Was ist Intelligenz?
Und wie mache ich sie künstlich?
Grundlagen von KI

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DER WISSENSCHAFTLER

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Agenda

What is intelligence and how do I make it artificial?

1. What is intelligence?

2. Stages in the development of AI

3. Future

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“

There is no such thing as

mathematical theory of intelligence

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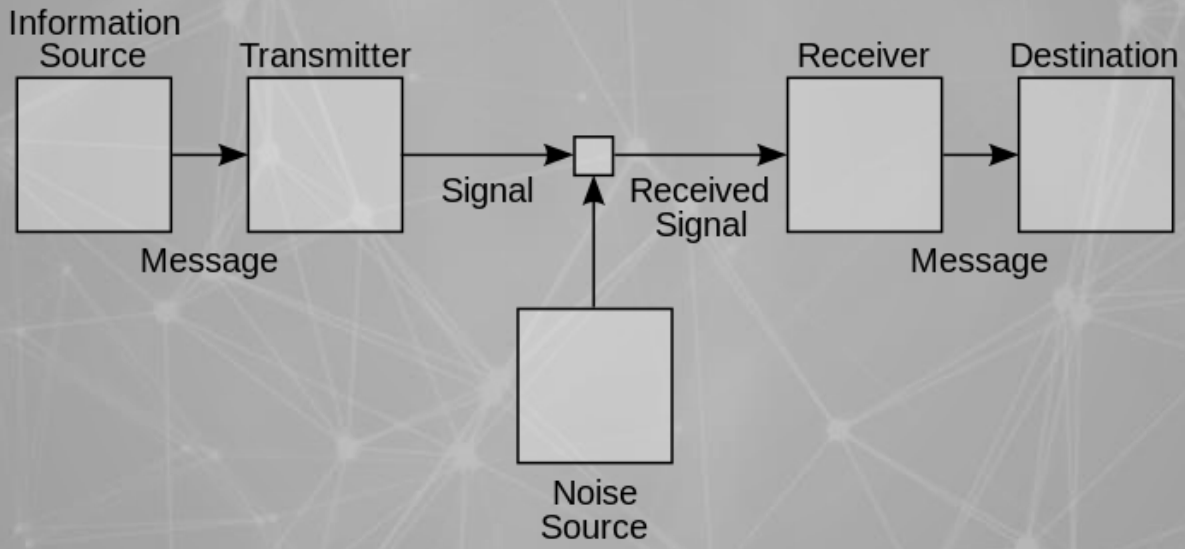
Theory of communication/information



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$$H(X) = \mathbb{E}_X[I(x)] = -\sum_{x \in \mathbb{X}} p(x) \log p(x).$$

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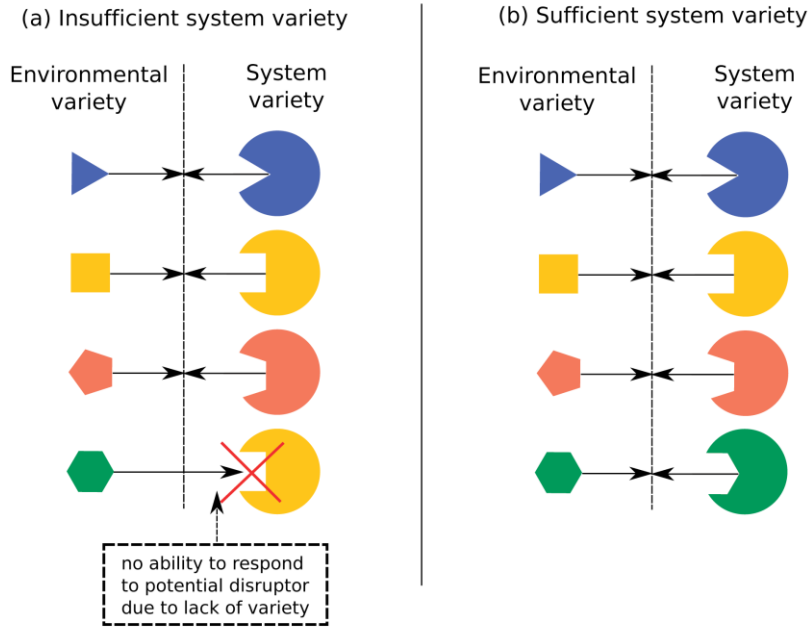
Requisite variety theorem

