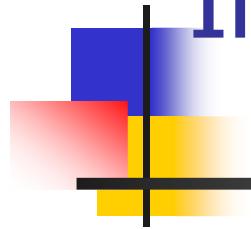


Note: This entire class will be video-recorded!

Cmput 466 / 551

Introduction to Machine Learning



R Greiner

Department of Computing Science
University of Alberta
(Fall 2016)

<https://eclass.srv.ualberta.ca/course/view.php?id=31990>

Amazon Updates Ratings System with Machine Learning Algorithms

Without much pomp, Amazon has made adjustments to its rating system algorithm, integrating learning to, first, present users with the newest and freshest feedback but also, secondly, to learn these reviews are actually the most helpful to users who are shopping.

These changes to the algorithm went into effect last week on the Amazon US site and could define provide change the way that users interact with the online marketplace but also how products are and presented to users.

"The enhanced system will use a machine-learned model to give more weight to newer, more he

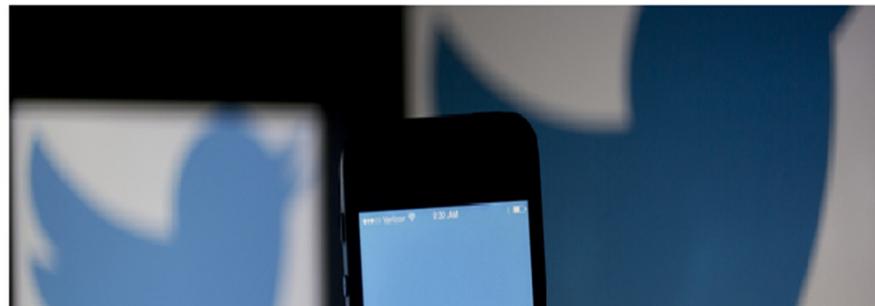


quires Artificial Intelligence Startup Whetlab In Machine Learning Push

New Posts Most Popular Lists Video 10 Stocks to Buy Now Search

Twitter Acquires Artificial Intelligence Startup Whetlab In Machine Learning Push

+ Comment Now + Follow Comments



When machine learning meets the mind: BBC and Google get brainy

Two projects show that brainwaves and computers are moving closer than ever

By Chris Merriman

Fri Jun 19 2015, 15:08



GOOGLE AND THE BBC have been looking at the way brains and computers can interact.

The BBC has revealed that it is working on a version of iPlayer that is controlled by thought waves. Yes, it's as creepy as it sounds.

The electroencephalography wearable that powers the technology requires

lucidity of thought, but is surprisingly light.

It has a sensor on the forehead, and another in the ear. You can set the headset to respond to intense concentration or meditation as the 'fire' button when the cursor is over the option you want.

Cyrus Saihan, head of business development at Auntie Beeb, said of the [initial iPlayer mind control tests](#): "It was much easier for some than it was for others, but they all managed to get it to work. And it's been a similar story for everyone who's tried it out in our BBC technology Blue Room since."

In short - right now - it's rubbish. But it's an important path for the media corporation to tread as it experiments with ways of improving accessibility, although there's always the worry that if you think the wrong thing, you'll get porn. Lots and lots of porn.

Meanwhile, a [team of Google researchers has been looking more closely at artificial neural networks](#). In other words, false brains.

The team has been training systems to classify images and better recognise speech by bombarding them with input and then adjusting the parameters to get the result they want.

But once equipped with the information, the networks can be flipped the other way and create an impressive interpretation of objects based on learned parameters, such as 'a screw has twisty bits' or 'a fly has six legs'.

But there's still a long way to go. Examples of a dumbbell showed that the system couldn't differentiate between the dumbbell and the arm holding it because it has never seen the two separately.

Google

- What is Google?
... what does it do?
- How does it make money?
 - \$60B US /year !
- A: Over 95% of
Google's revenue comes
from advertising!
 - **Google AdWords**
 - **Google AdSense**

A screenshot of a Google search results page for the query "bakery". The results are displayed in a white background with a light gray header bar. The top navigation bar includes the Google logo, a search bar containing "bakery", and links for Web, Maps, Images, News, Videos, More, and Search tools. Below the header, a message states "About 192,000,000 results (0.51 seconds)". The main content area starts with a section titled "bakery" which contains three local business cards. Each card includes a thumbnail image, the business name, review count, category, address, and opening hours. A red circle highlights this section. An arrow points from the word "advertising!" in the list above to this highlighted area. Below the cards is a link to "Bakery - Wikipedia, the free encyclopedia" with a brief description. Further down are links to "Best Edmonton Bakeries - Urbanspoon" and "Images for bakery", each accompanied by a small thumbnail image.

Web Maps Images News Videos More Search tools

About 192,000,000 results (0.51 seconds)

bakery

Whimsical Cake Studio
2 reviews · Bakery
109 St NW
Opens at 10:00 am

La Favorite Pastry Shop
No reviews · Bakery
12431 102 Avenue NW

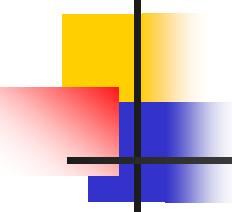
Fuss Cupcakes
4.2 ★★★★☆ 6 reviews · Bakery
Whyte Ave NW
Opens at 10:00 am

More bakery

Bakery - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/Bakery •
A bakery (aka, baker's shop or bake shop) is an establishment that produces and sells flour-based food baked in an oven such as bread, cakes, pastries, and ...

