

Deep Learning Crash Course



www.deeplearningcrashcourse.org

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Fall 2021



National Heart, Lung,
and Blood Institute

Closing remarks



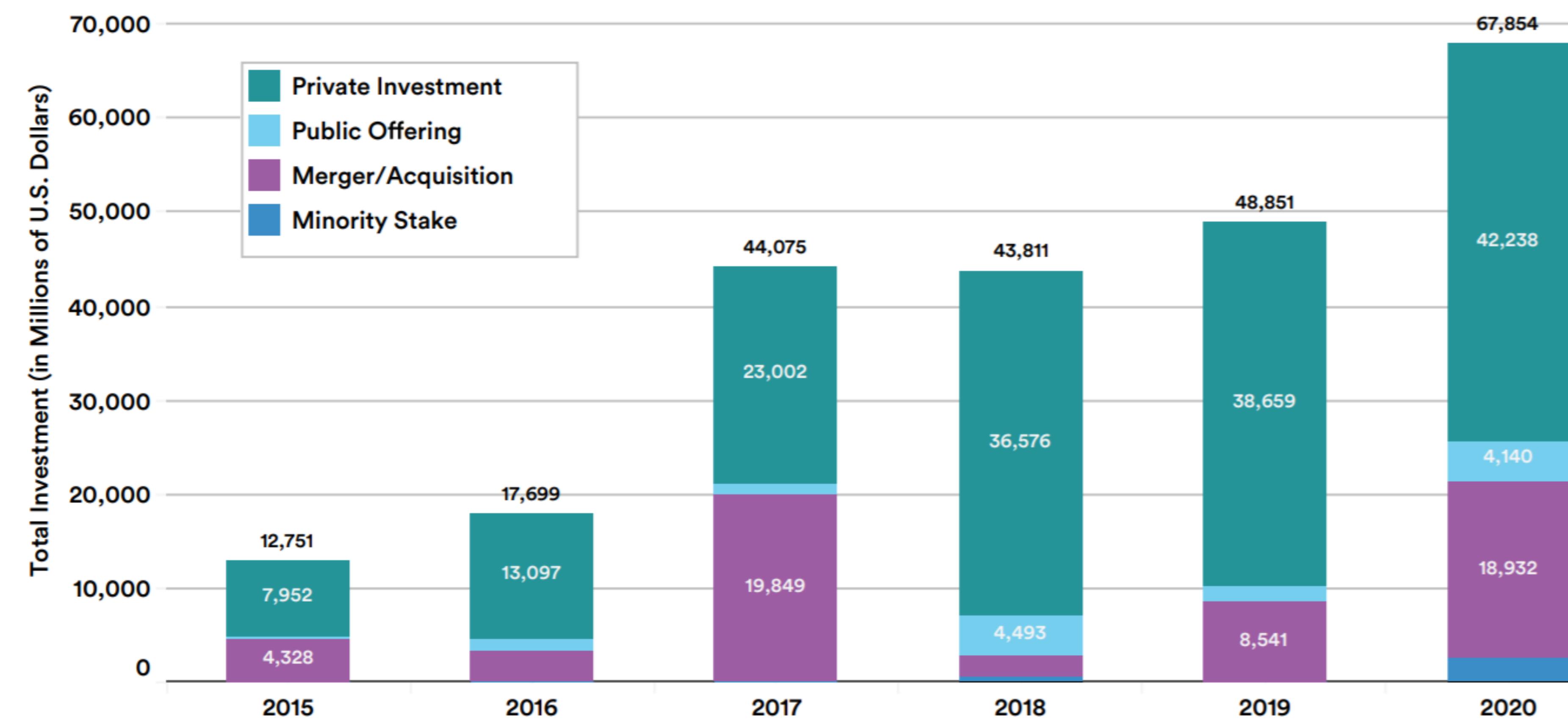
variance cross
lstm gradient descent
experiment management test
weight saliency map
gru grad cam learning curve
data management rnn cycle scheduler
validation mlp gan pytorch binary ce
dev adam layer norm adversarial attacking
cnn group norm log likelihood transformers
bias meta learning

- Neural Network basics
- Setup your training
- CNN
- RNN, transformer
- GAN
- Adversarial attacking
- Visualization
- Transfer learning, meta learning, contrastive learning
- Data management, experiment management ...

