SAICA DIFFERENCE MAKERS™

The difference Makers Guide to AI

SAICA Audit and Assurance Division

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Objective of the Manual

Emerging technologies such as Augmented Reality (AR), Big Data, Blockchain, Cleantech, Internet of Things (IoT) and Artificial Intelligence (AI) are innovative tools, systems, or advancements that have the potential to dramatically alter industries, economies, and societies.

The United Nation Development Programme (UNDP) champions AI to accelerate progress towards sustainable development, whilst steadfastly promoting human rights. This involves the ethical, transparent and sustainable development and utilization of AI technologies to ensure their deployment strengthens local AI ecosystems

This manual provides a general understanding of artificial intelligence and empower members to be able to apply the key learnings of the guide when some of the terms or topics mentioned in the guide are used or discussed. It also gives an overview of practical considerations to keep in mind when using artificial intelligence (AI).

1. What is Artificial Intelligence?

Artificial Intelligence (AI) refers to the development of computer systems that can perform tasks that typically require human intelligence. These tasks include problem-solving, learning from experience, and making decisions based on data. AI is significant because it has the potential to revolutionise various industries, from healthcare to finance, by automating processes, improving efficiency, and enabling machines to understand and interpret complex data.

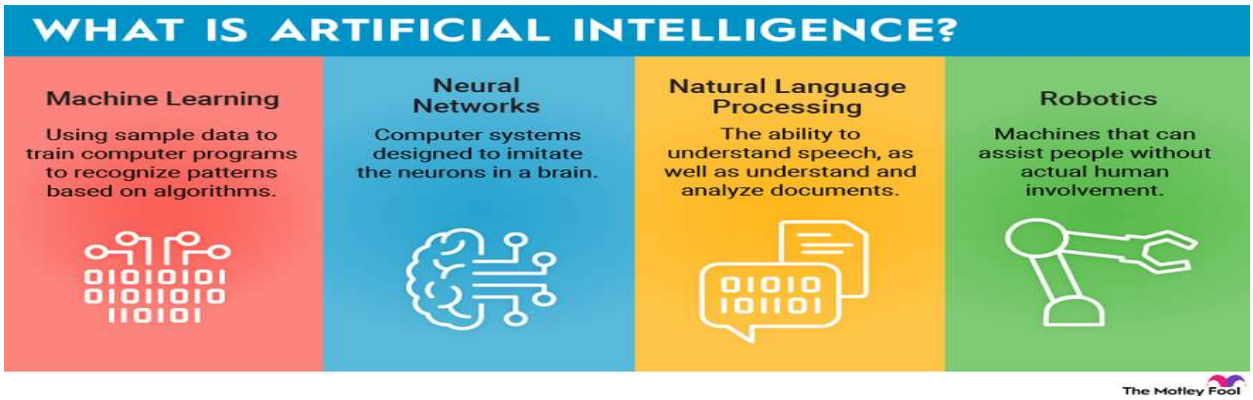
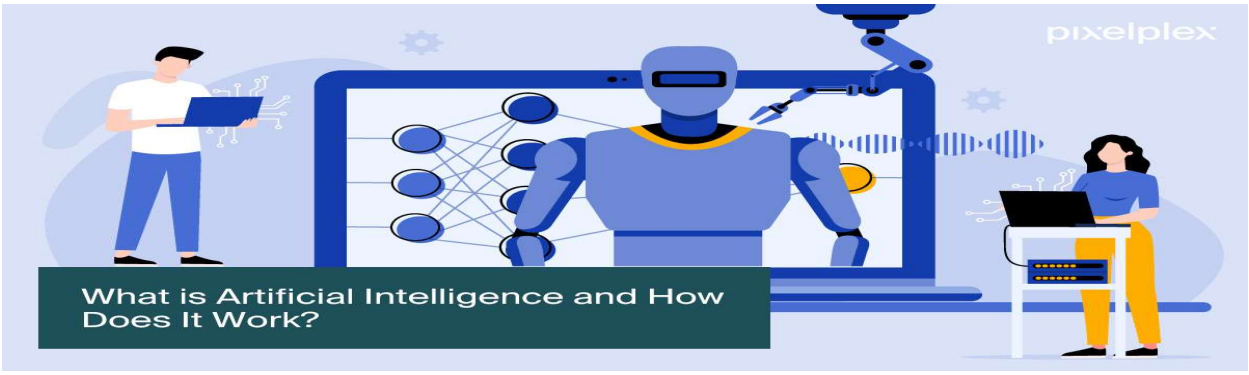


Table 1.1

2. How does AI work?

AI works through a combination of algorithms and machine learning techniques. Algorithms are step-by-step instructions that computers follow to perform specific tasks. In AI, these algorithms are designed to process and analyse data, extract patterns, and make predictions. Machine learning is a subset of AI that involves training algorithms on large datasets to improve their performance over time.