Best Edmonton Bakeries - Urbanspoon
www.urbanspoon.com › Restaurants › Edmonton ›
Westmount - Bakery, Dessert, Coffee 10720 124 St NW. Al Salam Bakery Deli ... Heritage - Bakery, Middle Eastern, Halal 10141 34 Ave NW. District Coffee Co.

Images for bakery Report images



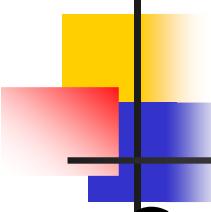
Google AdWords

- an online advertising service
- advertisers compete to display brief advertising copy to web users
 - based on *keywords* (provided by the advertiser)
- **Advertisers pay Google** when users seek more information about the copy displayed
- How did Google select THESE ads?
- A: Machine Learning

Whimsical Cake Studio
2 reviews · Bakery
109 St NW
Opens at 10:00 am

La Favorite Pastry Shop
No reviews · Bakery
12431 102 Avenue NW

Fuss Cupcakes
4.2 ★★★★☆ 6 reviews · Bakery
Whyte Ave NW
Opens at 10:00 am



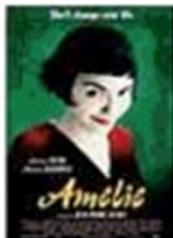
Google + Machine Learning

- Google uses machine learning in many products
 - AdWords, AdSense
 - Automatic translation
 - Voice-based searching
 - New photo-storage service
 - + actions
 - self-driving cars
 - Nest connected thermostat
 - ...
- Get needed info by running machine-learning programs on the company's vast stores of data
 - ... the majority of Internet searches conducted world-wide

[Close](#)

Other Movies You Might Enjoy

[Amelie](#)



[Add](#)



[Y Tu Mama Tambien](#)



[Add](#)



[Guys and Balls](#)



[Add](#)



[Mostly Martha](#)



[Add](#)



[Only Human](#)



[Add](#)



[Russian Dolls](#)



[Add](#)

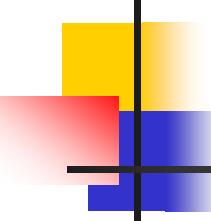


[Close](#)

Netflix Recommendations

- Why did Netflix recommend ?
- A: Collaborative filtering:
Similar users
 - ... who liked the movies that you liked ...
also liked this movie
- Which users ?
- A: Machine Learning

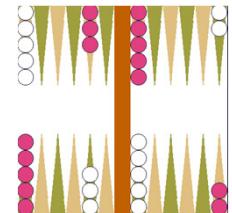
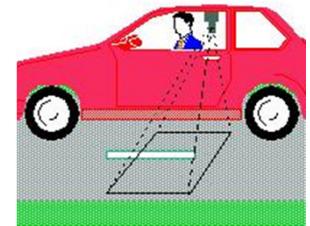




Successes in Machine Learning

Machine Learning is finding (and using) patterns in data

- to help web navigation, search engines, ad words, ...
 - Google **YAHOO!** bing™ ...
 - NETFLIX **facebook** LinkedIn® eHarmony® ...
- to understand natural language (English)
 - translation (BabelFish), ...
 - Siri: "How to wreck a nice beach"
- to enable effective control
 - power plants, robots, driving cars, ...
 - playing games (backgammon, chess, poker, ...)
- to help suggest new insights
 - sports [MoneyBall], ...
 - chemistry, biology, astronomy, medicine



Machine Learning-Gen
(96 Companies)



Machine Learning-App
(201 Companies)



Computer Vision-Gen
(97 Companies)



Computer Vision-App
(73 Companies)



Smart Robots
(52 Companies)



Virtual Personal Assistants
(71 Companies)



Artificial Intelligence

Contact
info@venturescanner.com
to see all 855 companies

Speech to Speech Trans.
(15 Companies)



Context Aware Comp.
(28 Companies)



Gesture Control
(30 Companies)



Recommendation Eng.
(54 Companies)

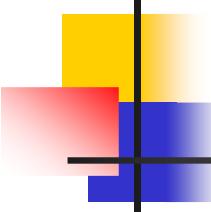


Video ACR
(14 Companies)



Venture Scanner

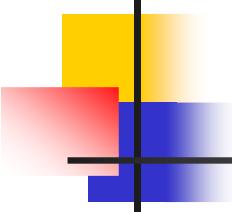
<https://medium.com/@VentureScanner/the-state-of-artificial-intelligence-in-six-visuals-8bc6e9bf8f32>



Various Applications of ML ...

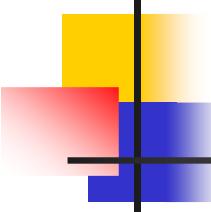
- Smart Robots
- Gesture Control
- Virtual Personal Assistants
- Computer Vision/Image Recognition
- Natural Language Processing
- Natural Language Processing (Speech Recognition)
- Computer Vision/Image Recognition
- Recommendation Engines and Collaborative Filtering
- Video Automatic Content Recognition
- Context Aware Computing
- Speech to Speech Transition

"it is now the golden age of machine learning"
median entry-level salary: \$85,000 - \$137,000



Administrivia

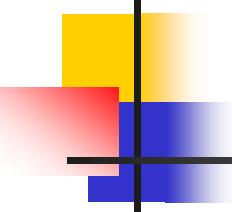
- Motivation
- Resources
 - Homepage
 - Instruction Team
 - Textbook
- Evaluation
 - Homeworks, Programming Exercises
 - Projects
- Labs
- Pre-requisites
- Other topics



eClass Homepage

- <https://eclass.srv.ualberta.ca/course/view.php?id=31990>
- Assignments
 - Homeworks, Programming Exercises, Project description
- Lecture Material
 - Schedule, Slides
 - Note "(2015)", "Draft", "(Revised 10/Sept)", ...
- Resources
- Announcements
 - News Forum, Discussion Forum
- ...

