

# DATA-DREVEN INNOVATION – DATALOGENS FREMTID I EN VERDEN AF LÆRENDE MASKINER

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# EN KORT HISTORIE OM KUNSTIG INTELLIGENS

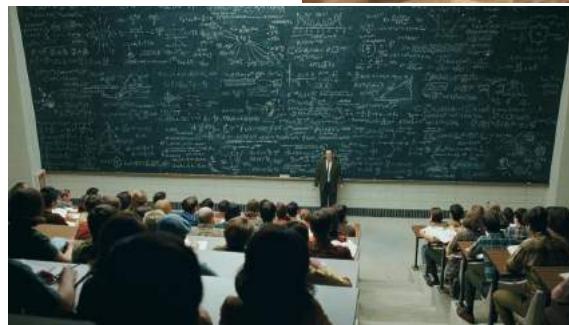


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1956

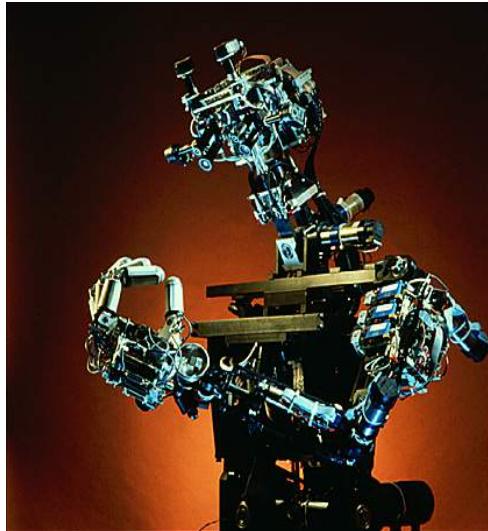


1960 –  
1970





1990'erne



2000->



2016->



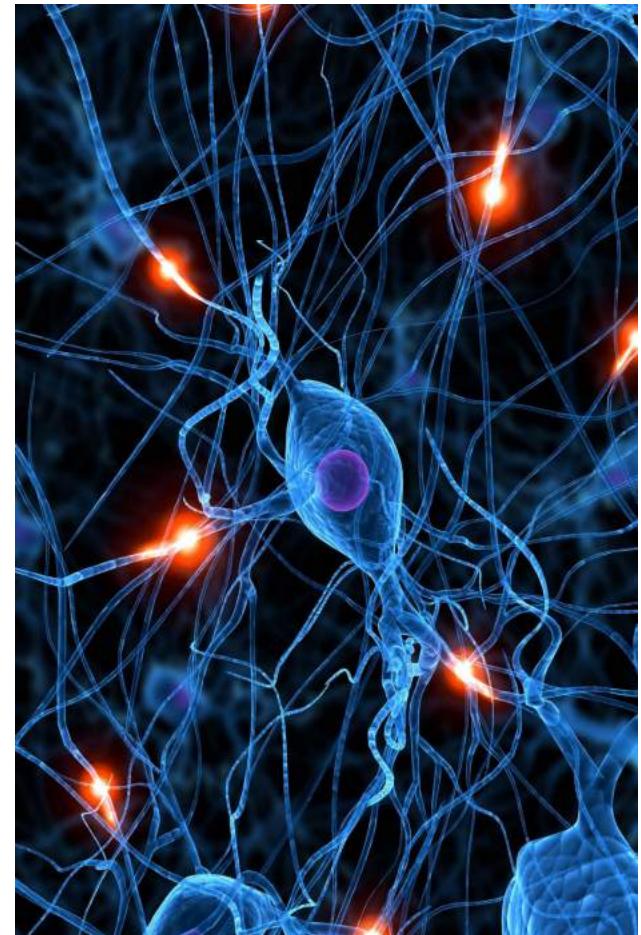
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# HVAD ER KUNSTIG INTELLIGENS

# THE SCIENCE AND ENGINEERING OF AI



Good old-fashioned  
artificial intelligence (GOFAI)



Computational  
intelligence

# “DEFINITION” OF AI

*Artificial intelligence is that activity devoted to making machines intelligent, and intelligence is that quality that enables an entity to function appropriately and with foresight in its environment.*

-- Nils J. Nilsson

*Artificial intelligence is the science and engineering of making intelligent machines.*

-- John McCarthy

*Artificial intelligence is what ever artificial intelligence researchers do.*

-- N. N.