AI algorithms use data to make decisions and predictions. They learn from the data they are exposed to, adjusting their behaviour and improving their accuracy as they process more information. This allows AI systems to recognise patterns, understand natural language, and perform tasks like image recognition, speech recognition, and autonomous decision-making.



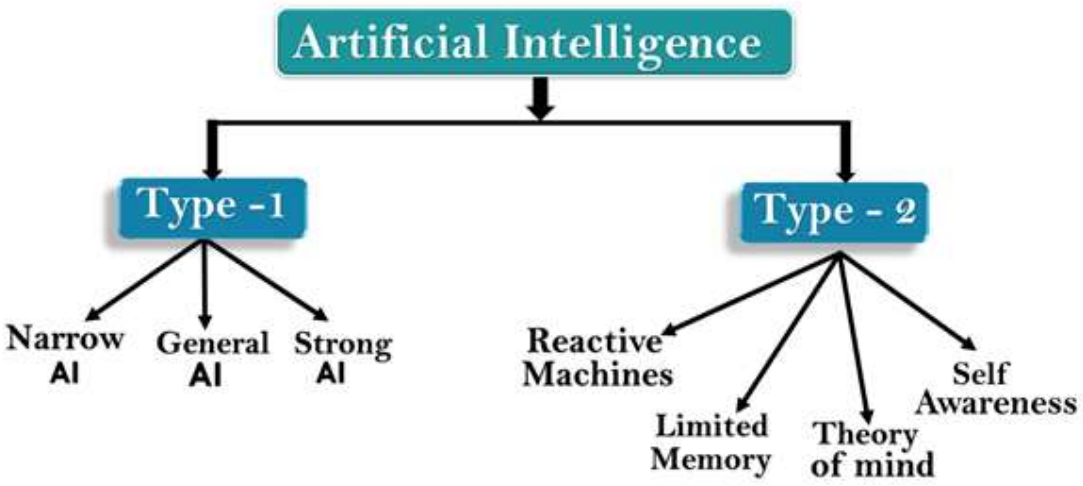
3. What are the main challenges in AI development?

AI development faces both technical challenges and societal impacts.
Technical challenges include achieving higher accuracy and efficiency in AI models, improving natural language understanding, and addressing issues related to scalability. Research and innovation in these areas drive AI progress.

Societal impacts encompass concerns about job displacement, transparency, and accountability. As AI becomes more integrated into society, addressing these issues is essential. Developing policies and regulations, along with fostering ethical AI practices, is key to mitigating negative societal impacts.

4. What are the different types of AI?

Artificial Intelligence (AI) comes in various forms, each with distinct capabilities and applications. Understanding these types is crucial for grasping the landscape of AI technologies. We'll delve into the differences between Narrow AI vs. General AI and Weak AI vs. Strong AI.



4.1 Narrow AI (Artificial Narrow Intelligence – ANI)

Narrow AI, also known as Artificial Narrow Intelligence (ANI) or Weak AI, is the most prevalent form of AI today. It excels at specific tasks and operates within predefined parameters. Think of virtual assistants like Siri or Alexa; they're great at voice recognition and providing answers, but they lack a deep understanding of context.

Narrow AI systems are designed for specialised tasks, from image recognition in self-driving cars to fraud detection in financial institutions. They rely on extensive datasets and advanced algorithms to perform exceptionally well in their domains. However, they can't generalise their knowledge to tasks outside their scope.

4.2 General AI (Artificial General Intelligence – AGI)

On the other end of the spectrum, we have General AI, also called Artificial General Intelligence (AGI) or Strong AI. AGI represents the holy grail of AI development. It possesses human-like cognitive abilities, enabling it to learn, reason, and adapt to a wide range of tasks, much like the human mind.

