Computing Everywhere

Tuesdays 7-9 pm	Wednesdays 7-9 pm
Frances Searle Building 3-220	Shepard Hall B-05

March 28-April 26, 2017

Amanda Lazar, lazar@northwestern.edu (student point of contact)
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Course Overview

This course is a series of workshops, designed to improve computational literacy and computational thinking. The course will include a basic introduction to what computation is, and how programs, algorithms, and hardware work. But, it will also focus on the social, political, and psychological implications of living in an environment that is often mediated by computation.

Course Goals

The overall goal for the course is to introduce students to computational thinking. This includes moving beyond seeing algorithms and programs as black boxes, and to a conceptual understanding of how computation works, where computation is used, and what some of the benefits and dangers of computation are. We have multiple specific objectives, including:

- Understand and recognize the variety of hardware in everyday technology (e.g. smartphones, cameras, laptops/desktops, wearables) and their differing inputs and outputs (e.g. inputs such as touch, voice, pressure).
- Understand and execute basic text search and analysis functions.
- Understand the networked structure of the web, the basics of preferential attachment, and how PageRank is built off of this structure.
- Be comfortable with the chatbot development platform landscape and know how to leverage it for the design and engineering of their own chatbot service.
- Be able to describe the structure of the internet and complete basic web programming tasks.

Course Structure and Student Evaluation

This course is not letter-graded and carries zero academic credits, but will appear on your transcript with a grade of ‘S’ (satisfactory) or ‘U’ (unsatisfactory). A grade of ‘Satisfactory’ will be earned by students who attend and participate in all 5 workshops.

Instructors

Amanda Lazar (lazar@northwestern.edu) is a postdoctoral fellow affiliated with the Technology and Social Behavior program. She applies a critical perspective to the design of technology for health, focusing on older adults and people with cognitive impairment.

Emily Wang (eqwang@u.northwestern.edu) is a PhD student in Technology and Social Behavior. Her research in human-computer interaction and accessibility focuses on multimodal interfaces to support teams with individuals with disabilities.

Scott Allen Cambo (scottcambo2019@u.northwestern.edu) is a PhD student in the Technology and Social Behavior program studying how learning algorithms and the user interfaces that connect users to them can be designed to facilitate better understanding, trust, performance, and usefulness of such systems

Robin Brewer (rnbrewer@u.northwestern.edu) is a PhD student in the Technology and Social Behavior program developing systems and studying how to make online communities more meaningful and accessible to older adults.

Jim Maddock (maddock@u.northwestern.edu) is a second year PhD Student in the Computer Science and Communications departments at Northwestern University. He currently works with Darren Gergle and Aaron Shaw, studying collaboration and coordination dynamics across different language speaking peer-production and collective action communities.

Matthew Heston (heston@u.northwestern.edu) is a PhD student in the Technology and Social Behavior program. He has developed web applications to understand how people collaborate and communicate online.

Mike DeVito (devitom@u.northwestern.edu) is a doctoral student in the Media, Technology, and Society PhD program. His research focuses on user understanding of algorithmically-driven systems such as the algorithmic curation systems that power many social media platforms.

Igor Zakhlebin (igorzakhlebin2020@u.northwestern.edu) is a PhD student in Technology and Social Behavior. He is interested in network science, natural language processing, and machine learning. He researches the interplay between human interactions and relationships over long periods of time.

Sneha Narayan (snehanarayan2012@u.northwestern.edu) is a PhD candidate in Technology and Social Behavior. Her research centers around understanding how newcomers are mobilized and socialized in online volunteer communities.

Workshop Descriptions

1. Hardware (3/28 & 3/28) - Emily Wang and Amanda Lazar

Technology can be found in every aspect in our daily lives: work, play, communication, transportation, health/wellness, safety, and more. How does technology respond to our interactions in the physical world and what happens "behind the scenes" with our favorite devices? In this session, we will discuss the concept of input and output, introduce students to a variety of hardware, and have everyone program microcontrollers to put these concepts into practice.

2. Build a Bot (4/4 & 4/5) - Scott Cambo and Robin Brewer

All of the major companies are developing their own digital assistant and/or chatbot services. Apple's Siri, Amazon's Alexa, Microsoft's Cortana, and Facebook's bots are becoming more popular than ever before. But, why now? Surely, messaging systems and chatbots have been around for decade, but what has changed? We will explore the answers to these questions while guiding students through the design process for their own chatbot using the API.ai system. When students finish they will be comfortable with the chatbot development platform landscape, know how to leverage it for the design and engineering of their own chatbot service, and be able to discuss the social and technical challenges of chatbots and digital assistants.

3. The Structure of the Web (4/11 & 4/12) - Jim Maddock and Matthew Heston

Many communications students study or use web based ICTs, yet the Internet largely remains a complex, unapproachable, “black boxed” technology. We hope to demystify “the web” for the non-technical communications audience, enabling students to build a rudimentary theoretical understanding of web based computing into their work. We also teach students a basic web programming in order to both reinforce theoretical concepts and to provide a starting point if they wish to further develop their technical skills. This workshop will also allow students interested in pursuing a career in software project management or user experience to become more conversant with developers and designers.