NB: You need to check here often...
as we will post important information here!!



Instruction Team



- Prof: R. Greiner
 - Office hours: Tues: 2-3pm, or by appointment
<http://www.cs.ualberta.ca/~greiner/GoogleCalendar>
 - 780 492-4828 (admin)
 - rgreiner@ualberta.ca

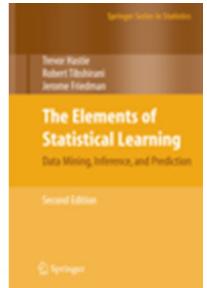
- TAs: ... by appointment



- Roberto Vega <rvega@ualberta.ca>

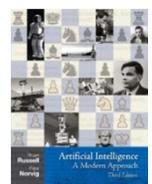
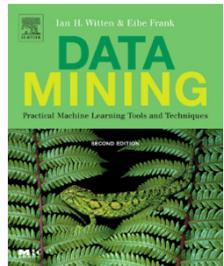
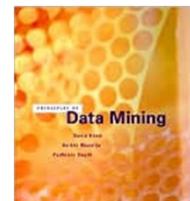
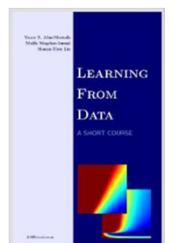
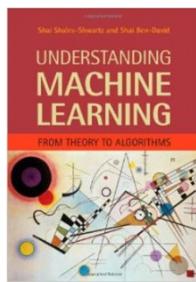
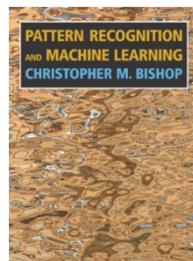
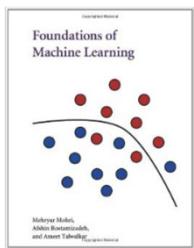
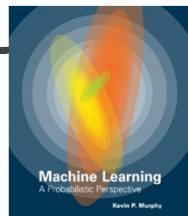
- Peng Xu <pxu4@ualberta.ca>

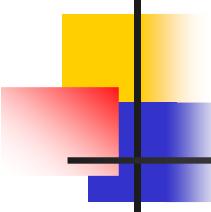
- Junfeng Wen <junfeng.wen@ualberta.ca>



Textbooks

- **Hastie/Tibshirani/Friedman, *The Elements of Statistical Learning*, Springer, 2009 (2nd ed).** On-line ...
- Recommended
 - K Murphy, *Machine Learning: A Probabilistic Perspective*, 2012
 - Duda/Hart/Stork, *Pattern Classification*, 2006
 - C Bishop, *Pattern Recognition and Machine Learning*, 2006
 - Mohri/Rostamizadeh/Talwalkar, *Foundations of Machine Learning*, 2012
 - Abu-Mostafa / Magdon-Ismail / Lin, *Learning From Data*, 2012
 - Shalev-Shwartz / Ben-David, *Understanding Machine Learning: From Theory to Algorithms*, 2014
 - Hand/Mannila/Smyth, *Principles of Data Mining*, 2001.
 - Alpaydin, *Introduction to Machine Learning*, 2004.
 - Witten/Frank, *Data Mining* (2nd) Morgan Kaufmann, 2005.
 - Russell/Norvig, *Artificial Intelligence: A Modern Approach*, 2003.¹⁴

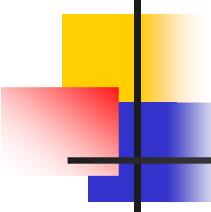




Evaluation

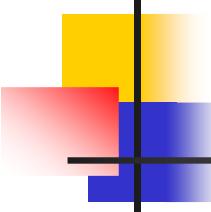
- 8 Programming Assignments
 - 43%
 - in Octave/Matlab
 - Many from Coursera HWs
 - Solo
- 4 Written assignments/quizzes
 - 27%
 - Solo
- Project
 - 30%
 - Teams of 4-5 students

Note: different questions
for grads vs undergrads



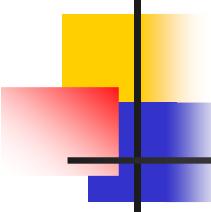
Homework Issues

- NonProgramming Questions
 - Type or write (legibly) + scanned
 - Submit using **eClass**
- Programming Questions
 - Octave (Matlab)
 - Your implementations must run on lab machines (CSC 219)
 - ... so runs in Coursera site ...
 - Neat, well-documented ... include *convincing* examples and tests
 - The onus is on **you** to convince TAs that your code/idea works
 - Submit:
 - Coursera exercises: on our Coursera website... and also on eClass
 - Others: using just **eClass**
- ... don't annoy the Graders (TAs)!



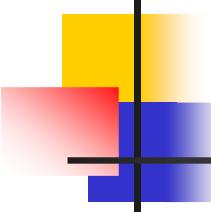
Why use Coursera Assignments?

