

How autodiff changed the world

02457 Machine Learning Operations

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Postdoc

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Who am I?



- Bachelor, Master and PhD from DTU
- Currently: Postdoc at section for cognitive systems
- Focus: Inductive biases in deep learning
- Eager open-source contributor

The screenshot shows the GitHub profile of Nicki Skaft. The profile includes a circular profile picture, the name 'Nicki Skaft', and the username 'SkaftNicki'. Below the name, it states 'Postdoc at section for Cognitive Systems (CogSys), Technical University of Denmark (DTU). Main focus: Generative models and geometrical deep learning.' and provides an 'Edit profile' button. The profile also shows '49 followers · 3 following · 31 stars', location 'Denmark', and email 'skaftenicki@gmail.com'. There are sections for 'Achievements' (showing a GitHub logo), 'Highlights' (showing '19 discussions answered'), and 'Organizations' (showing logos for DTU, CogSys, and others). The main content area displays 'Pinned' repositories: 'ddtn', 'Deep_LMNN', 'libcpab', 'pyclust', 'unsuper', and 'py_uci'. At the bottom, there is a 'Contribution activity' section showing a calendar heatmap for the last year with 1,075 contributions, and a summary stating 'Created 42 commits in 4 repositories'.

Course settings



- 5 ECTS
- 3 weeks period
- Level: Master
- Grade: Pass/not passed
- Type of assessment: weekly project updates + final oral examination/presentation
- Recommended prerequisites: 02456 (Deep Learning) or
 - General understanding of machine learning (datasets, probability, classifiers, overfitting ect.) and
 - Basic knowledge about deep learning (backpropagation, convolutional neural network, auto-encoders ect.)
 - Coding in Pytorch

What is this course/What is it not

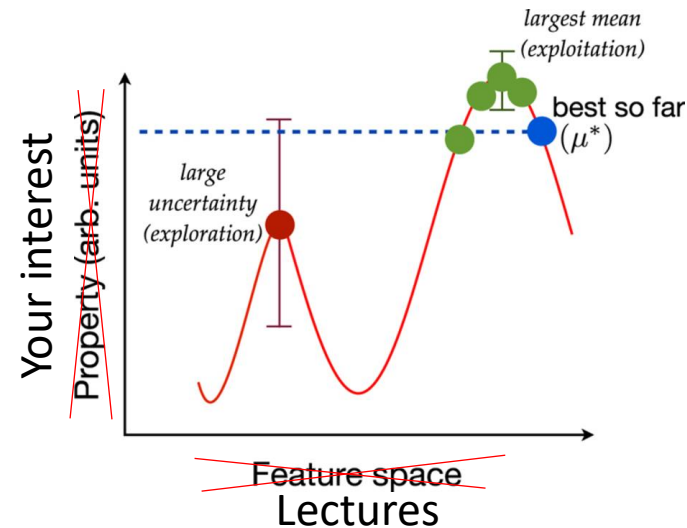


- Introduce the student to a number of coding practices, that will help them do state-of-the-art research. To provide hands-on experience with a number of frameworks for doing deep learning.
- Keywords:
 - Organization
 - Scalability
 - Reproducibility
 - Hands-on experience
- How deep learning models works (02456)

What do I expect from you



- This course was developed over 1½ month, meaning that the material may be suboptimal
- We provide lectures, exercises and guidance but encourage self-study
- Make sure to both explore and exploit it!



- Provide all the feedback you have, I can take it!



What I hope from this course



- Have fun!
- Playing around with the different frameworks
- Maybe learn something along the way



