



# Artificial Intelligence and blockchain

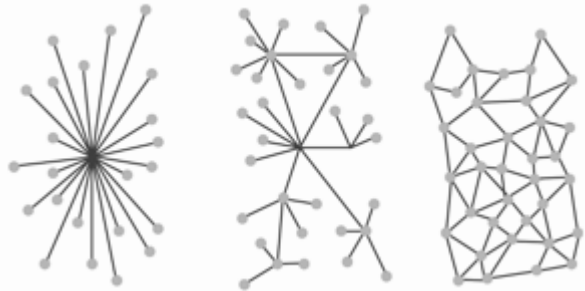
*Stronger together*

Dr Yannis Kalfoglou

# AI meets blockchain, blockchain meets AI

## BLOCKCHAIN

*Decentralized, distributed...*



*Immutable, safe,  
consensus, self-executable*



## Possibilities...

*Decentralized AI*

*Certified data marts*

*Track n trace audits (explainable AI)*

*Efficient, intelligent, transactions' ordering*

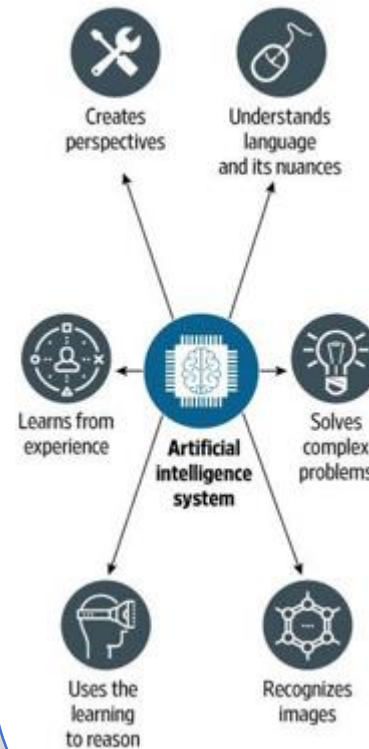
*Smart consensus*

*Smart marketplaces (data, algorithms, AIs)*

...

## AI

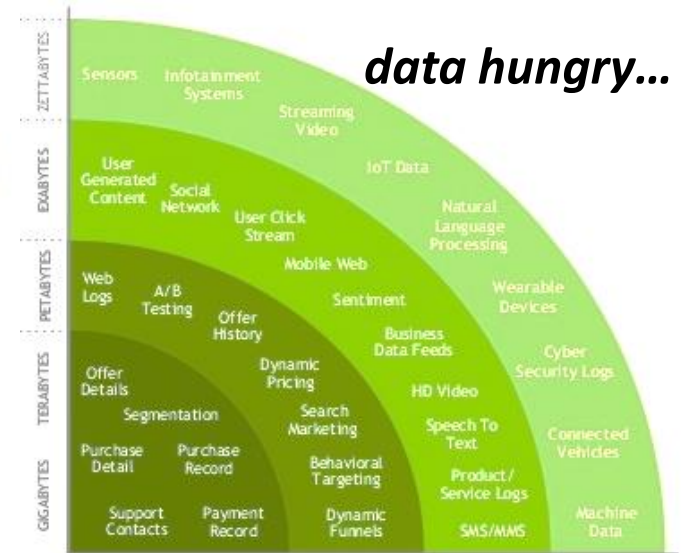
*Exhibits intelligence*



*data master...*



*data hungry...*



# ARTIFICIAL INTELLIGENCE USES IN BLOCKCHAIN

- ✓ Blockchain's consensus mechanisms are slow and expensive to run **AI can help with optimizing the path to consensus** and calculate (semi-) automatically the least compute-heavy, hence, less energy consumed, path to consensus.
- ✓ **AI can also help with smart agents** - the birth place of multi-agent systems and topologies of agents have been explored in AI since the 90s - tasked with orchestrating actions between them to achieve federated consensus at the enterprise level. This could cut the coordination time between nodes and more effectively manage network resources to validate transactions.
- ✓ AI use in blockchain can have an impact on cost, as **optimized blockchains** would result in more spare capacity, which then could be used for other operations or re-directed to power up AI blockchains (GPUs from mining to DNN training)

# ARTIFICIAL INTELLIGENCE USES IN BLOCKCHAIN

- ✓ AI's role in blockchain smart contracts - **AI can enable more sophisticated triggering mechanisms for smart contracts**, which go beyond externally sources trigger points through vetted oracles. There is little or no automation in monitoring and interacting with a live smart contract; AI can help there with continuously learning best execution paths and adjusting trigger points to suit the contextual changes in the surrounding environment.
- ✓ AI's role in redefining multi-modal interfaces is big. Lately, the advent and maturity of virtual agents, like chatbots, is only a first demonstration of the different modalities that could be the next user interface - go beyond keyboard and vocal commands. Yet, developing and interacting with blockchain(s) and smart contracts on-the-fly, is still done at the programming environment of software development apparatus. **An AI-driven multi-modal interface could help lower the barrier of interaction with blockchain** and empower new innovations to emerge.

# BLOCKCHAIN USES IN ARTIFICIAL INTELLIGENCE

- ✓ **Explainable AI:** Blockchain(s) can help there as their core characteristic is that of immutability and track and trace of verifiable audits. If we are in a position to record all the high level steps followed by AI algorithms in an immutable and traceable blockchain, we can then improve the explainability of the system and be able to go back in time and explain any decision ever made by that AI system. This could have an impact on the visibility of underlying algorithms and reduce training data sets bias;
- ✓ **Data:** most state-of-the-art AI systems rely on gigantic data feeds, the scale of which makes them affordable only by the very few tech conglomerates. But blockchain(s) can help **federate and democratize the data sourcing for AI systems**. More and better vetted data, federated and contributed by many, not selected few, resulting in better models and results as a consequence and better AI experience;

# BLOCKCHAIN USES IN ARTIFICIAL INTELLIGENCE

- ✓ the emergence of "blockchain AIs", that is, **AI systems that they themselves live on blockchain**. Therefore, are by the nature of blockchain, immutable, shareable, decentralized – no central AI authority control.
- ✓ Tokenized AI: tapping a little into the inner mechanics of modern ML, **blockchain technology can help tokenize the rewards' mechanism for emerging ML techniques, like reinforcement learning**. Typically, these are done at the programmatic level, before the AI system is shipped out, but blockchain(s) can help tokenize the entire reinforcement learning mechanism, thus providing new innovations and economic incentives for a truly distributed ML environment.

ARTIFICIAL INTELLIGENCE

# ARTIFICIAL INTELLIGENCE USES IN BLOCKCHAIN

# BLOCKCHAIN USES IN ARTIFICIAL INTELLIGENCE

**UNLOCK** BLOCKCHAIN  
FORUM

15 - 16  
Jan 2019

Dubai  
United Arab Emirates



JOIN ME



**Dr. Yannis Kalfoglou**  
Blockchain Advisor

SPEAKER

## Day Two: 2019-01-16

08:30 AM Networking Breakfast  
1 hour

09:30 AM Panel 6: If I were an AI & you were a Blockchain, how would we Tango in a Smart City?  
45 minutes

This panel will discuss how artificial Intelligence and Blockchain technologies can work together to enhance the efficiencies and quality of offerings in Smart Cities given the data generated from Blockchain and the predictive analytics derived from AI.

10:15 AM UNLOCK Chat: Is Blockchain infringing on privacy or protecting it?  
45 minutes

Privacy, security of data, and the latest GDPR compliance law in EU have opened up Pandora's box as to whether the Blockchain were data is

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