- PRO:
 - Fairly interesting, on real-ish datasets
 - Only need to produce small part
 - (As graded automatically,
we require fewer TAs...
enabling us to increase enrollments)
- CON:
 - Fairly simplistic
 - Limited: Only part of a topic, for only some topics
- Self-contained?
 - You MAY watch the on-line Coursera lectures
<https://class.coursera.org/ml-006/lecture>
but should be not necessary



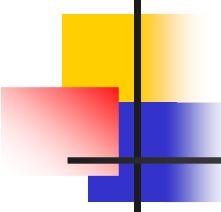
Coursera + Privacy Issues

- We are using Coursera assignments
 - ... and using their evaluation facility
- But that evaluation is in the US...
and we cannot let anyone outside of Canada
know your scores ...
- So...
 - We will create an alias for each of you
 - You will use that alias when submitting your solutions
 - NB: do NOT use YOUR email address, etc.!
 - We will identify the score with that alias... with you



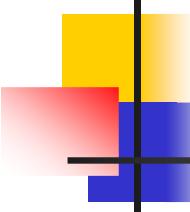
Assignment Guidelines

- Submit on due date/time
 - Programming (eClass/Coursera) + “Written” (eClass)
 - Late policy: 5 “excused days”
 - If >5 days: 15% penalty / day (until solution posted... or 0%)
- Use **eClass Grades** to see...
 - Current marks, #Late days, Class statistics
- If question about marking:
 - See TA first... then prof, only if necessary
- *Don’t look for answers on the web...*
 - *Do not post your answers, nor my answers !*
- Don’t cheat... Code of Conduct



Mini-Research Project

- Investigate some interesting aspect of machine learning
 - a broad thorough literature review, overviewing general topic:
Ex1: techniques for learning motifs in DNA
Ex2: ways to cope with missing data
 - a deeper discussion of some specific subtopic
Ex1: using HMMs to learn probabilistic motifs
Ex2: statistically motivated ways to handle blocked attribute values
 - theoretical/empirical analysis of several systems for this task
Ex1: empirical comparison of several gene-finding tools, on novel datasets
Ex2: empirical, +? theoretical, analysis of several techniques, on data
- Either
 - “application pull”: seeking ways to solve some specific problem (Ex1)
 - “technology push”: exploring ways of coping with some specific technical challenge (Ex2)
- **You** select task !



Possible Topics...

- *Whatever YOU are interesting in!*

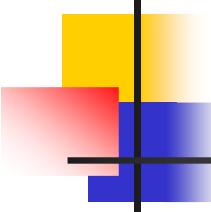
Analysis of interesting dataset

- Microarray
- MRI / fMRI
- Metabolomics
- “Challenge” problems
(Kaggle)
- Imaging data
- Textual data
 - reviews, twitter, ...
- Consumer Transactions
- ...

Foundational topics

- Active/Budgeted Learning
- Survival Prediction
- On-Line learning
- Learning structure
/parameters of PGMs
- Modeling Text and Images
- LDA methods
- Missing data
- ...

<http://tinyurl.com/CmputProjects>



Mini-Research Project (con't)

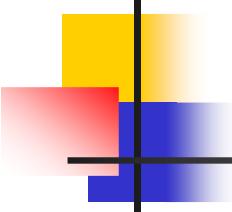
- ≈5-person teams
(Prefer: all Grads, or All UGrads)
- 30% of course grade
 - Everyone gets same
 - If problems: see me early!
- Schedule
 - + bi-weekly meetings w/ coach ...
- Note: 2 presentations
- ALSO: help eval another project

Tentative!

Decide on topic (≈1page)	8/Oct
Presentation #1 "lay of the land"	2/Nov
Presentation#2: contributions	6-8/Dec
Final write-up	14/Dec (*)

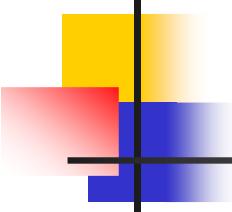
<http://tinyurl.com/PastProjects>

(*) 7/Dec but 0% penalty until 14/Dec 22



Mini-Research Project (con't)

- Report should include:
 - Problem: Why is problem interesting and challenging?
 - Background material, review/limitations of previous work
 - Technical solutions used to solve problem, successful? (why?)
 - Remaining problems; future research
- Format: **8 page, NIPS style** (+ bibliography)
- Evaluation Criteria
 - Apparent effort
 - Clarity... analysis, examples, ...
 - Originality
 - Implementation

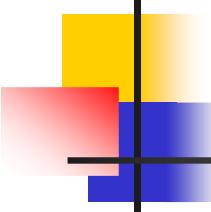


Rough Guidelines

Tentative

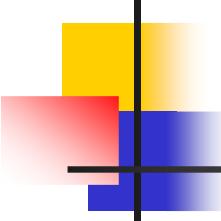
72%	<i>Content</i> of Written Report	Understanding of basic Idea: Implementation Evaluation of ideas
15%	<i>Form</i> of Written Report	Clarify of presentation, ...
10%	Verbal Presentations, I + II	Conciseness, preparations, appropriate content .. + feedback
3%	Comments on other project	Correctness, appropriateness, ...