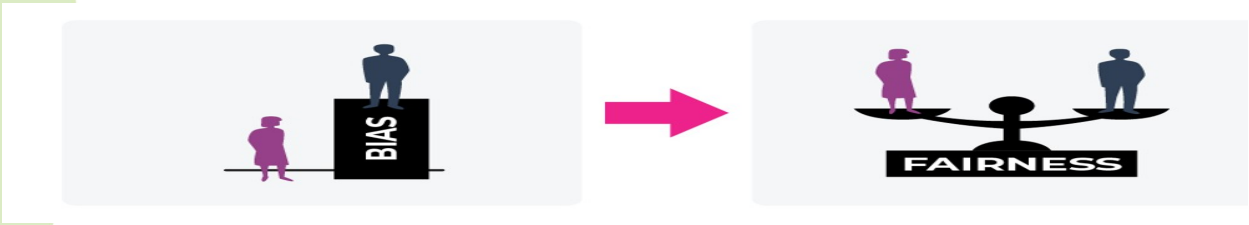
AGI is a type of artificial intelligence (AI) that matches or surpasses human cognitive capabilities across a wide range of cognitive tasks. This contrasts with narrow AI, which is limited to specific tasks.

5. What is AI-Bias and fairness

AI bias, also called machine learning bias or algorithm bias, refers to the occurrence of biased results due to human biases that skew the original training data or AI algorithm—leading to distorted outputs and potentially harmful outcomes.

Many AI systems learn from historical data that reflects human decisions, behaviour, and assessments. If this data contains prejudices against certain groups or individuals, the AI learns these prejudices and replicates them in its decisions.

When AI bias goes unaddressed, it can impact an organization's success and hinder people's ability to participate in the economy and society. Bias reduces AI's accuracy, and therefore its potential. Businesses are less likely to benefit from systems that produce distorted results.

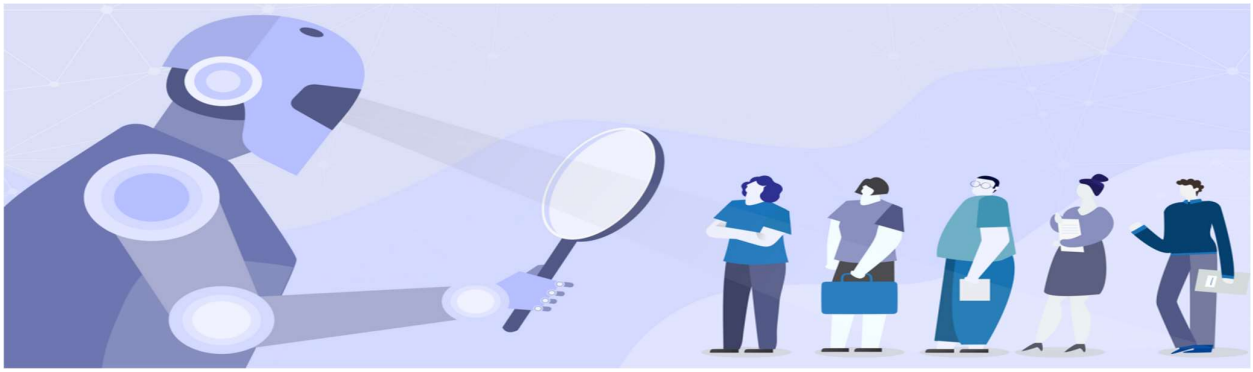


Biased data can lead to discriminatory or incorrect outcomes. To mitigate bias, it's essential to scrutinise data sources.

Three examples of the potential pitfalls of biased data noted in America:

- In the healthcare sector, biased data led to racial disparities in medical care assessment by AI systems, highlighting the risk of perpetuating historical biases.
- In criminal profiling, AI's reliance on biased data resulted in disproportionate profiling of African Americans, even when white individuals had committed similar crimes.
- In workforce hiring, AI systems, influenced by historical data, favoured male candidates over females, undermining diversity in the workplace.

Foundational principles of fair AI should include transparency, accountability, and ethical consideration. Transparency ensures that the decision-making processes of AI systems are clear and understandable. Accountability holds developers and users responsible for the outcomes of AI applications.

