

Machine Learning Meetup #1

Pre-survey

- Would you have signed up if the meetup was called “Deep Learning”?
- How did you hear about this meetup?
- Who here has practiced machine learning?
 - For fun
 - For job

What is Machine Learning?

Teaching computers to learn to perform tasks from past experiences.

What is Machine Learning?

"A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P if its performance at tasks in T , as measured by P , improves with experience E ." – Tom M. Mitchell

AI beginnings

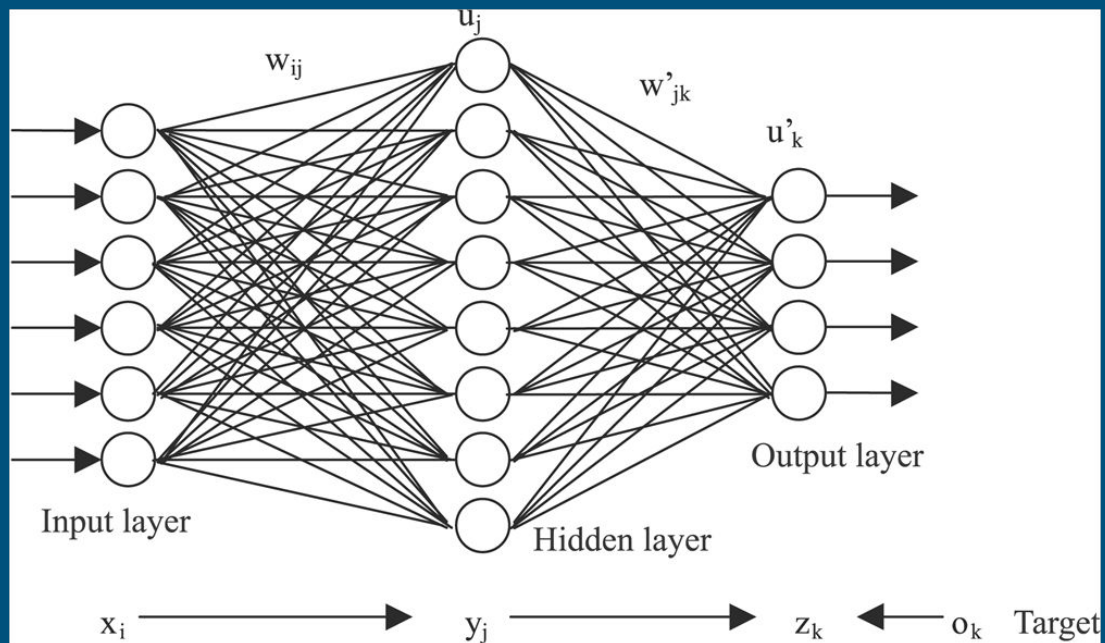
- 1842: Could machines become intelligent?
- Early AI - rapidly solved problems with formal, mathematical rules
 - Chess with IBM's Deep Blue – difficult for a human, but easy to formalize
- Knowledge base approach
 - Hard-code knowledge about the world
 - ~~No real success~~ (see expert systems)
- True challenge to solve tasks easy for people but hard to describe formally
 - Recognize objects
 - Understand speech and language