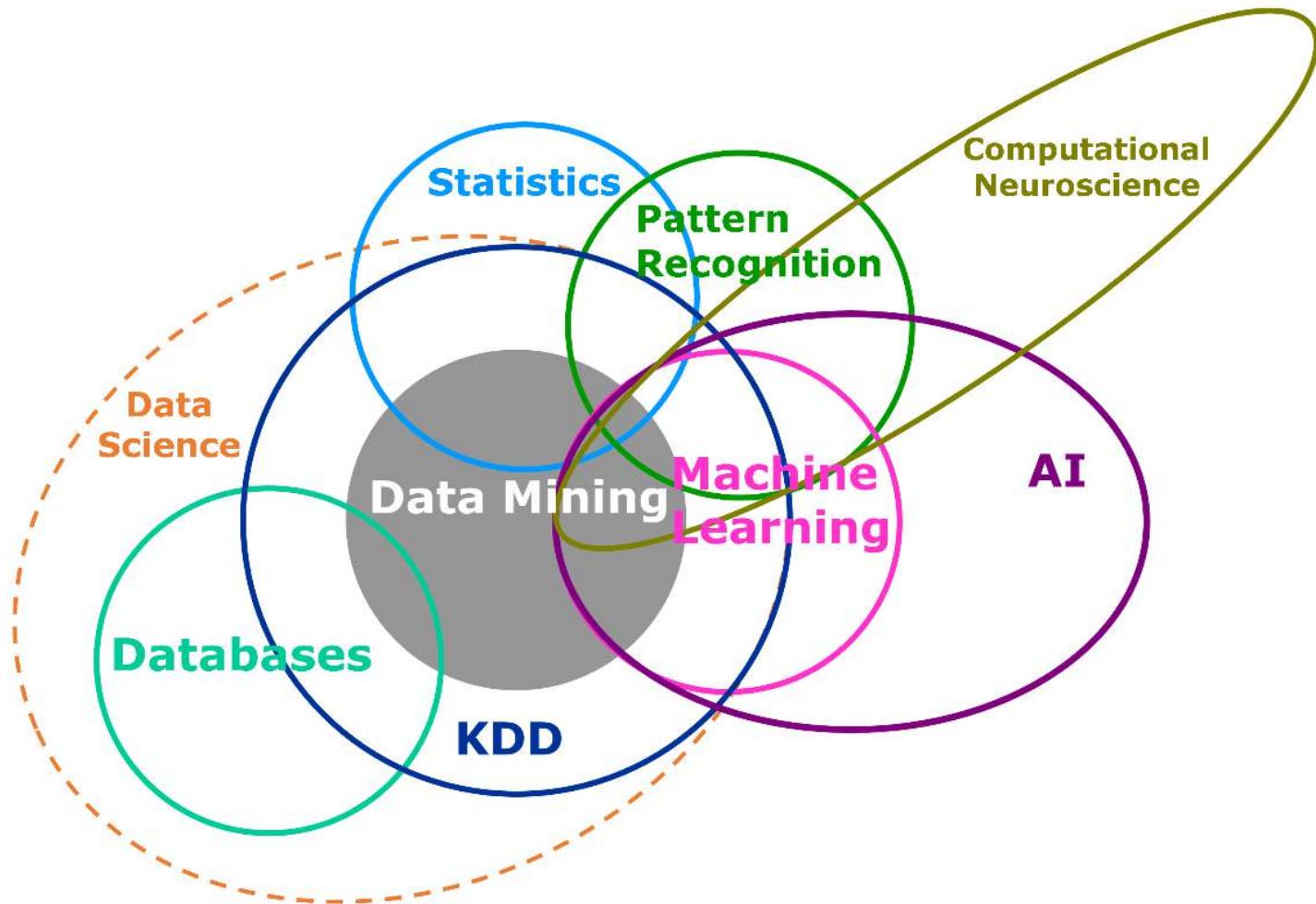
*AI is whatever hasn't been done yet.*

-- Larry Tesler.

# INTELLIGENS DREJER SIG OM LÆRING



# EN MYRIADE OF AI TERMER

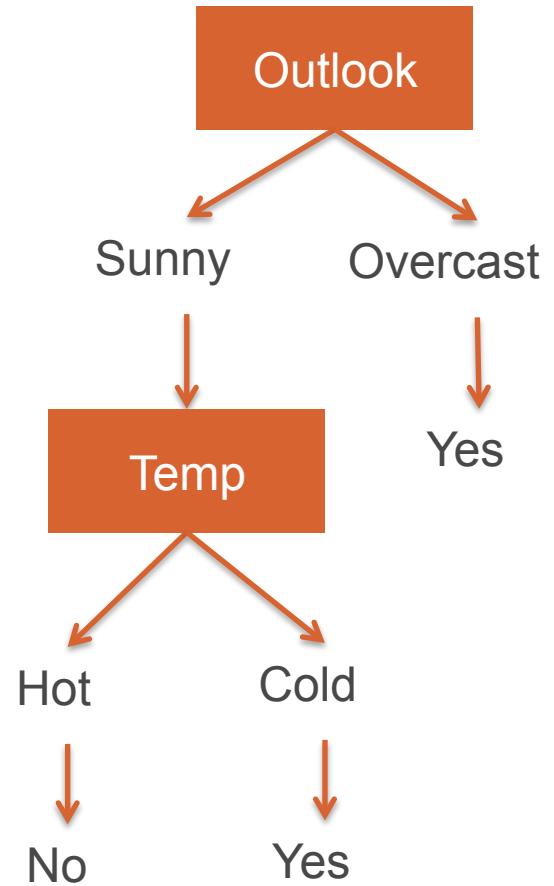


# MACHINE LEARNING 101

A simple example:

*Will I enjoy a cricket match?*

Day	Outlook	Temp	Enjoy
1	Sunny	Hot	No
2	Sunny	Hot	No
3	Overcast	Hot	Yes
4	Sunny	Cold	Yes
5	Overcast	Cold	Yes



# HVAD ER ALT STØJEN OM?



1. Verden er regulær – der er mønstre
2. Maskinlæring kan lære mønstre
3. Hvis man kender mønstrene kan man forudsige fremtiden
4. Forudsigelser tillader os at påvirke

# ET EKSEMPEL PÅ KUNSTIG INTELLIGENS

# HVAD ER DER I ET BILLEDE?



ClarifAI

Caffe

# HVAD ER DER I ET BILLEDE?

## Classification

Click for a Quick Example



Maximally accurate

Maximally specific

**musical instrument**

1.15297

**wind instrument**

1.00978

**brass**

0.63670

**device**

0.53549

**stringed instrument**

0.43016



### Predicted Tags

performance    music    concert  
musician    singer    instrument  
group    people    festival  
stringed instrument

### Similar Images



# HVAD ER DER I ET BILLEDE?

## Classification

[Click for a Quick Example](#)



Maximally accurate	Maximally specific
garment	1.12935
clothing	1.09957
jersey	0.98027
consumer goods	0.96650
shirt	0.96587

CNN took 0.085 seconds.