<http://tinyurl.com/CmputProjects>



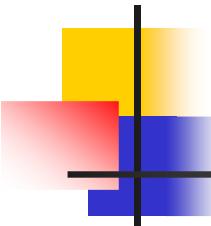
Presentations during Labs

- Currently: ≈ 75 enrolled
- Requirements wrt Team Presentations
 - 4-5 students/team
 $\Rightarrow \sim 15$ teams
 - 15minutes / presentation
 - Requires ~ 240 minutes...
 $> 2 \times 80$ -minute class sessions
- So we will use LAB times
 W 17:00 - 19:50



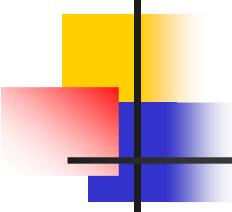
Lab Sessions

- Wed 5pm – 8pm
- **Project Presentations**
 - 2/Nov, 7/Dec
 - CSC 3-33, ...
 - Everyone must attend these!
- Other weeks ...
 - CSC 219
 - ONLY if “requested” via Survey in eClass
 - >10 students
 - ... by 5pm on Tues
 - Optional



wrt Octave

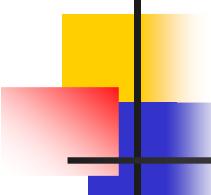
- Coursera Programming Exercises use Octave
- If you don't know Octave:
 - Watch (Coursera) Octave Tutorial
<https://class.coursera.org/ml-006/lecture/26>
(and subsequent videos, through .../32)
 - Can have ADDITIONAL Q/A session
 - on Wed 7/Sept, 5pm
 - But only if >10 say "Yes" in eClass survey
- wrt handing-in
Coursera Programming Exercises:
 - See <https://class.coursera.org/ml-006/lecture/32>



Goals of Course

- Obtain a (near)graduate-level understanding of
Machine Learning
- Emphasis: systems that can learn about environment, to help them improve their performance on range of tasks
- Covering...
 - ***general models:*** supervised learning, unsupervised learning,
 - ***theoretical concepts (foundations):*** relevant ideas from statistics, inductive bias, Bayesian learning and the PAC learning framework... feature selection, regularization, overfitting, ...
 - ***general techniques:*** gradient descent, consistency filtering, EM, ...
 - ***practical aspects:*** algorithms for learning linear regressors, linear classifiers, SVMs, decision trees, neural networks, belief networks, HMMs,...+ mixtures, boosting, ...;

Tentative...



Specific Ideas

■ **Big Ideas:**

- Learning is possible; can be done – in practice, theory
- $\neg\exists$ Universal knowledge-free learner!
 ⇒ needs prior knowledge
- Rel'n of Training Data (Size, Quality) to quality of results (Overfitting)
- Computational complexity

■ **Techniques:**

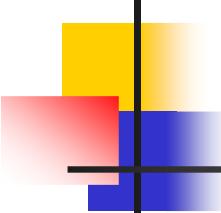
- Specific algorithms for learning ...
 Linear Separators, Decision Trees, Neural Nets, Belief Nets, ...
- General techniques:
 Consistency Filtering, Gradient Descent, EM, Boosting, ...
 Feature selections, Regularization, Cross-Validation, ...

■ **Foundations, Formal theories:**

Bayesian Theory, Hypothesis Eval'n, PAC-Learning

■ **Applications:**

- Classification/ Regression (Diagnosis), Reinforcement (Control)
- Computational Biology, DataMining, Adaptive software (Web/Interfaces)



Topics this semester

- Overview: Machine Learning
- Linear Models
 - Regression
(Exact; Gradient Descent; ...)
 - Classification
- Overfitting
... bias / variance, regularizer, ...
- Linear Model:
Support Vector Machine
 - Quadratic Programming
 - Kernel Trick
- NonLinear Models
 - Neural Nets
 - Conjugate Gradient
 - Decision Tree
 - Entropy, Incremental, ...
- Formal Learnability [PAC]
- Modeling
 - Probabilistic models
 - Belief Nets, HMM, ...
 - PCA
 - Clustering (EM)
- Topics
 - Imbalanced data
 - Sparse models
 - Ensemble Models

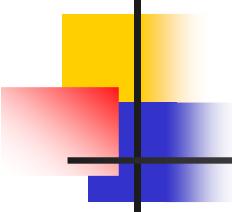
Major Topics *Not* Covered

- Reinforcement Learning
 - Decision Theory
 - MDPs
 - RL Algorithms
- Biological basis of learning
 - Human
 - Animal models
- Genetic algorithms
- Fuzzy sets
- Rough sets

An important part of machine learning!
But too much other stuff...
and is covered in another
semester-long course!

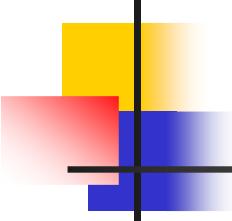
This is a Computing Science course...

No comment ☹



Prerequisites

- Ability to deal with “abstract mathematical concepts”
- Basic probability / statistics:
 - Typical distributions, densities, marginalization, ML estimation, ...
- Calculus:
 - Derivatives, integrals, ...
- Linear Algebra:
 - Vector, matrices, eigenvectors, PCA, SVD, ...
- Graph theory:
 - Basic definitions (nodes, arcs, ...), data structures, algorithms
- Algorithms
 - Dynamic programming, basic data structures, complexity, ...
- Programming languages
 - Matlab / Octave
- We provide some background, but the class will be fast paced 34

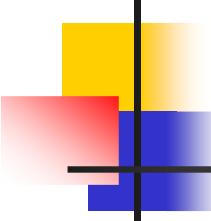


Formal Foundations

- Course material will include...
 - implementation (programming)
 - formal foundations (math)
 - ... not watered down ...
- You've been warned ...

