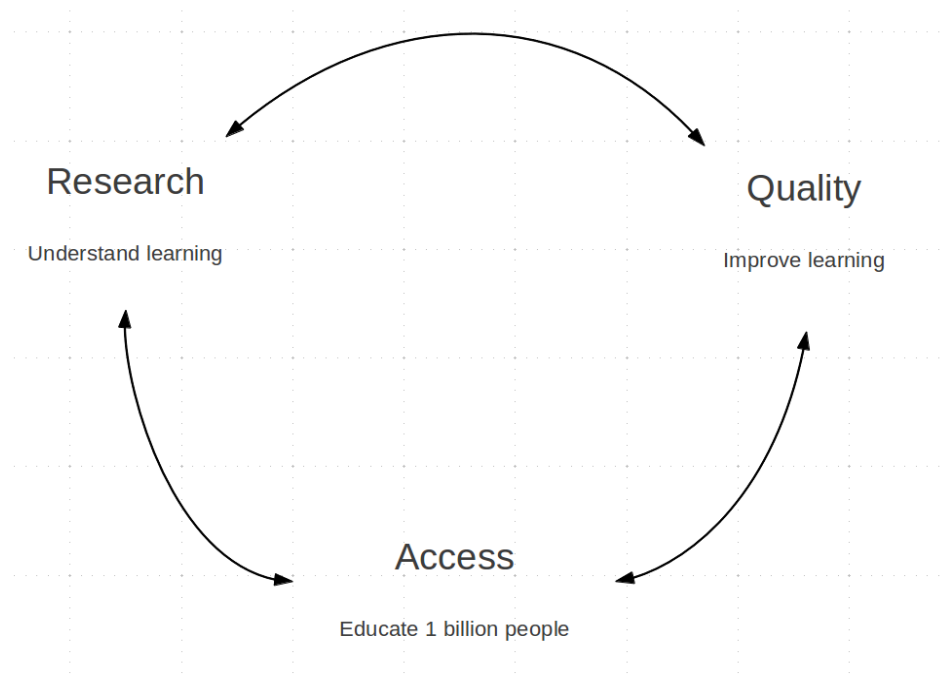


An Integrated Framework for the Grading of Freeform Responses

Vik Paruchuri/Piotr Mitros
edX

What is edX?



Assessment in MOOCs

All aspects of a MOOC must scale to thousands



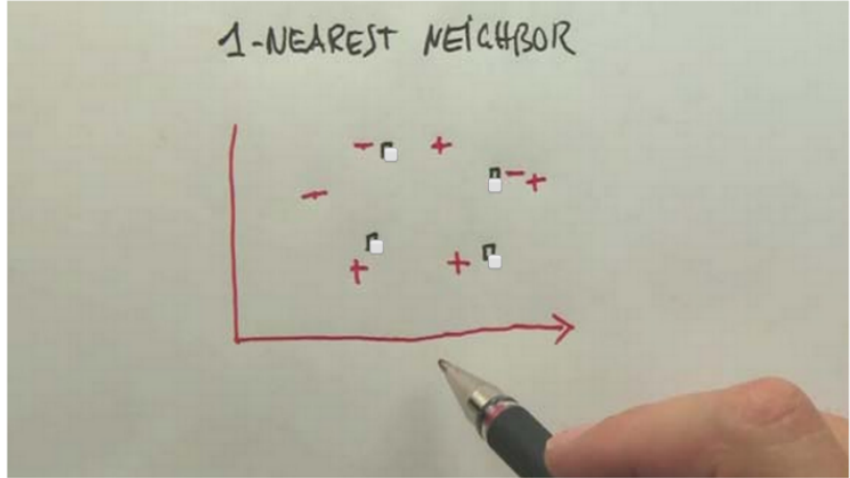
INTRODUCTION TO Artificial Intelligence

In partnership with **STANFORD ENGINEERING**

Course | Discussion | Progress | **Information** | Profile

Next

- 24. Quadratic Loss ?
- 25. Problems with Linear Regression ?
- 26. Linear Regression and Complexity Control
- 27. Minimizing Complicated Loss Functions ?
- 28. Question ?
- 29. Question ?
- 30. Answer
- 31. Gradient Descent Implementation
- 32. Perceptron ?
- 33. **k Nearest Neighbors ?**
- 34. kNN Definition ?
- 35. k as Smoothing Parameter
- 36. Problems with kNN
- 37. Congratulations
- ▶ Homework 2(closed)
- ▶ 4. Probabilistic Inference
- ▶ 3. Probability in AI
- ▶ Homework 1(closed)
- ▶ 2. Problem Solving



Discuss this question on aiquis. When posting use the tag 'unit5-33'