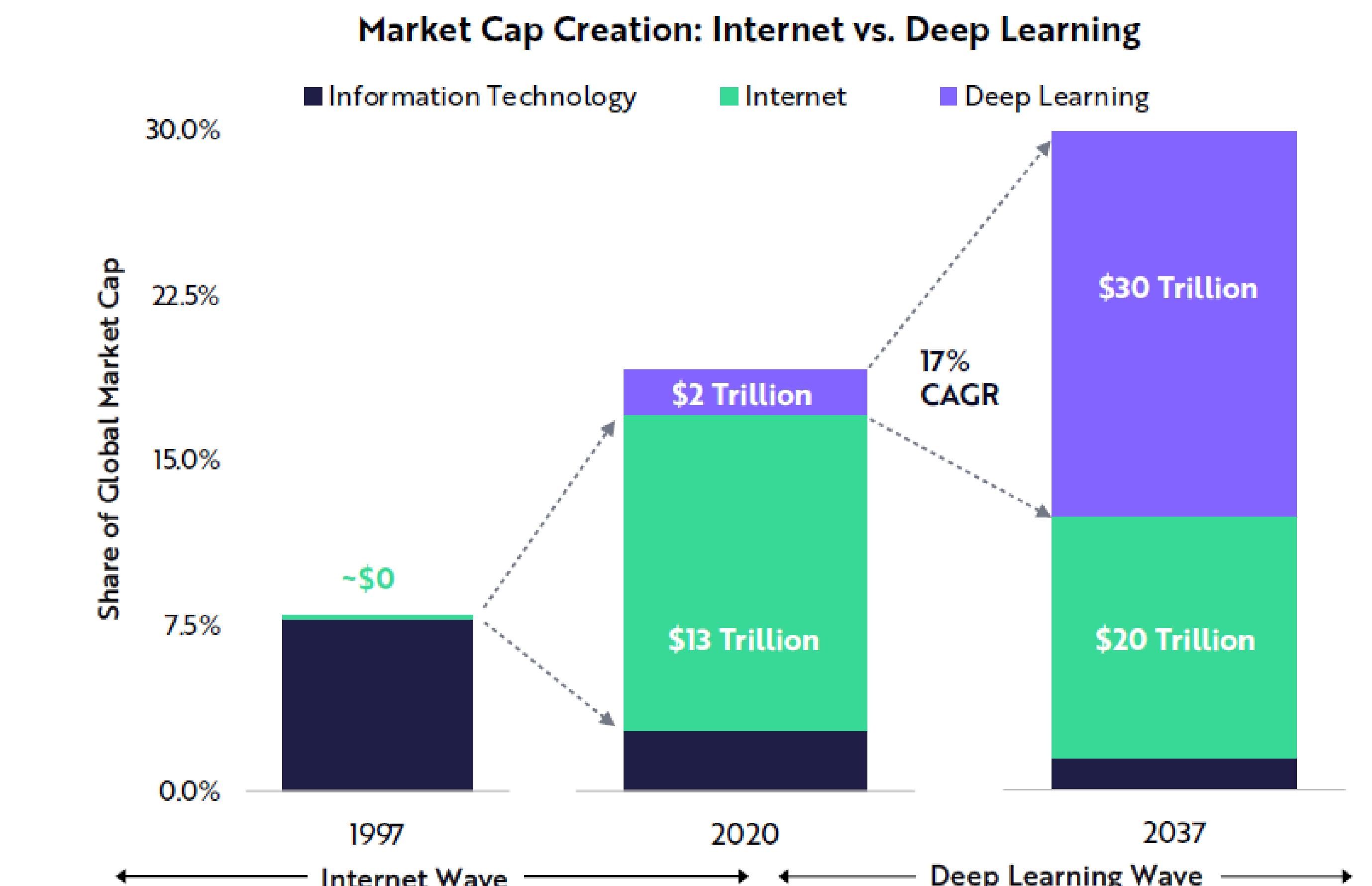
Big picture

GLOBAL CORPORATE INVESTMENT in AI by INVESTMENT ACTIVITY, 2015-20

Source: CapIQ, Crunchbase, and NetBase Quid, 2020 | Chart: 2021 AI Index Report



Chapter 3, Artificial Intelligence Index Report 2021



According to ARK's research, deep learning will add \$30 trillion to the global equity market capitalization during the next 15-20 years.

