

ENGR-E 533 “Deep Learning Systems”

Lecture 00: Introduction

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Research Group: <http://saige.sice.indiana.edu>

Meeting Request: <http://doodle.com/minje>

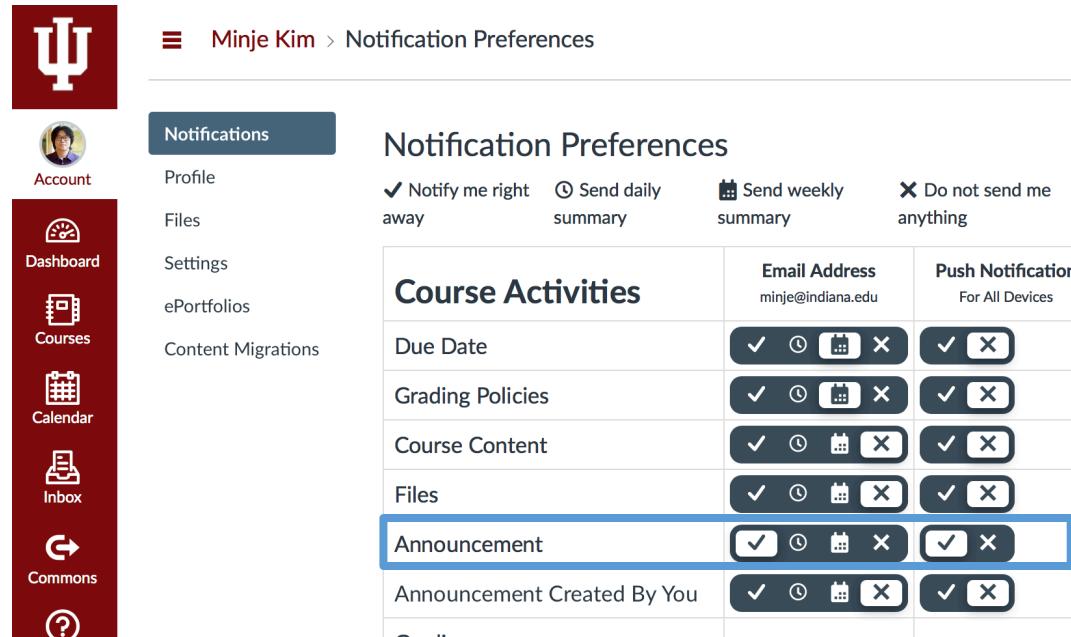


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Course Logistics

- Canvas → Account → Notifications →
Set to receive emails (and push notifications if you use the app) right away for an announcement



The screenshot shows the Indiana University Canvas "Notification Preferences" page for user Minje Kim. The left sidebar includes links for Account, Dashboard, Courses, Calendar, Inbox, Commons, and Help. The main content area shows general notification settings and a detailed table for course activities.

Notification Preferences

Course Activities	Email Address	Push Notification
Due Date	minje@indiana.edu	For All Devices
Grading Policies		
Course Content		
Files		
Announcement		
Announcement Created By You		



Course Logistics

- 3 assignments (35%)
- Final project (40%)
- Pop quizzes (10%)
- Attendance (5%)
 - Only for guest lectures
- Piazza (10%)
 - Sign up: piazza.com/iu/spring2018/sp18blengre53333591



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Course Logistics

- Late submission penalty
 - 3 assignments (35%)
 - Each will be a mixture of relatively simple math questions followed by programming tasks
 - Late policy
 - Assignments will be released monthly. Deadline is two weeks after the release date
 - Late submissions are accepted without any late penalty
 - If the sum of the late hours (throughout the semester) < five days (120 hours)
 - If your total late hours is between 120:00:01 and 144:00:00 (from 5 to 6 days): you'll lose **20%** of your **total late homework score you earned**
 - Between 144:00:01 and 168:00:00 (from 6 to 7 days): you'll lose **40%** of your **total late homework score you earned**
 - Between 168:00:01 and 192:00:00 (from 7 to 8 days): you'll lose **60%** of your **total late homework score you earned**
 - Between 192:00:01 and 216:00:00 (from 8 to 9 days): you'll lose **80%** of your **total late homework score you earned**
 - If you're late by more than 9 days for any of the assignment or for some of the assignment in total, you get no points for the late submissions
 - You can discuss about it with your friends, but your solution should be created by yourself
 - This is a graduate course, so I take plagiarism seriously