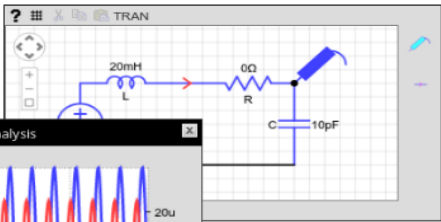
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MITx · Circuits and Electronics Courseware Course Info Textbook Discussion Wiki Profile

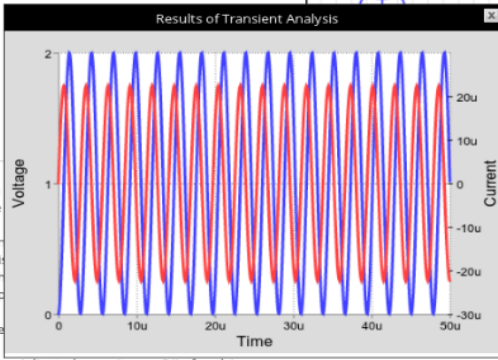
LAB 9: SECOND-ORDER CIRCUITS

In this lab we'll be exploring the properties of *second-order circuits*, i.e., circuits with two energy storage elements. You may find it useful to review [Chapter 12](#) in the text.

Figure 1 below shows the circuit we'll be using to explore the step response of an RLC circuit. The voltage source produces a $1V$ step at $t = 0$. Initially the resistor has been set to 0Ω . We'll be probing the voltage across the capacitor, which will indicate the amount of charge on the plates of the capacitor ($q = Cv$), and the current through the inductor, which will indicate the flux linkage of the magnetic field of the inductor ($\lambda = Li$).



Results of Transient Analysis



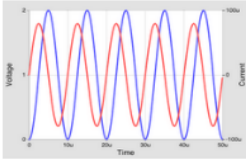
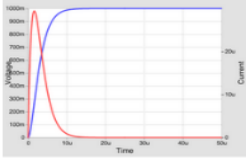
Adjusted capacitance C (in farads):

Keeping the adjusted C , now adjust the resistance R so that the system is just operating in the over-damped region, i.e., so that the voltage across the capacitor makes a single $0 \rightarrow 1$ transition, never exceeding $1V$. Again you can use the analysis in [Section 12.2.2](#) to compute the R necessary to produce a plot like that to the right. Hint: if there's any voltage sample that is greater than $1V$, the voltage scale will have a maximum of $2V$, so one quick way to tell if the voltage is staying less than or equal to $1V$ is when the maximum value on the voltage scale is $1V$.

Please enter the adjusted resistance R below:

Adjusted resistance R (in ohms):

Now let's use the properties of second-order systems to build a *boost converter*, a DC-to-DC power supply useful where high voltages are required but not directly available. Powering the flash bulb in a camera is one such example. A boost converter circuit is shown in Figure 2. In this case the supply voltage is $3V$ and the goal is produce a relatively stable supply of $6V$ to drive a load, here represented as a $1k\Omega$ resistor. Your task is to adjust L , C and the duty cycle D of the square wave controlling the MOSFET switch so that the output voltage falls between $5.9V$ and $6.1V$ ($6V$ with a maximum of $0.1V$ ripple).

Remaining Problems

Short answers

Forum posts

Essays

Pictures

Videos

...

Approaches

Approaches

Portfolios

Artificial intelligence

Self-assessment

Peer assessment

Instructor/TA

Approaches

Portfolios

Artificial intelligence

Self-assessment

Peer assessment

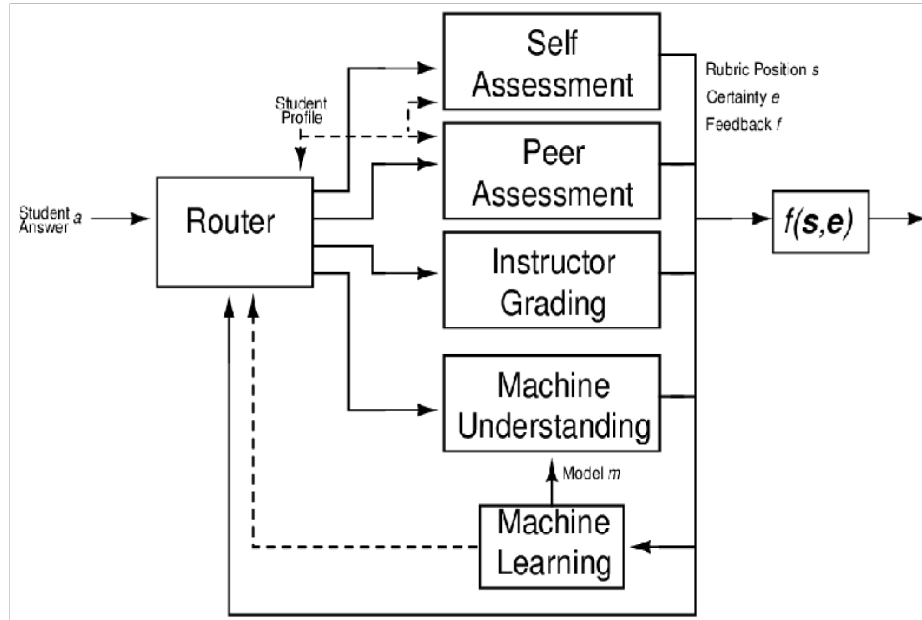
Instructor/TA

Goals

Maximize accuracy of assessment

Minimize cost (where grading can be a hassle)

Framework



Implementation

Self Assessment

- Self assessment allows students to answer a question, see a rubric, and rate themselves.
 - Requires no grading effort from course staff.
 - Particularly valuable in learning sequences where the goal is to learn by constructing knowledge.