-- Big Idea 2021, <https://ark-invest.com/big-ideas-2021/>

Model centric to Data centric



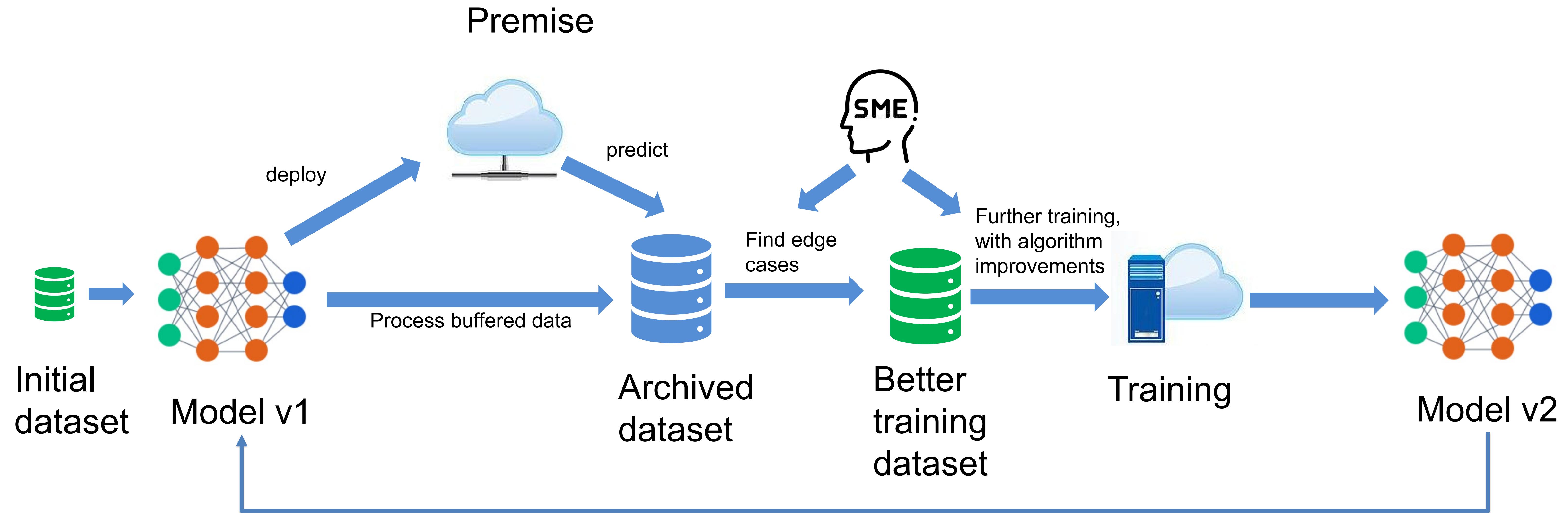
Vicious circle of Deep Learning

<https://www.youtube.com/watch?v=06-AZXmwHjo&t=1142s>



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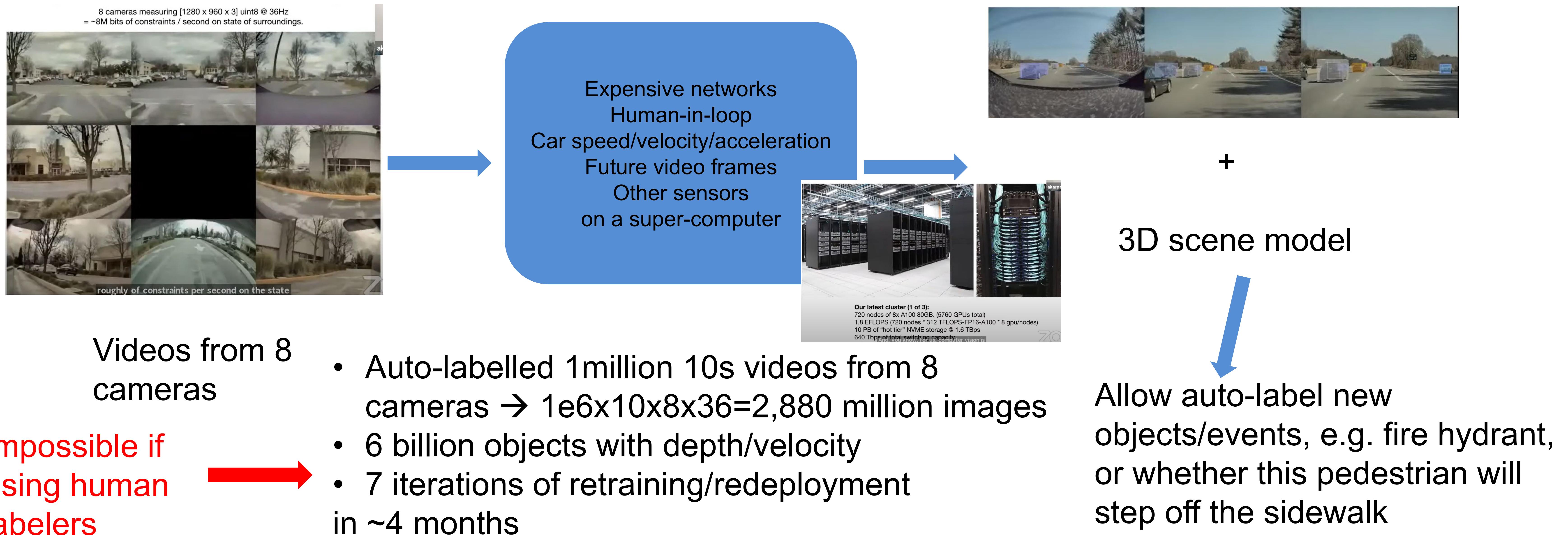
More focus on system/MLOps



