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# AI och Chat-GPT

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KALLE ÅSTRÖM, MATEMATIKCENTRUM, LUNDS UNIVERSITET



# Kalle Åström

## Centre for Mathematical Sciences

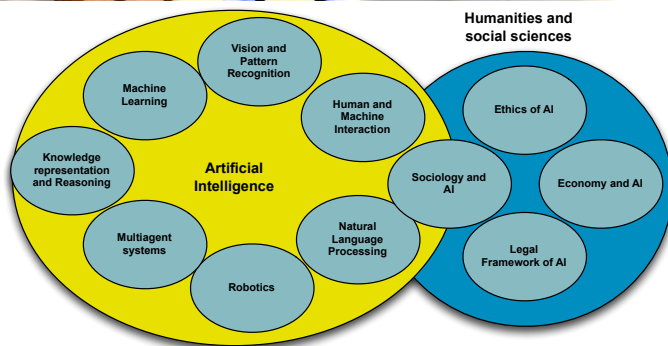
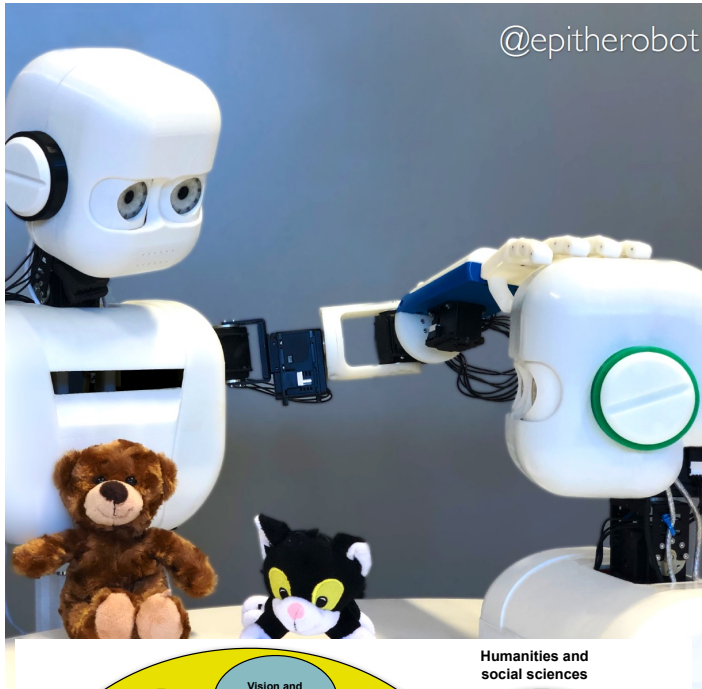


- Mathematics, Mathematical Statistics, Numerical Analysis
- Around 130 members of staff.
- Turn-around about 130 MSEK.
- World-class research in a number of areas, including **partial differential equations, computer vision, dynamical systems, numerical analysis**
- Fields medal (Lars Hörmander, 1962)
- Gustafsson Prize (A Melin, A Meurman)
- Clay Prize (Nils Dencker, 2006)
- Marr Prize (Fredrik Kahl, 2005)
- Wallenberg Price (Erik Wahlén, 2016)
- PASCAL Challenges (C Sminchisescu, 2009-2012)
- AI Lund
- Profilmråde: Naturlig och Artificiell Kognition



# AI Lund

## AI at Lund University



- Research on AI and ML at least since 1965
- Broad coverage of AI topics. All eight faculties involved. ML, AI, Computer Vision, Natural Language Processing, Automatics Control, Robotics, E-health, Ethics, Law, Economy, Psychology, Sociology, Cognition, Philosophy, Medicine, Democracy
- **200** senior researchers **400** PhD Students
- **2000** external members
- Webpage: AI.LU.SE
- Interest from society at large (AI-Lab?)
- Pufendorf themes (DATA, digitrust, ...)
- WASP, eSENCE, ELLIIT, E-health, digit@lth, Compute, Lunarc, HumLab, SamTech, VRLab, AI Competence for Sweden, AI innovation of Sweden, AI sustainability center