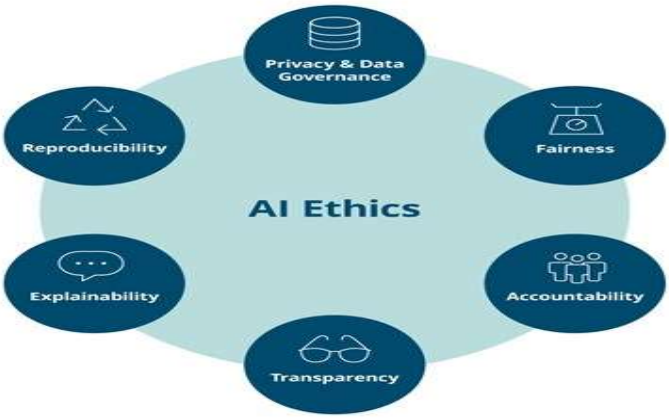


6. What are the ethical considerations to keep in mind with AI?

Ethical considerations in AI are crucial, and they revolve around addressing AI bias and privacy concerns. AI systems can inadvertently reflect biases present in their training data. This bias can lead to unfair or discriminatory outcomes. To tackle this, developers must

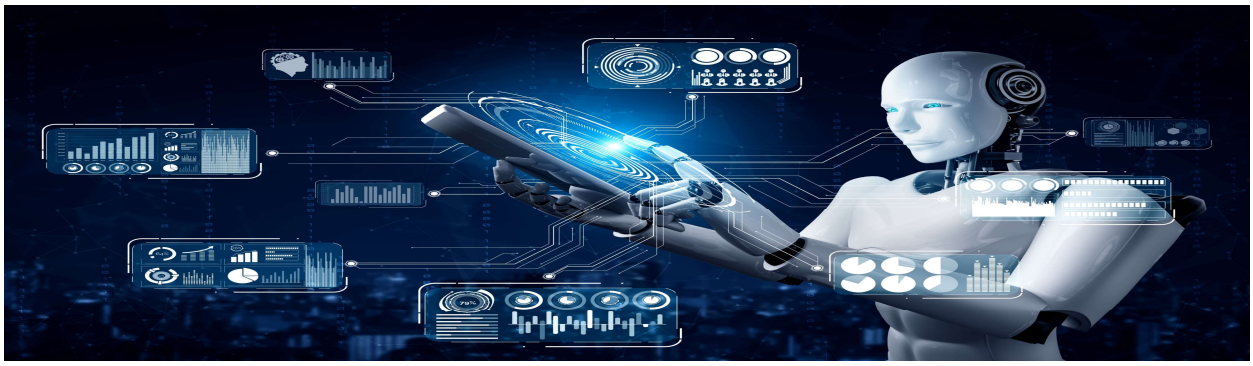
implement robust bias detection and mitigation techniques. It involves carefully curating training data and continuously monitoring AI systems for bias.

Privacy concerns arise due to the vast amount of data AI systems process. Protecting individuals' privacy is vital. This involves implementing stringent data anonymisation techniques, secure storage, and adherence to data protection regulations like General Data Protection Regulation (GDPR).



7. How are machine learning and AI related?

Machine learning and Artificial Intelligence (AI) are closely related but distinct fields within the broader domain of computer science. AI includes not only machine learning but also other approaches, like rule-based systems, expert systems, and knowledge-based systems, which do not necessarily involve learning from data. Many state-of-the-art AI systems are built upon machine learning techniques, as these approaches have proven to be highly effective in tackling complex, data-driven problems.



8. What is machine learning, and how does it relate to AI?

Machine learning (ML) is the bedrock of artificial intelligence (AI). At its core, ML empowers AI systems to learn from data and improve their performance over time. Imagine it as

teaching a computer to recognise patterns and make decisions, much like a human brain, but with the advantage of processing vast amounts of data at lightning speed.
In simpler terms, machine learning is a subset of AI that focuses on enabling computers to learn from experience.

AI, on the other hand, encompasses a broader spectrum of technologies that aim to simulate human intelligence, including problem-solving, reasoning, and decision-making.
The connection between ML and AI is profound. ML algorithms enable AI systems to recognise images, understand spoken language, predict stock prices, and even drive autonomous vehicles. In essence, machine learning is the engine that powers AI's ability to think and act intelligently.