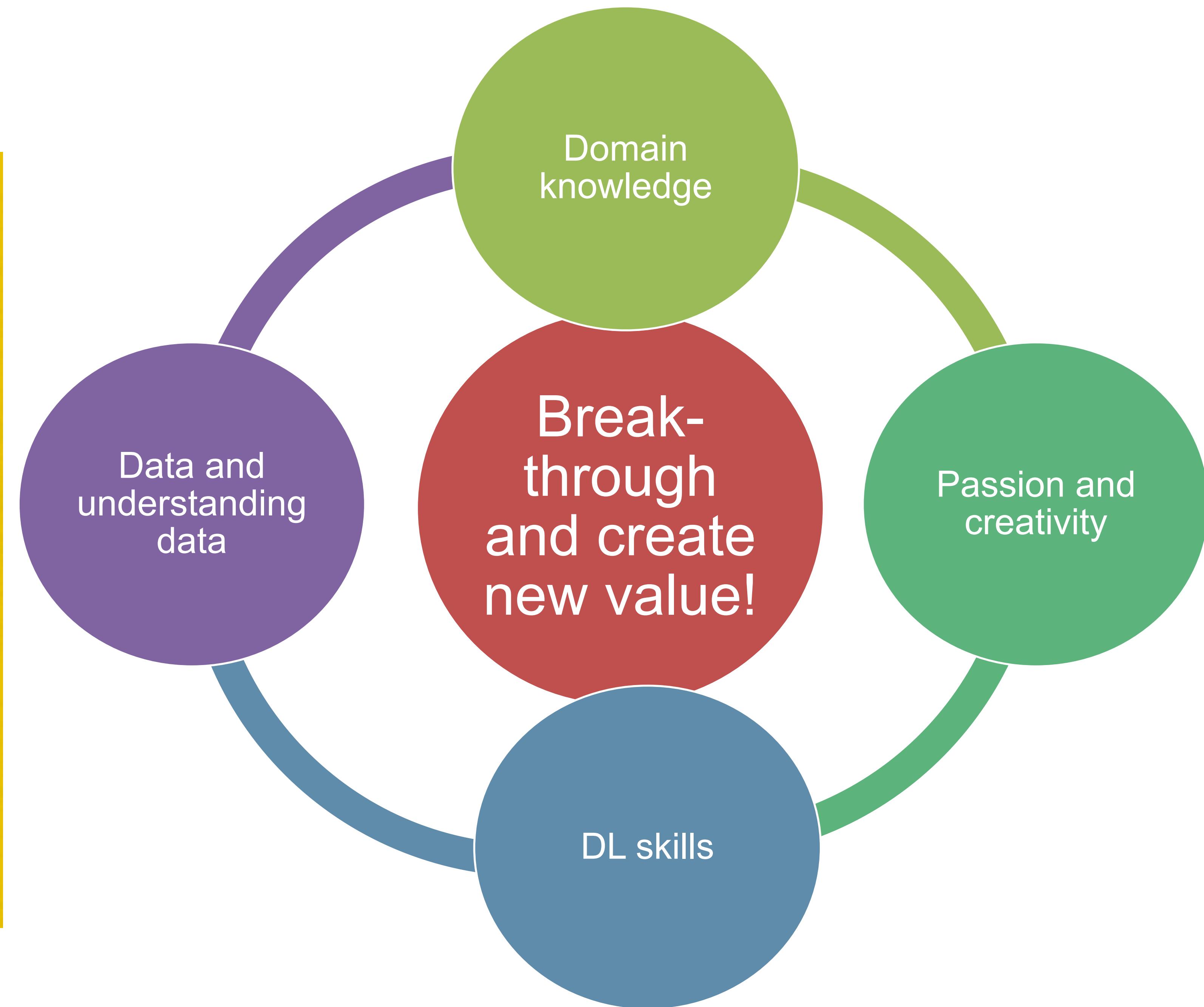
- MLOps : hybrid team, ML pipeline, data versioning, testing, experiment management, monitoring model performance and data shift ...
- Start by making your training reproducible

Auto-Labelling at Scale

- The guaranteed win is automated generation of **clear labels** on **large** and **diverse** datasets
- Require human-in-the-loop
- Require system in place