AI -> Machine Learning

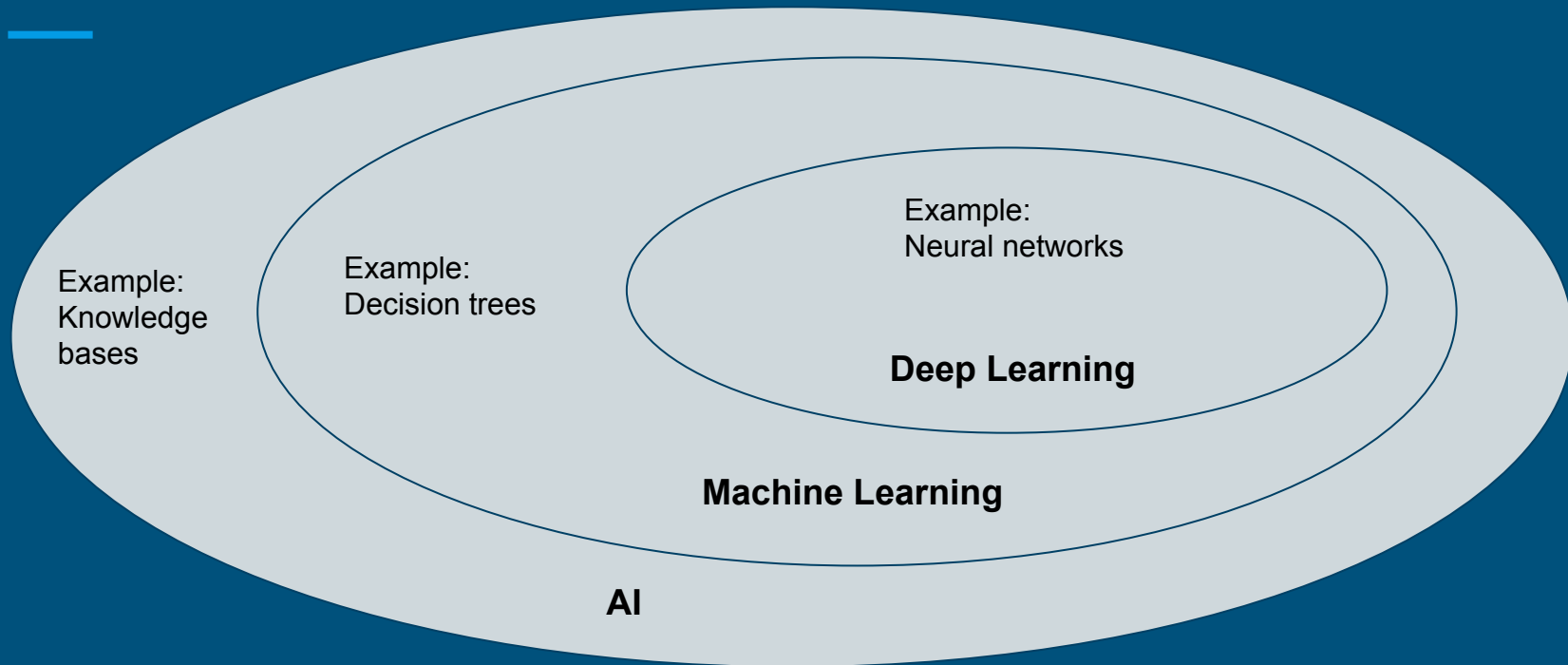
- Solution is to learn from experience
- Machine learning algorithms
 - Logistic regression
 - Ordinary least squares
 - Naive Bayes
 - Support Vector Machines
 - Nearest neighbors
 - Decision trees
 - K means clustering
 - Ensemble methods
- Representation of the data is important
- Supervised
- Unsupervised
- Reinforcement learning
- Regression vs classification
- Time series analysis
- Dimensionality Reduction

