Special Topics in Deep Learning

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TA: Lisa Anne Hendricks

Why Deep Learning?
End-to-End Learning for Many Tasks
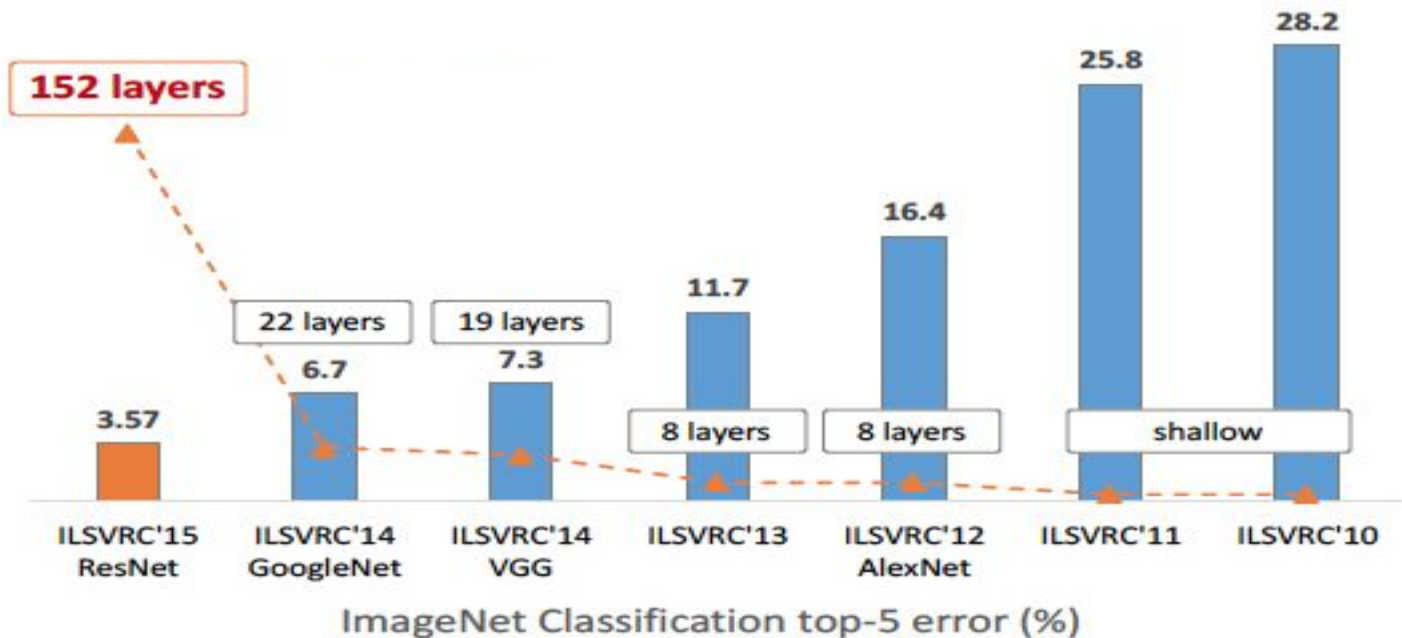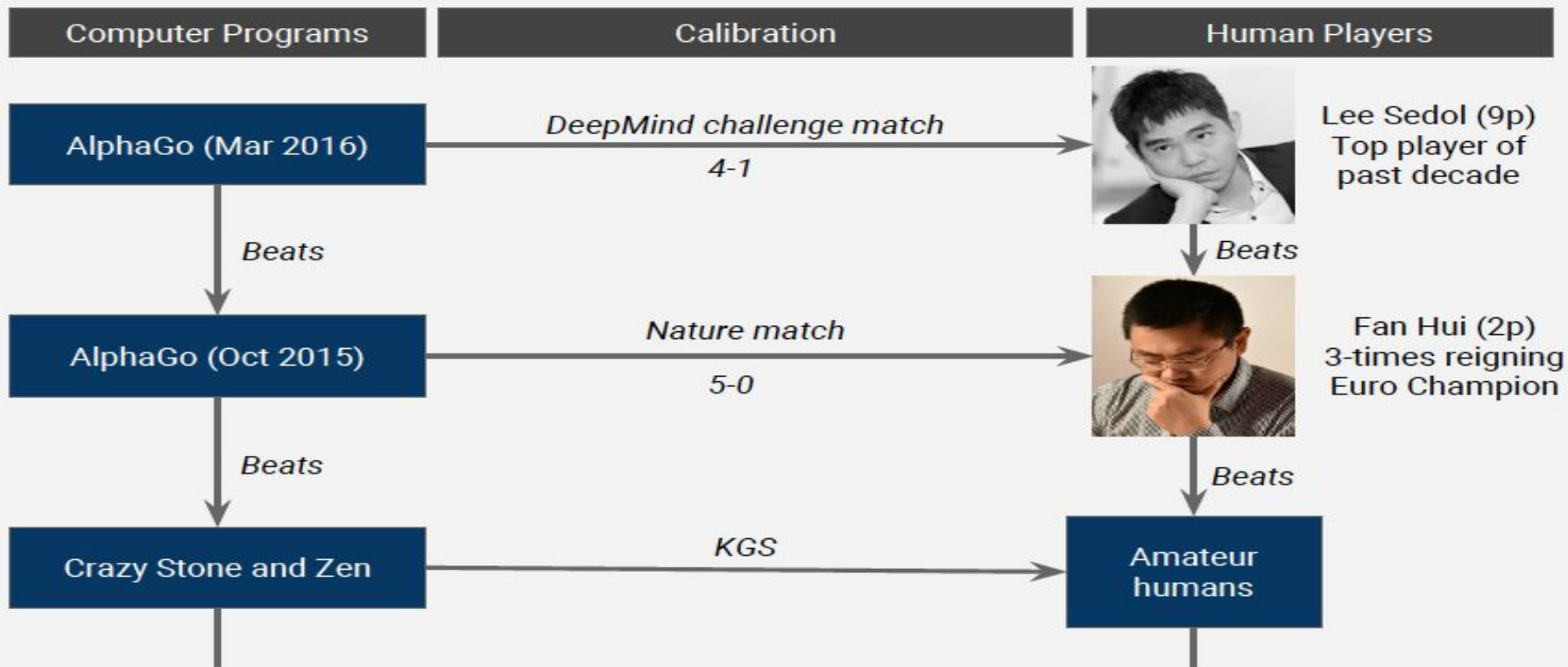

