(REVIEW ARTICLE)

An extensive review of the benefits and drawbacks of AI tools

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Abstract

Today every person is directly or indirectly communicating with AI tools. Artificial Intelligence (AI) tools have revolutionized various aspects of our daily lives and industries, offering unprecedented capabilities in automation, data analysis, and decision-making. In fact users/people are getting addicted to AI tools and losing their ability to use their brains properly. AI tools are very convenient while using them, but once we/the public give up communication, it can seem passive. This entitle articles expose the concepts of the merits and demerits while using AI tools frequently. The aim of the authors is the aware of the public if they are frequently utilizing the AI tools.

Keywords: Artificial Intelligence; Different AI Tools; Benefits; Drawbacks

1. Introduction

Artificial Intelligence (AI) is a multidisciplinary field of computer science that focuses on the development of intelligent agents capable of performing tasks that typically require human intelligence. These tasks include problem-solving, learning, reasoning, perception, language understanding, and more. AI systems aim to mimic or simulate human cognitive functions to achieve various goals, such as automation, data analysis, decision-making, and more.

AI Tools [1]:

- **Machine Learning (ML):** Machine learning is a subset of AI that involves training algorithms to learn from data and make predictions or decisions without being explicitly programmed. Popular ML techniques include supervised learning, unsupervised learning, and reinforcement learning. Tools like scikit-learn, TensorFlow, and PyTorch are commonly used for ML tasks.
- **Natural Language Processing (NLP)**: NLP focuses on the interaction between computers and human language. NLP tools enable machines to understand, interpret, and generate human language. Libraries like NLTK and spaCy, as well as cloud-based services like Google Cloud NLP and Amazon Comprehend, are used for NLP tasks.
- **Computer Vision**: Computer vision is the field of AI that deals with teaching computers to interpret and understand visual information from the world, such as images and videos. OpenCV and deep learning frameworks like Keras and TensorFlow can be used for computer vision tasks.
- **Deep Learning**: Deep learning is a subset of machine learning that employs artificial neural networks, typically deep neural networks with many layers. Deep learning frameworks like TensorFlow, PyTorch, and Keras have revolutionized various AI applications, including image and speech recognition, natural language understanding, and more.

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- **Robotics**: AI plays a significant role in robotics, enabling machines to perceive their environment, plan actions, and interact with the physical world. Robotic operating systems (ROS) and various sensors and actuators are essential tools in this field.
- **Expert Systems**: Expert systems are AI applications designed to mimic human expertise in a specific domain. They use knowledge bases and inference engines to solve complex problems. Tools like CLIPS and Jess are used for building expert systems.
- **AI Planning and Optimization**: These tools focus on solving problems related to decision-making and resource allocation. They can be applied in fields like logistics, supply chain management, and scheduling. Libraries like Google OR-Tools are used for optimization tasks.
- **AI Chatbots and Virtual Assistants**: AI-powered chatbots and virtual assistants use natural language processing and machine learning to interact with users, answer questions, and perform tasks. Platforms like Dialog flow, Microsoft Bot Framework, and Rasa are used for chatbot development.
- **AI in Data Analytics**: AI is used to extract insights and patterns from large datasets. Tools like Python, R, and libraries like pandas and NumPy are commonly used for data preprocessing and analysis.
- **AI in Healthcare**: AI is employed for diagnosing diseases, drug discovery, and personalized treatment plans. Tools and platforms like IBM Watson Health and Google Health are used for healthcare applications.
- **AI in Autonomous Vehicles**: Self-driving cars and autonomous drones use AI for perception, navigation, and decision-making. Platforms like NVIDIA's DRIVE platform and Apollo by Baidu are essential tools for developing autonomous vehicles.

These AI tools and techniques are continually evolving, and they are applied across various industries to enhance efficiency, improve decision-making, and create innovative solutions to complex problems. AI's impact on society is growing, and it has the potential to revolutionize how we work, live, and interact with technology.