1

2

Many

N

A

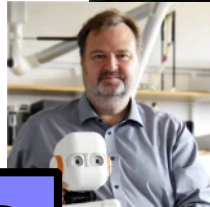


A

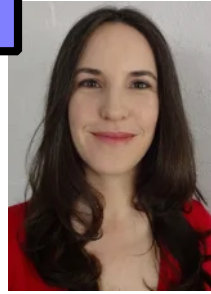


C

D



B



# Natural and Artificial Cognition



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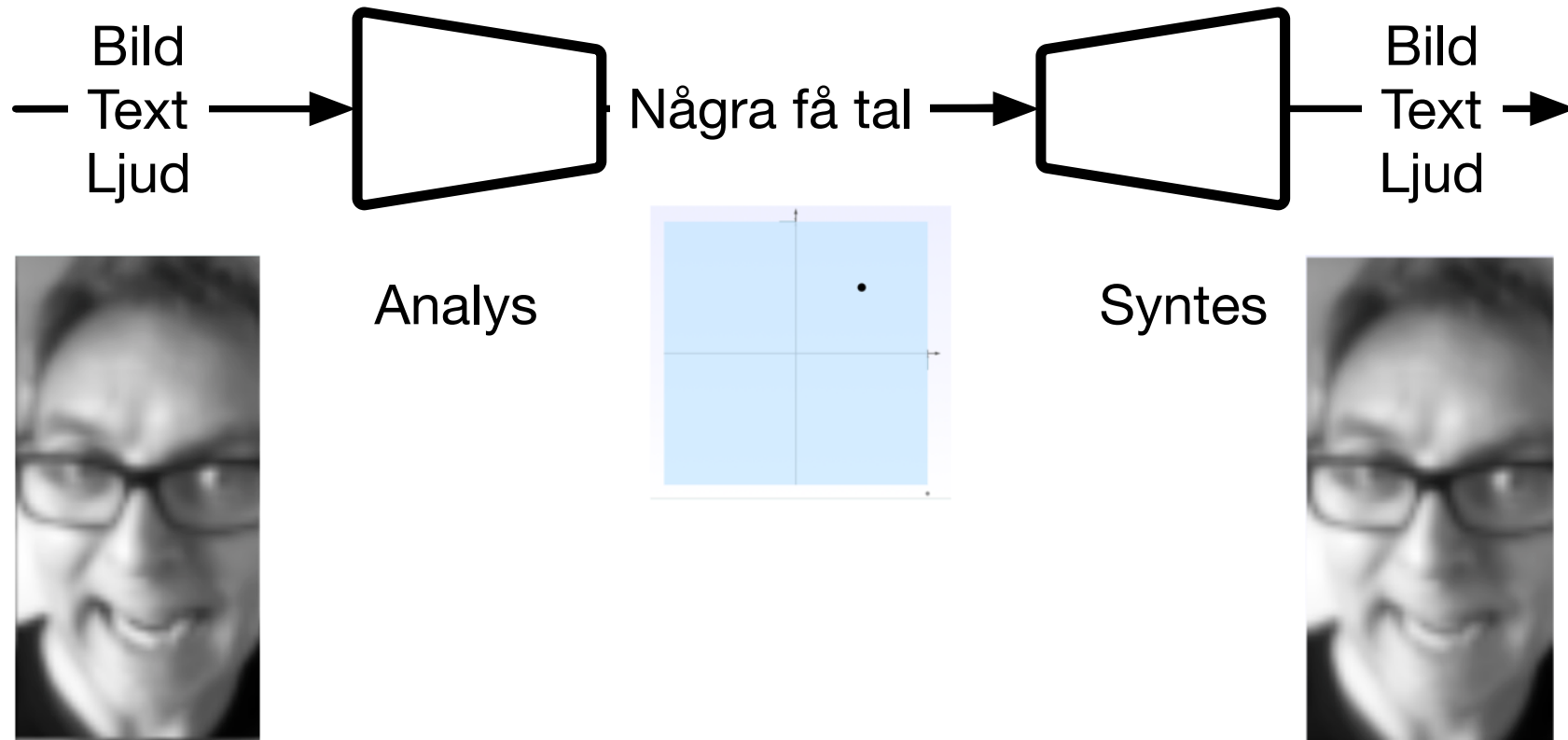