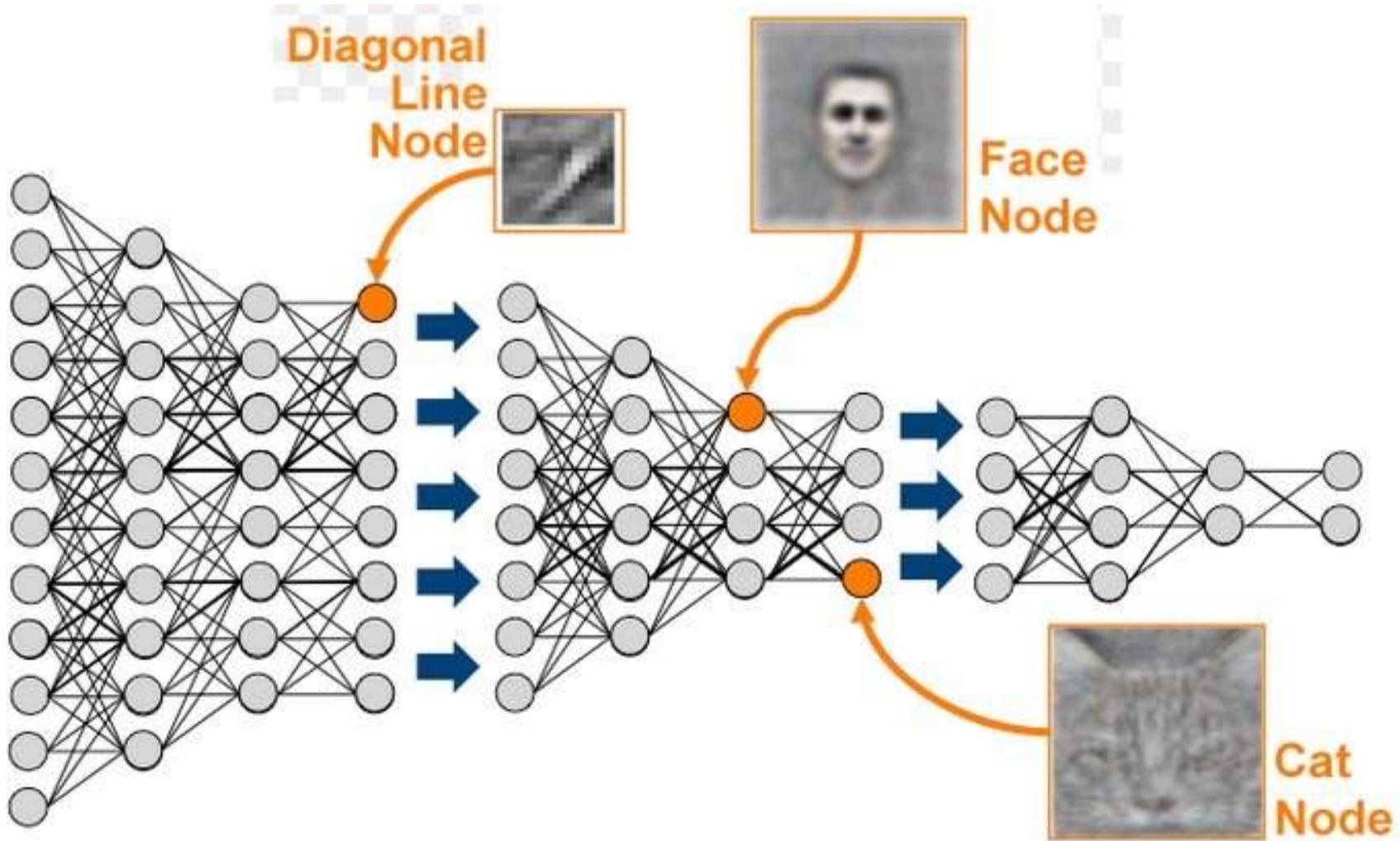
## Predicted Tags

man people vertical portrait  
adult indoors serious  
fine-looking looking movie

