HI6330W Biomedical Natural Language Processing (NLP): Methods and Applications

Fall, 2015
3 Semester Credit hours

Course Description

This course will examine current natural language processing (NLP) methods and their applications in the biomedical domain. It will provide a systematic introduction to basic knowledge and methods used in NLP research and hands on experience with existing biomedical NLP systems. Students will gain knowledge and skills in various NLP tasks such as Named Entity Recognition, Information Extraction, and Information Retrieval.

Learning Objectives

Upon successfully completing this course, students will be able to:

- Apply the probabilistic theory and machine learning algorithms to solve Biomedical/General Natural Language Processing problems
- Analyze text data using different levels of linguistic knowledge
- Describe the system architecture and the state-of-the-art methods for the major topics in NLP domain: Information Extraction, Text Classification, Information Retrieval, Question Answering and Sentimental Analysis
- Design systems and evaluate their performances for specific NLP tasks.
- Explain the differences between Biomedical NLP and general English NLP
- Use existing Biomedical resources and Biomedical NLP systems to conduct Biomedical research
- Apply statistical methods to solve biomedical NLP problem

Prerequisite/Co-requisite

Programming experience is required. Contact your instructor if you have any questions.

Textbook

Recommended Readings

Foundations of Statistical Natural Language Processing - *by Christopher D. Manning and Hinrich Schutze*

Speech and Language Processing - *by Daniel Jurafsky and James H. Martin*.

Instructor Information

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Method of Instruction

This online course is broken down into weekly/topical instructional units. Every week, a new instructional unit will be presented, with each unit containing a combination of the following elements:

- Unit Overview
- PowerPoint presentation(s)

You are responsible for reading all the course materials, actively participating in the weekly activities including the discussion/forums, and completing the homework if any. The course also contains a final research project that involves building a prototype system for a selected NLP task.

The instructional materials and activities for this course reside in Moodle, a Learning Management System (LMS). You can log into SBMI Moodle site using your UTH credentials at: https://moodle.sbmi.uth.tmc.edu/

The activities for each week should take you about 6 to 9 hours depending on your study skills and previous experience with graduate education, technology, on-line learning and Moodle. Dedicate at least 3 hours each week on the current assignment and 3 to 6 hours of work outside of the course each week.

It is expected that you will access the course on a regular basis. As the course progresses you will get a better sense for how frequently you need to access the course site to complete and submit the assignments and meet the course objectives. Moodle monitors your access and activities in the course and the course instructor may contact you if you do not access and make reasonable progress in the course over a period of time.

Successful course completion requires having access to the current course resources and materials, reading the course materials, actively participating in learning activities such as discussions, group projects and completing all assignments, quizzes and exams. Completing all the assignments is required in order to receive a course grade.

The instructor will respond to student emails, monitor student progress and answer questions posted on the discussion forums, and send out weekly announcements or emails to the class.

It is your responsibility to check your UTH e-mail account regularly (at least weekly) to make sure you receive announcements and information sent out by your instructor and TA.

Grading

The following evaluation criterion will be used for determining your grade for this course. Letter grades will be assigned based on the percentage of total points received (e.g., 90-100% =A, 80-89%=B, 70-79%=C, <60=F, and I (Incomplete)). An Incomplete is given only when situations outside of the student's control occur. School policy mandates that an Incomplete must be completed by the end of the following semester. An Incomplete that is not completed by the end of the next semester will turn into an F automatically.

Your final class grade will largely be based on the results of all the assignments and activities (e.g., online discussions, homeworks, and completion of course project) that are designed to reflect your understanding of the course content. Finishing all the assigned readings, assignments, and activities **on time** will help you to achieve the objectives for this course.

Requirements	Percentage of Total Points
Homework	30%
Mid-term exam	30%
Final Project	40%
Total	**100%**

Student Feedback / Evaluation of Instruction

At the end of the semester, you will be asked to fill out an online “Course and Instructor Evaluation” survey.

> **Instructors do not receive the aggregated results until all grading is done and course grades are submitted.**
>
> **Instructors do not have access to the identity of the survey participants when they view the survey results.**

Please take time to finish the evaluation survey since it is helpful to evaluate the instruction and provide for revisions of future course offerings.

Your feedback is encouraged throughout the course and is always welcomed.