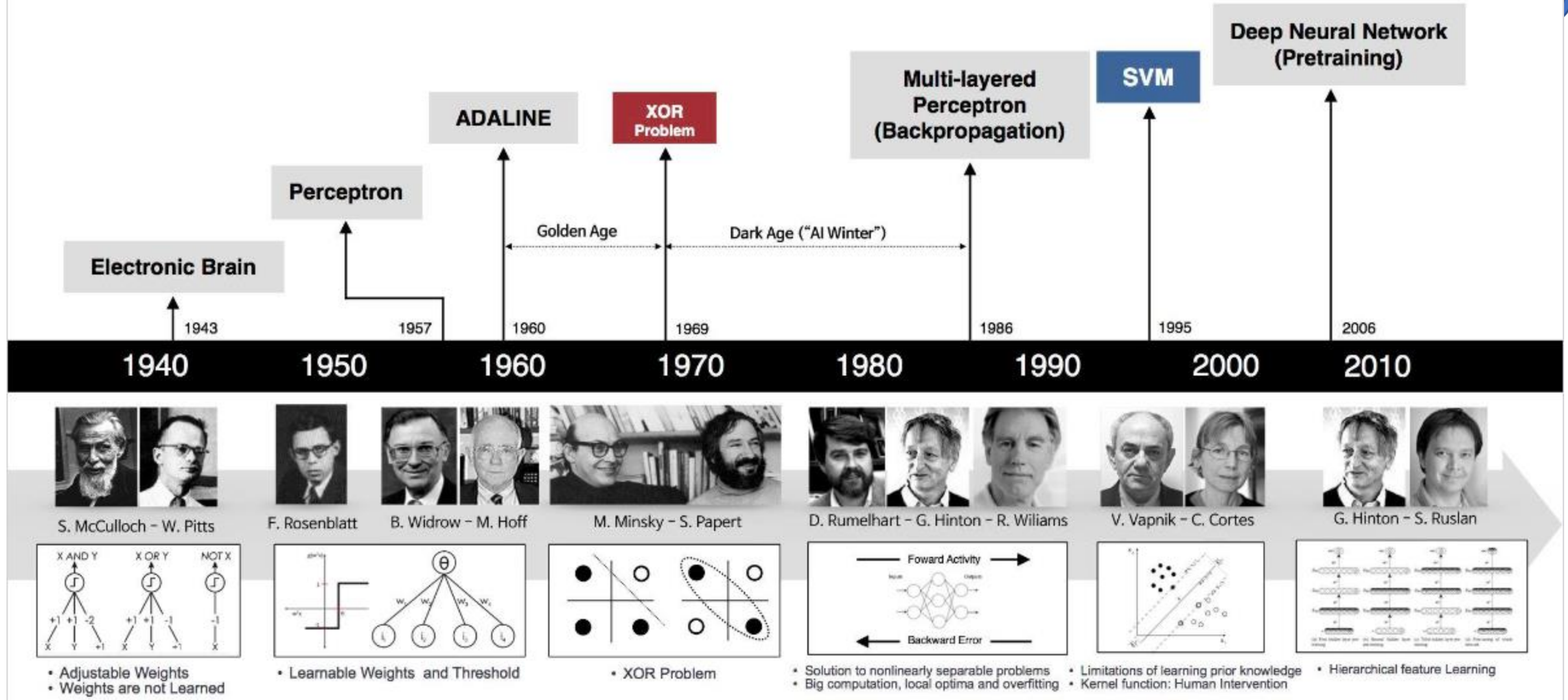
hygge

[hue-gah] *noun*

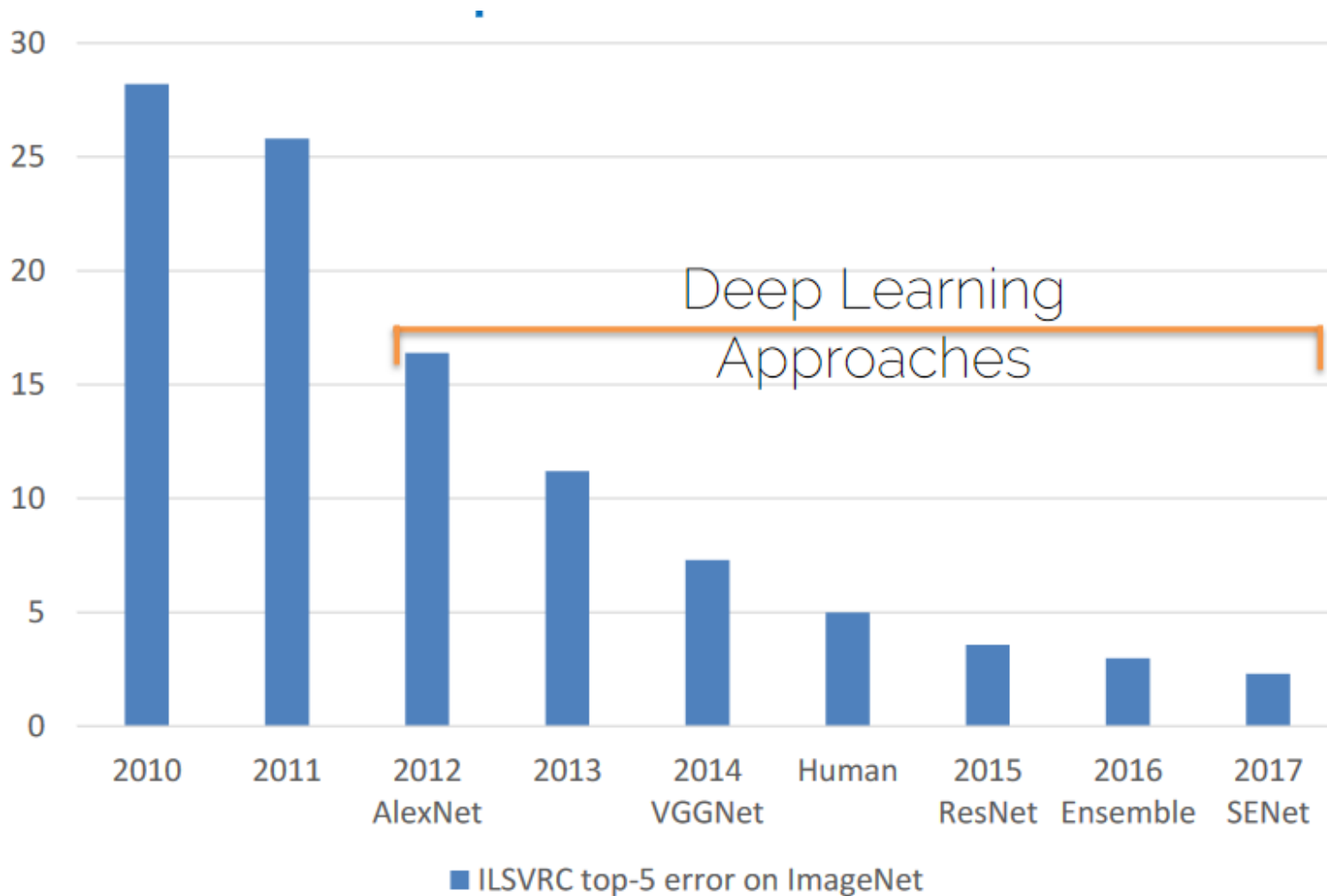
An atmosphere of warmth, wellbeing, and cosiness when you feel at peace and able to enjoy simple pleasures and being in the moment.

History of deep learning

History of deep learning



The Deep Learning Revolution



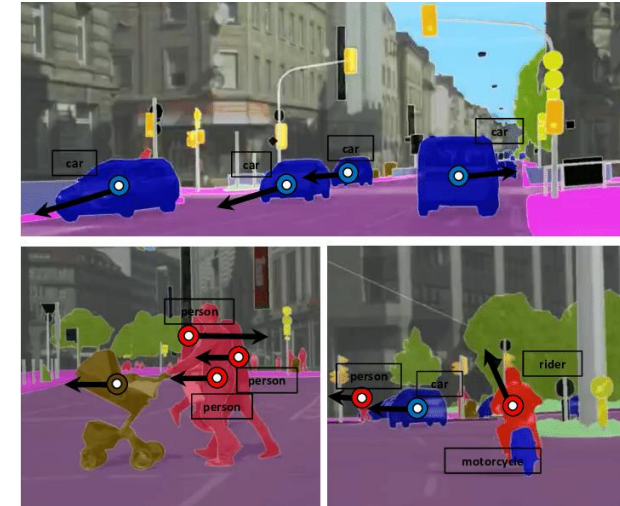
Since then...



AlphaGO:
Beating humans



Unet:
High quality