# AI-Historik

- Ideas of intelligent constructs (Hephaestus, Pygmalion's Galatea, Jābir ibn Hayyān's Takwin, Paracelsus' homunculus and Rabbi Judah Loew's Golem)
- Charles Babbage, Ada Lovelace
- Turing, turing machine, turing test
- Dartmouth workshop, golden years 1956-1974, Symbolic reasoning, semantic networks, search algorithms, micro-worlds, perceptron
- first AI winter 1974–1980
- Boom 1980–1987, expert systems, ANN, backpropagation
- Second AI winter 1987–1993
- AI 1993–2011, use in industry, chess 1997, Darpa Grand Challenge, Bayesian networks, hidden Markov models, information theory, stochastic modeling, support vector machines, random forests, logistic regression
- 2011 – **revolution 1** - Deep learning, big data and artificial general intelligence, image net, go, Atari games, widespread use
- 2022 – **revolution 2** – GPT, Chat-GPT

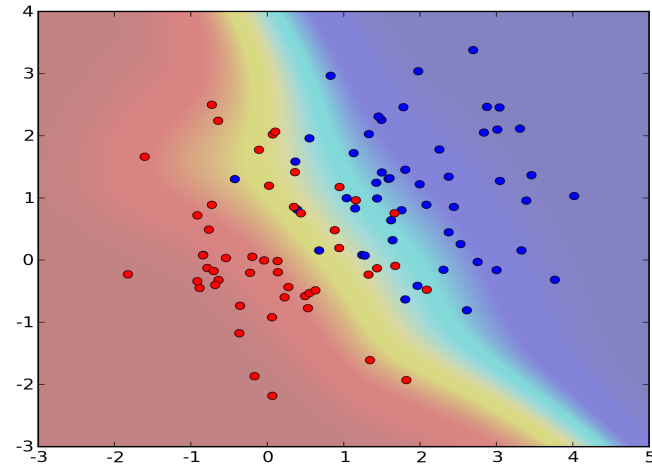


# Modeller för att analysera och generera data



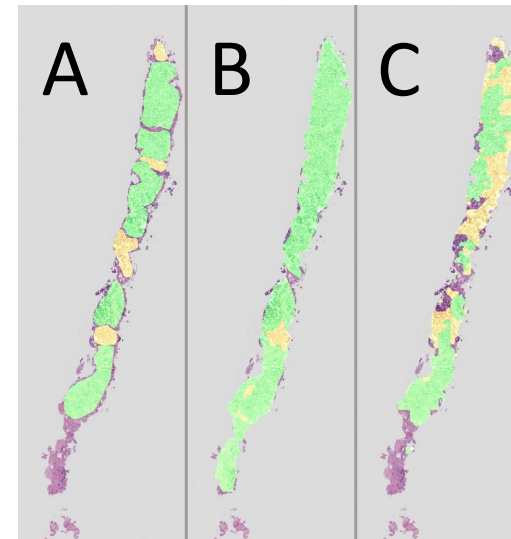
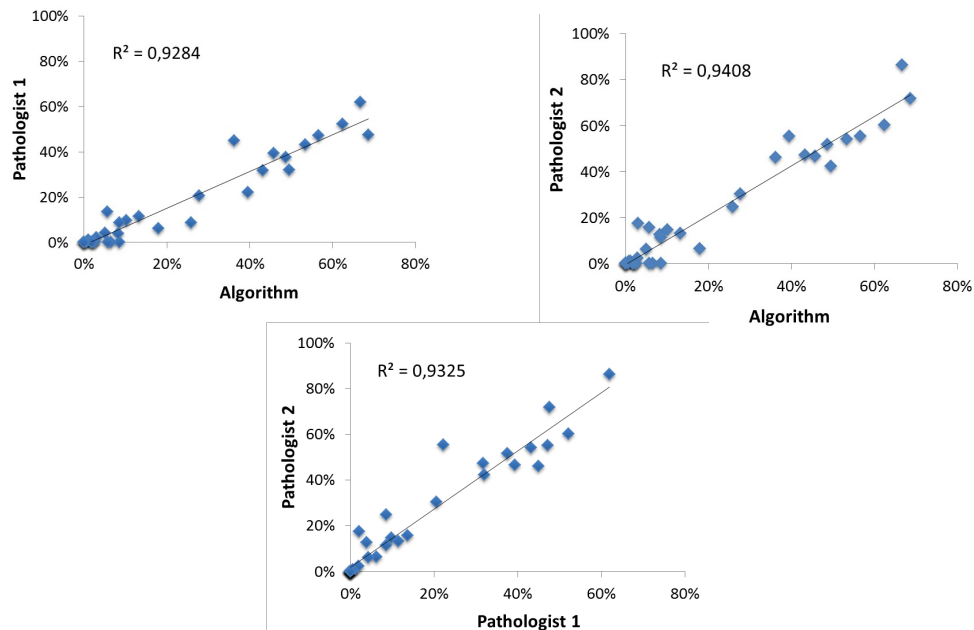