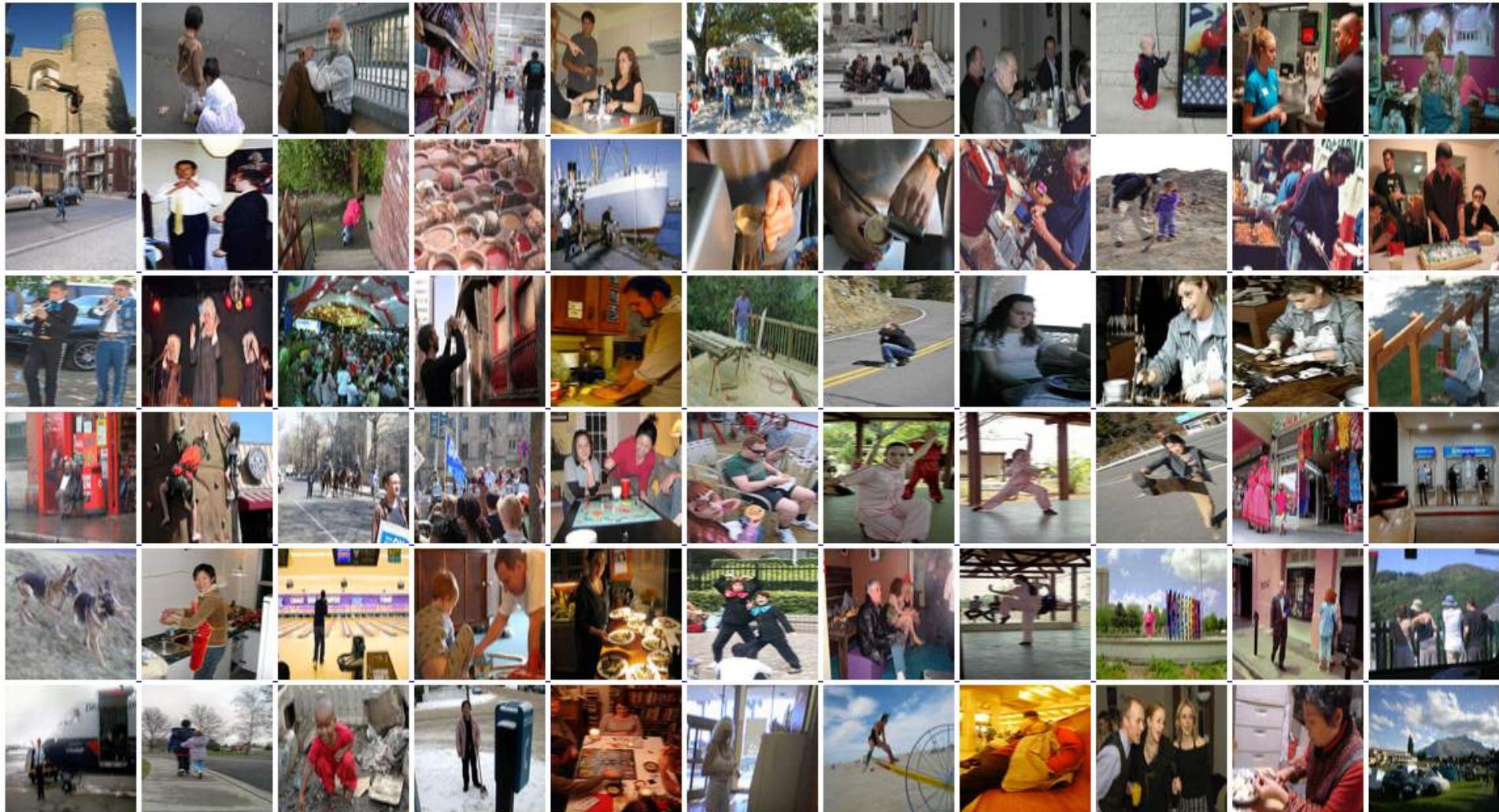
## Similar Images



# HVAD GJORDE DETTE



# HVAD ER DER IKKE I ET BILLEDE?



# HVAD ER DER IKKE I ET BILLEDE?

## Results

### Tags

- shoots
- powerlines
- abseiling
- composited
- compositing

### Nearest Caption in the Training Dataset

a man is climbing a tree to retrieve a kite that ' s stuck there .

### Generated Captions

- a man in a red shirt is climbing a tree limb in the air .
- a man flying through the air on a hill .
- a man in a red shirt jumps out of a tree .
- a man flying through the air while running on a hill .
- a man in a wind kite doing something to climb a tree in a wooded area .



# DEN KAN SNAKKE OG SPILLE MUSIK



The Blue Laguna



Aspects of the...



Babbling in Chinese?



Babbling in English?



