AI Panel Discussion

ETH Zurich, 27 October 2017

reatch
research and technology
in switzerland

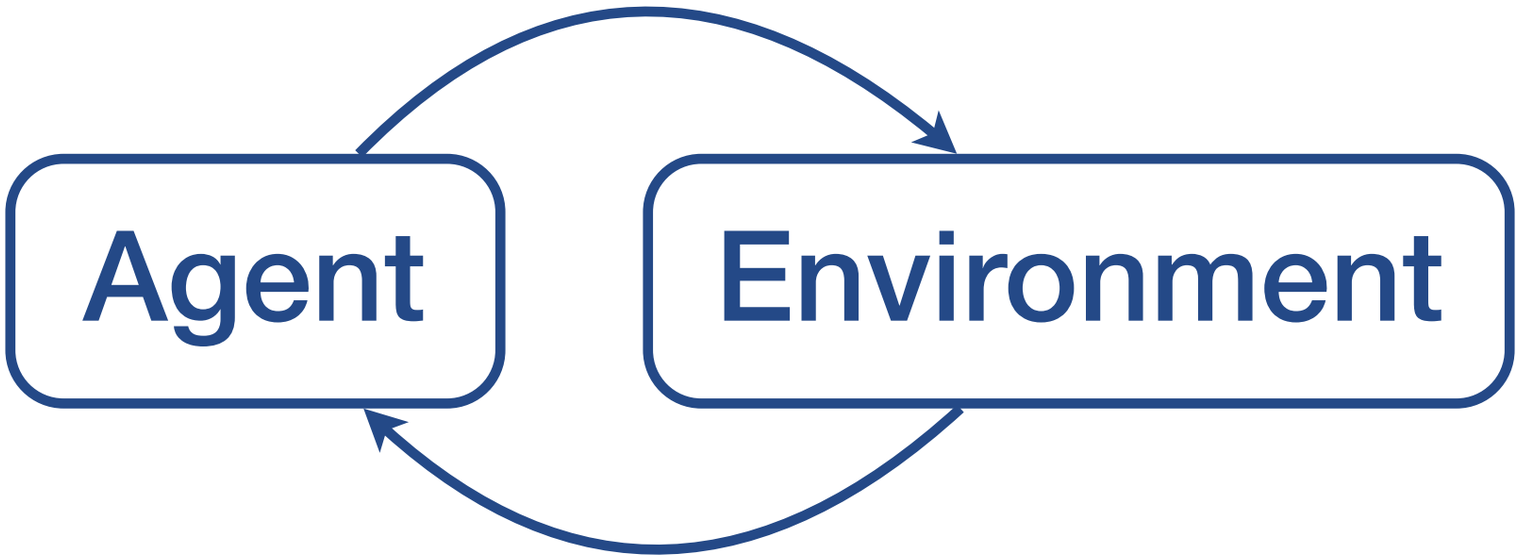
Kaspar Etter
www.reatch.ch

Intelligence

«Intelligence measures an agent's ability to achieve its goals in a wide range of unknown environments.»