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Course Logistics

- Late submission penalty

- Student A was on time for two assignments
 - But was late by 100 hours for HW#3 due to a conference trip
 - A's good. No penalty.
- Student B was late for twice, and the sum is 119 hours
 - B's good, too. No penalty.
- Student C was on time for two assignments
 - But was late by 121 hours for HW#3 due to hangover
 - C got 8 out of 12 for HW#3 after grading
 - I'll apply late penalty to this, so C gets $8 \times 0.8 = 6.4$ for HW#3
- Student D was on time for only one assignments
 - D's total late hours is 150 hours for all the other two assignments
 - D got 6 and 4 for the two late submissions
 - I'll apply late penalty to this, so D gets $(6+4) \times 0.6 = 6$ for the two late submissions



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Course Logistics

- Final Project (40%)
 - BYOP
 - No template project will be provided. Be creative.
 - But, I'll give a boring traditional project well done more points than a nonsensical ambitious project that nobody (including the team) can solve
 - Submit a project proposal (one page) before the spring break
 - 23:59 PM, Mar. 9
 - Form a team of 2 or 3 people. No solo project.
 - There will be a presentation session during the finals
 - And, submit a final report
 - **23:59 PM, May 3 (NO LATE SUBMISSION!)**
 - For the final project you're free to use whatever toolbox you need
 - But cite them properly in your report



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Course Logistics

- Quiz (10%)
 - Random in-class quiz to keep the tension between us
 - Attend the class and write down your name
 - You'll get some point even if your answer is wrong (thank you for coming)
- Piazza (10%)
 - Goes to good answerers in Piazza discussion board
 - Sometimes to good questioners, too



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Course Logistics

- No hand-written report
 - Both for homework assignments and final project, I don't accept hand-written report
 - Scanned images of hand-written reports are NOT accepted as well
- Instead, I strongly recommend LaTeX
- <http://sharelatex.com>
 - SICE students can use it for free
 - <https://uisapp2.iu.edu/confluence-prd/pages/viewpage.action?pageId=123961887>
 - Non-SICE Students can still use it with some minor limitations
- Or, you can always install an off-line LaTeX package (free)
 - <https://www.latex-project.org/get/>



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Schedule

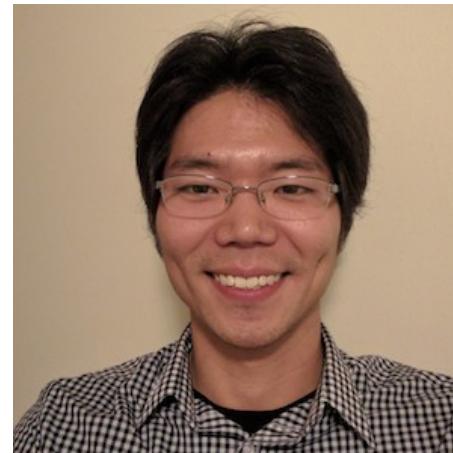
Week	Topics	Assignment
1-3	Baseline shallow neural networks and their limitations	
4	Optimization and the other training schemes	Homework 1
5	Convolutional neural networks	
6	Recurrent neural networks	
7	Generative adversarial networks	
8	Variational autoencoders	Homework 2
9	Autoregressive models	
10	Word representations	
11	Reinforcement learning	
12	Transfer learning	Homework 3
13	Network compression	
14-15	Guest lectures <ul style="list-style-type: none">• Hardware acceleration for deep learning (Prof. Lei Jiang)• Computer vision (Prof. David Crandall)• Robot vision (Prof. Michael Ryoo)• Natural language processing (Prof. Damir Cavar)• Speech enhancement (Prof. Donald Williamson)	
16	Project presentation	



Associate Instructors



Mrinmoy Maity
mmaity@umail.iu.edu
Office hours: 3-5PM Mondays
Office: Luddy Hall 4068