Deep Learning

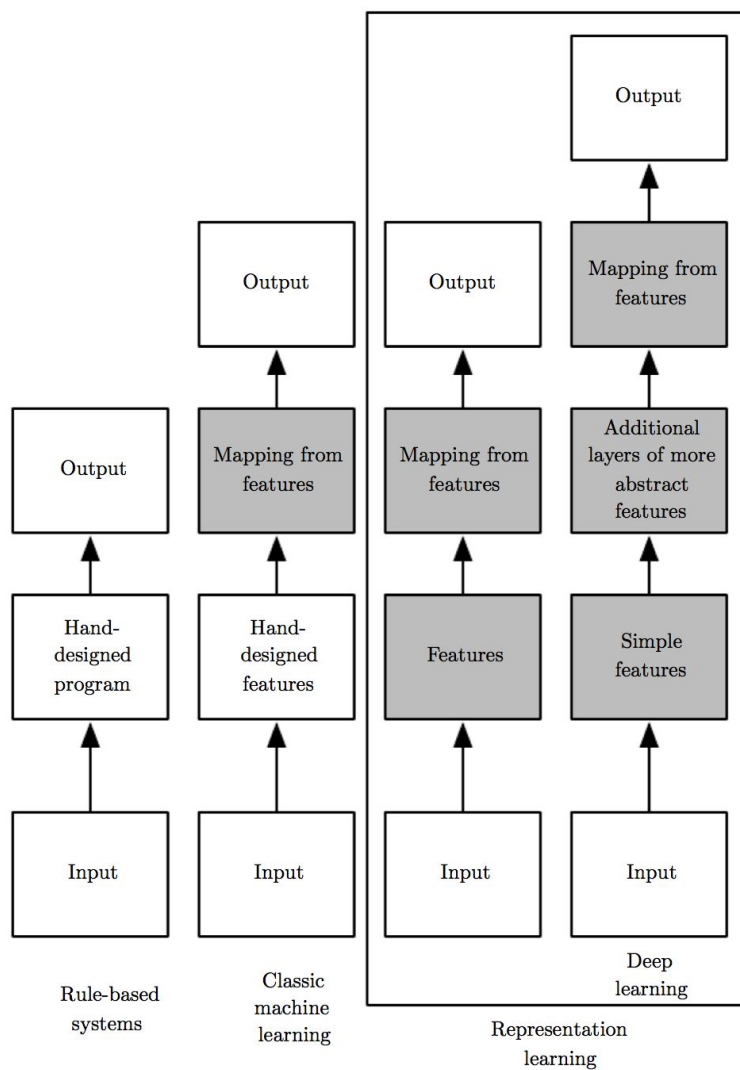
- Deep learning understands the world in terms of a hierarchy of concepts
- Representations are learned instead of hand picked
- Dominated by neural networks



From AI to Deep Learning

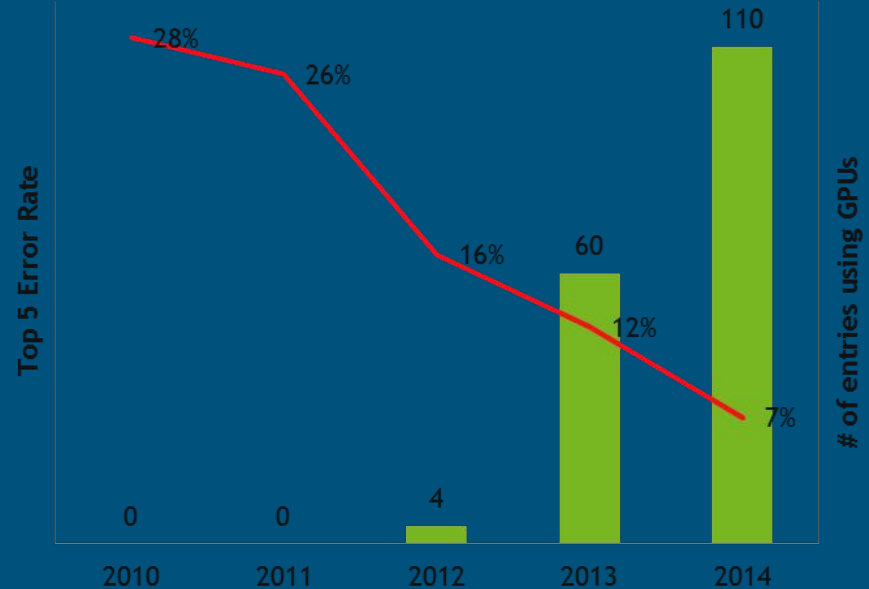
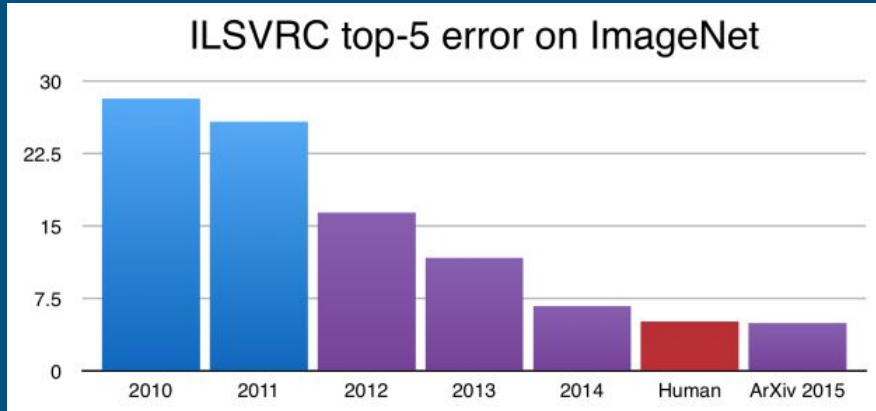