semantic
segmentation



GPT-3
Having
conversations
with humans

Q: What is your favorite animal?
A: My favorite animal is a dog.

Q: Why?
A: Because dogs are loyal and friendly.

Q: What are two reasons that a dog might be in a bad mood?
A: Two reasons that a dog might be in a bad mood are if it is hungry or if it is hot.

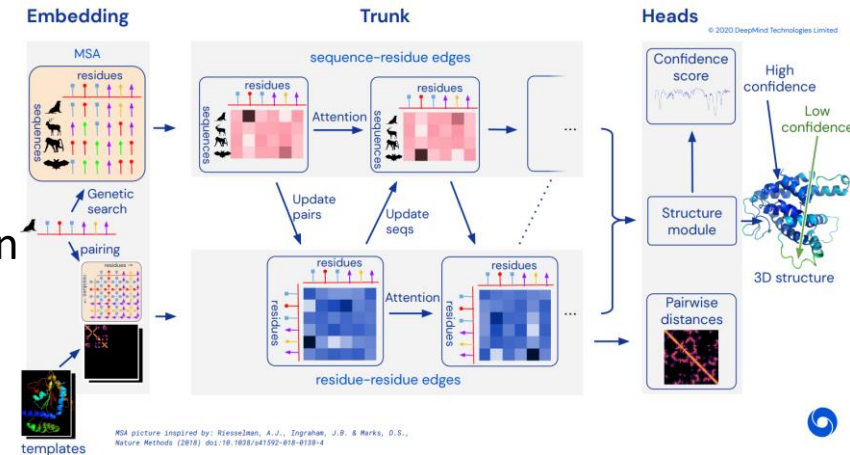
Q: How many eyes does a giraffe have?
A: A giraffe has two eyes.