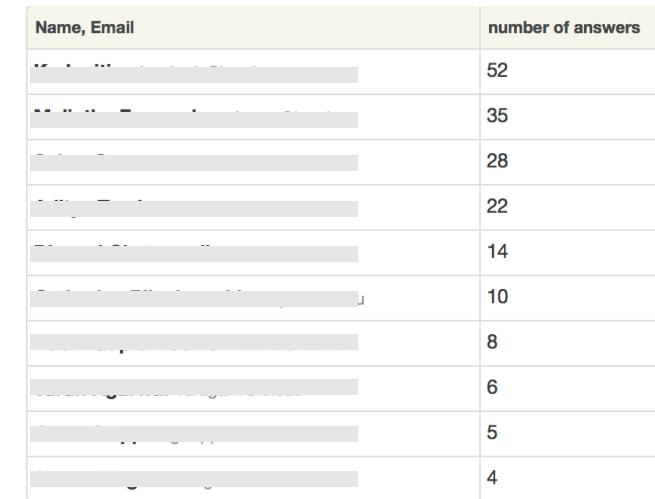
Sun Woo Kim
kimsunw@indiana.edu
Office hours: 12-2PM Wednesdays
Office: Luddy Hall 4068

Meet Me

- Request a meeting through doodle
 - <http://doodle.com/minje>
 - In-person meeting is not for homework questions
- Piazza
 - You can see me at Piazza instead
 - Sign up: piazza.com/iu/spring2018/sp18blengre53333591



Name, Email	days online	posts viewed*	contributions**
Minje Kim minje@indiana.edu	96	258	333



Learning Objectives

- Target audience
 - A graduate student in his/her early years
 - Not the first year master's students though
 - Knows something about machine learning
 - Who took B555 or "Machine Learning for Signal Processing (ENGR E511)"
- Theory versus practice
 - Both
 - That's what engineering is about IMHO
 - But only for the topics that are important
- After taking this course
 - You can brag that you learned deep learning
 - To a limited amount of people around you
 - You know who to ask questions
 - You might not be able to do the state-of-the-art deep learning research for any given application
 - But, you might be able to train a decent network for many given tasks

