

Online Courses for Lifelong Learning

Presentation to
OSHER Lifelong Learning Institute
Social Media and Digital Technology

October 25, 2012

Douglas H. Fisher
Vanderbilt University

Outline

- Motivations for online learning
- Availability of (free) online learning materials
- Technological and Pedagogical Theory
- Communities of Learners (Global and Local)
- Personalization and Humanization through Technology
- Some history and proposals

Overview Videos

Daphne Koller: <http://www.youtube.com/watch?v=U6FvJ6jMGHU>

Salman Khan: <http://www.youtube.com/watch?v=nTFEUsudhfs>

Peter Norvig: <http://www.youtube.com/watch?v=tYclUdcdeo>

(Free) Online Education Resources

COURSERA <https://class.coursera.org/> (198 courses)

EdX <https://www.edx.org> (7 courses)

Udacity <http://www.udacity.com> (14 courses)

Udemy <http://www.udemy.com>

Khan Academy <http://www.khanacademy.org>

Examples of MOOCs

coursera

COURSES

UNIVERSITIES









ABOUT ▼




DOUG ▼


Your Courses

Screenshot of <https://www.coursera.org>


	Machine Learning Aug 20th Oct 29th 	Aug 20th 2012 10 weeks long Go to class View course info Un-enroll
	Introduction to Sustainability Aug 27th Oct 22nd 	Aug 27th 2012 8 weeks long Go to class View course info Un-enroll
	Introduction to Mathematical Thinking Sep 17th Nov 5th 	Sep 17th 2012 7 weeks long Go to class View course info Un-enroll
	Software Engineering for SaaS Ended 4 months ago	May 18th 2012 5 weeks long View class archive View course info Un-enroll
	Introduction to Databases	To be announced 10 weeks long


Examples of MOOCs


 COURSES ABOUT ▾ DOUG ▾


 **Stanford University**
Machine Learning


Andrew Ng
Professor of Computer Science


 Home


 Video Lectures


 Review Questions


 Programming Exercises


 Discussion Forums


 Course Schedule


 Course Information

 Course FAQ


 Octave Installation

 Help with Subtitles

 Join a Meetup

 Course Wiki

Announcements

 **Week 2 content's homework -- Two day extension**

Dear Class,


Because of a GoDaddy.com DNS outage earlier today, the Coursera site was inaccessible for a few hours. I'm very sorry that many of you were unable to access the site. I know also that quite a few of you who had been planning to finish up the homework were worried about getting it submitted on time, and must have been frustrated by the outage, and I apologize for that also.

Given the outage, and to make sure that you can get your homework submitted, we've extended by two days the deadline for the homework for the Week 2 content, to Wednesday September 12th (11.59pm, US PDT). Coursera has also migrated its DNS service off GoDaddy to a different provider, so that a similar outage won't occur again.

Thanks again for all your hard work, and for sticking with the class. And a big congrats also to all of you who had managed to submit the homework by Monday despite the outage.

Andrew

Tue 11 Sep 2012 12:11:00 AM PDT


 **Homework 2 friendly reminder**


Hi all,


About 58,000 of you had signed up for this offering of the machine learning class. I'm thrilled that there're so many of you still excited to learn this topic!

I also hope you're enjoying learning about machine learning and linear regression. As a friendly reminder, the homeworks for the Week 2 content (Review Questions + First Programming Exercise) are due tomorrow Monday September 10th. Doing the


Invite your friends!


 Like 7.7k


 Tweet 525


 +1 6.9k


Upcoming Review Questions


 **XII. Support Vector Machines**
Due: Mon 15 Oct 2012 11:59:00 PM PDT


 **XIII. Clustering**
Due: Mon 22 Oct 2012 11:59:00 PM PDT

 **XIV. Principal Component Analysis**
Due: Mon 22 Oct 2012 11:59:00 PM PDT

 **XV. Anomaly Detection**
Due: Mon 29 Oct 2012 11:59:00 PM PDT

 **XVI. Recommender Systems**
Due: Mon 29 Oct 2012 11:59:00 PM PDT

 **XVII. Large Scale Machine Learning**
Due: Mon 5 Nov 2012 10:59:00 PM PST


 **XVIII. Application: Photo OCR**
Due: Mon 5 Nov 2012 10:59:00 PM PST


Upcoming Programming

Screenshot of <https://class.coursera.org/ml-2012-002/class/index>

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Examples of MOOCs


 COURSES ABOUT ▾ DOUG ▾





University of Illinois at Urbana-Champaign
Introduction to Sustainability


Jonathan Tomkin, Ph.D.
University of Illinois at Urbana-Champaign


 Home


 Syllabus


 How to Pass the Class


 Course Orientation
(Mandatory; Start Here)