Number of states in the environment vs. number of system states



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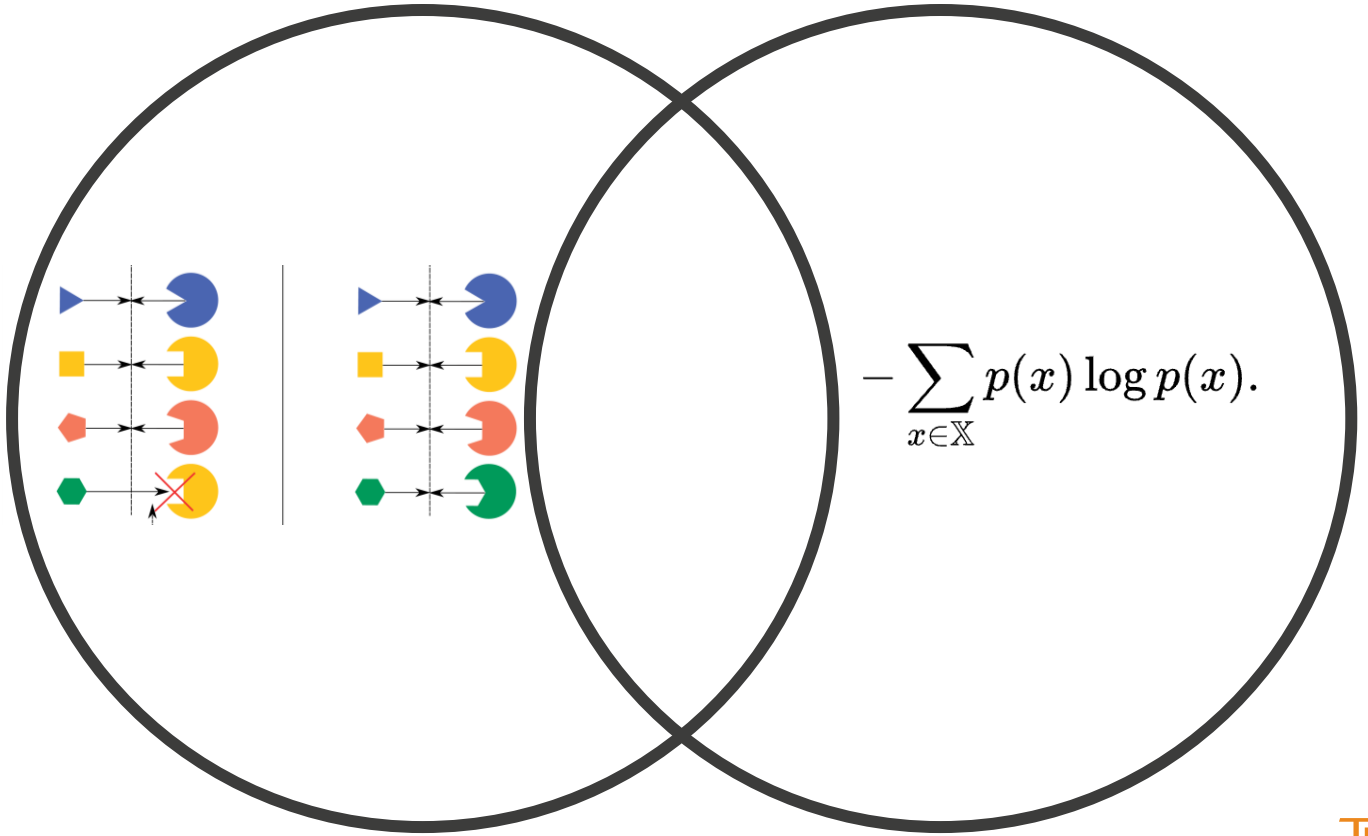

$$-\sum_{x \in \mathbb{X}} p(x) \log p(x).$$

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Two stages in the history of AI

Direct programming

Intelligent behaviour explicitly specified by human programmers and experts (if-then rules).

Machine learns on its own

Only a few general rules are directly specified. The machine learns the rest on its own.