AI Assessment

- A computer algorithm scores student submission.
 - Machine Learning (ML) creates a model using 100 course staff graded responses.
 - This model is used to automatically grade students.
 - For many problems, similar to course staff grading each student individually, but with much less effort.

Peer Assessment

- Peer assessment involves students giving each other scores and feedback
 - Significant pedagogical value for both the student being graded and the grader.
 - Graders first learn how to grade the problem by looking at instructor graded examples.
 - Features such as smart peer matching and user flagging of inappropriate submissions address concerns with previous online peer grading implementations.

Flexible Assessment Types

- Any of the previous 3 assessment types can be used together.
 - A single student response can pass through any combination of graders.
 - For example, a response could be self-assessed, then ML graded. If the two mismatch, peer grading can be used to confirm.

Current Student Problem Interface

| STUDENT SUBMISSION | STUDENT SELF-ASSESSES | EXTERNAL GRADER RESULTS |
|--|---|---|
| <p>Status Self Assessment (Not started)</p> <p>HUMANITIES QUESTION -- MACHINE ASSESSED</p> <p>Prompt (Hide)</p> <p>Censorship in the Libraries</p> <p>"All of us can think of a book that we hope none of our children or any other children have taken off the shelf. But if I have the right to remove that book from the shelf -- that work I abhor -- then you also have exactly the same right and so does everyone else. And then we have no books left on the shelf for any of us." --Katherine Paterson, Author</p> <p>Write a persuasive essay to a newspaper reflecting your vies on censorship in libraries. Do you believe that certain materials, such as books, music, movies, magazines, etc., should be removed from the shelves if they are found offensive? Support your position with convincing arguments from your own experience, observations, and/or reading.</p> <p>Response</p> <p>In libraries, there should not be censorship on materials considering that it's an individual's decision to read what they prefer. There is no appropriate standard on what makes a book offensive to a group, so it should be undetermined as to what makes a book offensive. In a public library, many children, who the books are censored for, are with their parents. Parents should make an independent choice on what they can allow their children to read. Letting society ban a book simply for the use of inappropriate materials is ridiculous. If an author spent time creating a story, it should be appreciated, and should not put on a list of no-nos. If a certain person doesn't like a book's reputation, all they have to do is not read it. Even in school systems, librarians are there to guide kids to read good books. If a child wants to read an inappropriate book, the librarian will most likely discourage him or her not to read it. In my</p> <p>Submit</p> <p>Legend AI-Assessment= Self-Assessment= Peer-Assessment=</p> | <p>Status In progress</p> <p>HUMANITIES QUESTION -- MACHINE ASSESSED</p> <p>Prompt (Show)</p> <p>Response</p> <p>In libraries, there should not be censorship on materials considering that it's an individual's decision to read what they prefer. There is no appropriate standard on what makes a book offensive to a group, so it should be undetermined as to what makes a book offensive. In a public library, many children, who the books are censored for, are with their parents. Parents should make an independent choice on what they can allow their children to read. Letting society ban a book simply for the use of inappropriate materials is ridiculous. If an author spent time creating a story, it should be appreciated, and should not put on a list of no-nos. If a certain person doesn't like a book's reputation, all they have to do is not read it. Even in school systems, librarians are there to guide kids to read good books. If a child wants to read an</p> <p>Rubric</p> <p>Select the criteria you feel best represents this submission in each category.</p> <p>Writing Applications</p> <ul style="list-style-type: none"> 0 points : The essay loses focus, has little information or supporting details, and the organization makes it difficult to follow. 1 points : The essay presents a mostly unified theme, includes sufficient information to convey the theme, and is generally organized well. <p>Language Conventions</p> <ul style="list-style-type: none"> 0 points : The essay demonstrates a reasonable command of proper spelling and grammar. 1 points : The essay demonstrates superior command of proper spelling and grammar. <p>Submit assessment</p> <p>Legend AI-Assessment= Self-Assessment= Peer-Assessment=</p> | <p>Status Done Done</p> <p>HUMANITIES QUESTION -- MACHINE ASSESSED</p> <p>Prompt (Show)</p> <p>Response</p> <p>In libraries, there should not be censorship on materials considering that it's an individual's decision to read what they prefer. 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Current/Future Status

Questions?