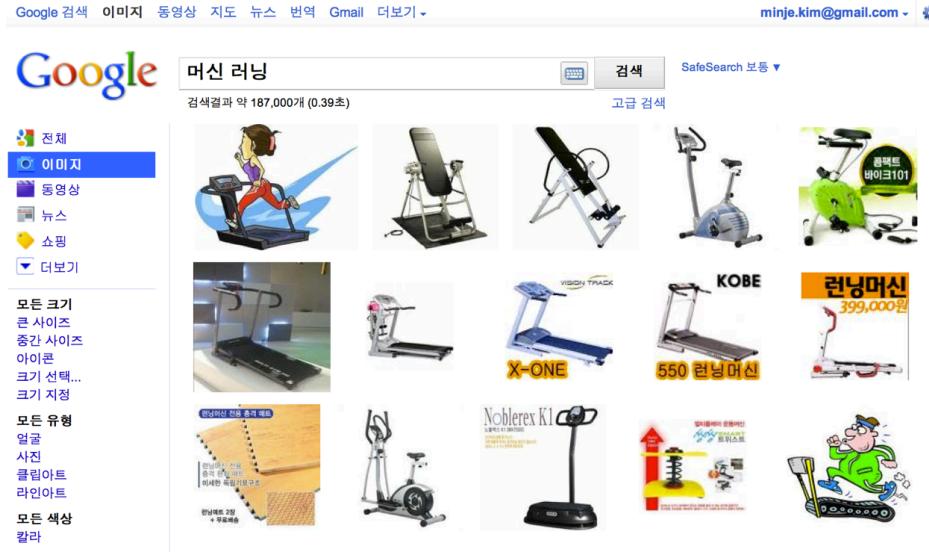


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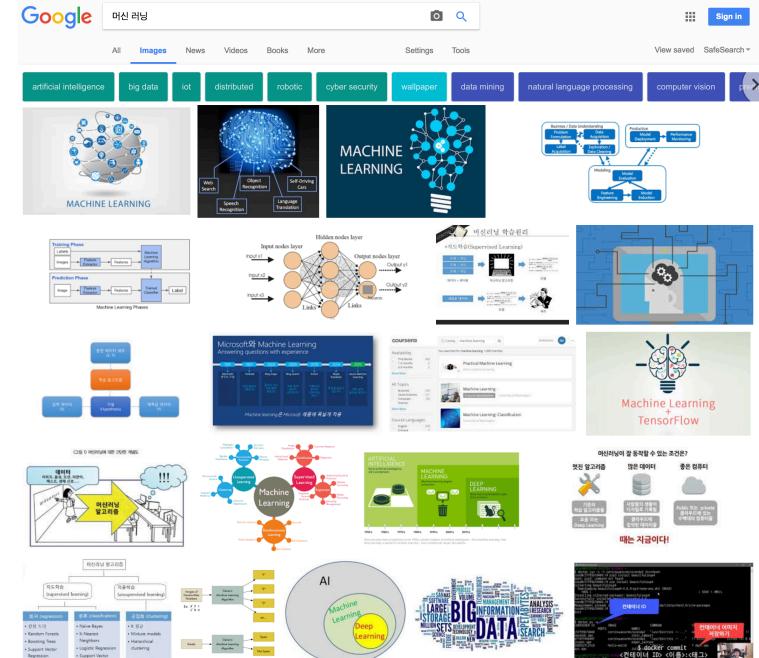
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- In Korean, we don't distinguish "R" and "L"



Google image search results for “머신 러닝” in 2011

It can mean either “machine learning” or “machine running”



