CS839 Special Topics in Deep Learning

Uni of Wisconsin Madison

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Lecture1

- Neural architecture design
- Trustworthy deep learning
- Interpretable deep learning
- Deep learning generalization and theory
- Learning with less supervision
- Lifelong learning
- Deep generative modeling

Evolution of NN architecture

LeNet AlexNet InceptionNet DenseNet

~~DesNe~~ DenseNet → AutoML → NasNet [Zoph 2017]

goal is to replace human expert

Trustworth DL

Out of distribution reliability

Closed-world → train and test dist match

Open world → turn and test dist differ.

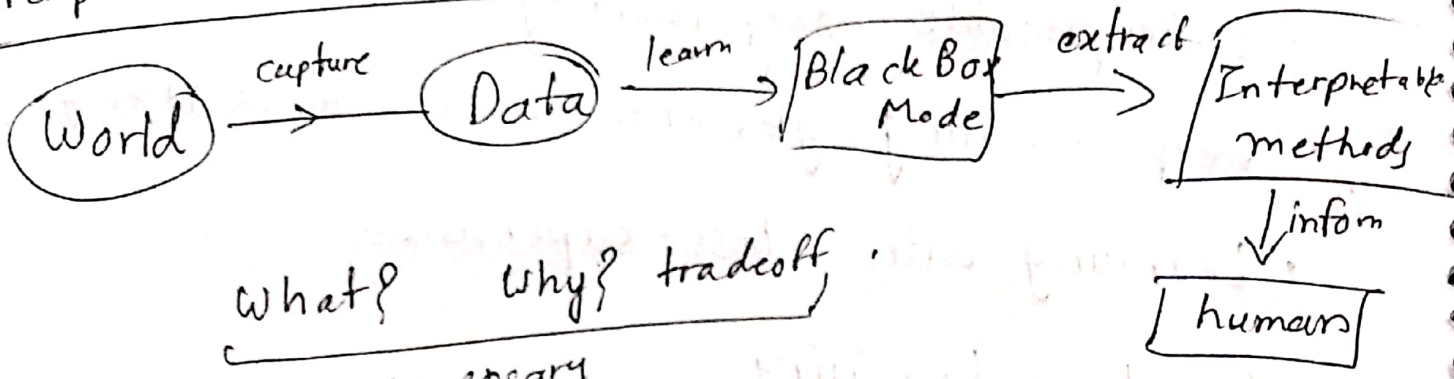
Trustworthy Deep learning

Out-of-distribution reliability

Adversarial Robustness

Fairness/Group Robustness

Interpretable Deep Learning



what? why? tradeoff.

necessary

Generalization an Theory

Learning with less supervision

fully supervised → Weakly Supervised → Self supervised (true notion of artificial intelligence)

Lifelong learning

Machines that improve with experience and become 'smarter' over time

Deep Generative Modeling

45 years of face generation Style transfers