# Hövding



# Evaluation of current system

## Comparison of area covered by cancer



Generalization of prostate cancer classification for multiple sites using deep learning, Arvidsson, I., Overgaard, N. C., Marginean, F. E., Krzyzanowska, A., Bjartell, A., Astrom, K. & Heyden, A., 2018 May 23, 2018 IEEE 15th International Symposium on Biomedical Imaging, ISBI 2018. IEEE Computer Society, Vol. 2018-April, p. 191-194 4 p.

## Using AI to diagnose skin cancer

📅 January 28, 2017 👤 Jack Simpson 💬 Leave a comment

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Currently, a visit to the dermatologist is your best chance of accurately identifying whether a mole could be cancerous. However, researchers at Stanford University have just [developed a computer program](#) which is able to diagnose skin cancer as accurately as doctors using pictures of moles.



# Objektigenkänning i var mans hand, 2019



# Söker efter Delfin



# Språkmodeller

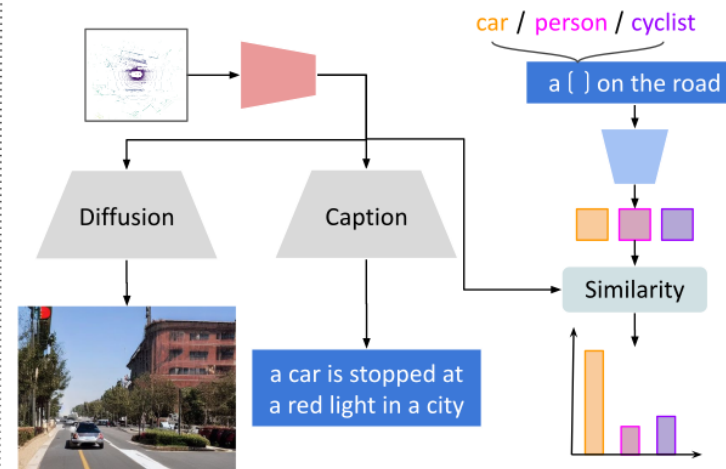
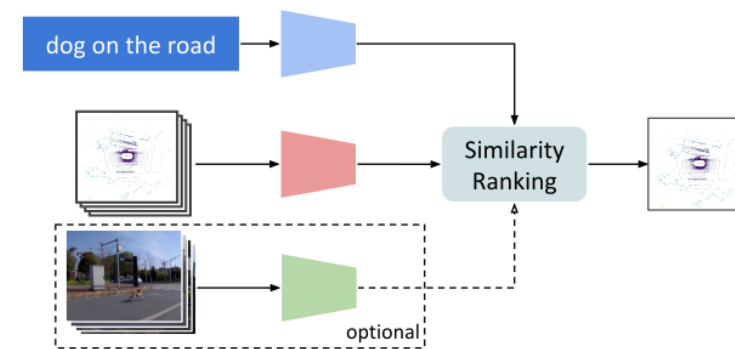
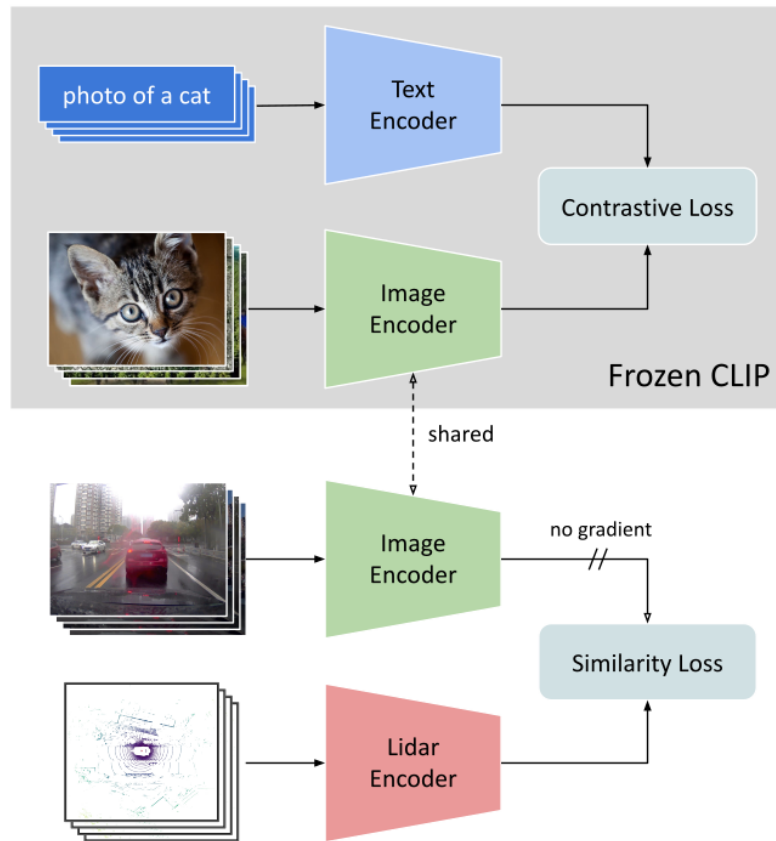
- Enkla modeller
  - Bokstäver (e – 10%, a – 9%, n - 8%, ..., x - 0,15%)
  - Om man vet bokstaven innan
  - Ordstatistik
  - Om man vet ordet innan
  - ...
  - GPT, Chat-GPT