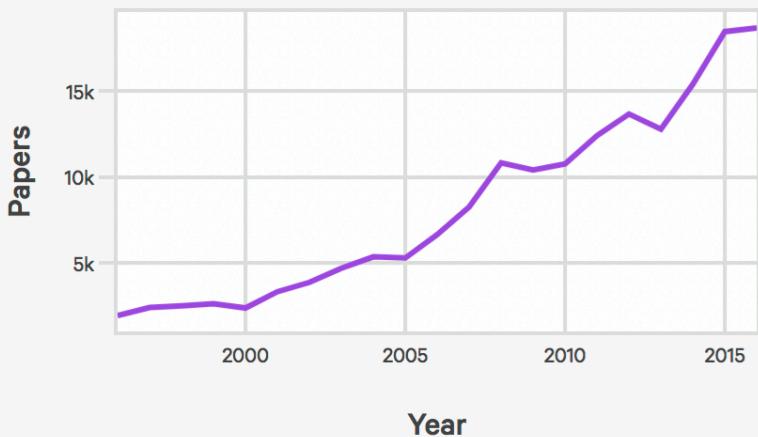
1/8/2018



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Some Stats about AI

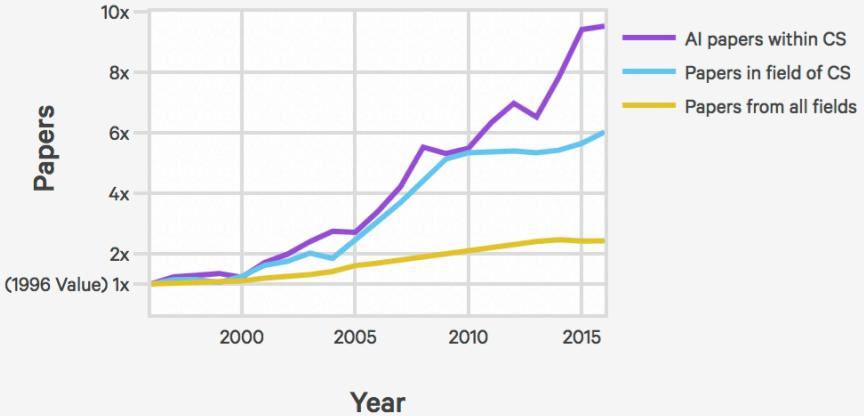
Annually Published AI Papers



Source: Scopus.com

AIINDEX.ORG

Growth of Annually Published Papers

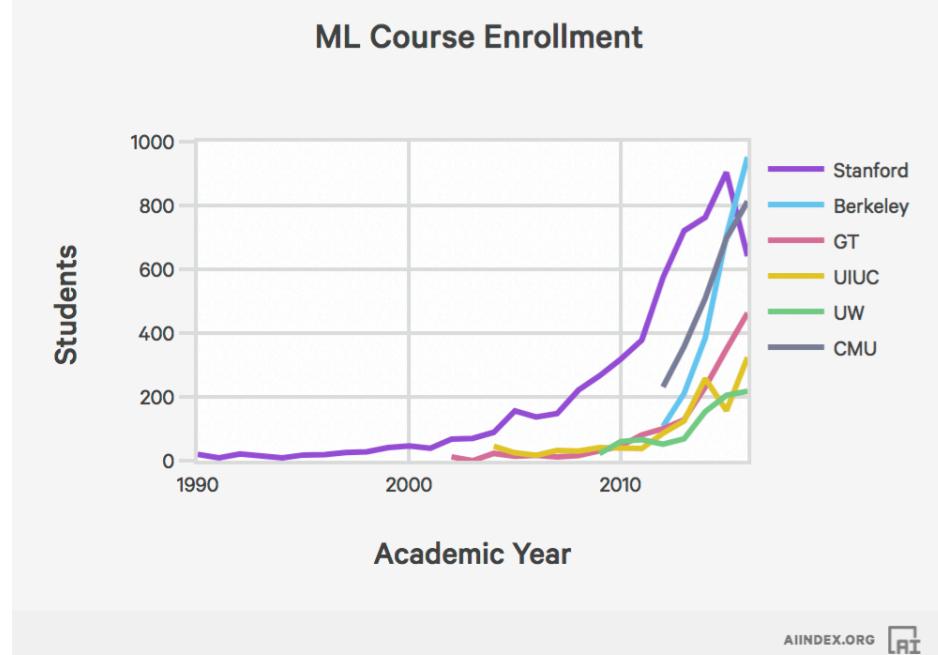
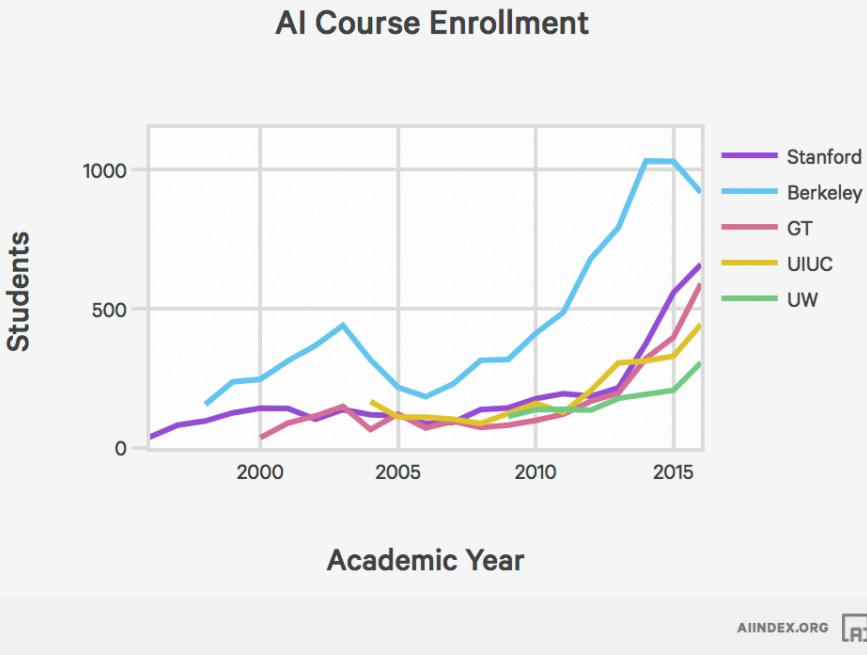