9. What is Data analytics?

Analysing data quickly and accurately, while identifying patterns and anomalies, lead to more valuable insights for executive leadership and enable quicker fixes of control issues. Predictive analytics are pivotal in improving efficiencies in areas such as payroll expenses, vendor management, order and sales activity, and error identification in accounts payable processes. Auditors will also be able to focus more on high-risk areas, thus providing more value to the organisation.

10. What is the advantage of virtual reality (VR) and augmented reality (AR) and how can it be used?

Augmented reality (AR) and virtual reality (VR) are both technological experiences that change how digital technology interacts with the physical world. AR and VR are often lumped together, but each has its way of interacting with the virtual environment.

AR uses a real-world setting while VR is completely virtual. AR users can control their presence in the real world; VR users are controlled by the system. VR requires a headset device, but AR can be accessed with a smartphone.

Artificial Intelligence (AI) enables computer applications to mimic human-like intelligence and can resolve problems, make predictions, and provide solutions. Augmented Reality (AR) enhances real-world objects on a virtual platform to create an immersive environment.

These advanced tools are becoming increasingly integrated with the Internal Audit function. The interactivity of VR and AR will allow opportunities to drill deeply into data, enabling senior management and board members to make better informed decisions.

Auditors could use VR to 'walk through' a facility without physically being there i.e 360° virtual reality camerasor use AR to overlay data onto a physical space i.e metaverse analytics are used to track user behaviour within the Metaverse

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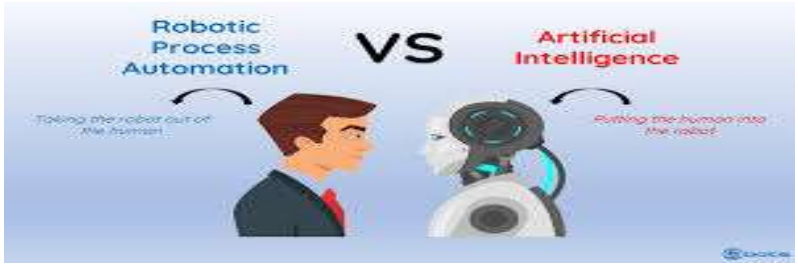
11. What is the difference between Automation and AI?

Complexity and Adaptability: Automation is typically rule-based and designed to perform a highly specific, repetitive task without variation. It doesn't "learn" from its experiences but rather follows pre-set instructions. In contrast, AI involves a level of complexity and adaptability; it can learn from data, improve over time, and make decisions based on its learning. AI can handle a wider variety of tasks and adapt to new situations that it wasn't explicitly programmed for.



Scope of Application: Automation is generally applied to tasks that require consistency and precision but do not necessarily require adaptation or decision-making based on unknown variables. AI, particularly with the inclusion of machine learning, is applied to areas requiring decision-making that mimics human judgment, such as recognising speech, interpreting complex data, or predicting trends.

As the application of technology becomes more commonplace in the Internal Audit function, some of the core compliance functions can be automated to improve operational efficiency. Automation will also allow the Internal Audit function to focus more on emerging risks, fraud trends, root cause analysis and providing problem-solving solutions to address risk areas in a more preventive and timely manner.

12. Natural language processing

Natural language processing (NLP) models driven by artificial intelligence (AI) – like ChatGPT and Google Bard – improve efficiency, ensure consistency, maintain quality assurance, and facilitate continuous assurance. These tools are particularly valuable when

dealing with large volumes of unstructured textual data that require analysis and interpretation.

What is natural language processing (NLP) in AI?

Natural Language Processing (NLP) is a subset of artificial intelligence that focuses on the interaction between computers and human language. Its goal is to enable computers to understand, interpret, and generate human language in a valuable way.
NLP plays a crucial role in various applications, from chatbots that converse with users in natural language to language translation systems like Google Translate. At its core, NLP involves three key tasks:

- **Tokenisation:** Breaking down text into individual words or phrases, known as tokens.
- **Syntax Analysis:** Understanding the grammatical structure of sentences to identify relationships between words.
- **Semantics:** Extracting the meaning and context from text to comprehend user intentions.