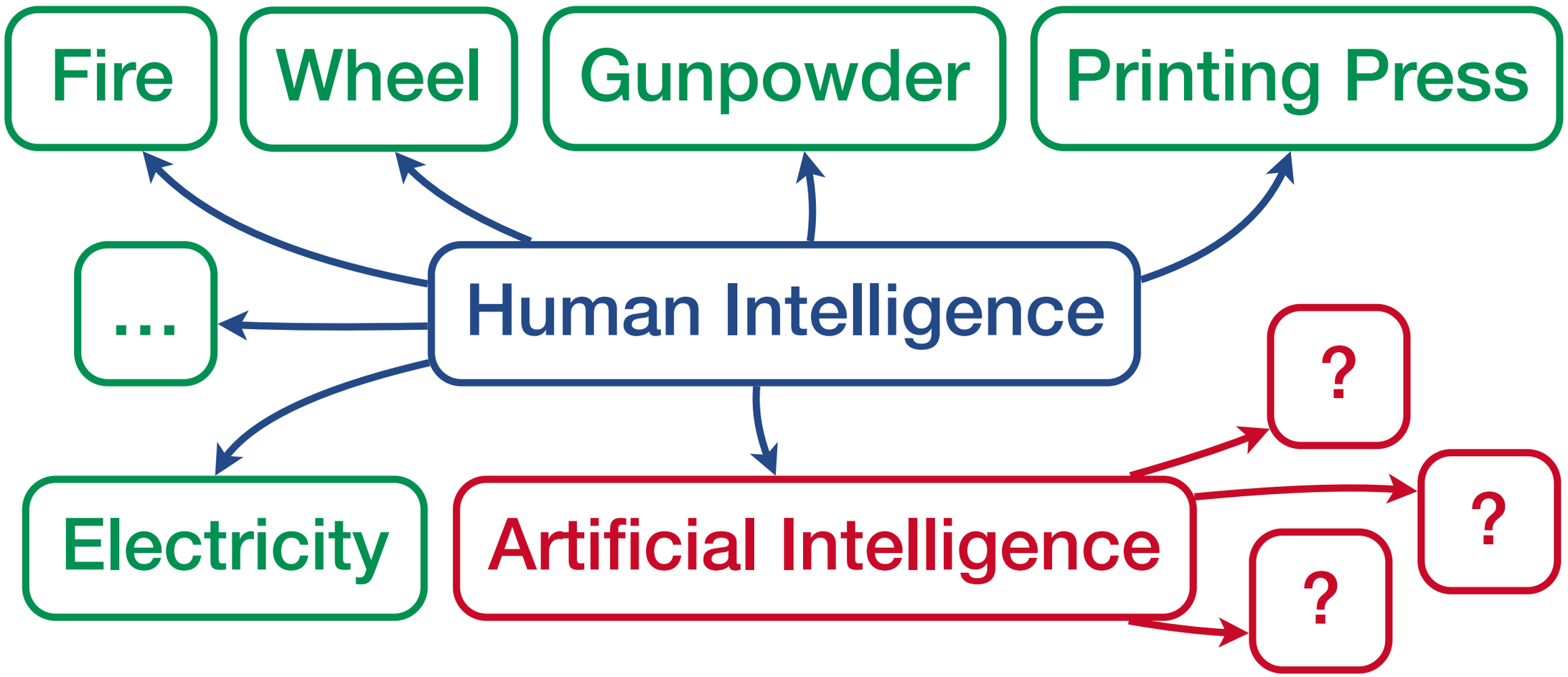
$$\text{Intelligence} = \frac{\text{Optimization Power}}{\text{Used Resources}}$$

Interaction



Learn, predict, rate and plan

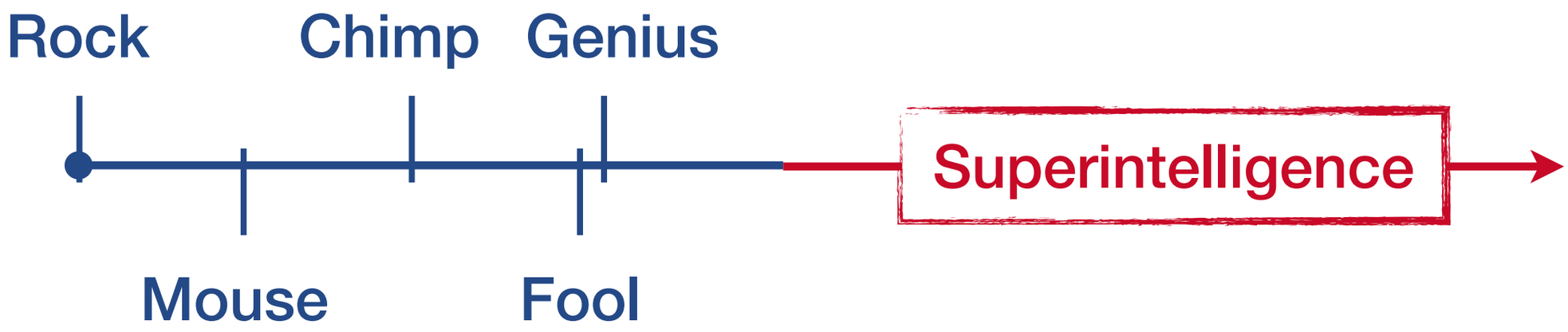
Artificial (General) Intelligence



Intelligence is a technology like no other

Definition of Superintelligence

An agent is called **superintelligent** if it exceeds the level of current human intelligence in all areas of interest.