 Week 1


 Week 2


 Week 3


 Week 4


 Week 5


 Week 6


 Week 7

 Week 8


 End-of-Course Survey

 All Forums

 Quiz Results

 Help With Subtitles


Announcements

 **Reminder to submit final materials for the Project Achievement and Forum Achievement Badges by tomorrow**

Achievement Badges by tomorrow

Just a quick reminder that tomorrow (Sunday) is an **important deadline** for people pursuing either the Project Achievement Badge or the Forum Achievement Badge. Those pursuing the Project Achievement Badge should post their cover sheet and final version of their project (see the [Week 7 Milestone](#) for details). Those pursuing the Forum Achievement Badge should [post samples of their best contributions to the discussion forum here](#).

Sat 13 Oct 2012 12:10:00 PM PDT

 **Week 6 in Review**

Hi everyone,

Many interesting comments in the forums this week. Permaculture (which would base our living and agricultural systems around ecosystem principles) was put forward ([Permaculture as an alternative](#), [Project Discussion - Sustainable Family biotype](#)) as a sustainable food production system. Although it clearly takes into account the externalities that conventional farming does not – there is explicit concerns in permaculture about caring for soil, fossil fuel use, avoiding monocultured crops, and reducing synthetic fertilizer, there was the question of whether permaculture is scalable for the world population, and whether or not the societal/lifestyle change required is feasible (e.g. [Hardy Cook](#), [Andrew Warren Nute](#)).

Another observation was, given the high grain and water requirements of meat production, that we would be more sustainable if we were vegetarian (e.g. [Lisa Farrell - You want sustainable food? Go vegetarian](#)). Again, there is the question of what people can be expected to give up in consumption (for a broader context on our options, I recommend this post and its comments: [Angus McKenzie: Behaviour Change is the Key to Food Security](#)), and it's been noted that we could give up many things and be more sustainable. This question illustrates that, in the developed world, there is the luxury of a large buffer between current levels of consumption and Malthusian conditions. Given that individuals don't wish to reduce consumption unnecessarily, it might be that unpalatable decisions need to be made. If we are unsustainable, the challenge would appear

Upcoming Quizzes

 [Week 7 Quiz 1](#)
Due: Tue 16 Oct 2012 9:55:00 PM PDT

 [Week 7 Quiz 2](#)
Due: Tue 16 Oct 2012 9:55:00 PM PDT

 [Week 8 Quiz 1](#)
Due: Sun 21 Oct 2012 9:55:00 PM PDT

 [Week 8 Quiz 2](#)
Due: Sun 21 Oct 2012 9:55:00 PM PDT

New Lectures

 Week 7, Module 2: Environmental Policy

 Week 7 Module 3: Environmental Policy Assessment

 Week 7, Module 4: Environmental Economics

 Week 7, Module 5.1: Application of Environmental Economics and Policy (Part 1)

 Week 7, Module 5.1: Application of Environmental Economics and Policy (Part 2)

 Week 7, Module 5.3: Application of Environmental Economics and

Screenshot of <https://class.coursera.org/sustain-2012-001/class/index>

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Massively Open Online Courses

Accessibility and affordability

“MOOCs, have the potential to make quality education a basic, international human right.”★

(but “MOOCs may pose a grave threat to financially struggling colleges and universities with less prestigious brand names.” ★)

★Stephen Smith, “The World-Wide U”, American Radio Works,
[americanradioworks.publicradio.org/features/tomorrows-college/
keyboard-college/moocs.html](http://americanradioworks.publicradio.org/features/tomorrows-college/keyboard-college/moocs.html)

Consortium on Urban and Metropolitan Universities (CUMU)
mission: *“... to use the power of their campuses in education, research, and service to enhance the communities in which they are located.”* (<http://www.cumuonline.org/about.aspx>)

How can MOOCs be folded into CUMU’s mission?