<https://docs.google.com/document/d/1qWxWrqMmz5U8Tgk26GCtEPeFv-O53VDBIZFiFmuJg0g/pub>

$$E(\alpha) = \sum_k \alpha_k - \frac{1}{2} \sum_k \sum_m \alpha_k \alpha_m y_k y_m (\mathbf{x}_k \cdot \mathbf{x}_m)$$



Where to find Useful Information

- Machine Learning is challenging...
- Requires knowing
 - Partial derivatives; Conjugate gradient; Eigenvalues; ...
- Fortunately, textbook covers a lot
 - Other textbooks... many on-line ...
- Course webpage lists:
 - “Resources”, “Auxiliary Material”, ...
 - Recommended texts ...
 - Can pose Q’s on *Discussion Forum*
 - Recommend: do NOT opt-out
 - Wiki
 - please add relevant material there!!
- \exists many other on-line resources...
MOOCs in general
 - Coursera, Udacity, ... [Caltech]

Stanford

Machine Learning

Andrew Ng

Learn about the most effective machine learning techniques, and gain practice implementing them and getting them to work for yourself.

Workload: 5-7 hours/week

[Preview](#)**Sessions:**

Oct 14th 2013 (10 weeks long)

[Sign Up](#)

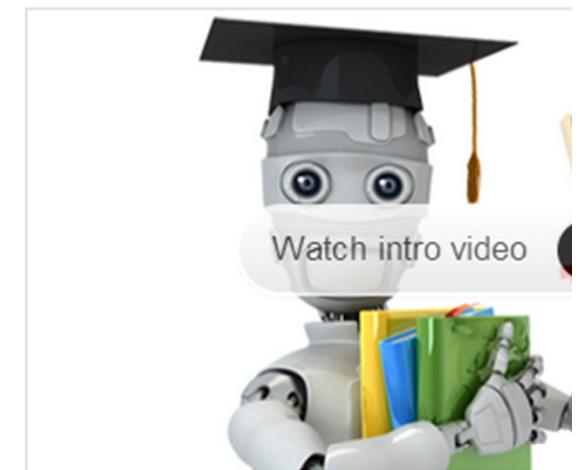
3,2



Apr 22nd 2013 (10 weeks long)

[Sign Up](#)

Future sessions

[Add to Watchlist](#)[About the Course](#)[About the Instr](#)

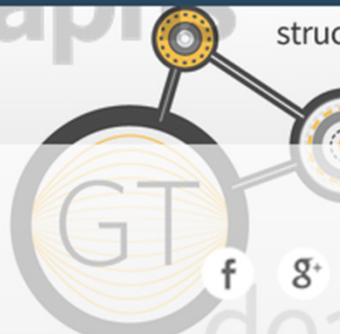
automatic decision trees access predict
model diverse game theory properties get classification web
theoretical world questions

results supervised extract analyze parameters relations example

graph structure interactions massive analysis

Machine Learning: Supervised Learning

Conversations on Analyzing Data



Intermediate

Built by **Georgia Tech**



Approx. 2 months

Assumes 6hr/wk (work at your own pace)

Join 28,623 Students

Course Summary

This is the first course in the 3-course Machine Learning Series and is offered at Georgia Tech as CS7641.

Please note that this is first course is different in structure compared to most Udacity CS courses. There is a final project at the end of the course, and there are no programming quizzes throughout this course.

This course covers Supervised Learning, a machine learning task that makes it possible for your phone to recognize your voice, your email to filter spam, and for computers to learn a bunch of other cool stuff.

Supervised Learning is an important component of all kinds of technologies, from stopping credit card fraud, to finding faces in

Start Free Course

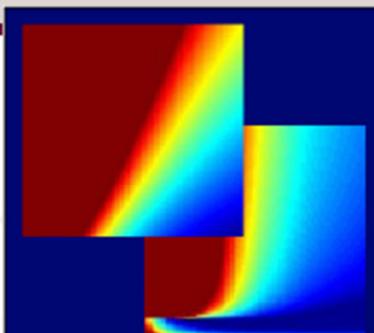
Start free course

Free

You get

- Instructor videos
- Learn by doing exercises

CALIFORNIA INSTITUTE OF TECHNOLOGY



LEARNING FROM DATA

Machine Learning course - recorded at a live broadcast from Caltech

HIGHLIGHTS

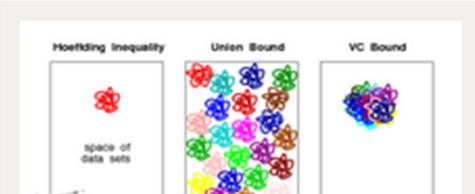
A real Caltech course, not a watered-down version

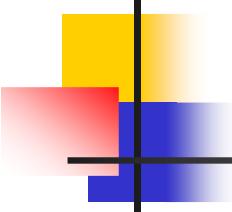
- Free, introductory *Machine Learning* online course (MOOC)
- Taught by Caltech Professor Yaser Abu-Mostafa [[article](#)]
- Lectures recorded from a live broadcast, including Q&A
- Prerequisites: Basic probability, matrices, and calculus
- 8 homework sets and a final exam
- Discussion forum for participants
- Topic-by-topic video library for easy review



Overview

Take the course at your own pace
Lectures - Homework

[Outline](#)[\[Home\]](#)[The lectures](#)[Homework](#)[Textbook](#)[Forum](#)[The instructor](#)[Contact](#)[terms and conditions](#)

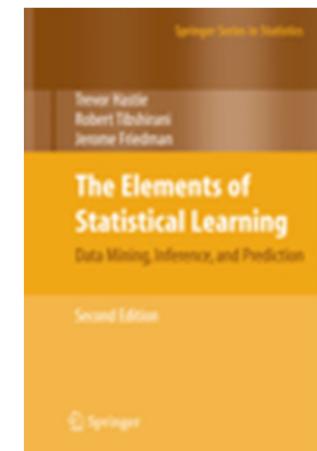


Other Issues

- Can enroll, if you have background
- Auditors welcome ... as long as seats
 - **Answer G'form** (email-address for eClass)
- Ask LOTS of questions
 - Really!
- Octave / Matlab tutorial ??
 - Next Wed: 7/Sept?
- **Everyone: fill out eClass Survey**
 - ... or removed from class ☺