Add DL to your expertise: AI+X



Keep learning



NUMBER of AI-RELATED PUBLICATIONS on ARXIV by GEOGRAPHIC AREA, 2015-20

Source: arXiv, 2020 | Chart: 2021 AI Index Report

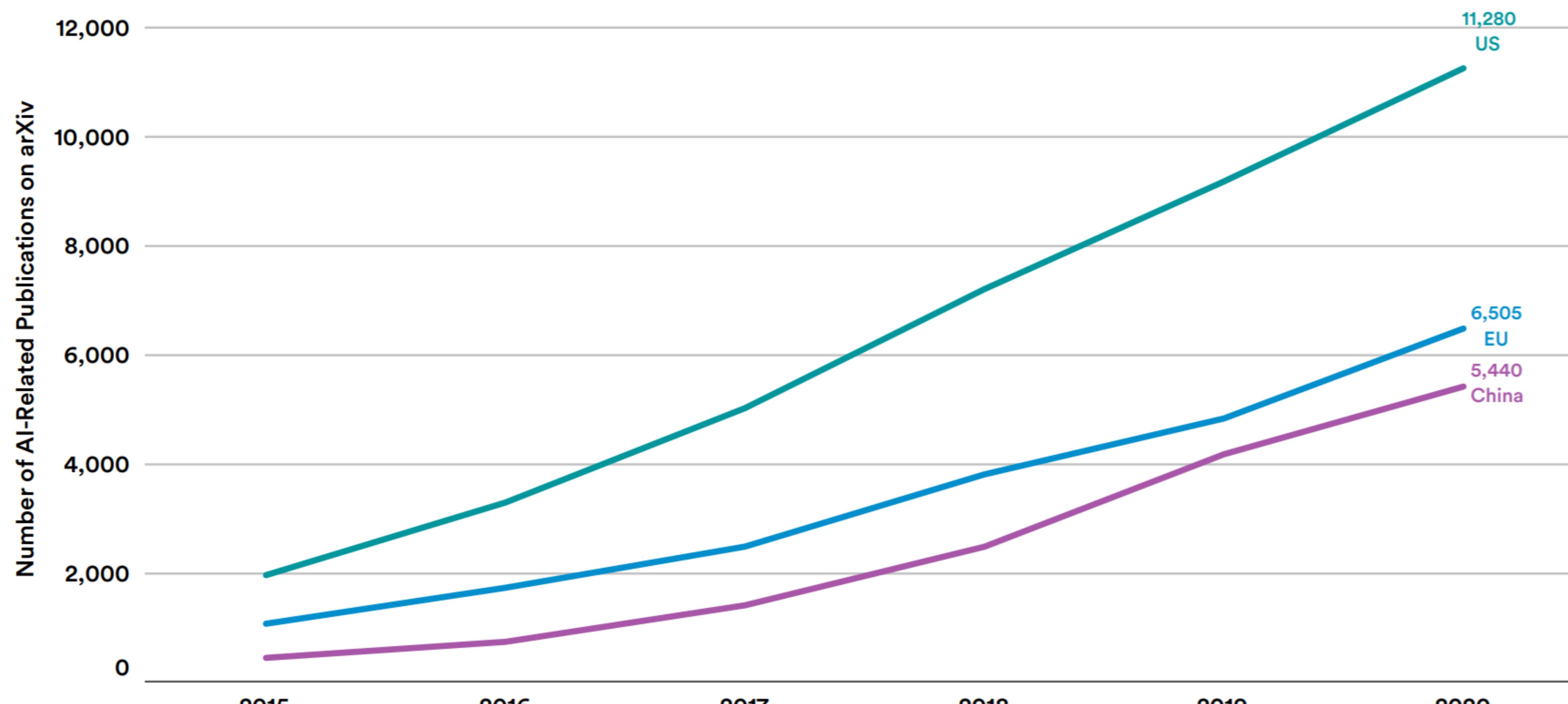


Figure 1.1.18a

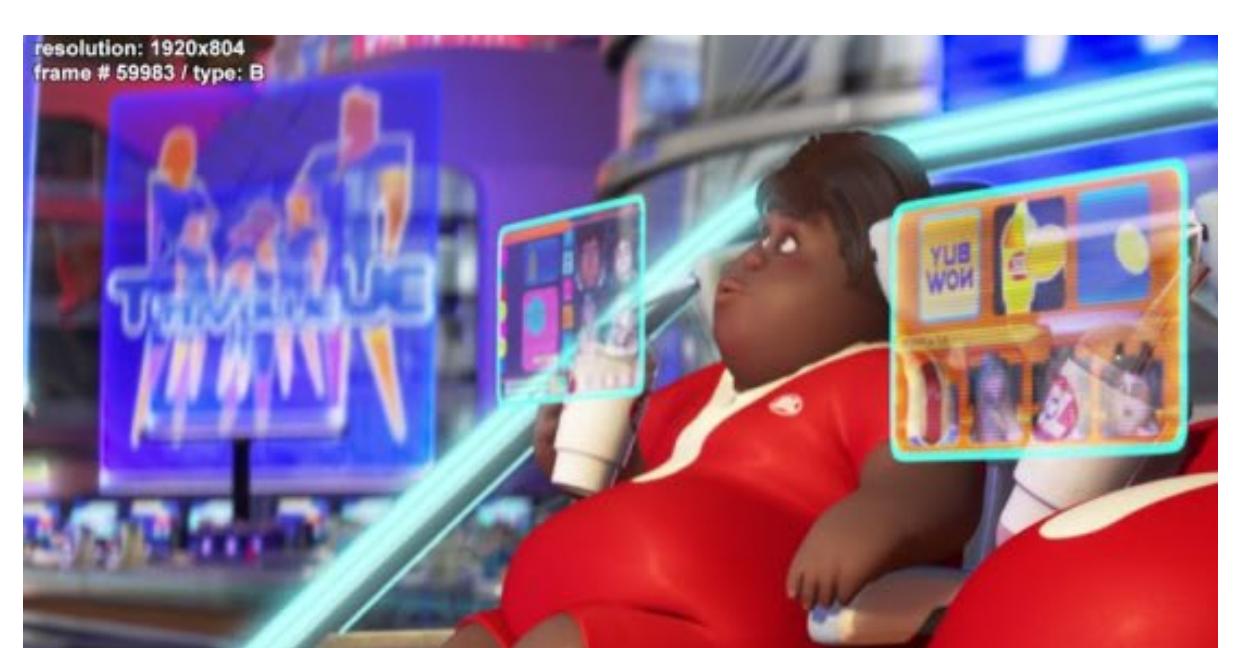