Components learning systems

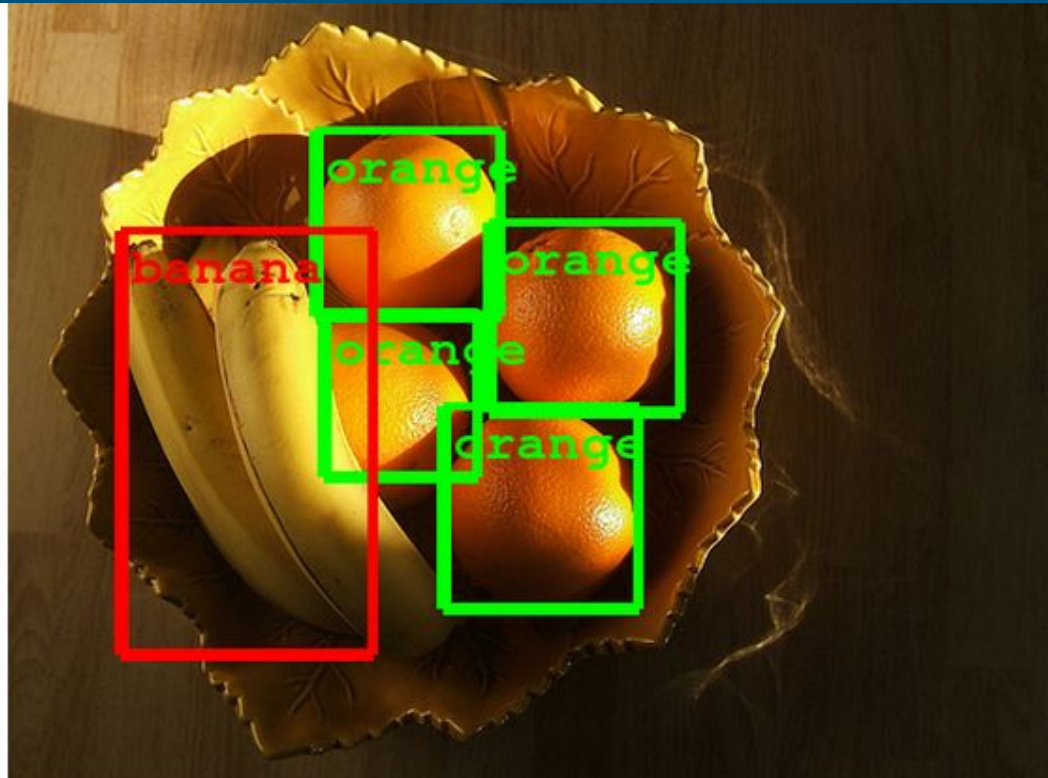
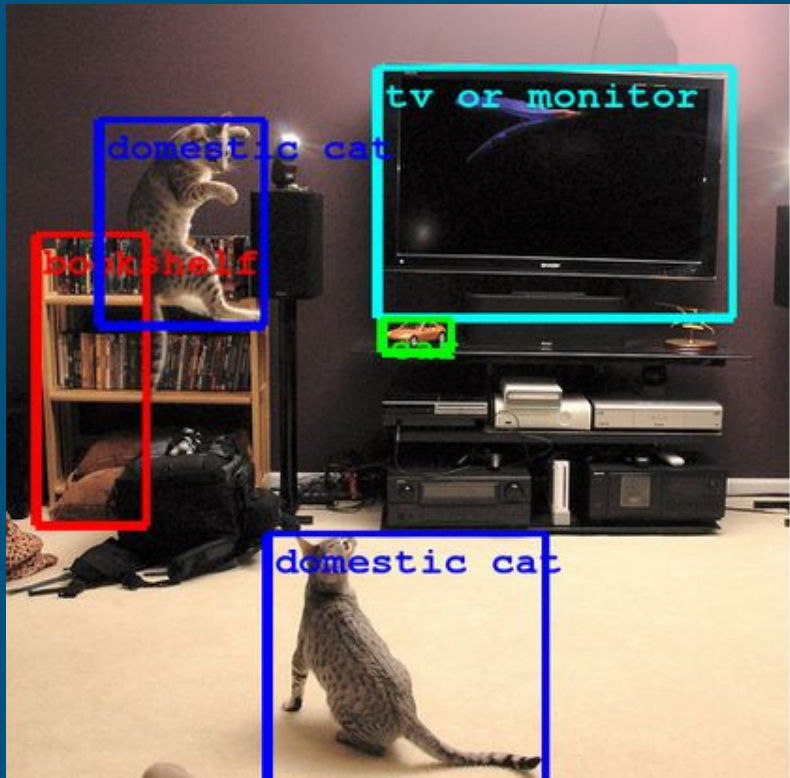