2. The required things to build the ai tools system

Building an AI system or tool involves several key components and considerations.Here are the things required to build an AI tool system [2]:

- **Data**: Data is the foundation of any AI system. You need high-quality, relevant, and labeled data to train and test your AI models. The amount and quality of data significantly impact the performance of your AI tool.
- **Algorithms and Models**: Choose the appropriate machine learning or deep learning algorithms and models for your specific problem. This includes neural networks, decision trees, support vector machines, and more. You may also need to develop custom models for unique applications.
- **Computing Resources**: AI models, especially deep learning models, require substantial computing power. You may need GPUs or TPUs to train large models efficiently. Cloud-based services like AWS, Google Cloud, and Azure can provide the necessary resources.
- **Software Frameworks**: Use AI development frameworks such as TensorFlow, PyTorch, or scikit-learn to implement and train your models. These frameworks offer a range of tools and libraries for machine learning and deep learning.
- **Feature Engineering**: Extract and select relevant features from your data to feed into your AI models. Feature engineering is critical for improving model performance.
- **Training and Evaluation**: Train your models on your data and evaluate their performance using appropriate metrics. You may need to fine-tune hyperparameters to optimize your model.
- **Deployment**: Once your AI model is trained and validated, deploy it into a production environment. This may involve integrating it into a web application, mobile app, or other software system.
- **Data Pipeline**: Create a data pipeline to collect, preprocess, and feed data into your AI system. This ensures that your models receive fresh data for predictions.
- **User Interface**: If your AI tool is user-facing, design a user-friendly interface for users to interact with the AI system effectively.
- **Monitoring and Maintenance**: Continuous monitoring of your AI tool is essential to ensure it performs as expected. You should be prepared to retrain your models as new data becomes available and make updates to the system as needed.
- **Ethics and Bias Mitigation**: Consider ethical and bias-related issues in your AI tool. Implement strategies to mitigate bias, ensure fairness, and protect user privacy.
- **Legal and Regulatory Compliance**: Ensure that your AI system complies with relevant legal and regulatory requirements, such as data privacy laws like GDPR or HIPAA.
- **Security**: Implement security measures to protect your AI system from potential threats and data breaches.

- **Scalability**: Plan for scalability to accommodate increased usage and data volume as your AI tool gains popularity.
- **Documentation**: Proper documentation is crucial for your team and any future maintainers of the AI system. This includes documentation for code, data, models, and usage instructions.
- **Testing**: Rigorous testing is essential to identify and fix any issues before deploying your AI system. Consider unit testing, integration testing, and user testing.
- **Support and Feedback**: Provide channels for users to seek support, offer feedback, and report issues with the AI tool.

Building AI tools and systems is a complex and multidisciplinary task that involves various fields, such as machine learning, data science, software engineering, and domain-specific knowledge. Collaboration among experts in these areas is often necessary to create successful AI solutions.

With support of above required thing and following steps to create our own AI Tools. Here are five steps that will help you build your own personal AI.

- ➢ Identify a Problem Your AI Should Solve. ...
- ➢ Choose Your AI Platform or Tech Stack. ...
- ➢ Gather Data that AI Will Use. ...
- ➢ Finetune AI with Prompt Engineering. ...
- ➢ Deploy and Monitor Your AI.

2.1. The basic architecture to work in ai tools

The architecture for AI tools [3] can vary depending on the specific task and the level of complexity required. However, I can provide you with a basic overview of the components commonly found in AI tools and systems. In order to learn from patterns and characteristics in the data they study, artificial intelligence (AI) systems combine massive amounts of data with clever, iterative processing methods. Every time an AI system processes data, it evaluates and assesses its own performance and gains new knowledge. How does artificial intelligence operate if it's a sophisticated but essential technology? In short, artificial intelligence functions by merging complex processing algorithms with extensive data sets. Through the process of identifying patterns in the data collection, artificial intelligence may modify these algorithms.

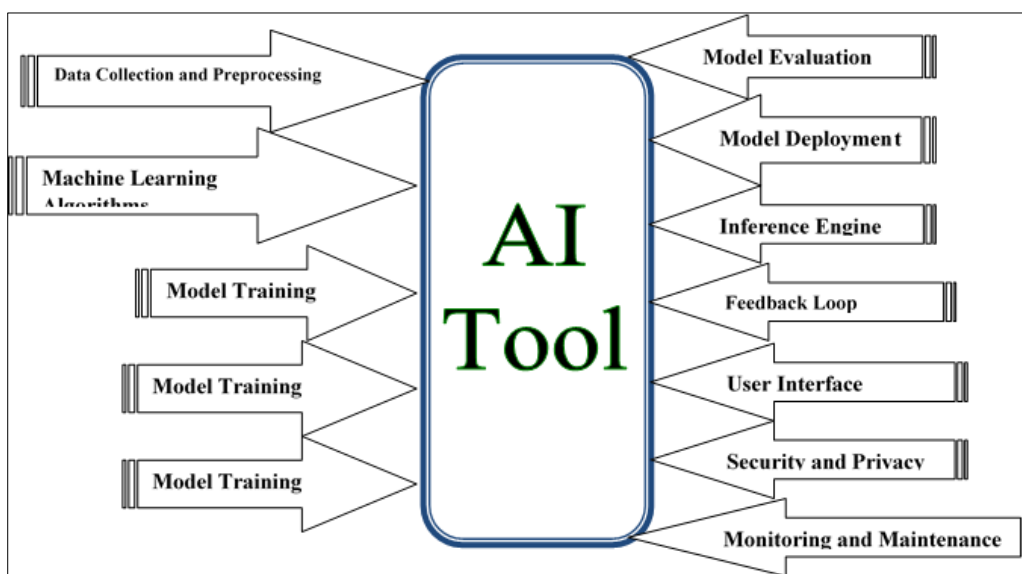The following diagram describes the components of AI tools.

