiency.

Artificial neural networks (ANNs) are another AI technique that can be applied to database formation. ANNs can learn complex relationships between data points through multiple layers of computation, allowing for advanced pattern recognition and predictions. In database design, ANNs can be used to identify latent features or hidden patterns that traditional algorithms may overlook, helping create more accurate and relevant database structures.

By training neural networks on large datasets, databases can adapt to new data inputs and update their structures without requiring human intervention, thus creating self-organizing systems that improve over time.

Support Vector Machines are effective algorithms used for classification and regression tasks. In the context of database formation, SVMs can be employed to classify data into distinct categories or groups. By maximizing the margin between data points of different classes, SVMs ensure that databases are organized with high accuracy, which is essential for databases used in decision support systems or predictive analytics.

SVMs can also help detect outliers in the data and identify abnormal patterns, improving the quality of the information stored in the database.

The AI-based database formation algorithm consists of the following key steps:

The first step involves gathering data from various sources and preprocessing it for analysis. This includes data cleaning, handling missing values, and normalizing the data to ensure consistency.

AI methods, such as feature selection algorithms, are used to identify the most relevant features of the data. This step reduces the dimensionality of the dataset and ensures that only the most important information is included in the database.

Using unsupervised learning techniques like k-means clustering or hierarchical clustering, the algorithm groups similar data points together. This allows

ISSN 3060-4567

the database to have predefined categories that are based on the inherent relationships in the data rather than arbitrary manual grouping.

Supervised machine learning algorithms, such as decision trees or support vector machines, are then used to classify and label the data within the clusters. This step assigns clear categories to data points, making it easier for users to navigate and retrieve relevant information.

The database structure is continuously updated as new data is added. Neural networks are trained to recognize new patterns and adapt the database accordingly. This step ensures that the database can evolve with the changing needs of the users and the nature of the data.

Finally, the performance of the database is evaluated based on metrics such as retrieval time, accuracy, and data integrity. AI techniques can optimize query performance and reduce computational load by refining database structures based on usage patterns.

AI-based systems automate the process of organizing and structuring databases, reducing the need for manual intervention and improving efficiency.

AI algorithms, especially machine learning models, allow databases to adapt to new data patterns and trends, ensuring that the system remains effective over time.

By using advanced classification and clustering methods, AI can create more accurate and relevant database structures, enhancing decision-making and information retrieval.

As datasets grow, AI-based methods can efficiently scale database structures to handle increasing volumes of data without compromising performance.

Despite the promising benefits, there are challenges in applying AI methods to database formation. These include data privacy concerns, the need for large labeled datasets for supervised learning, and the complexity of implementing AI algorithms in real-time systems. Future research should focus on improving the scalability and interpretability of AI models, as well as addressing ethical concerns related to automated decision-making in database management.

AI has the potential to revolutionize the way databases are formed and managed. By incorporating machine learning, clustering, and neural networks, databases can become more intelligent, adaptive, and efficient in handling complex data structures. The proposed algorithm highlights the capabilities of AI in automating database formation, ensuring accurate categorization, and optimizing system performance. As AI technology continues to evolve, its integration into database management systems will likely lead to more sophisticated and intelligent databases that support a wide range of applications in various industries.

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