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GOFAI

Good old-fashioned AI

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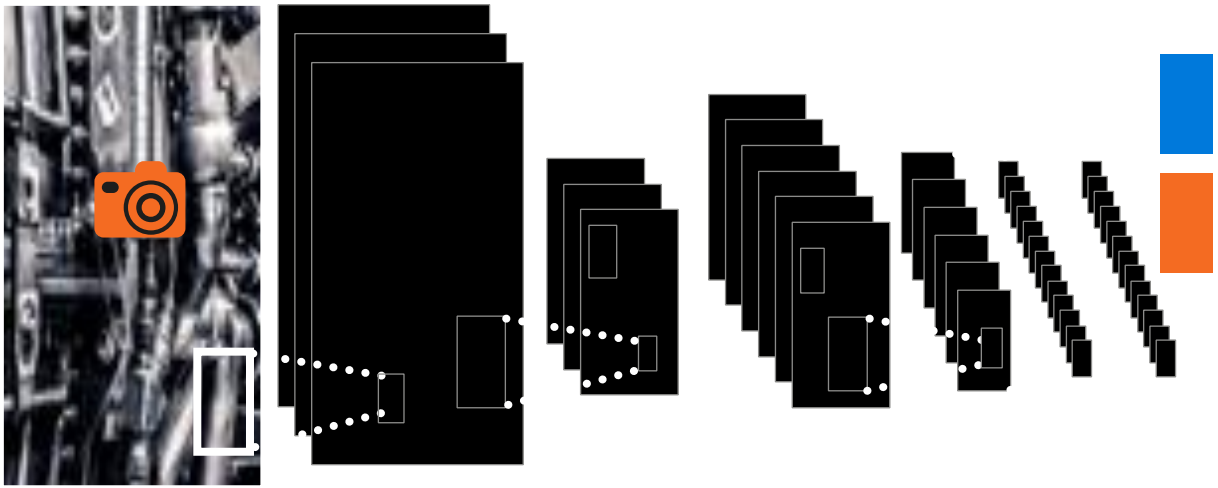
DEEP LEARNING



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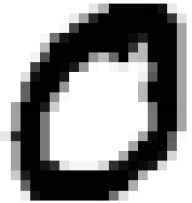
1. Training

2. Production



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HIDDEN FACT OF TODAY

It is always:

machine learning + GOFAI

The future of intelligent machines

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We need “small data” AI

Big data, small applicability

All possible applications of machine learning tool that require big data for training

Small data, big applicability

The universe of all possible applications of machine learning that can be trained using small amounts of data.

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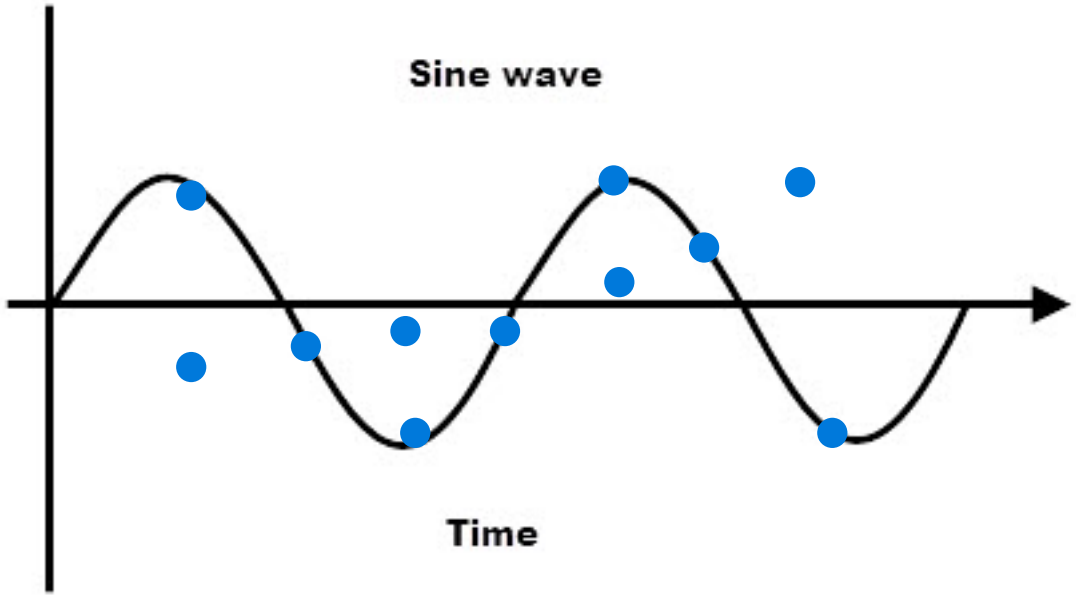
Inductive bias