Figure 1 The components of AI tool

It's important to note that the architecture of AI tools can vary significantly depending on the specific use case, the AI techniques employed, and the technology stack used. Additionally, advancements in AI research and technology can lead to changes in AI tool architecture over time.

2.2. Function processor in the ai tool

The "function processor" in the context of an AI tool [4] typically refers to a component or module within the AI tool that is responsible for performing specific functions or tasks. The exact nature and purpose of a function processor can vary widely depending on the AI tool's intended use and design. Here are some common examples of function processors in AI tools:

- Natural Language Processing (NLP) Processor: This function processor is responsible for understanding and processing human language input. It can include tasks such as text tokenization, part-of-speech tagging, entity recognition, sentiment analysis, and language translation.
- Image Processing Processor: In AI tools that work with images, this processor is responsible for tasks like image recognition, object detection, image segmentation, and image enhancement.
- Data Analysis Processor: AI tools designed for data analysis and data science may have processors that perform tasks like data cleaning, feature engineering, statistical analysis, and machine learning model training.
- Speech Recognition Processor: In AI tools for speech-related tasks, this processor converts spoken language into text. It involves tasks such as audio signal processing, speech-to-text conversion, and voice command recognition.
- Recommendation Engine Processor: Recommendation systems use processors to analyze user behavior and preferences to suggest products, content, or services. These processors may employ collaborative filtering, content-based filtering, or hybrid recommendation algorithms.
- Reinforcement Learning Processor: In AI tools that involve reinforcement learning, this processor manages the interaction between the AI agent and the environment, facilitating learning and decision-making.
- Vision Processing Processor: AI tools for computer vision tasks may have processors that handle tasks such as feature extraction, object tracking, and 3D reconstruction.
- Control Systems Processor: For AI tools used in robotics and automation, this processor manages control algorithms and feedback loops for controlling physical systems.

The specific functions and capabilities of a function processor depend on the AI tool's goals and its underlying algorithms and models. Function processors are often designed to work in conjunction with one another to enable the AI tool to perform its intended tasks effectively.

AI tools may use various AI techniques and technologies, including machine learning, deep learning, neural networks, and more, to implement these function processors. The design and architecture of an AI tool can vary widely based on the complexity of the tasks it needs to perform.
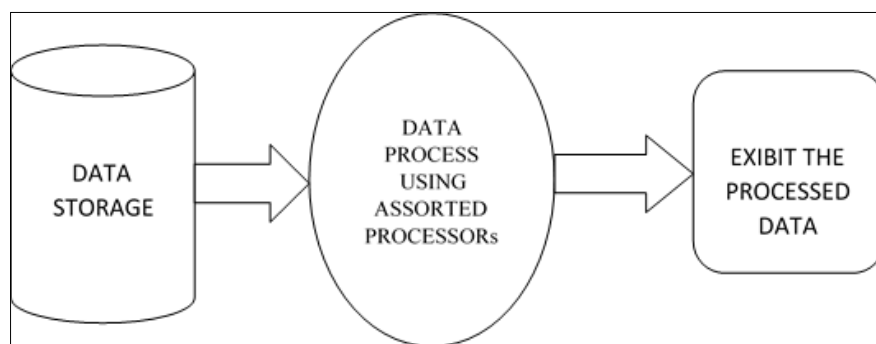

Figure 2 AI TOOL Functionality

3. Merits and demerits using at tools

Using AI tools in various applications has both merits and demerits. Here are some of the key advantages and disadvantages:

3.1. Merits of Using AI Tools [5]:

- Efficiency and Automation: AI tools can automate repetitive tasks and processes, saving time and reducing the risk of human error. This leads to increased efficiency in various industries, from manufacturing to customer service.