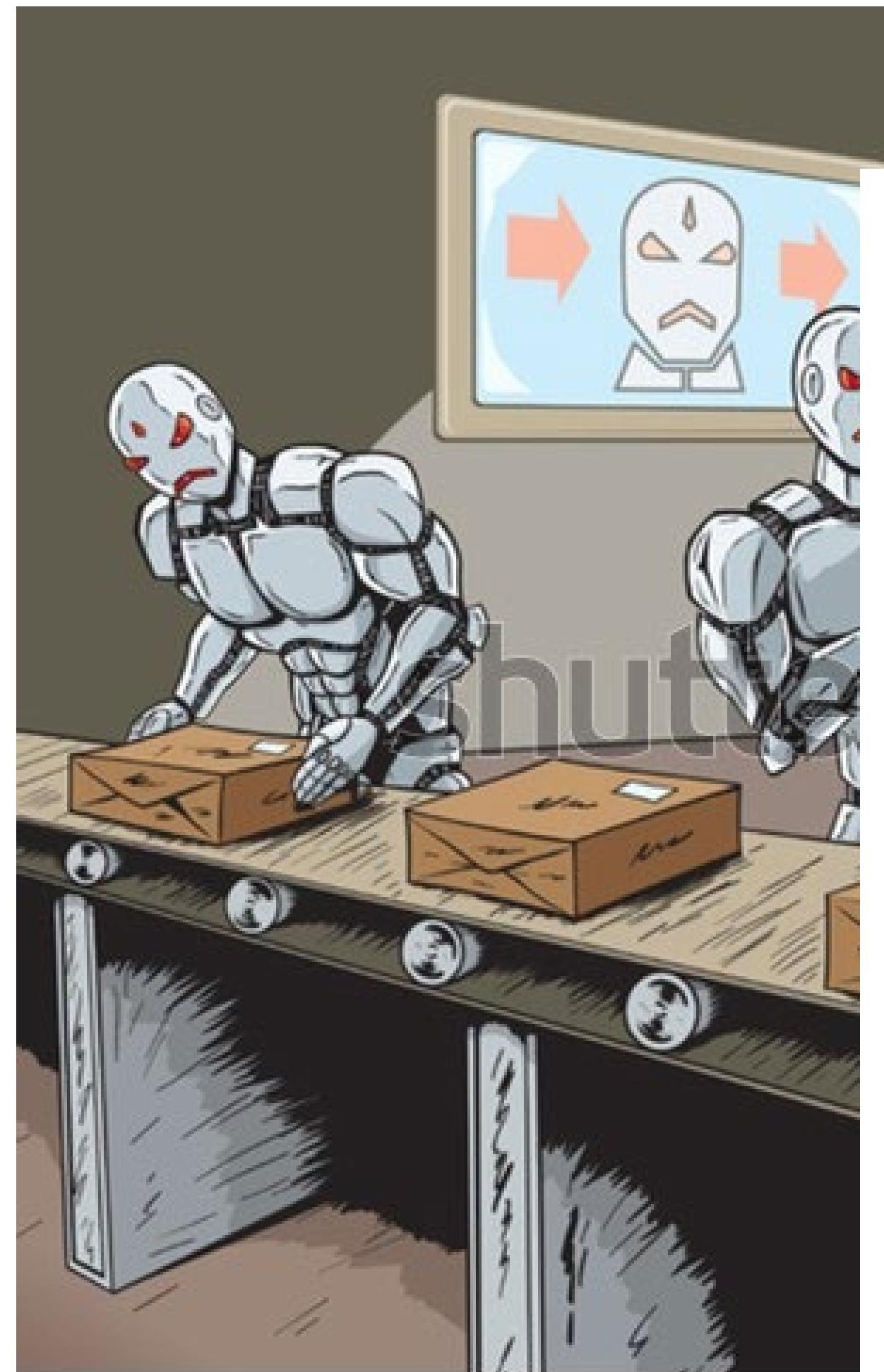
ARXIV AI-RELATED PUBLICATIONS (% of WORLD TOTAL) by GEOGRAPHIC AREA, 2015-20