4. Natural Language Processing and Working with Data (4/18 & 4/19) - Mike DeVito and Igor Zakhlebin

The analysis of text has always been key to the study of communication, and today we are aided by a wide variety of digital tools for the handling and analysis of large corpuses of text, from the full works of Shakespeare to the vitriolic tweets of the 2016 election. This workshop is a very basic introduction to text analysis in Python using the Natural Language Toolkit (NLTK),

aimed at showing students the basics of finding patterns in a corpus of text. Topics covered include basic maintenance operations such as tokenizing and cleaning data for processing, as well as immediately-useable discovery features such as word frequency (including frequency plots and distributions), dispersions, collocations, concordances, and contextual inquiries.

By the end of this workshop, students will be able to: a) understand and execute basic data preparation tasks that are common to all text corpuses; b) understand and execute basic text search and analysis functions, and; c) understand the research utility of the aforementioned text analysis functions.

5. Google Search (4/25 & 4/26) - Sneha Narayan

When Google launched their search engine in the late 90s, it quickly emerged as the leading way to find information on the web, so much so that the word “google” became synonymous with the act of search itself. What was the innovation behind the search engine that made it so wildly successful? Understanding the structure of hyperlinks between webpages can shed light into the inner workings of the PageRank algorithm that forms the basis of Google’s search function.

Workshop Assessments

Short workshop assessments in the form of anonymous canvas surveys will be completed at the end of each workshop by each student. Additional feedback to Amanda or Jeremy is also welcome.

Recordings and Privacy

It is essential to the success of this class that participants feel comfortable sharing questions, fears, reservations and various experiences during discussions. Therefore, you may not create any audio or video recordings during class time nor share verbatim comments with those not in class whether through text messages, email, social media updates, casual lunch time conversation or any other format.

Getting Help or Answers to Questions

Course Details

Most of the information you need for this course will be on Canvas (syllabus, lecture slides, etc.).

If there's something course-specific you can't find on Canvas after looking carefully, email a fellow student (first) and Amanda (second) if your peers are also struggling to find it.

If you're having trouble with Canvas itself, you should contact NUIT Support: http://www.it.northwestern.edu/supportcenter/index.html

Attendance

As a workshop-based course, attendance every week is necessary to receive a grade of 'Satisfactory' for the course. Each workshop will build off of the previous workshops and missing a workshop may make it difficult to participate fully in the future.

Electronic and Other Distractions

To facilitate an environment in which we are all focused on discussion of relevant issues and learning, it is imperative that we all take steps to limit potential distraction. Except when clearly being used for purposes immediately related to class (and in a manner that is not distracting to others), laptops, tablets, cell phones, personal digital assistants, music players, cameras and other devices should all be turned off during class. You may not talk on the phone, text, IM, email, read, solve crosswords, take pictures, etc. during class. All of these activities are likely to distract you, your peers, and the instructors; which is not fair to others in the class. Those engaging in these activities may be called on by the instructor to describe what they are doing and/or asked to leave the class. Direct repercussions could include loss of class attendance and class participation points.

Students with Disabilities

Students with disabilities who believe that they may need accommodations in this class are encouraged to contact the Office of Services for Students with Disabilities (SSD) as soon as possible (i.e., during the first week of classes, barring extenuating circumstances that prohibit this) to ensure that such accommodations are implemented in a timely fashion. In general and to ensure fairness to all students, the instructors will not make accommodations for disabilities without documentation from the SSD office. For more information, visit the SSD website at http://www.northwestern.edu/accessiblenu/.

Academic Integrity at Northwestern

Students are expected to comply with University regulations regarding academic integrity. If you are in doubt about what constitutes academic dishonesty, speak to the instructors before the assignment is due and/or examine the University web site. Academic dishonesty includes, but is

not limited to cheating on an exam (e.g., copying others' answers, providing information to others, using a crib sheet) or plagiarism of a paper (e.g., taking material from readings without citation, copying another student's paper). Failure to maintain academic integrity on an assignment will result in a loss of credit for that assignment—at a minimum. Other penalties may also apply, including academic suspension. The guidelines for determining academic dishonesty and procedures followed in a suspected incident of academic dishonesty are detailed on the website.

For more information, visit:
http://www.communication.northwestern.edu/programs/undergraduate/policies_procedures/academic_integrity/

Sexual Harassment Policy

It is the policy of Northwestern University that no member of the Northwestern community—students, faculty, administrators, or staff—may sexually harass any other member of the community. Sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute harassment when:

- submission to such conduct is made or threatened to be made, either explicitly or implicitly, a term or condition of an individual's employment or education; or
- submission to or rejection of such conduct is used or threatened to be used as the basis for academic or employment decisions affecting that individual; or
- such conduct has the purpose or effect of substantially interfering with an individual's academic or professional performance or creating what a reasonable person would sense as an intimidating, hostile, or offensive employment, educational, or living environment.

For more information, visit:
http://www.northwestern.edu/sexual-harassment/university-policies/sexual-harassment-policy/index.html