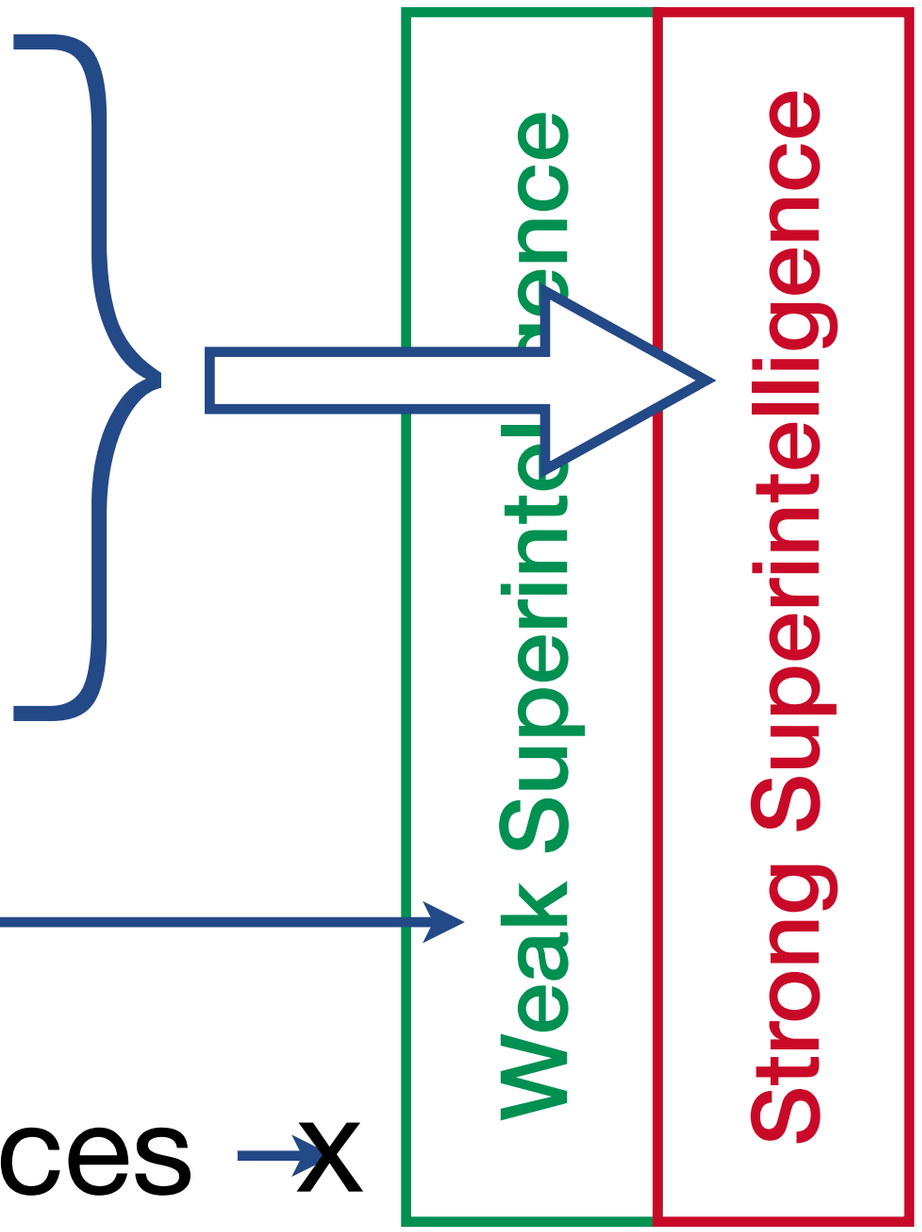
Pathways to Superintelligence

artificial intelligence
- neuromorphic
- mathematical

whole brain emulation

biological cognition

brain-computer interfaces → X



Advantages of AIs over Brains

Hardware:
- Size
- Speed
- Memory

Software:
- Editability
- Copyability
- Expandability

Effectiveness:
- Rationality
- Coordination
- Communication

Human Brain	Modern Microprocessor
86 billion neurons	1.4 billion transistors
firing rate of 200 Hz	4’400’000’000 Hz
120 m/s signal speed	300’000’000 m/s