An Online Computer Science Curriculum (Basics)

Introduction to Logic
(Stanford)

Combinatorics
(Princeton)

Learn to Program:
Fundamentals
(Toronto)

Introduction to
Computer
Science 1 (Harvard)
and 2 (MIT)

CS 101
Introduction to
Computer Science
(Udacity)

Computer
Science
101
(Stanford)

*“equivalent”
alternatives*

Learn to Program:
Crafting
Quality Code
(Toronto)

CS 212
Design of
Computer Programs
(Udacity)

*“equivalent”
alternatives*

The Hardware/Software Interface (U Washington)

CS 215
Algorithms:
Crunching Social Networks
(Udacity)

Algorithms Part 1
(Princeton)
*“equivalent”
alternatives*

Algorithms:
Design and Analysis,
Part 1
(Stanford)

An Online Computer Science Curriculum (Core)

Algorithms
Part 2
(Princeton)

Algorithms:
Design and Analysis,
Part 2 (Stanford)

*“equivalent”
alternatives*

Automata
(Stanford)

Programming Languages
(U Washington)

Compilers
(Stanford)

Pattern-Oriented
Software
Architectures
(Vanderbilt)

Design of
Computer Programs
(Udacity)

Software as a Service
(UC Berkeley)

Introduction to
Databases
(Stanford)

Computer
Architecture
(Princeton)

Computer
Networks
(U Washington)

CS188.1x
Artificial
Intelligence
(UC Berkeley)

CS373
Artificial
Intelligence
(Udacity)

Creative, Serious and
Playful Science of
Android Apps
(UIUC)

Creative programming for
digital media and
Mobile Apps
(U of London)

Web Intelligence
and Big Data
(IIT, Dehli)

Machine Learning
(Stanford)

Machine Learning
(U Washington)

Discrete
Optimization
(Melbourne)

Networked Life (U Penn)

Social Network Analysis (Michigan)

An Online Computer Science Curriculum Technical Electives

Software
Defined
Networks
(U Maryland)

Malicious Software
underground story
(U of London)

Interactive
Programming
(Rice)

Gamification
(U Penn)

AI Planning
(Edinburgh)

NLP
(Stanford)

Functional Programming
Principles in Scala
(Ecole Polytechnique)

Heterogeneous
Parallel
Programming
(Stanford)

Cryptography
(Stanford)

Applied
Cryptography
(Udacity)

Computing for
Data Analysis
(Johns Hopkins)

Coding the Matrix: Linear Algebra
CS applications (Brown)

Image
and Video
(Duke)

Computational
Photography
(GaTech)

Computer Vision
(UC Berkeley)

Computer Vision
(Stanford/Michigan)

VLSI CAD:
Logic to Layout
(UIUC)

An Online Computer Science Curriculum Tech/Soc

Writing in the Sciences
(Stanford)

Internet History, Technology, and Security
(Michigan)

Sci, Tech, Soc in China
(Hong Kong)

Securing
Digital
Democracy
(Michigan)

How to Build a Startup
(Udacity)

Computational
Investing
(GaTech)

Online Games:
Literature,
New Media, and Narrative
(Vanderbilt)

Information Security
and Risk Management
in Context
(U Washington)

Specialized
and Tutorial

Sciences, Humanities, Arts

MySQL Databases
For Beginners
(Udemy)

Differential
Equations
(Khan Academy)

few thus far, but enough
To fill out a “major”

Overview Videos

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Peter Norvig: <http://www.youtube.com/watch?v=tYclUdcdeo>

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Udacity <http://www.udacity.com> (14 courses)

Udemy <http://www.udemy.com>

Khan Academy <http://www.khanacademy.org> (about 3,500 videos)

Brief History

Spring 2009: Tried to “flip” my Vanderbilt database class from NSF, using online lectures, but no appropriate material (though lots of good online stuff)

Fall 2011: Stanford Announces three MOOCs in Database, Machine Learning, and AI

Spring 2012: Used Jennifer Widom’s online database lectures to “flip” my database classes; incorporated Andrew Ng’s online machine learning lectures into my ML course

“Regarding Professor Widom's videos: On one hand, they are an excellent resource, and not taking advantage of them would be silly. On the other hand, early in the semester, a lot of in-class lectures were a review of the assigned videos for that week, and it felt a bit repetitive. To be fair, I don't honestly know what else there is to have covered during those classes, since we were first learning the basics of thinking in relational algebra terms. Later in the course you did a much better job of taking what we'd learned from her and applying it further than she did. Overall a very good course, and I feel like I learned a lot about a very useful subject.”