Source: Scopus.com

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Some Stats about AI



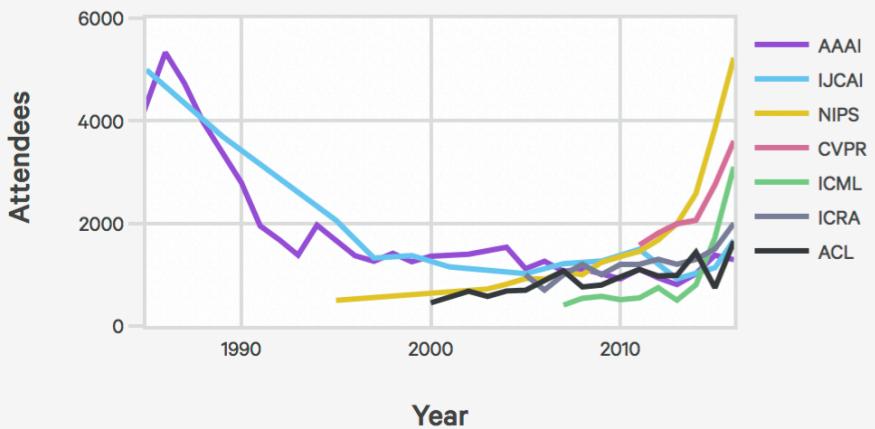
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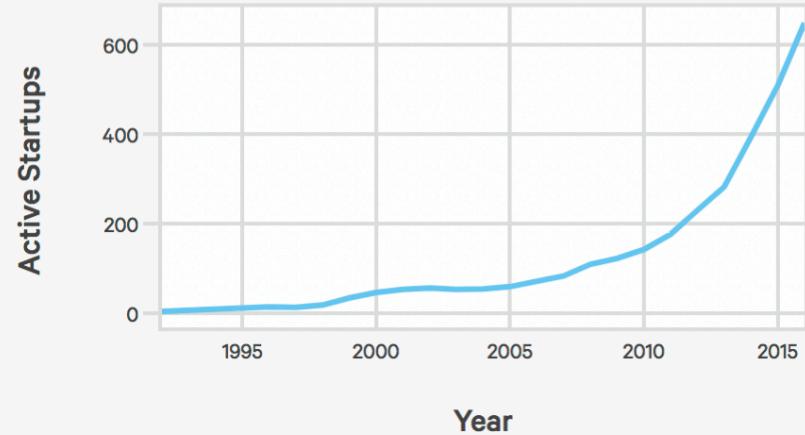
<http://cdn.aiindex.org/2017-report.pdf>

Some Stats about AI

Large Conference Attendance



Startups Developing AI Systems



Sources: Crunchbase, VentureSource, Sand Hill Econometrics



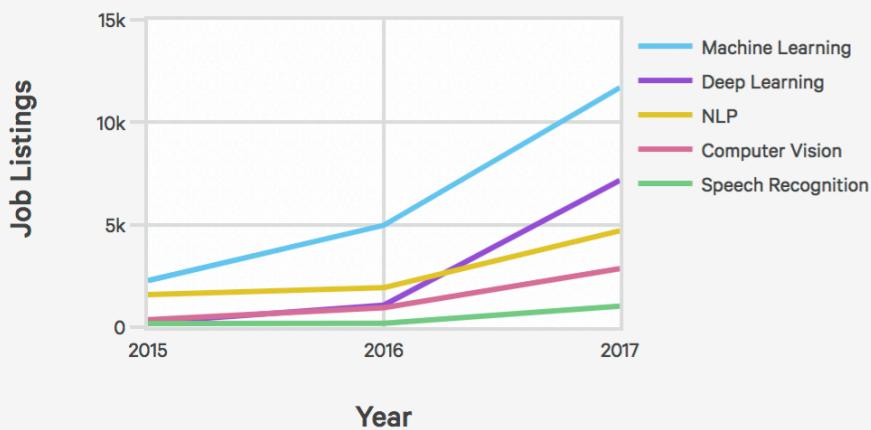
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<http://cdn.aiindex.org/2017-report.pdf>

