DESCRIPTION

*Human and Machine Intelligence* covers cutting-edge research on machine learning and artificial intelligence and its applications for business leaders. Machines help solve complex problems, lessen decision bias, scale human effort, and spot hidden patterns in big data. However, they lack the creativity and insight that top executives possess. Together, executives and machines have the potential to make powerful “thought partnerships.” Using hands-on cases and applications this course shows how to use a critical set of machine learning decision tools to improve processes, turn raw numbers into convincing stories, and make less biased judgments. The overarching goal is to enable you to confidently lead data science and design teams, know the expansiveness and limits of machine-learning complex decision support tools, and be capable of applying human+machine thought partnerships to grow businesses or disrupt Grand Masters in any field.

GRADING

*Human and Machine Intelligence* is an exciting, and possibly scary, new topic area in business education. While there has been extensive writing about Artificial Intelligence and Machine Learning in the popular and business press, it is difficult to create a coherent understanding of the field from those pieces—even more so to understand how humans fit into this new world.

I start from this framing to put you in the correct mindset, namely that this space is still intellectually wide open and experts are few and far between. As a part of this I want you to engage with the assignments in a way that your written work is thorough, explanatory, and reflective — that what you submit is a professional level document that you would be willing to publish in an effort to establish yourself as a thought leader in this space. While I do not require that you post your assignments to LinkedIn/Medium/etc. (although I do hope that some of you will),
I do require that you will prepare them as if they were the final product to be distributed in such a way. As such, basics of writing matter (spelling and grammar) since they contribute to the professional appearance that you project to the world.

Assignments (90%) A series of individual and group assignments will give you first-hand experience in understanding how machine-learning is used to make business decisions.

Attendance and Participation (10%) Sharing insights and participating in class discussions is integral to success in the course. Attendance will be randomly taken, while participation will be recorded every class. Completing activities that carry no explicit grade (i.e. submitting additional documents or business plans for discussion) are also a part of your participation grade.

Honor Code
As with all Kellogg courses, by enrolling in this course you agree to abide by the Kellogg Honor Code (http://www.kellogg.northwestern.edu/stu_aff/policies/honorcode.htm). In this course you may (and are encouraged to) discuss both the individual assignments and group assignment with your fellow students; however, the finished product that you submit should be entirely your own work. If you have any questions regarding how the honor code applies to this course, please ask.

Summary of Assignments
Assignments must be uploaded to Canvas by midnight CST on the day listed.

**Late assignments are accepted for 24 hours after the deadline and will be **MARKED DOWN 20% FOR LATENESS.**

No assignments are accepted after 24 hours unless you have a serious extenuating circumstance.

Peer assessments will be used for group projects and will affect individual grades.

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<thead>
<tr>
<th>Title</th>
<th>Distributed</th>
<th>Due</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>1 GROUP WHO ARE YOU HIRING?</td>
<td>April 5th</td>
<td>APRIL 18TH</td>
<td>30%</td>
</tr>
<tr>
<td>2 GROUP AI Canvas</td>
<td>APRIL 19TH</td>
<td>MAY 3RD</td>
<td>30%</td>
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<tr>
<td>3 INDIVIDUAL HIRING YOUR REPLACEMENT</td>
<td>MAY 3RD</td>
<td>MAY 8TH</td>
<td>30%</td>
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<tr>
<td>* INDIVIDUAL PARTICIPATION</td>
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Week 1 — Building Blocks

Session 1. What, Why, and Where?
What is machine-learning? Where can you use it? Why should we use it? Why should we consider other traditional methods of analysis, prediction, and decision-making? What business problems are machine-learning and artificial intelligence most suited to?

Video: From hacking the iPhone to self-driving — Comma.ai’s maiden voyage

Before Class Reading:
- McAfee and Brynjolfsson. Machine, Platform, and Crowd. Ch 2, pgs 28-36

Before Class Watching:

Session 2. How?
How does an algorithm actually work? How do the limitations of machine-learning compare to traditional knowledge building? Are these limitations different, or a new version of an old problem? Difference between correlation and causation.

Before Class Reading:

Assignment 1: Who are you hiring? Explanation and distribution.

Out-of-class exercise: Submit a plain text file (so a '.txt' file - very important!!) of more than 1,000 words of your writing. This is NOT new text you are writing, just copy and paste your resume, application cover letters, blog posts you’ve written, etc. into a single text document and submit it at http://bit.ly/hmiwords by midnight (same day as class).
Week 2 — Replicating Human Insight

Session 1. Machines replicating humans
What is a neural network? What has made it so powerful? What differentiates it from other approaches we have learned? What questions does this create about the future?

Video. AlphaGo

Before Class Reading:

(Optional) Before Class Watching:

Session 2. Who are you hiring?
In-class activity: Who are you hiring data switch and discussion.

Assignment 1 Write-up due February 21st at Midnight

Week 3 — Practicum

Session 1. Evaluating Machine Effort
How do you judge goodness? Recalling accuracy, precision, and judging the `badness' of bad. Comparing machine-learning to human decision-making. What is bias and variance?

Before Class Reading:
McAfee and Brynjolfsson. Machine, Platform, and Crowd. Ch 2, pgs 36-44.

Session 2. Application as Process
The AI Canvas. Identifying and evaluating AI opportunities.

Pre-Watch:
- Google Duplex - https://www.youtube.com/watch?v=D40jGFZShXK
Assignment 2: AI Canvas. Explanation and distribution.

Week 4 — Knowledge Building

Session 1. Building Machine Models
Predicting customers that will default on their debt. In-class instruction on building machine-learning models on the Microsoft Azure model. Discussing the gap between model predictions and business decisions.
Dataset: credit_delinquency.csv

Session 2. The Cost of Data
Machine-learning and societal outcomes. The ease of red-lining and the danger in not asking questions.
Before Class Reading:
Week 5 — The Frontier

Session 1. Cognitive Analytics
What is Cognitive Analytics and, by extension, Watson? Why was Watson’s task so much harder than playing chess? Building a ‘natural’ understanding in an unstructured word.

Videos. Jeopardy

Before Class Reading:
- Why I’m Pulling for Watson. HTTP://BIT.LY/HMIWATSON

Session 2. AI Canvas Presentations
Group presentations of AI Canvas for Honeywell Aerospace. Presentations will be 10 minutes and peer-graded.

Assignment 3: Hiring your replacement. Explanation and distribution.