Q: How many legs does a frog have?
A: A frog has four legs.

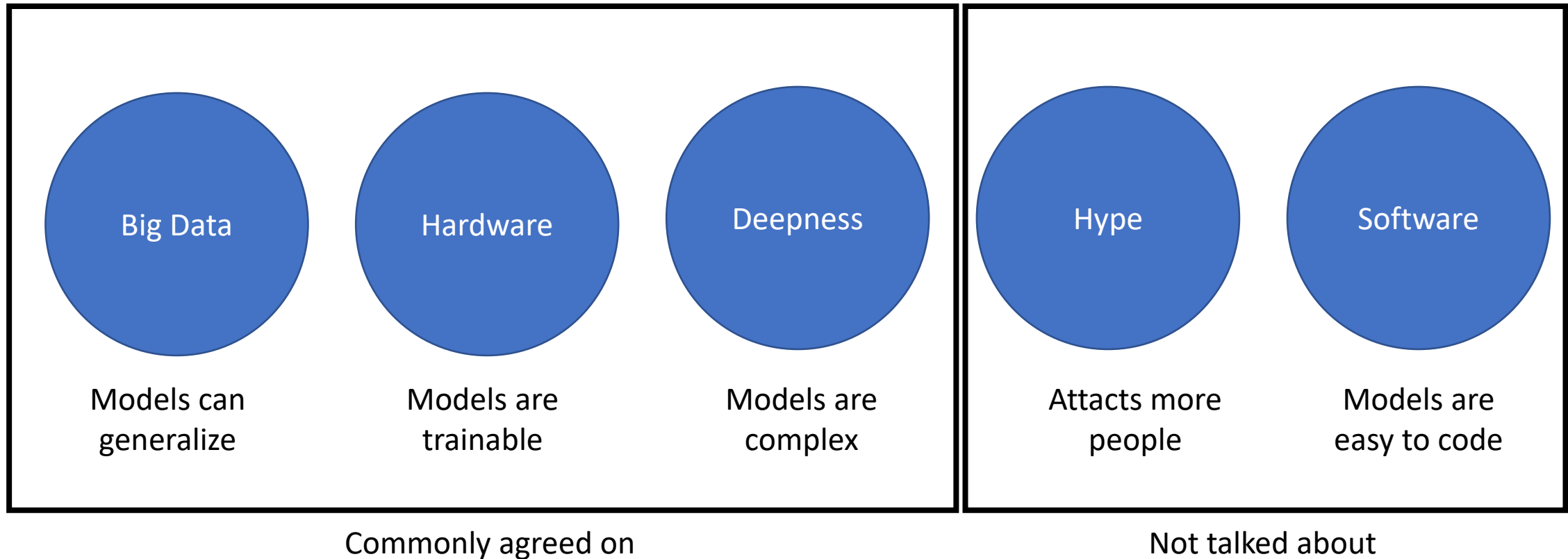
Q: Are there any animals with three legs?
A: No, there are no animals with three legs.

Q: Why don't animals have three legs?
A: Animals don't have three legs because they would fall over.