Source: arXiv, 2020 | Chart: 2021 AI Index Report

Keep learning : Resources

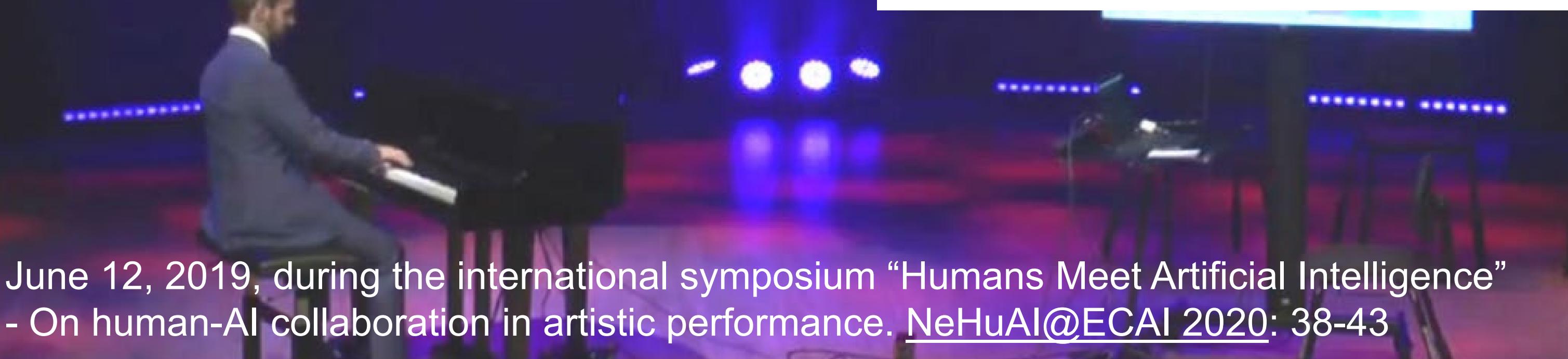
- Tutorial on AI conferences (e.g. ICLR, NeurIPS ...)
- Your domain journals, find and track AI related papers, focus on how to apply DL to new problems
- Kaggle competition, discussion forum, strategy used in winning solutions
- Youtube is a good resource: [Yannic Kilcher, Two Minutes Paper](#)
- AI new letters: [Batch](#) by deeplearning.ai, [机器之心](#), [Import AI](#)
- Blogs of DeepMind, Google Brain, Fast.AI ...
- Tutorials: <https://medium.com/machine-learning-in-practice/over-200-of-the-best-machine-learning-nlp-and-python-tutorials-2018-edition-dd8cf53cb7dc>

Be optimistic, be sharp



In as little as 10 years, AI could generate enough wealth to pay every adult in the U.S. \$13,500 a year, Altman said in his 2,933 word piece called "[Moore's Law for Everything.](https://moores.samaltman.com/)"

<https://moores.samaltman.com/>



June 12, 2019, during the international symposium "Humans Meet Artificial Intelligence" - On human-AI collaboration in artistic performance. [NeHuAI@ECAI 2020: 38-43](#)



Using the same core technique ...



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Please fill in the course feedback survey!