- Data Analysis: AI tools can process and analyze vast amounts of data quickly, helping businesses make data-driven decisions, identify trends, and discover valuable insights.
- Personalization: AI can be used to personalize user experiences, whether in e-commerce, content recommendation, or marketing. This leads to better customer satisfaction and increased engagement.
- Predictive Analytics: AI can predict future events or trends based on historical data, which can be invaluable for businesses in terms of inventory management, maintenance scheduling, and financial forecasting.
- 24/7 Availability: AI-powered chatbots and virtual assistants can provide round-the-clock customer support, enhancing service availability.
- Medical Applications: AI tools can assist in early disease detection, drug discovery, and medical image analysis, potentially saving lives and improving healthcare outcomes.
- Natural Language Processing (NLP): NLP algorithms enable machines to understand and generate human language, facilitating language translation, sentiment analysis, and chatbots.
- Improved Safety: AI can enhance safety in various sectors, such as autonomous vehicles and industrial settings, by reducing the likelihood of accidents and errors.

3.2. Demerits of Using AI Tools [5]:

- Job Displacement: The automation of tasks using AI can lead to job displacement, particularly in industries with routine and repetitive tasks, potentially causing unemployment.
- Bias and Fairness: AI systems can inherit biases from the data they are trained on, leading to biased decisions in areas like hiring, lending, and criminal justice.
- Privacy Concerns: AI tools that collect and analyze personal data raise privacy concerns, especially when data is used without consent or for unethical purposes.
- Security Risks: AI systems can be vulnerable to hacking and misuse, which can have serious consequences, especially in critical infrastructure and cyber security.
- Ethical Issues: The development and use of AI tools raise ethical questions, such as the moral implications of autonomous weapons, surveillance systems, and the impact on human society.
- Cost of Implementation: Implementing AI tools can be expensive, and not all organizations may have the financial resources to adopt these technologies.
- Dependency on Technology: Overreliance on AI tools can lead to a loss of critical skills and knowledge in specific domains, as humans increasingly depend on machines for decision-making. It's important to carefully consider these merits and demerits when implementing AI tools and to have policies and regulations in place to address potential challenges and ensure responsible and ethical AI use.
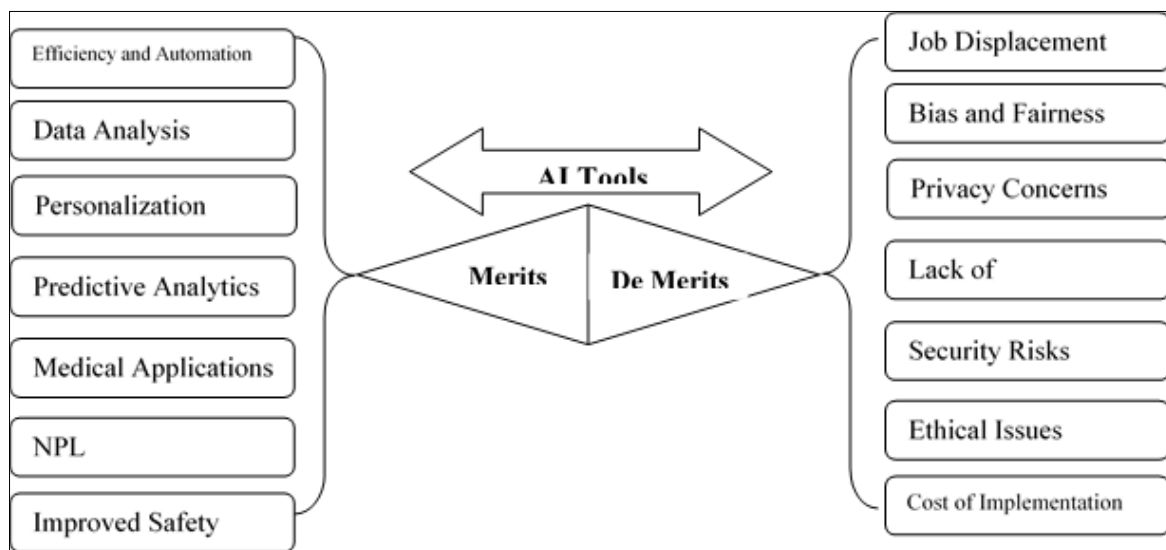
Figure 3 Merits and Demerits of AI Tools

4. Conclusion

There are benefits and drawbacks to AI tools, and their effects on different fields are still being discussed and investigated. AI solutions provide many benefits, including improved productivity and data analytic skills. They do,

however, also raise issues with regard to ethics, security, privacy, accountability, and the displacement of jobs. It is a difficult and continuous task for society to strike a balance between utilizing AI's advantages and reducing its disadvantages. Rules and moral principles are necessary to guarantee that artificial intelligence is developed and applied ethically, maximizing its benefits and avoiding its drawbacks.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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