AlphaFold:
Solving protein
engineering



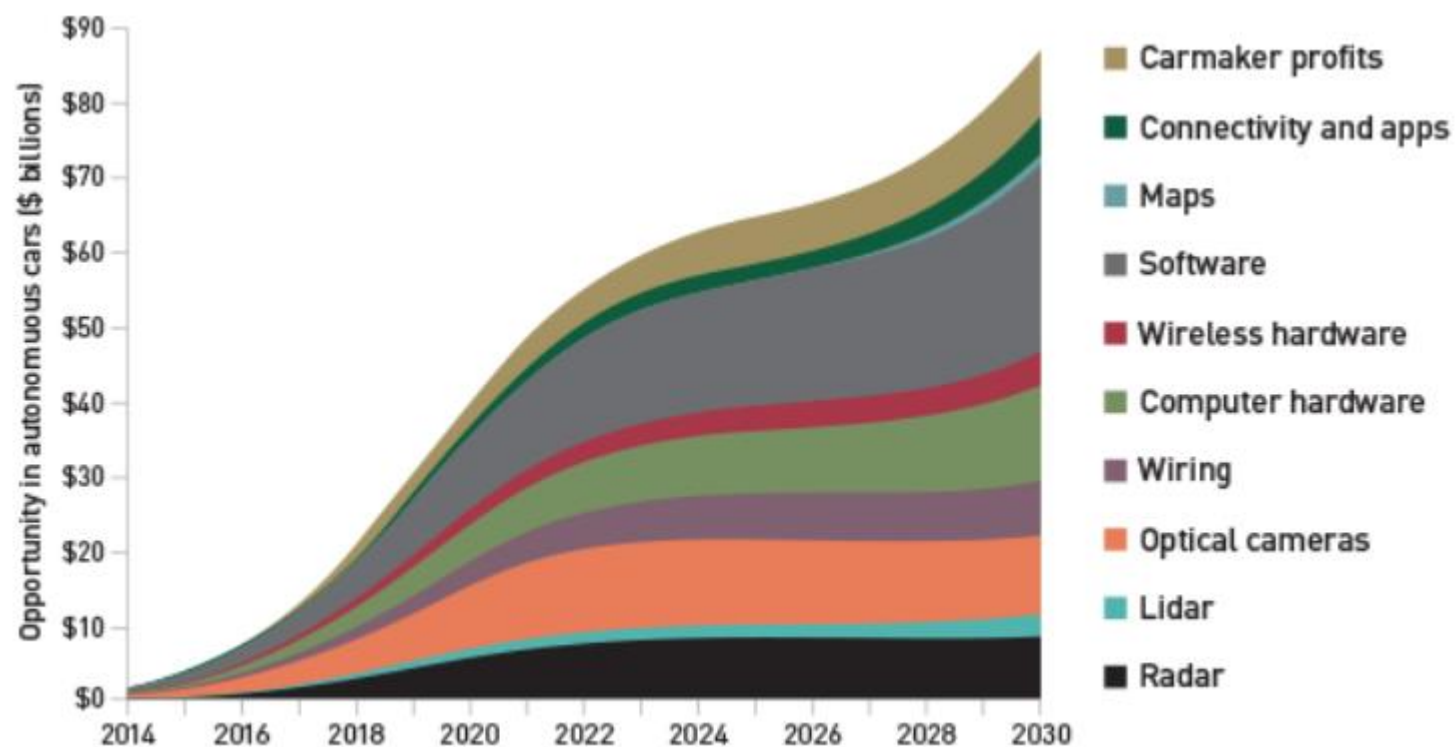
What has changed?



Why you should jump the wagon



“... the deep learning market is expected to be worth USD 1,722.9 Million by 2022”