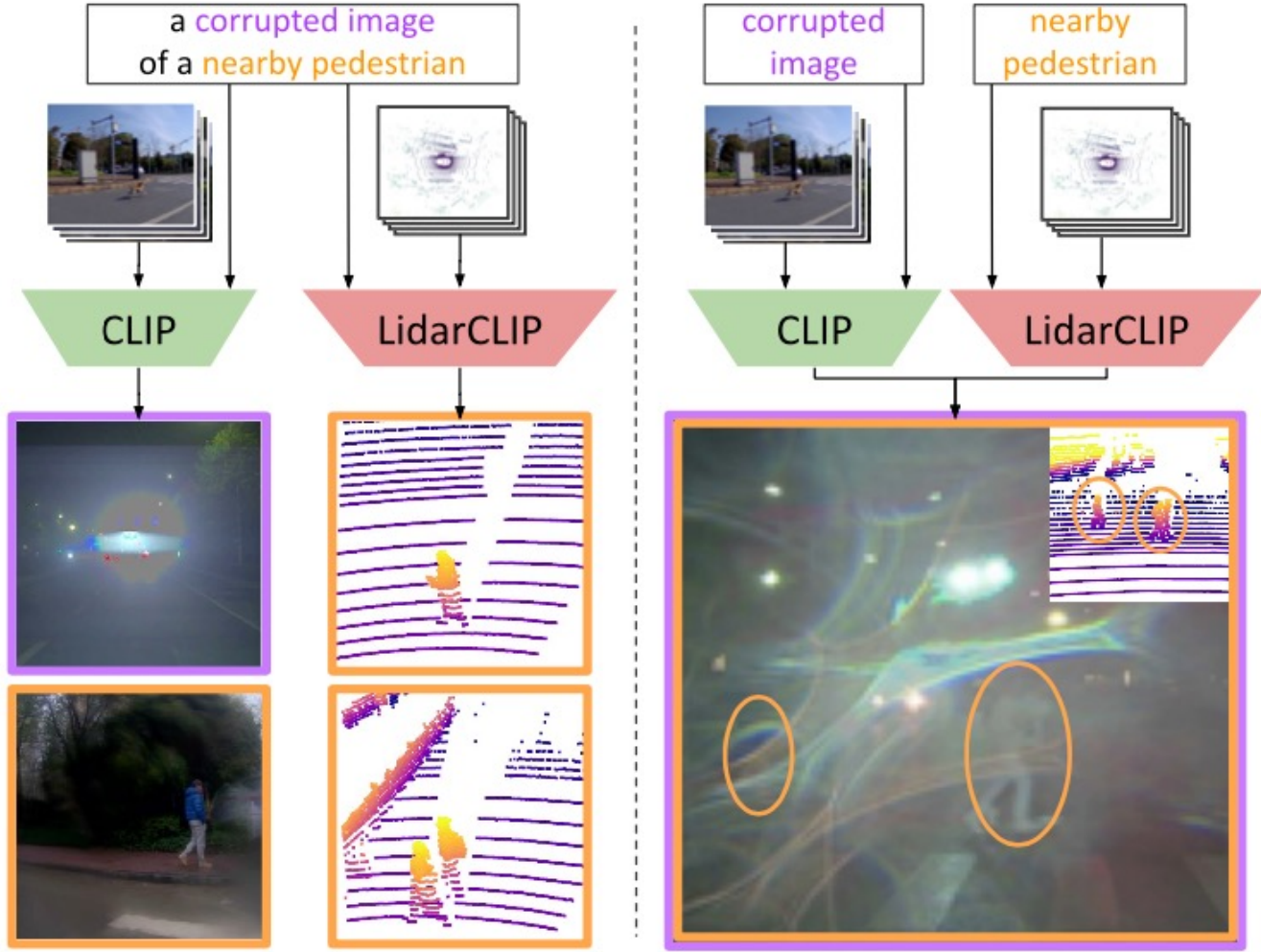


# Vad innebär GPT - chat-GPT

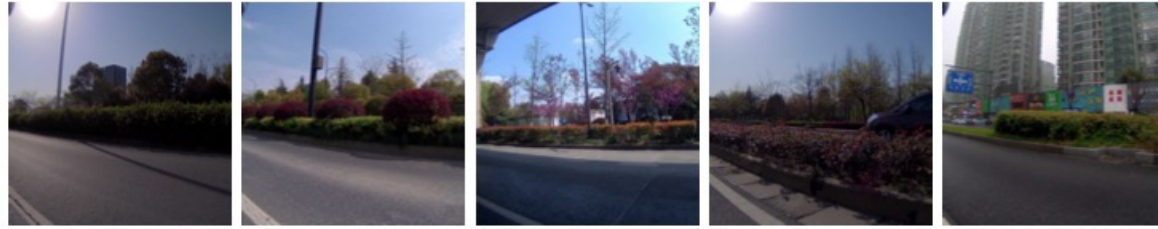
- Bättre verktyg för att analysera och generera text
- Sammanfatta texter
- Strukturera texter
- Vara bollplank
- Ställa frågor
- Viktigt att se det som verktyg – man har själv ansvar för sin text
- Kontrollera, arbeta vidare med text