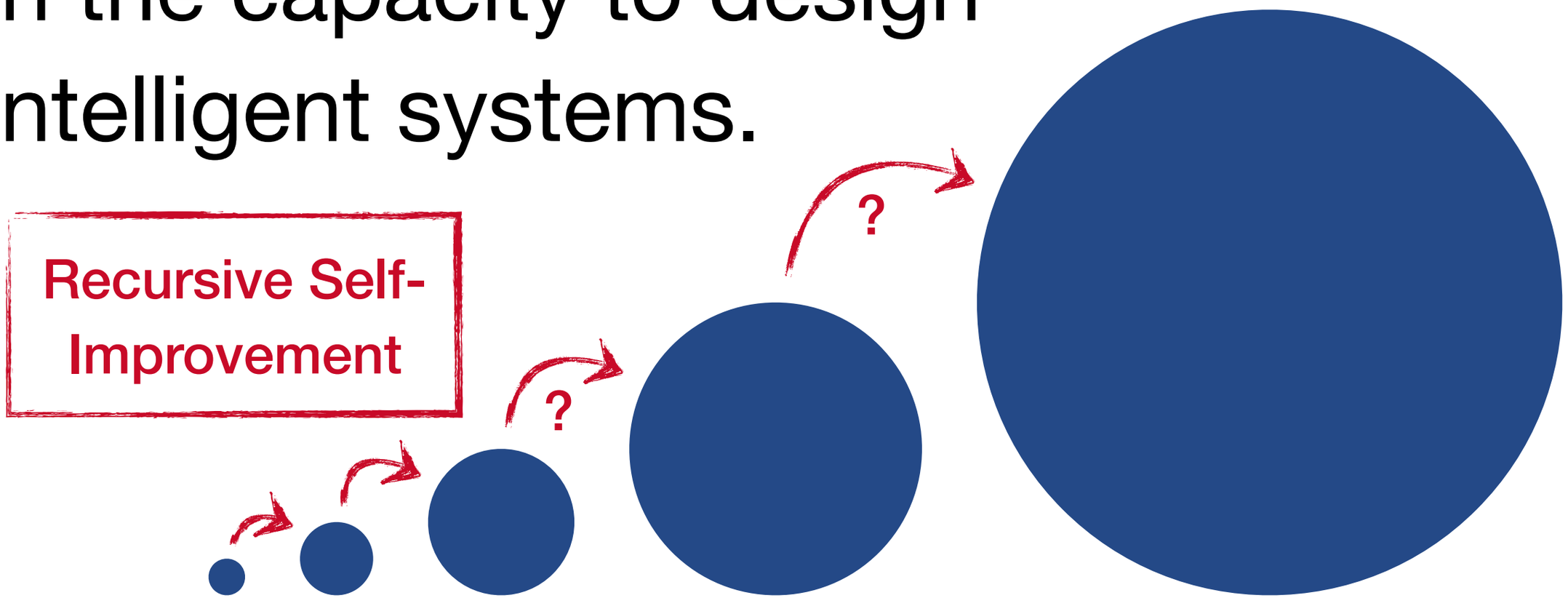
A rational agent will strive to …

- stay functional (**self-preservation**)
- keep its goal (**goal-preservation**)
- get stuff (**resource accumulation**)
- be smarter (**intelligence explosion**)