Playing piano



Playing piano



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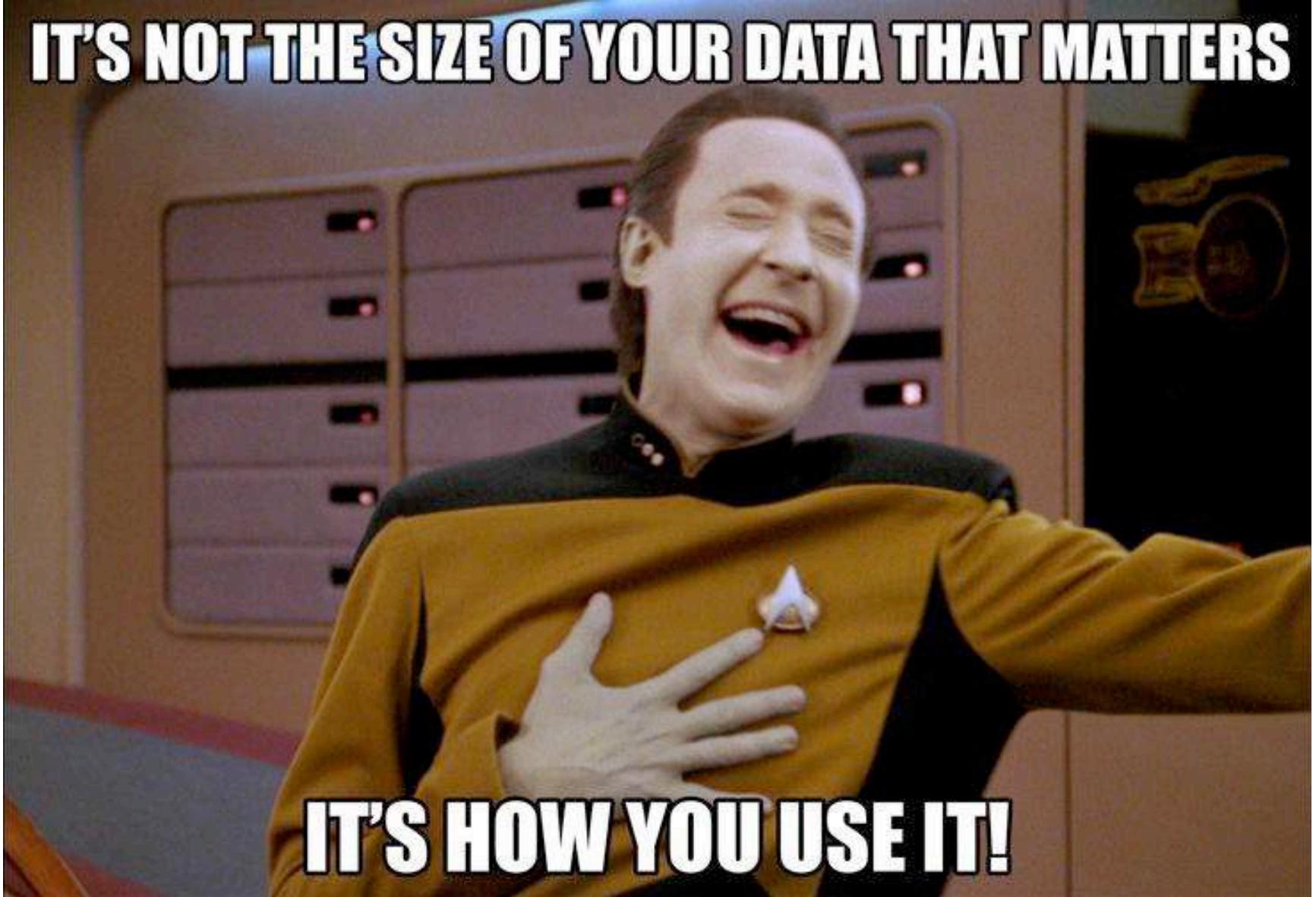
# DATADREVEN INNOVATION

# BIG DATA

© D.Fletcher for CloudTweaks.com



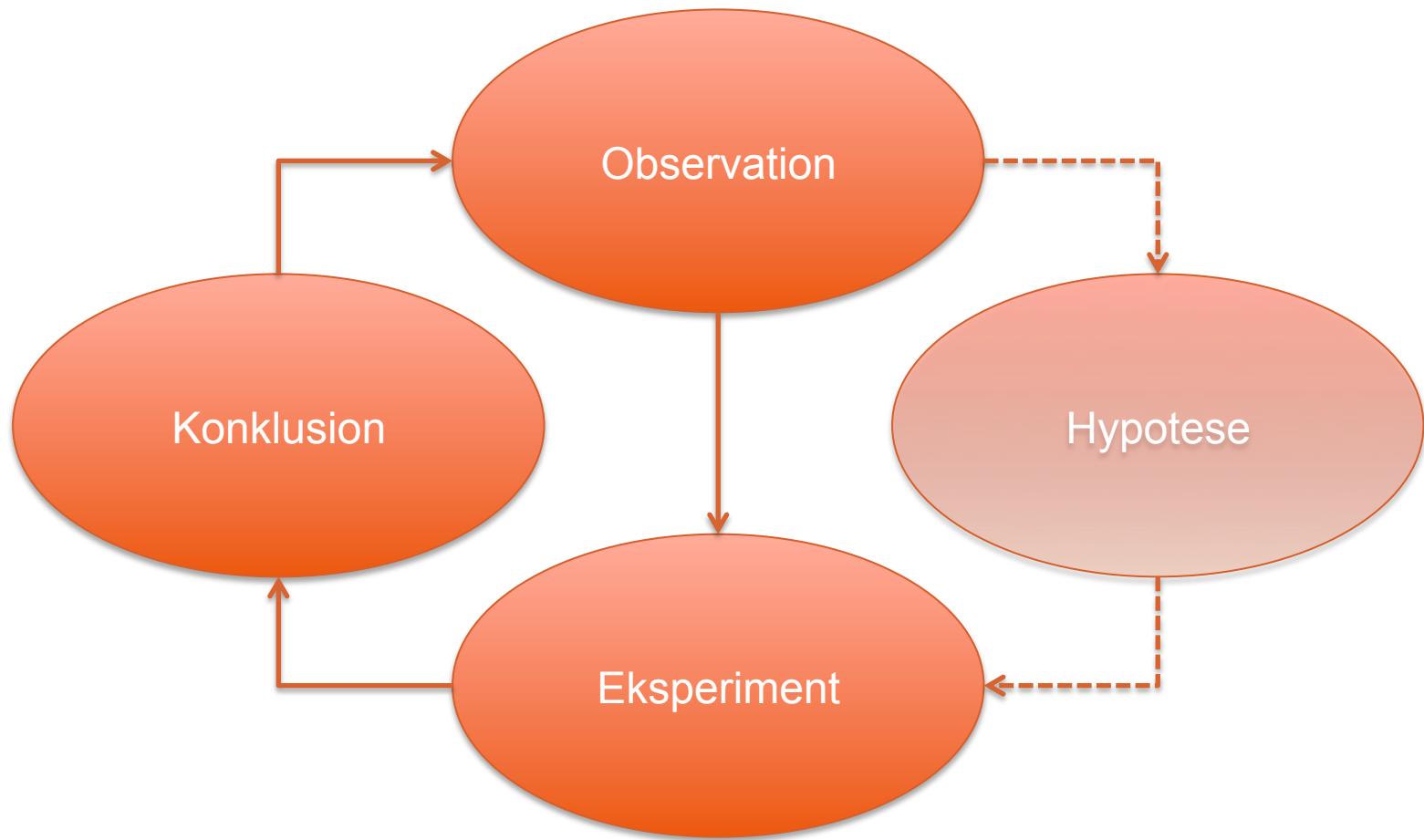
**IT'S NOT THE SIZE OF YOUR DATA THAT MATTERS**