NLP leverages machine learning techniques and large language datasets to achieve these tasks. It allows AI systems to process and respond to text or speech inputs in a way that feels natural to humans

13. What is the role of digital assurance

Digital assurance encompasses technology, data analytics, and advanced tools to optimise assurance processes and enhance audit quality. It employs data analytics, AI, automation, and continuous monitoring to assess the accuracy, completeness, and reliability of financial and non-financial information.

14. How do AI neural network's function?

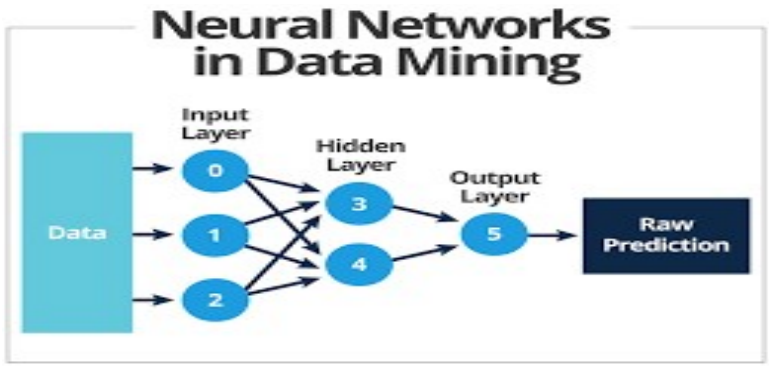
AI neural networks are the building blocks of many modern AI systems. They draw inspiration from the human brain's neural structure and are designed to process information in a similarly interconnected way. These networks consist of layers of artificial neurons, each responsible for specific computations.

Here's how it works: Input data is fed into the first layer of the neural network. Each neuron in this layer processes a piece of the input data and passes its output to the next layer. This process continues through multiple layers, with each layer performing increasingly complex computations. Finally, the output layer produces the network's final prediction or decision.

The magic lies in training these neural networks. During training, the network is exposed to a vast amount of labeled data, and it adjusts its internal parameters (weights and biases) to minimize errors. This fine-tuning process allows the network to make accurate predictions when presented with new, unseen data.

In essence, AI neural networks function by simulating the interconnected processing of information, enabling them to perform tasks like image recognition, natural language understanding, and more. It creates an adaptive system that computers use to learn from

their mistakes and improve continuously. Thus, artificial neural networks attempt to solve complicated problems, like summarising documents or recognizing faces, with greater accuracy.



15. Six regulatory trends in Artificial Intelligence

Core principles: The AI regulation and guidance under consideration is consistent with the core principles for AI as defined by the Economic Co-operation and Development(OECD) and endorsed by the G20 These include respect for human rights, sustainability, transparency and strong risk management.

Risk-based approach: Some of the countries within G20 are taking a risk-based approach to AI regulation. What that means is that they are tailoring their AI regulations to the perceived risks around AI to core values like privacy, non-discrimination, transparency and security. This “tailoring” follows the principle that compliance obligations should be proportionate to the level of risk (low risk means no or very few obligations; high risks mean significant and strict obligations).

Sector-agnostic and sector-specific: Because of the varying use cases of AI, some jurisdictions are focusing on the need for sector-specific rules, in addition to sector-agnostic regulation.

Policy alignment: The EU is taking a comprehensive approach to AI-related rulemaking within the context of other digital policy priorities such as cybersecurity, data privacy and intellectual property protection compared to South Africa, which is still lagging behind when it comes to developing laws and policies around AI.

Private-sector collaboration: Many of these jurisdictions are using regulatory sandboxes(a framework set up by a financial sector regulator to allow small-scale, live testing of innovations by private firms in a controlled environment under the regulator's supervision) as a tool for the private sector to collaborate with policymakers to develop rules that meet the core objective of promoting safe and ethical AI, as well as to consider the implications of higher-risk innovation associated with AI where closer oversight may be appropriate.

- **International collaboration:** Driven by a shared concern for the fundamental uncertainties regarding the risks to safety and security posed by powerful new generative and general purpose AI systems, countries are pursuing international collaboration towards understanding and addressing these risks i.e Algorithmic bias caused by bad data, Socioeconomic inequality, Weapons automatization, Lack of Data Privacy Using AI Tools, Weakening Ethics and Goodwill as a result of using AI.

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