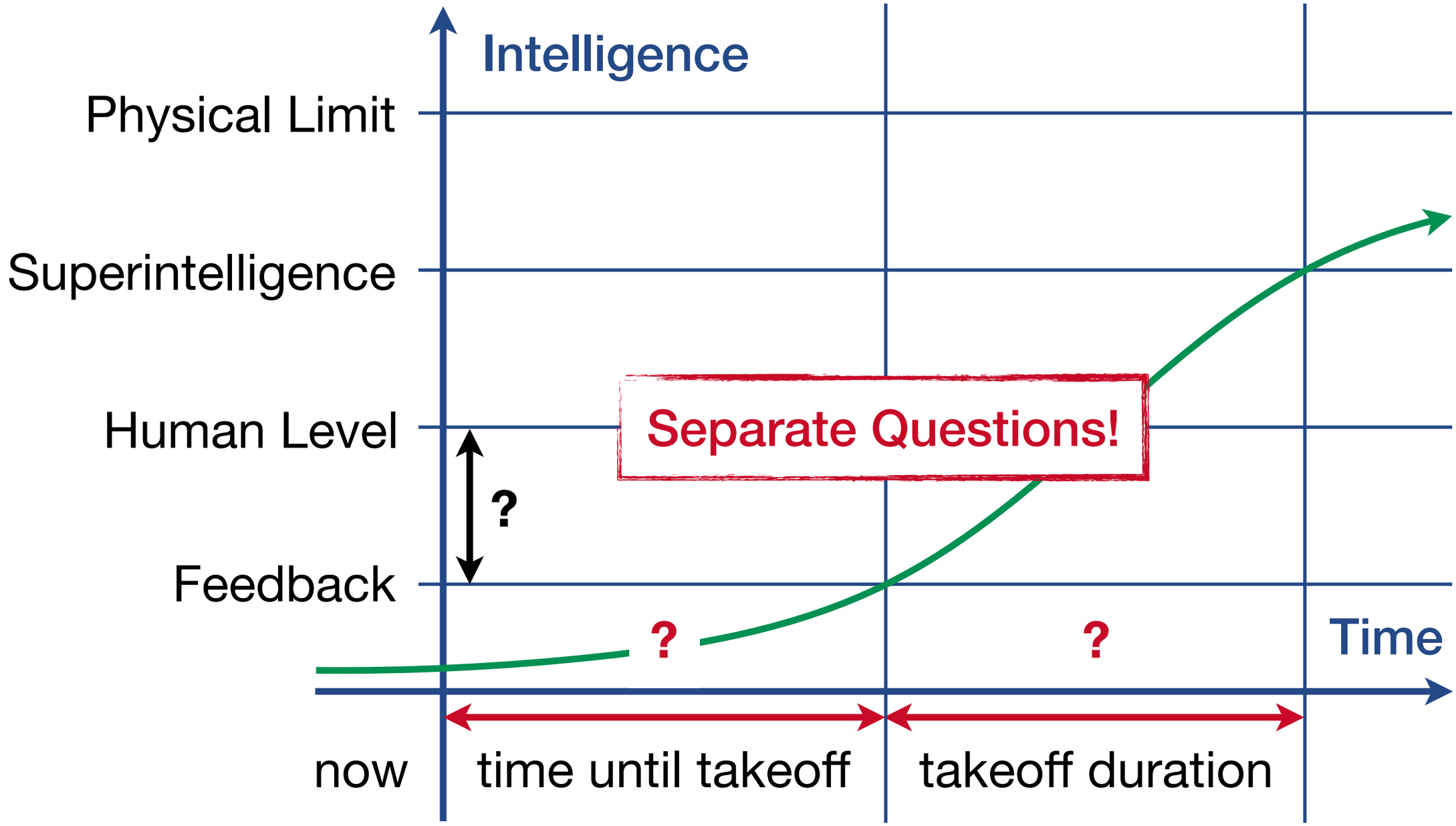
The problem is not malevolence but different goals and higher decision quality

Intelligence Explosion

Proportionality Thesis: An increase in intelligence leads to similar increases in the capacity to design intelligent systems.



Takeoff Scenarios



Predicting AI Timelines

Great uncertainties:

- Hardware or software the bottleneck?
- Small team or a Manhattan Project?
- More speed bumps or accelerators?

Probability for AGI	10%	50%	90%
AI scientists, median	2024	2050	2070
Luke Muelhauser, MIRI	2030	2070	2140

2014: A turning point in AI safety

Many smart people take superintelligence very seriously

reatch
research and technology
in switzerland

Panel Discussion

Robin Hanson, Professor of Economics, Associate at FHI

Max Daniel, Executive Director, Foundational Research Institute