Instructor Average: 4.45 Course Average: 3.63 (no ratings below average)

“Yay machine learning! The structure of the class maximized the perspectives of ML presented: the videos by Andrew Ng at Stanford covered many of the basic techniques of ML so that we were able to spend our class time discussing deeper levels of ML -- papers about more complicated ML systems, and the results of combining elements of different ML paradigms.”

Instructor Average: 4.22 Course Average: 4.22 (no ratings below average)

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Summer 2012: Produced a few of my own AI lectures, posted to YouTube, in prep for upcoming AI course, and continue (slowly) to do so

https://www.youtube.com/channel/UCWOFdpEfNuQP3O_JUiwhT8A?feature=watch

Summer 2012: Another academic department “desperately” wanted an ML course offering before next regularly schedule course in Fall 2014

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Summer 2012: Another department “desperately” wanted an ML course offering before next regularly schedule course in Fall 2014

Fall 2012: Running AI course using various online videos, but mainly Norvig and Thrun from Fall 2011, to flip classes; <https://my.vanderbilt.edu/cs260/>

Fall 2012: Running an ML course as a “wrapper” around the Stanford ML MOOC, which is running at the same time: students do all work required by the MOOC (lectures, quizzes, programs), submit the work for MOOC infrastructure grading, + do additional readings assigned by me, take quizzes on that material, and do a final Project: <https://my.vanderbilt.edu/cs390fall2012/>

Studies in Machine Learning (CS 390, Fall 2012)



[Overview](#) [Instructor](#) [Grading](#) [Schedule and Readings](#) [Course blog](#)

Overview

This offering of individual studies in machine learning is a “wrapper” around a COURSERA course on the same topic, adding readings, discussions, and an end-of-the semester project (with a faculty mentor) to the online course offering.

In particular, there will be several components to this individual studies offering during Fall 2012.

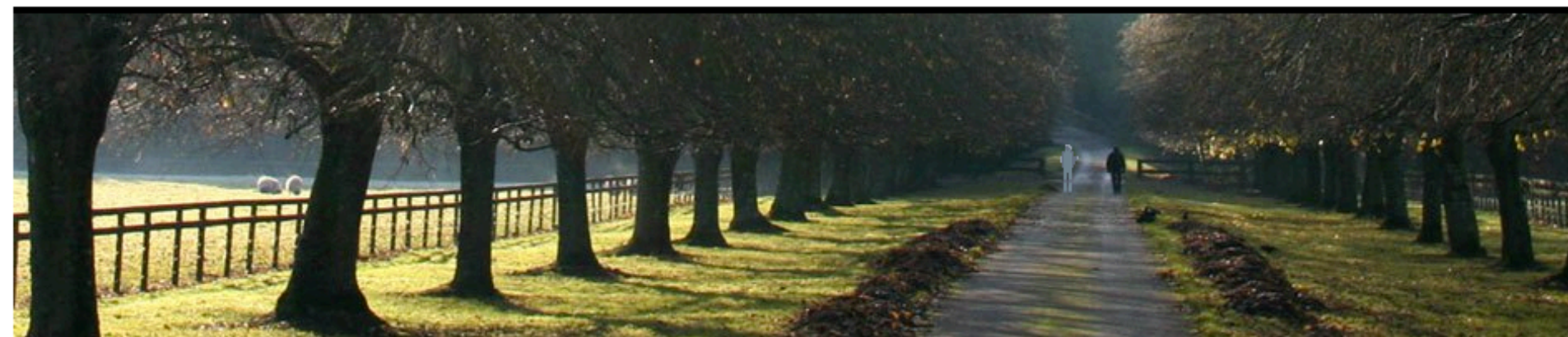
Archives

- [August 2012](#)

Meta

- [Site Admin](#)
- [Log out](#)

Studies in Machine Learning (CS 390, Fall 2012)



[Overview](#) [Instructor](#) [Grading](#) [Schedule and Readings](#) [Course blog](#)

Wednesday, September 19 (5:00 – 6:30) Quiz. Discussion of learning as search paper COURSERA material through week 4 (neural network representation); multi-task learning paper assigned

“*Multitask learning*” (1997) by Caruana:

<http://www.springerlink.com/content/x4q010h7342j4p15/>

Some neural network systems can be viewed as multitask learning, as can some unsupervised learning systems to be studied later

Wednesday, September 26 (5:00 – 6:30) Quiz. Discussion of multi-task learning and neural networks and COURSERA material through week 5 (neural network learning);

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CS 260 AI Video call out from UC Berkeley MOOC

Douglas Fisher

Subscribe

13 videos ▾

Example: scheduling activities

- **Variables:** *A, B, C, D, E* that represent the starting times of

thanks! You also helped me with [redacted]

[redacted] 6 days ago

Thanks! Just helped me figuring this out! I'm taking this online classes

And was struggling to understand the other professor...