vision

speech

text

control

Achieving Human-Level Performance on ImageNet Classification

ImageNet Classification top-5 error (%)

AlphaGo: Winning over World Champion

Source: David Silver

Prerequisites

- Assume basic knowledge in deep learning
  - Familiar with material in
    - Part I & II in Deep Learning book (Goodfellow et al.)
    - Cs294-129 or cs231n (Stanford class)
- For undergraduate students, ideally
  - Have taken AI/machine learning courses or equivalent (CS188/189, CS294-129, CS294-112)
  - Or have done some deep learning research/projects

Areas & speakers

- Anima Anandkumar: Tensor methods, DL

- Vladlen Koltun: DRL, learning to act

- Jianfeng Gao: Machine reading comprehension & dialogue

- Quoc Le: AutoML, Neural network architecture search

- Ross Girshik: CV

- Igor Mordatch: DRL

- David Patterson: hardware for DL (TPU)

Areas & speakers

- Matthew Johnson: Optimization, ML
- Percy Liang: NLP
- Li Deng: conversational agents, DL in Finance
- Rob Fergus: DL in CV, NLP
- Rishabh Singh: Neural Program Synthesis
- Danny Tarlow: Neural Program Synthesis

Course Format

- Lecture format
  - Main lecture (50 mins)
  - In-depth discussion (30 mins)

- Weekly reading, discussion questions

- Projects

Weekly Readings

- Research papers on week's topic
  - Main reading vs. background reading

Discussion Questions

- Each student proposes at least three discussion questions
    - General questions about the topic
    - Specific questions about the technical details in papers
- Each student votes on 5 most interesting questions
- Student votes inform discussion agenda

Discussion Question Schedule

- Questions due **Fri noon**

- Votes due **Saturday midnight**

Discussion leads for each lecture

- Send form to collect questions from students by Wed midnight
    - Share the form with edit permission with teaching staff
- Summarize questions proposed by students to form the poll
    - Containing about 20-25 questions
    - Send out the poll [by Fri midnight]
- Summarize the poll
    - Generate ranked & categorized discussion question list
    - Send the list to teaching staff [by Sunday 7pm]
- Answer questions from other students on Piazza about the assigned reading, both the week before the lecture and the week after the lecture.
- Sign up list will be sent out later in the week (FCFS)

Arxiv leads for each week

- Over piazza, discuss Arxiv papers for the week and choose (approximately) five "best-of" papers for the week.
  - For Arxiv leads for week A, the set of papers considered should be for Thu (week A-2) - Wed (week A-1).
    - Post candidate paper links in Slack channel during this period
  - Others may suggest or vote on papers that they'd like to see being summarized by posting and voting in Slack channel
- On Monday (week A), discussion leads must:
  - Present a short five minute presentation (in total) at the beginning of class.
  - Write a half page summary of each paper and send to the TA. Summaries will be posted online.
- Answer questions about the selected papers during week A

Projects

- 4 Types
  - Traditional Literature Review
  - [Distill](#)-Type Literature Review
  - Code Reimplementation & open source
  - **Conference quality** research project
- Groups of 2-3 people
  - Talk to instructors if needs to form group of 1 or 4 people

Project Schedule

- 9/18:   Project proposal due

- 10/30:   Project milestone report due

- 12/01:   Poster Presentation

- 12/09:   Final project report due

Grading and variable units

- 20% Class Participation

- 25% Weekly Reading Assignment

  - 7.5% discussion leads

  - 7.5% Arxiv Leads

  - 10% individual reading assignments

- 55% Project

- 1 unit for readings, 2 units for project, 3 units for both

Office hours

Lisa Anne: 5-6 PM on Mondays in Soda Alcove 283-H

Next steps

- Join Piazza, student Google Group, and Slack channel
  - Piazza: https://piazza.com/class/j4ock30iz2t2xk
  - Google Group:

    https://groups.google.com/forum/#!forum/cs-294-131-f17
  - Slack: https://cs294-131-f17.slack.com
- Reading for next lecture
- Plan for course project
  - Will send out a list of suggested course projects soon
- Sign up for discussion/arxiv leads

Web site: https://berkeley-deep-learning.github.io/cs294-131-f17