Large Scale Visual Recognition Challenge (ILSVRC)

Annual object recognition competition.
The algorithms must correctly identify
1000 different objects.



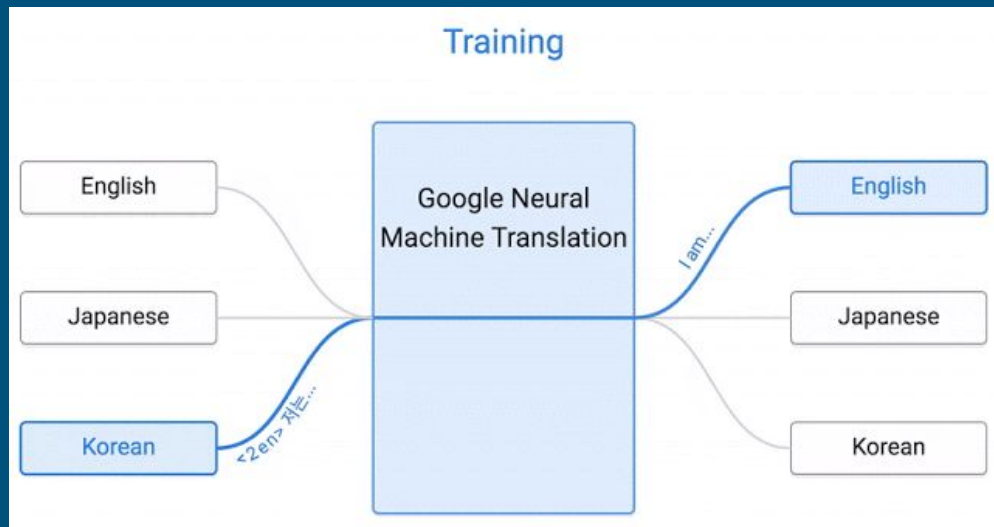
Object Recognition and localization



Zero-Shot Learning

Solve a task despite not having received any training examples of that task

- Google Neural Machine Translation: 103 languages
 - Teach English-Japanese & English-Korean, then knows Japanese-Korean