A photograph of Captain Jean-Luc Picard from Star Trek: The Next Generation. He is wearing his yellow command uniform with a gold star insignia on the chest. He is laughing heartily, with his head tilted back and mouth wide open. His right hand is resting against his heart, and his left arm is extended to the side. The background shows the interior of the USS Enterprise bridge with various control panels and a "CO" insignia on a wall.

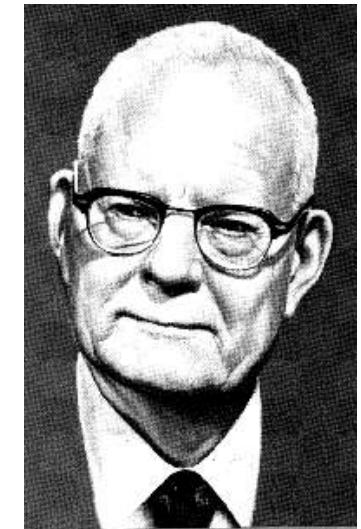
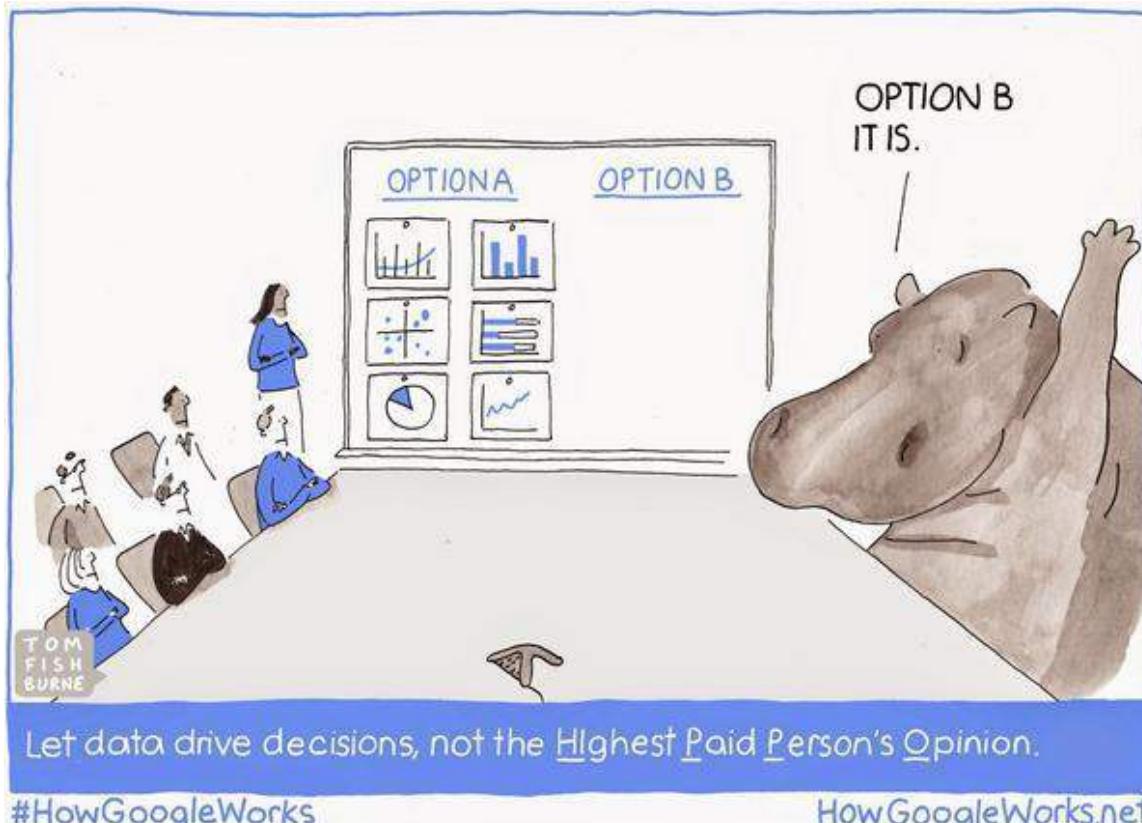
**IT'S HOW YOU USE IT!**



# ET “NYT” PARADIGME



# DATADREVEN INNOVATION



W. Edwards Deming

*“In God we trust; all others must bring data”*  
*“By what method?... Only the method counts.”*