# LidarCLIP

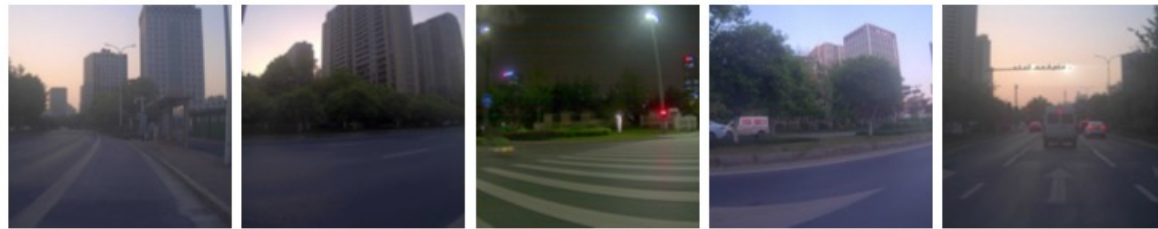




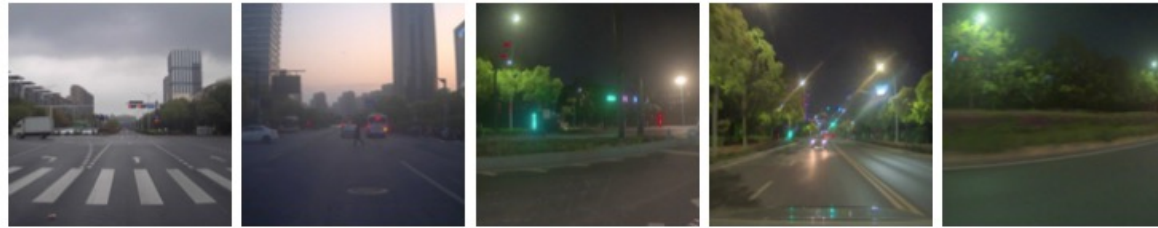
bright and sunny



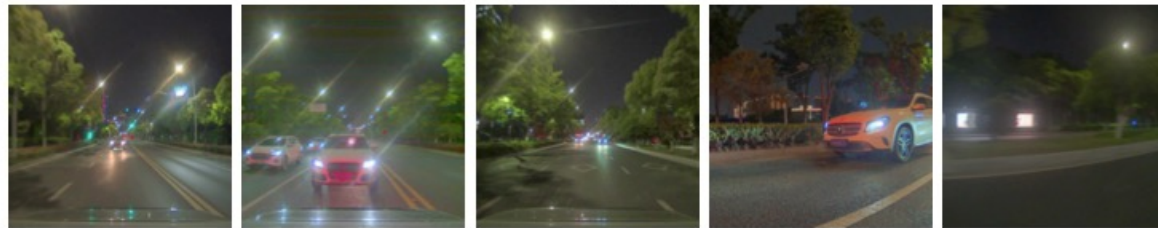
sunrise



night



headlights





# Computer Vision and Machine Learning

## From 'pixels' to meaning

379999953333334565556666555435751499999  
369999963365343563355  
469999964487444454543  
459999963486443445554  
459999954443444445555  
459999953433444445555  
558898853333344434555  
45554543334445535554  
445665433344335544454  
334566532333346444366654222222224333333  
444345444445554333565344222222222323223  