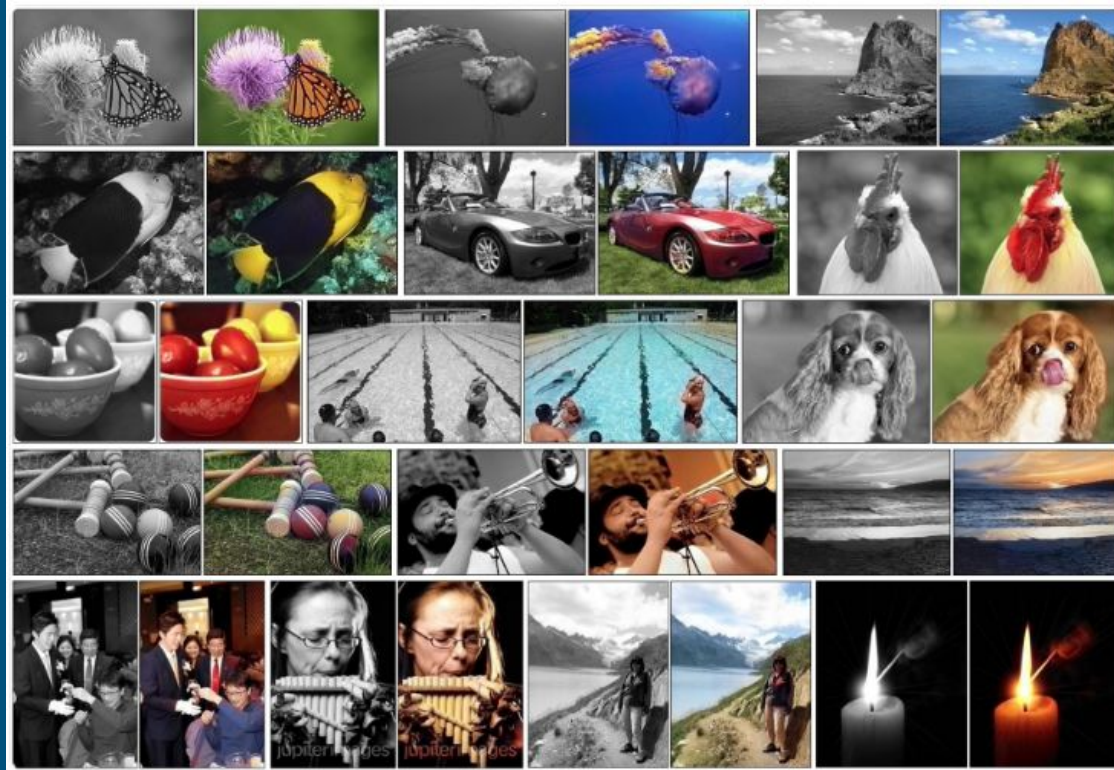
Tesla Self Driving Demonstration



Sunspring - Sci-fi movie scripted by AI using LSTM



Colorize black & white photos



Automatic game playing



Artistic style transfer



Other Examples

- Email spam filtering
- Smartphone Keyboards
- Robotics - navigation, object recognition
- Neural Turing Machine
- Speech Recognition
- Natural language processing
- [Netflix recommendations](#)
- Language translation
- Handwriting recognition
- Brain-machine interfaces
- Stock market analysis

Getting Started with ML

- [Coursera](#)
- [Udacity](#)
 - Free courses
 - Nano degrees
- YouTube
 - [Caltech CS 156](#)
- [Kaggle](#)
- Python
- [www.DeepLearningBook.org](#)
- [https://github.com/songrotek/Deep-Learning-Papers-Reading-Roadmap](#)

Meetup Goals

- Bring awareness to ML/DL
- Learn from each other
- Identify uses for ML/DL
- Discuss latest developments
- Identify resources for learning ML/DL
- Team up for Kaggle problems

Questions

- Are you interested in the broader area of machine learning or more specifically in deep learning
- What is a good meetup frequency?
- Where is a good meetup location?
- How does this agenda work?
 - Introductions
 - Presentation
 - News announcements & discussion
 - Q&A
 - Socialize
- Who is interested in presenting in the future?