Summary

- <https://eclass.srv.ualberta.ca/course/view.php?id=25947>
- Assignments, Logistics, Slides
- REQUIRED Texts:
 - Hastie/Tibshirani/Friedman, *The Elements of Statistical Learning*, Springer, 2009 (2nd ed). [on-line]
 - ? Other hand-outs ("Bayesian Networks")
- Evaluation:
 - Assignments: 70% (4+7 total); Solo
 - Project: 30%; in ≈5-person teams



Action Items:

- If want to register, audit: see <https://goo.gl/forms/pu0vkjcGoRXcBZpy2>
- Fill out survey on eClass

Russell Greiner

[Home](#)
[Research](#)
[Work With Me?
\(NSERC Summer\)](#)
[Publications](#)
[PapersDB](#)
[Presentations](#)
[Web Sites](#)
[Courses](#)
[Cmput466/551](#)
[My Group](#)
[Activities](#)
[Software](#)
[Funding](#)

[FAQ](#)
[Personal](#)
[Useful Pointers](#)



[Athabasca Hall 359](#)
[Artificial Intelligence](#)
[Group](#)
[Department](#) of
[Computing Science](#)
[University of Alberta](#)
[Edmonton](#), Alberta
Canada T6G 2E8

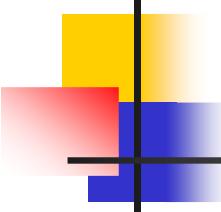
Professor
PI: [Alberta Innovates Centre for Machine Learning](#)
E-mail: rgreiner@ualberta.ca
Voice: (780) 492-5461 **admin:** 780-492-4828
Fax: (780) 492-1071
[Faculty Profile](#)

[Google Calendar](#)

Announcements:

- If you want to take the *Introduction to Machine Learning* course (Cmput466 for undergrads; Cmput551 for grads) this fall, please see the short [Announcement](#), which includes the "Required Background".
If you want to register, or to audit, please fill out [this G'form](#).
- I no longer have an office phone. Use email, or if very timely, contact our Admin at 780 492-4828.
- To understand the difference between *Association Studies* (common in biostatistics) vs *Prediction Studies* (common in machine learning), see [Youtube lecture](#).

[Short Bio](#)

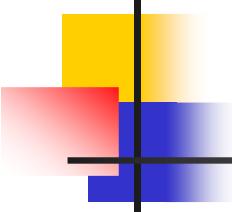


Academic Integrity

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behavior (online at

<http://www.governance.ualberta.ca/CodesofConductandResidenceCommunityStandards/CodeofStudentBehaviour.asp>)

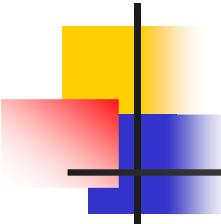
and avoid any behavior which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University.



Policies on Integrity

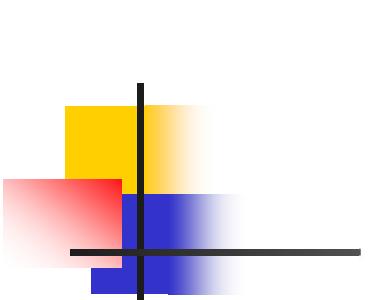
Common sense!

- Wrt assignments:
 - Yes, DO meet
 - But only **discuss** general approaches to problem
 - Do not take **written** notes
 - Do NOT share code!!
- Respect the lab environment
- Do not...
 - Interfere with operation of computing system
 - Interfere with other's files
 - Change another's password
 - Copy another's program
 - etc.
- Cheating is reported to university whereupon it is out of our hands
- Possible consequences:
 - A mark of 0 for assignment
 - A mark of 0 for the course
 - A permanent note on student record
 - Suspension from university
 - Expulsion from university



Code of Conduct: Plagiarism

- Students may **not** submit work as their own that was written by another person (in part or whole)!
 - Do NOT share coding
 - Do NOT use code from another person (student)
- All cases of plagiarism will be sent to the Dean of Science
- See “Course Policies” on eClass
- If any question, contact us FIRST!
- Students do get expelled. **Don’t do it.**



Don't do it!



Honesty is always the best policy

The reputation of this university and the degrees that are awarded to its students depends on academic honesty. It is for this reason the Faculty of Science has a zero tolerance policy when it comes to academic misconduct.

Every year significant numbers of students are found guilty of academic misconduct in a variety of Science courses. Some stressed students make serious errors in judgment and such errors can and often do have very significant consequences. Students who contravene the Code of Student Behaviour are often under the false impression that leniency will be a standard response to first offenses and that they won't have to face any real consequences for their actions. The Faculty of Science wants all students to understand that we take academic integrity very seriously and that harsh penalties will apply when students contravene the Code. All students enter University with the understanding that cheating is unacceptable behaviour and, irrespective of stage of program, should therefore expect to receive an automatic disciplinary failing grade (F8) for cheating. This sanction may or may not be accompanied by suspension or expulsion. In the case of plagiarism, students should expect sanctions that range from a zero on the assignment all the way to an F8 (with or without suspension or expulsion), depending on the degree of plagiarism and case particulars.