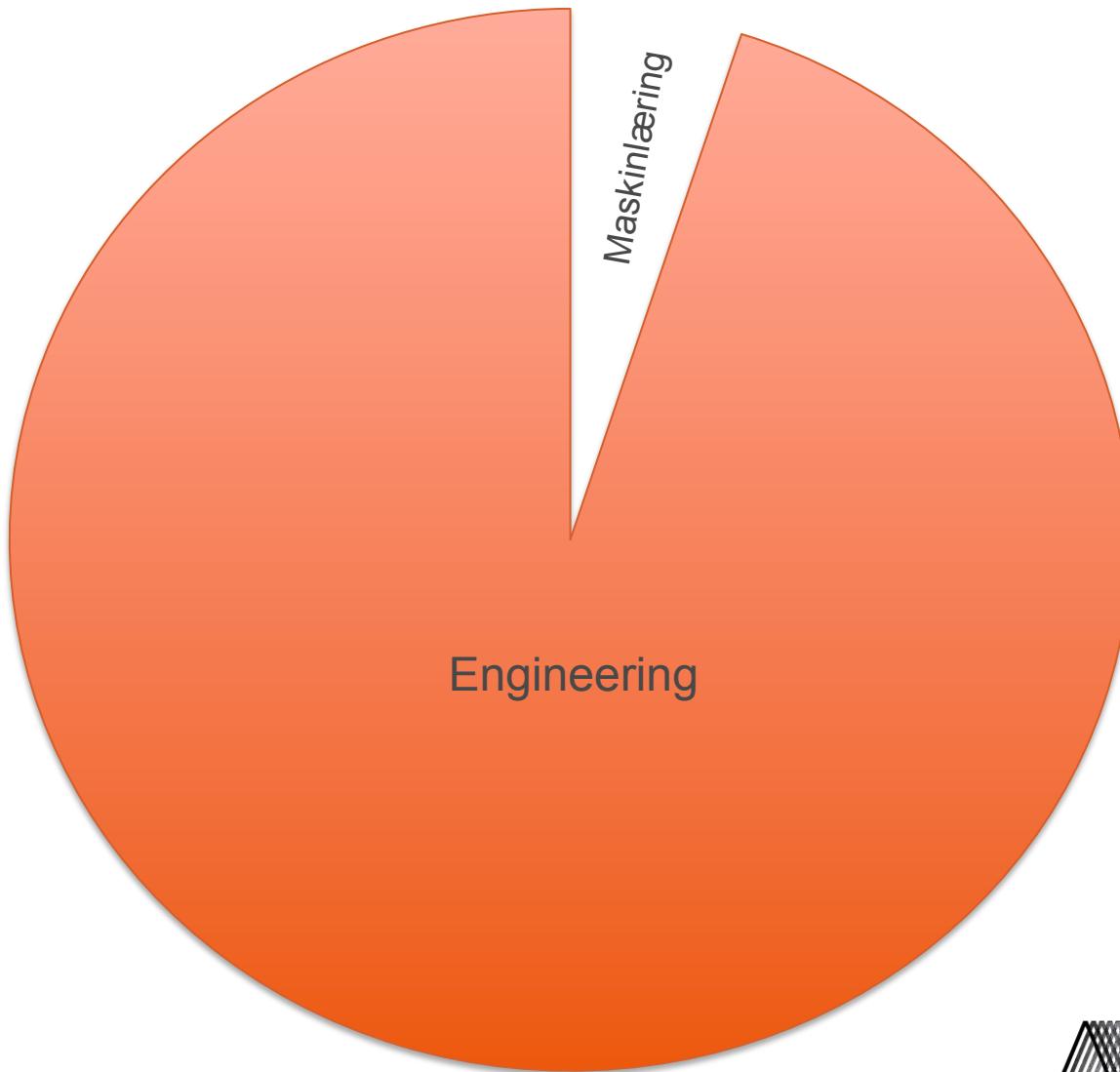
# DEN FREMTIDIGE DATALOG MED LÆRENDE MASKINER

Machine Learning: The High Interest Credit Card of Technical Debt; D. Sculley and Gary Holt and Daniel Golovin and Eugene Davydov and Todd Phillips and Dietmar Ebner and Vinay Chaudhary and Michael Young, 2004



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# HVOR MEGET ER EGENTLIG MASKINLÆRING