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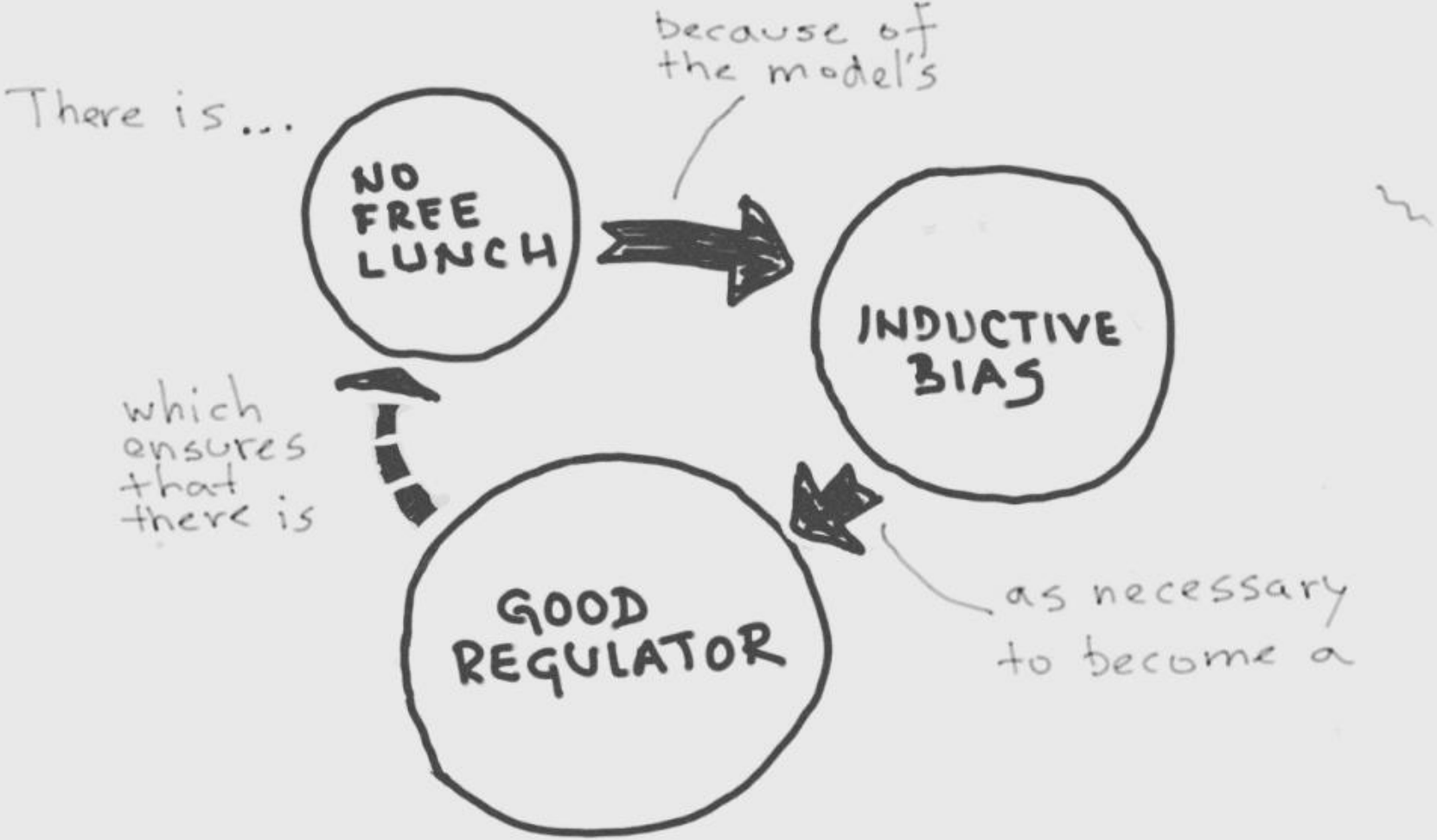
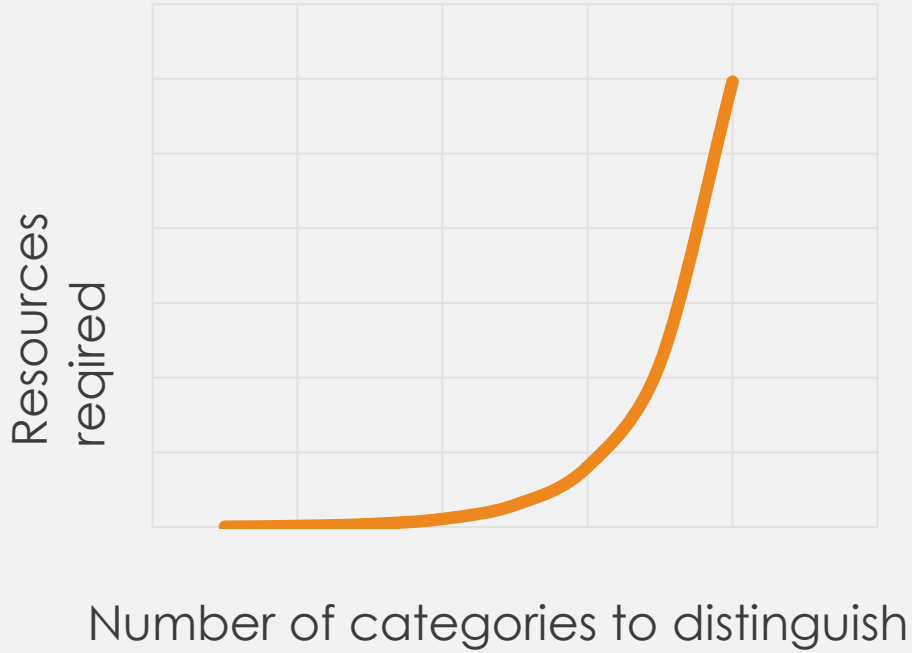