There are no excuses! Here are some ethical choices:

- 1) Don't procrastinate: practice good time management and start assignments early.
- 2) Take a reduced grade, even a zero; these are better than an F8 and a suspension.
- 3) Talk to your Professor if you run into difficulty.
- 4) Reduce your course load to what you can manage.

The Consequences are serious!

- You will have a disciplinary record denoted on your transcript for a period of 2 years.
- Your GPA is lowered substantially if you receive an F8. This grade is averaged into your GPA and may lead to your being required to withdraw if your GPA falls below Satisfactory Standing (2.0).
- You might lose your scholarship or admission (or future chances of admission) into other programs such as Medicine, Pharmacy, Dentistry, Business, Education or Graduate Studies.
- Suspension can set back or prevent graduation.
- Resentment of your fellow students – honest students don't want to see their grades diminished by those who cheat on exams and plagiarize written work.

The Code of Student Behaviour appears in Appendix A of the Calendar and can be accessed online at
<http://www.uofaweb.ualberta.ca/gfcpolicymanual>

Here are some examples of academic offences:

Plagiarism:

- Using any text/words, phrases, ideas or images from books (including encyclopedias), articles—including the Internet—without proper citation.
- Paraphrasing without providing proper documentation also constitutes plagiarism. **ASK**, if you're in doubt!
- Copying (in whole or in part) answers, essays, assignments or lab reports from another student.
- Submitting an essay, assignment or report that was (in whole or in part) submitted in another course.

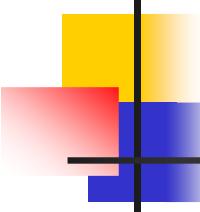
Cheating:

- Use or possession of unauthorized materials (notes, textbook, cheat-sheet, iPhone) during an exam.
- Copying or simply looking at another student's answers during an exam or allowing another student to see your answers during an exam.
- Unacceptable levels of external compositional or editorial assistance by a paid or unpaid tutor. If you are unsure of what would be acceptable, **ASK**!

Misrepresentation of Facts:

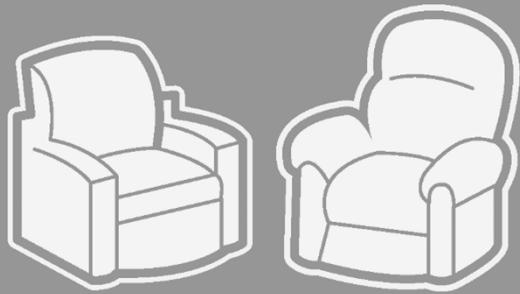
- Making up data, sources or page numbers for reports, assignments or essays.
- Changing answers on a corrected exam and re-submitting it for a mark increase.
- Forging or altering a Doctor's Note, or faking illness. Remember, deferred exams are granted for *incapacitating* illnesses.

Please familiarize yourself with the following web resources:
Truth in Education
<http://www.uofaweb.ualberta.ca/TIE/>
Student OmbudService
<http://www.uofaweb.ualberta.ca/OmbudService/>

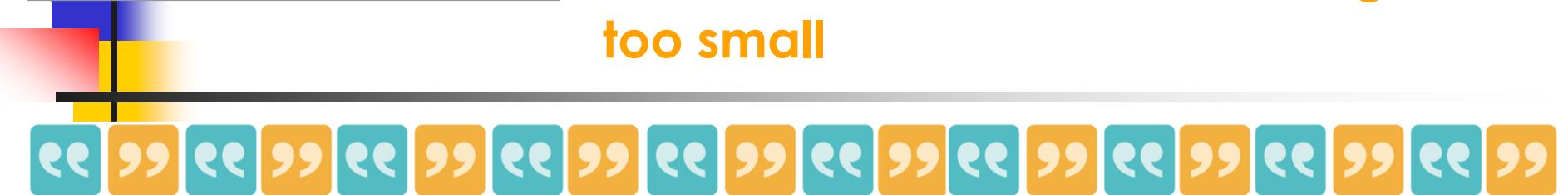


Don't Post Solutions

- You must NOT post **your** solutions,
nor **our** solutions
- ... nor provide them to others,
during the semester, or afterwards



PEER SUPPORT —CENTRE— *We listen. Seriously.*



FREE • SAFE • CONFIDENTIAL

If you are feeling **stressed** or **overwhelmed**, you are not alone.

At the **Peer Support Centre**, we're here to listen. **No issue is too big or too small**

To talk with one of our highly trained student volunteers:

Drop In: 2-707 SUB

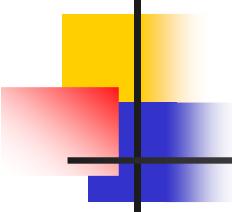
Mon-Fri: 9am-8pm

Call our HelpLine: 780-492-4357 (492-HELP)

To make an appointment, phone: 780-492-4268

www.su.ualberta.ca/psc
facebook.com/peersupportcentre

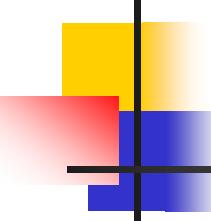




Writing Help is Available

- **Student Success Centre:**
 - <http://www.studentsuccess.ualberta.ca/>

- **Centre for Writers:**
 - <http://c4w.ualberta.ca/>



AI Seminar !!!

- Friday noons, CSC 3-33
- Neat topics, great speakers, FREE PIZZA!



<https://www.cs.ualberta.ca/research/research-areas/artificial-intelligence/ai-seminar>