Some Stats about AI

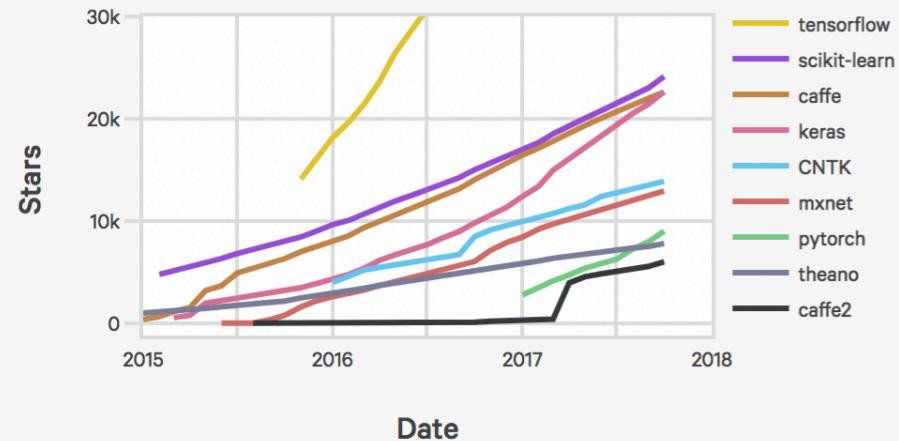
Job Openings, Skills Breakdown (Monster.com)



Source: Monster.com

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GitHub Stars of AI Software Libraries



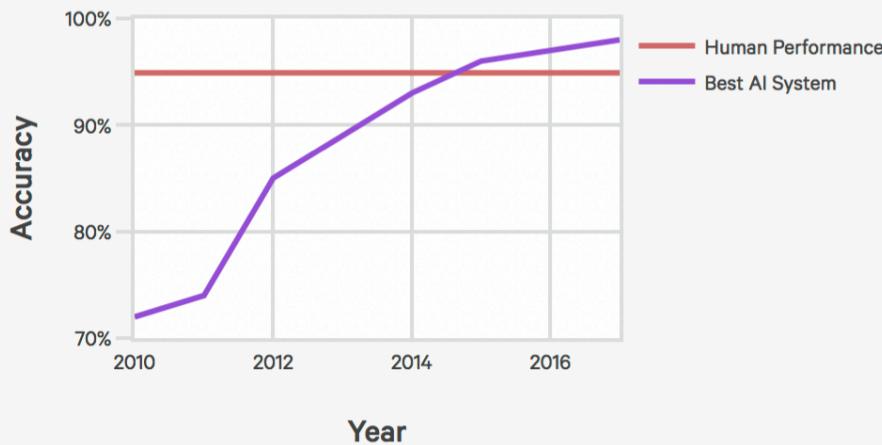
Source: GitHub Archive

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Some Stats about AI

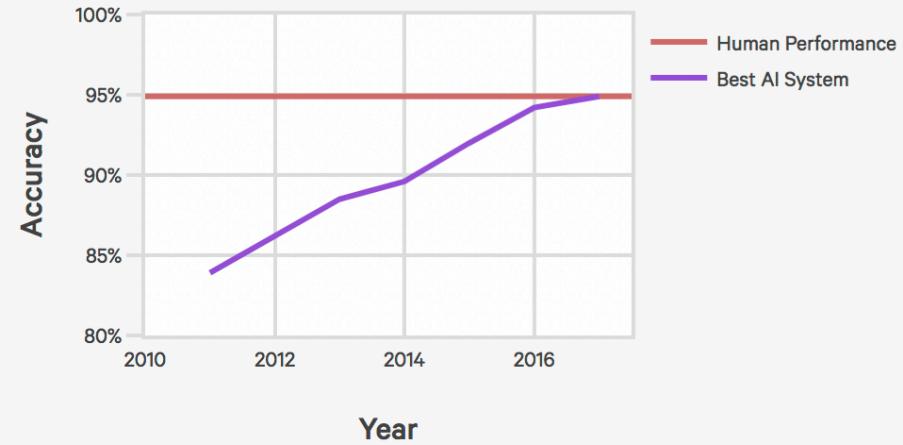
Object Detection, LSVRC Competition



Source: image-net.org

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Speech Recognition, Switchboard HUB5'00



Source: Electronic Frontier Foundation, AI Progress Metrics

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<http://cdn.aiindex.org/2017-report.pdf>



Thank You!

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