There is...
NO FREE LUNCH
because of the model's
INDUCTIVE BIAS
which ensures that there is
GOOD REGULATOR
as necessary to become a

Intelligence of deep learning does not scale well



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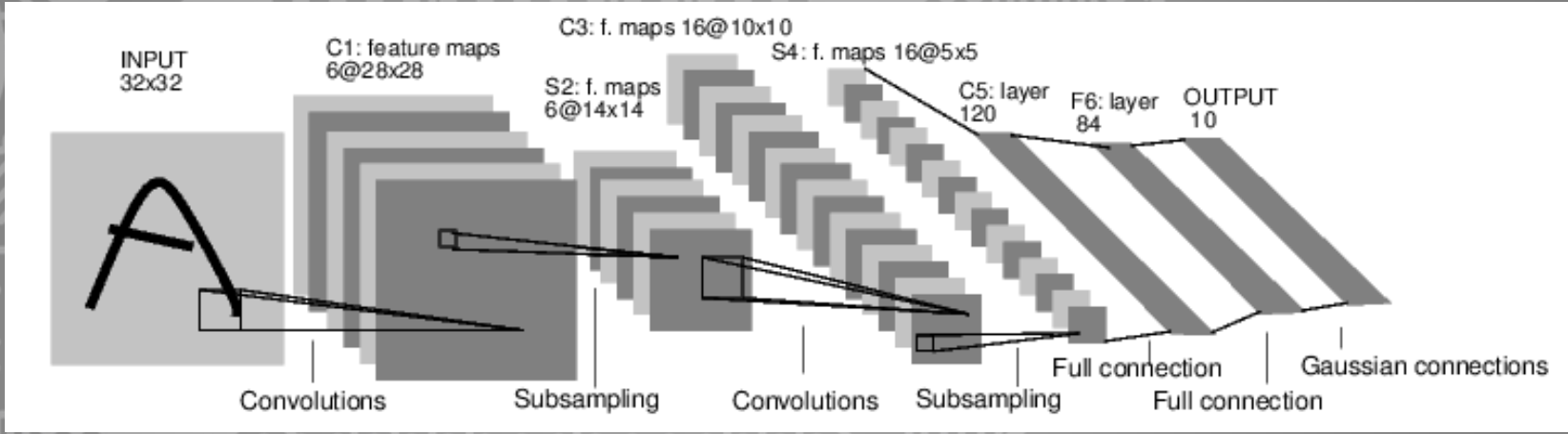
Learn smarter



Summary

1. No math theory of intelligence yet?

2. Two main stages in the history of AI

3. Future looks bright

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Vielen Dank
für Ihre Aufmerksamkeit!

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