# SYSTEM LEVEL ENGINEERING



Glue code



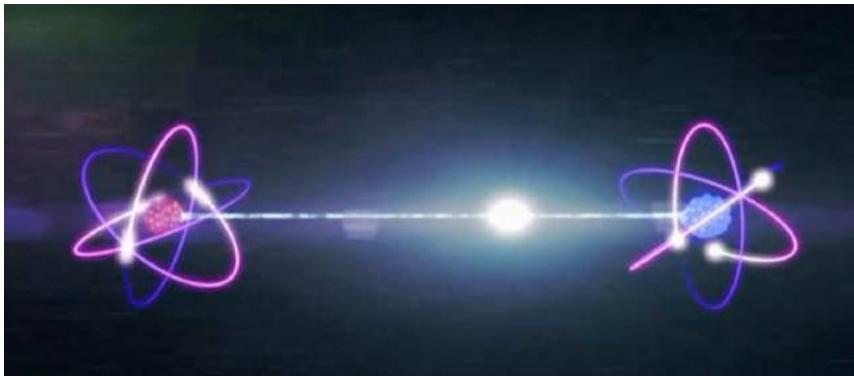
Pipelining jungle



# DEN VIRKELIGE VERDEN



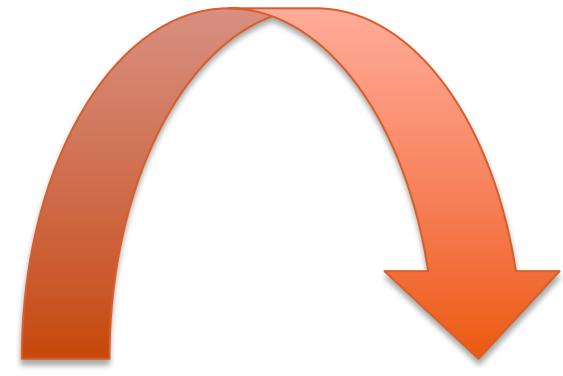
# MODELLER ER SURROGATER



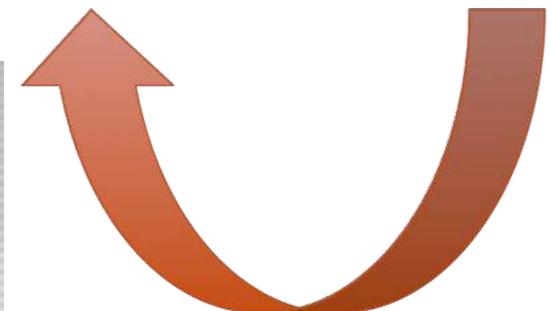
Entanglement



Data consumer

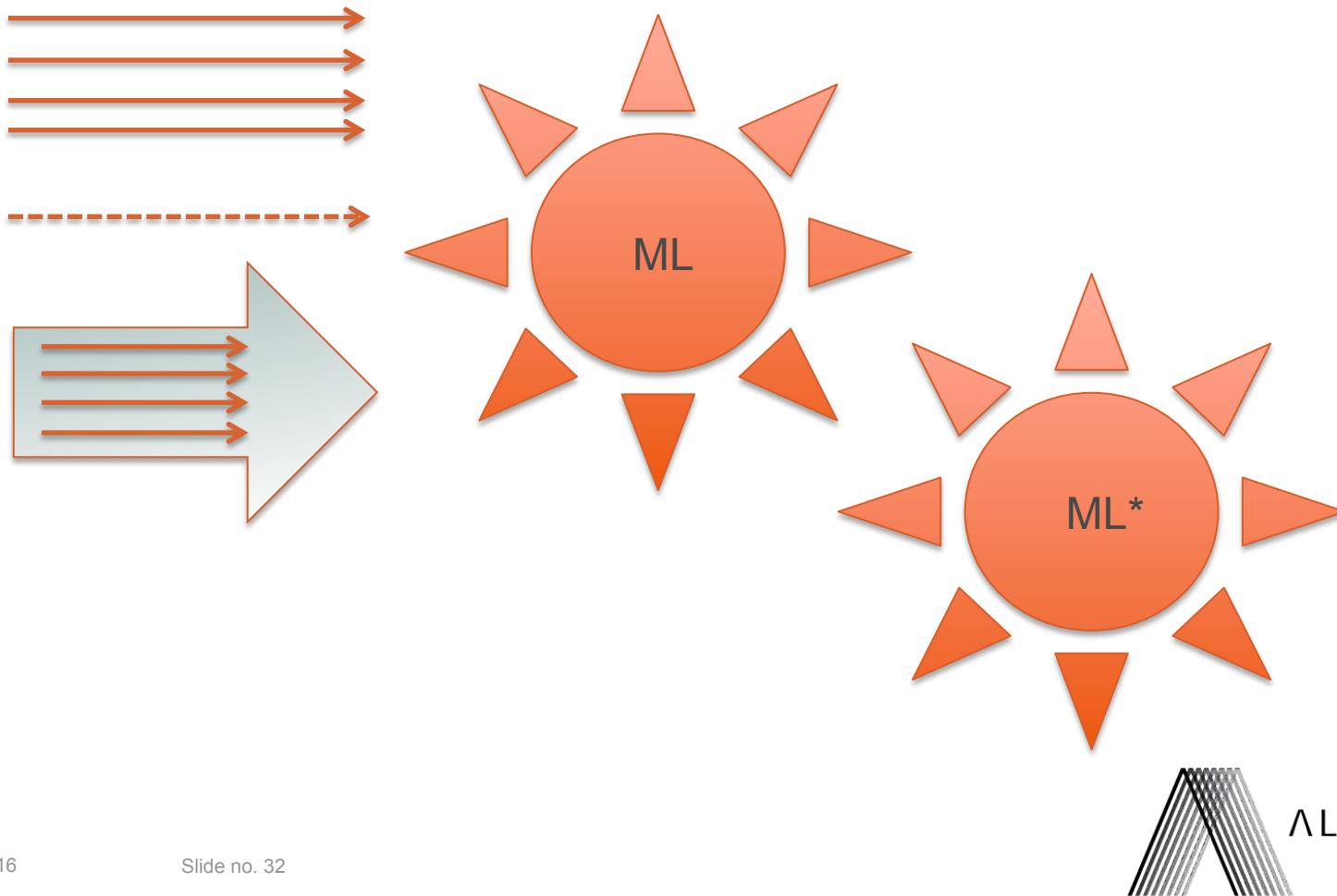


Machine learner



Feedback

DATA AFHÆNGER AF DATA, AFHÆNGER AF DATA,  
AFHÆNGER AF DATA, AFHÆNGER AF ....



# SÅ LANG, SÅ GODT, HVAD NU?

- Maskinlæring er cool og nyttigt
  - Datadreven innovation drejer sig om at lytte til ens data
  - Datadreven innovation er eksperimentelt
  - Der er meget engineering og datalogi at udføre
  - Der er mangel på "good practice"
- 
- Ikke vær bange
  - Vær eksperimentel
  - Vær en datalog