Technical Requirements and Support

Please make sure that your computer meets the minimum hardware and software requirements provided at this link. Additional instructions may be provided in the course for accessing other technologies if needed.

Students must have the latest version of their operating system installed including latest security updates and service packs. SBMI recommends installing and using the following anti spyware, malware and virus control software:

- For real time protection:
  - Microsoft Security Essentials
    http://www.microsoft.com/security/pc-security/microsoft-security-essentials.aspx
  - BitDefender Antivirus Free Edition
    http://www.bitdefender.com/solutions/free.html
  - AVG
    http://free.avg.com/
- Other malware removal tools:
  - Malwarebytes Anti-Malware
    https://www.malwarebytes.org/free/
  - Panda Cloud Cleaner
    http://pandacloudcleaner.pandasecurity.com/

Students are required to have access to the following for accessing course materials and to complete course activities:

- Stable high-speed internet
- Personal computer

In case of technical difficulties, inform the instructor and the TA. You can also direct any technology related questions to the Distance Education Team (de@uth.tmc.edu).

Currently, Distance Education Team is able to provide technical support only during business hours US Central Standard Time. Requests submitted after 5pm CST may take until the next business day to resolve. Please plan accordingly for time critical activities such as exams and submission dates for assignments.

Policies

Excused Absence on Holy Days

Students who wish to observe a religious holy day that interferes with classes, examinations or completion of assignments, must inform the instructor of each class to be missed and/or of the planned absence(s) not later than the fifteenth day of the semester. The notification must be in writing and may either be delivered by the student personally to each instructor, with receipt of the notification acknowledged and dated by each instructor, or mailed by certified mail, return receipt requested, to each instructor. The full policy can be found at:
http://www.uth.edu/hoop/policy.htm?id=1448072

Academic Honesty

Academic honesty is the cornerstone of the academic integrity of a university. It is the foundation upon which the student builds personal integrity and establishes a standard of personal behavior. Because honesty and integrity are such important factors, you should be aware that failure to perform within the bounds of these ethical standards is sufficient grounds to receive a grade of "F" in this course and be recommended for suspension from the SBMI.

You should submit only your own work unless group work is indicated in your assignment. To demonstrate academic honesty, you should always indicate the use of works other than your own. Plagiarism is prohibited. Remember that most instances of plagiarism can be avoided by simply citing the source for the material that is used and thus indicating that it is not your original material. Plagiarism may include

- words or ideas taken from someone else without acknowledgment
- giving incorrect information about the source
- changing the sequence or structure but using ideas without citation
- not including material in quotes if directly taken from someone else's material and/or copying amounts of other's material and using it in violation of fair use copyright laws

With the advent of the Web and access to materials, the need to guard against using other's material without acknowledgment is especially important. So, when in doubt, cite. Prevention is the best deterrent and thus avoids the academic consequences that may follow.

Per the Exam and Written Paper Monitoring Policy, your submitted work may be subject to evaluation from Turnitin for plagiarism and some courses may require the use of Proctorio, an online proctoring software that will monitor and record you when you take online exams.

Refer to the Student handbook Student Conduct and Discipline concerning plagiarism at https://sbmi.uth.edu/current-students/student-handbook/unacceptable-conduct.htm. More information regarding plagiarism and unacceptable conduct may be found at: HOOP Student Conduct and Discipline and http://www.uth.edu/hoop/186-appendix-a.htm. If you have questions or need additional information please let your instructor(s) know.

Copyright Policy

Information on copyright policy issues may be found at: HOOP Classroom and Research use of Copyrighted Material.

Intellectual Property

Information on intellectual property issues may be found at: HOOP Intellectual Property.

All materials presented in a course in Moodle are copyright protected unless otherwise noted.

Course Accommodation

Course accommodations are made in response to individual requests for accommodation. If you need accommodation please let your instructor(s) know. Information on disability issues may be found at: HOOP Disability Accommodation.

If you believe you have a disability requiring an accommodation, please contact Dr. Susan Fenton, Assistant Dean for Academic Affairs at (713) 500-3591 or by email at Susan.H.Fenton@uth.tmc.edu.

For additional information, contact Renee Williams, Equal Opportunity Admin at (713) 500-3416, or by email at Renee.Williams@uth.tmc.edu.