665555554455443333665543222222233333224  
5555555554343333366665222222222222234  
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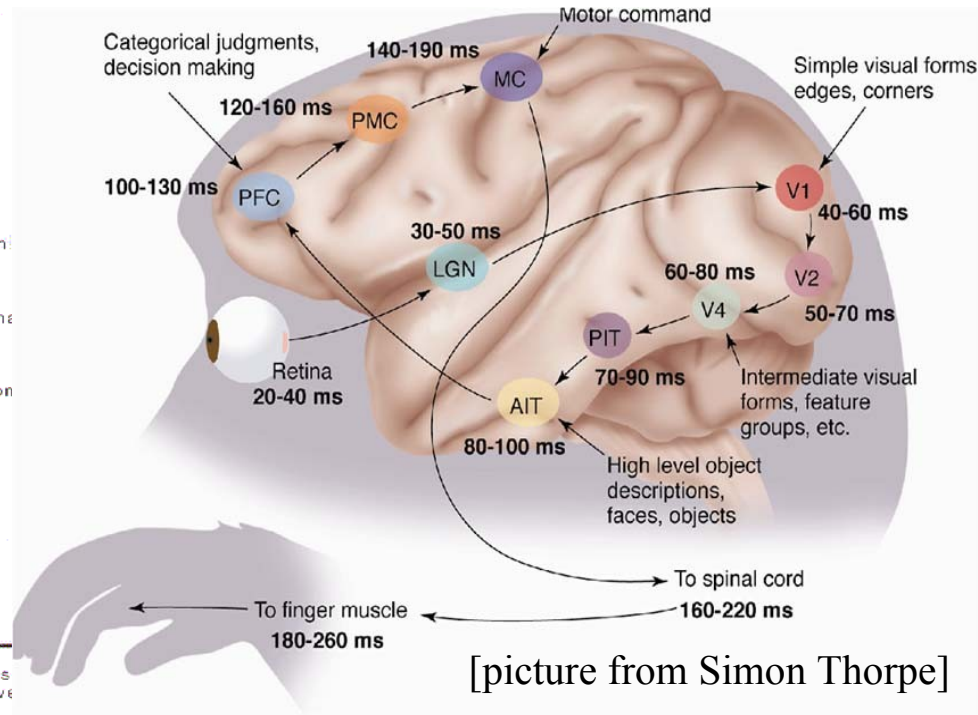
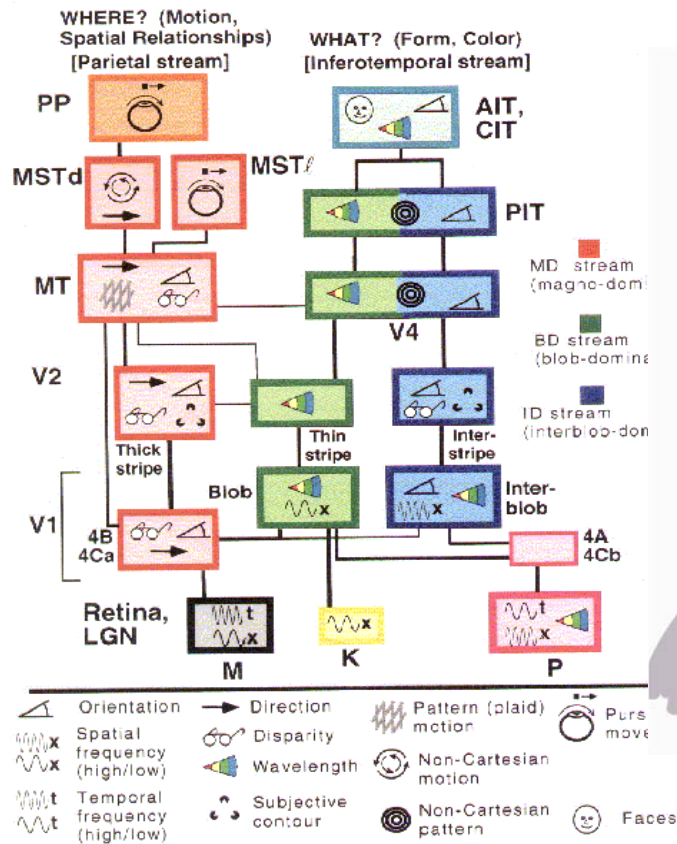




# The Mammalian Visual Cortex is Hierarchical

Y LeCun  
MA Ranzato

- The ventral (recognition) pathway in the visual cortex has multiple stages
- Retina - LGN - V1 - V2 - V4 - PIT - AIT ....
- Lots of intermediate representations



[Gallant & Van Essen]

[picture from Simon Thorpe]



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