The DL software landscape



Google



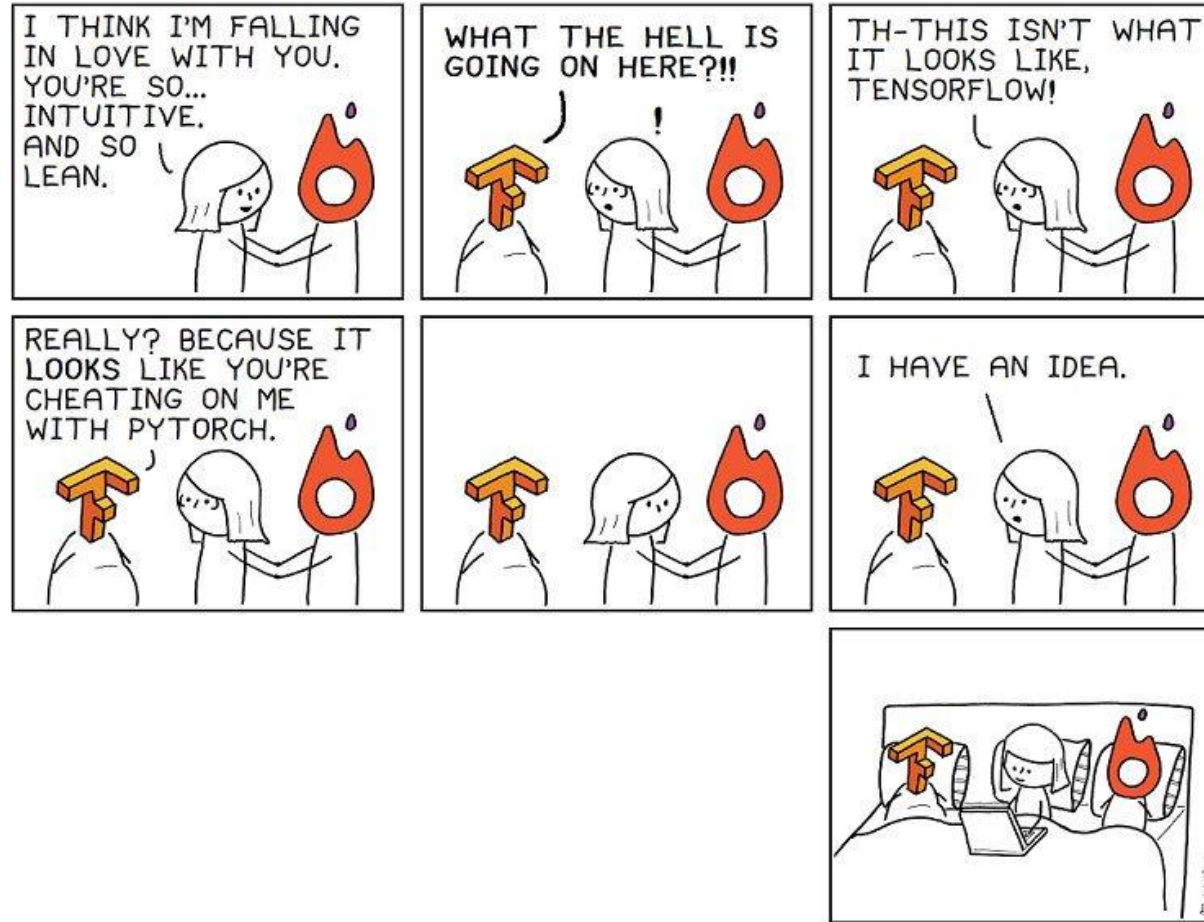
facebook



No point in discussion who is best. The (biased) facts are:

- Tensorflow are too a large extend used in production
- Pytorch is used in research

If you have the time, I recommend learning both

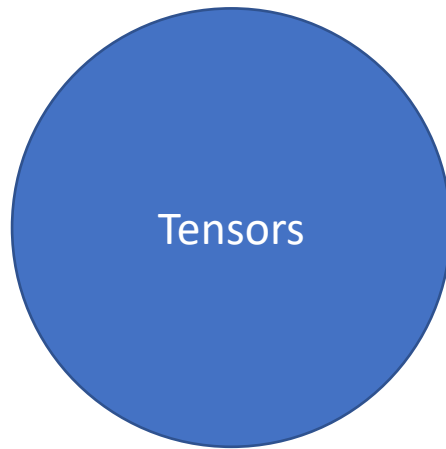


**Remember, it's
not a competition.**

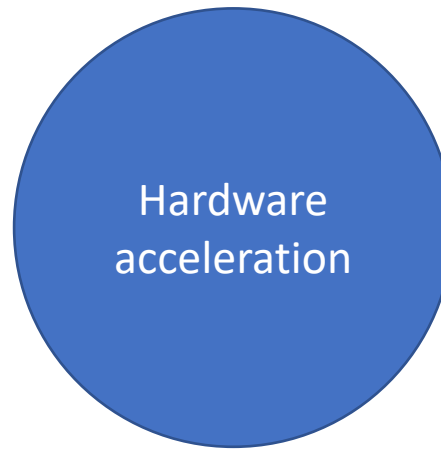
How to make a modern deep learning framework



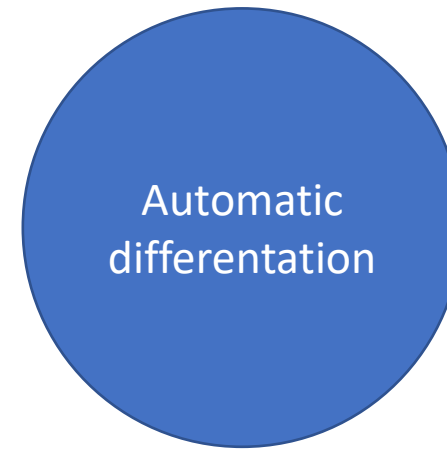
3 key elements



Abstraction to
higher order data



Faster
computations



Ease of use

Meme of the day