[redacted] 1 week ago 2 👍

Douglas H. F

© D. Poole and A. Mackworth 2009 Artificial Intelligence, Lecture 4.1, Page 4



0:08 / 15:51



This video is public.



Like



Add to

Share



284 views



Published on Sep 29, 2012 by [Douglas Fisher](#)

Examples of the Generalized Arc Consistency algorithm as given in Poole and Mackworth's Artificial Intelligence text

4 likes, 0 dislikes

Douglas H. Fisher

What had initially concerned me

- What would students, faculty, and Vanderbilt think of my “outsourcing” lectures?
- What would I do in class if not lecture?

What gets me excited about unfolding online activity

- I feel in community with other educators (for the first time in 25 years of teaching)
- Creating and posting my own content
- Even greater customization across courses and curricula
- Other forms of crowd sourcing educational material (e.g., Wikibooks)
- That students will see community modeled explicitly among their educators
- Leveraging and creating across institution MOOCs

Creative, Serious and
Playful Science of
Android Apps
(UIUC)

Creative programming
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(GaTech)

Computer Vision
(UC Berkeley)

Computer Vision
(Stanford/Michigan)

VLSI CAD:
Logic to Layout
(UIUC)

Coding the Matrix: Linear Algebra
CS applications (Brown)

Proposals

- An OSHER course that is wrapped around a MOOC
... with local faculty and student facilitators
- Putting OSHER student material online (we can all
be contribute content)

(Free) Online Education Resources

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Udemy <http://www.udemy.com>

Khan Academy <http://www.khanacademy.org>

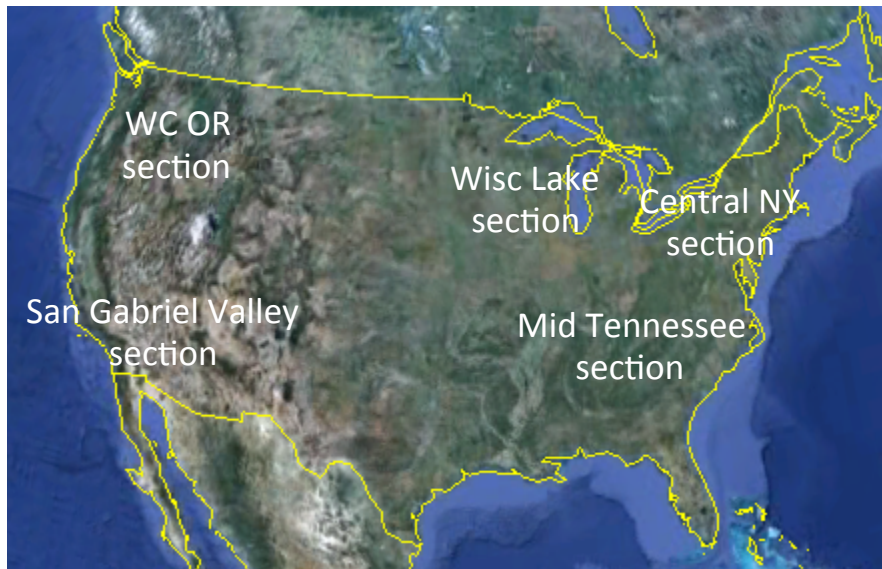
Distributed Shared Courses

Build on our previous course development activities (e.g., the highly interdisciplinary and popular “State of the Planet” course) by developing a distributed shared course across many institutions

Exploit existing infrastructure (e.g., COURSERA, VaNTH, Wikimedia) to develop and host courses

Virtual technology to manage lectures, and formal and informal discussion groups

Instill a commitment to place through local and regional “super sections,” with course activities customized to regional challenges



One general theme: what will my region be like in 40 years?

TSU

Fisk U

Vanderbilt U

Belmont U

Cumberland U

Middle Tennessee
State U

U of the
South

UT, Chat

Possible participants in the Middle Tennessee
super section of the State of the Planet OOC

Local themes:
flooding,
green spaces,
historic districts



NPO, Govt, Academic, Corporate advisors
on local and regional issues



Regional themes:
water quality,
invasive species,
climate change