

# Blockchain and Artificial Intelligence - The Beauty and the Beast

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# Background

- > Theoretical physicist - large scale structure formation in the early universe, ETH/UZH
- > PhD in robotics and artificial intelligence - influence of embodiment on intelligence, UZH
- > Postdoc in chemistry / materials science - self-assembling micro-robots, Harvard University
- > Founder / CEO / CTO of cleantech startup Enexra / Siltecta GmbH, raised EUR 8M, PoC of technology, 15+ patents
- > Currently: Senior lecturer at ZHAW in Mathematics, applied research in energy, AI, robotics
- > Currently also: Stealth robotics startup entrepreneur, Blockchain+AI advisor for Chinese group




# Blockchain and AI - Characteristics

	Blockchain
	
Description	Ledger for reliably recording and storing transactions
Operations	“Rule-based”
Example	Bitcoin, Ethereum
“Killer app”	Bitcoin




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Operations	“Rule-based”	“Rule-based”
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“Killer app”	Bitcoin	Chess, routing

# Blockchain and AI - Characteristics




	Blockchain	“old style” AI	“new style” AI
			
Description	Ledger for reliably recording and storing transactions	Rule-based logical reasoning	Biologically inspired machine learning and prediction
Operations	“Rule-based”	“Rule-based”	“Statistical”
Example	Bitcoin, Ethereum	Expert systems	Deep Neural Networks
“Killer app”	Bitcoin	Chess, routing	Speech recognition

# Blockchain and AI – Complementing each other




	Blockchain	“old style” AI	“new style” AI
			
Data storage	Local or distributed	Usually local	Usually distributed



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Backtracking	Easy	Easy	Hard
Learning, adaptation	Typically not, except “forks”	Yes, mostly supervised	Yes, supervised and unsupervised

# AI for Blockchain: Blockchain gets real (world)

Originally, Blockchain was only used “purely” (Bitcoin) or extended by programs manipulating the blockchain itself (Ethereum). Both are rule based, “digital” and “clean” environments.

→ Need AI for bringing the real world into Blockchain:



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- > Managing / controlling / optimizing blockchain operation: e.g., intelligent distributed cloud (e.g. DFINITY)
- > Blockchain stability, development: e.g., predictions of protocol changes, performance, market; (self-)adaptation

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- Use blockchain to trace, control, and gate user’s data flow between different, non-trusting AI applications / devices
- Use blockchain to keep track of an AI’s decision making, e.g. for holding machines (legally) accountable

# Blockchain for AI: Trust the robots!

Blockchain for AI – distributed trust between humans and machines:

- > IoT, sharing economy, medical, transport: Where does my data go?  
Now: Give away for free, forever. Better: Limit use by application or time, share it under own control, able to revoke sharing rights, compensate for use (e.g. 3D design), process/use without revealing.



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- > Technology already available, drivers from data protection laws and possibly increased consumer awareness

# Thank you for your attention! Questions?

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