CPSC 7373: ARTIFICIAL INTELLIGENCE (FALL 2012)

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CLASS SCHEDULE: MWF 12:00 – 12:50

1. OVERVIEW

CPSC 7373 is the graduate level course into the field of Artificial Intelligence in the department of Computer Science at UALR. It starts with some basic elements of AI, such as knowledge representation, interference, machine learning, neural networks, graph theory based network analysis, natural language processing, information retrieval, problem solving, and learning methods in general. And we will quickly dive into various specific research topics using these basic AI elements, such as social network analysis, and graph theoretical analysis of the human brain connectome.

Moreover, we are now in the era of the "big data" revolution where nearly every aspect of computing engineering is being driven by large-data processing and analysis, often in real or near-real time. It is important for the students to gain exposure to big data analytic problems and applications. Especially, this class aims to give the students insight to the basics of cloud computing, and hands-on experiences with the state-of-the-art programming paradigm–MapReduce–for a cloud computing environment to address the computational requirements of the big data problem.

The design of the class does have a strong focus on bioinformatics. The applications and problems presented in the class are derived from the instructor's research in bioinformatics using AI elements, such as the study of functional human brain networks and mining social media content for public health issues.

The preliminary list of topics that will be covered in this class include, but are not limited to:

- Problem solving – Search
- Probability, graphical representation, and Bayes network
- Hidden Markov models, Markov Decision Process, and Reinforcement learning
- Machine learning (supervised, unsupervised) (e.g., support vector machines, k-mean clustering, etc.)
- Neural networks
- Genetic algorithms*
- Graph theory and network analysis (e.g., human brain network organization)

- Natural Language Processing and Information Retrieval (e.g., social network analysis)
- Cloud-computing, Map-Reduce programming paradigm, big data analytic

The final list of topics is subjected to change based on the survey conducted at the beginning of the class, according to the students' background and interests.

2. Important Dates:

- 8/29: Late registration ends
- 9/3: Labor Day, no class
- 11/16: Last day to drop a class and receive a final grade of "W" by 5 p.m.
- 12/10: Last day of classes/Last day to withdraw from all classes by 5 p.m.

3. Office Hours

For your convenience, I would like to answer any questions right after the class, since my office is at UAMS. If you need to visit at other times, please make an appointment. I will try my best to accommodate your schedule.

Address: University Tower Building, Room 400, 1123 South University Avenue, Little Rock, AR.

4. Course Materials

Book: Stuart Russell and Peter Norvig. 2009. *Artificial Intelligence: A Modern Approach (3rd ed.).* Prentice Hall Press, Upper Saddle River, NJ, USA.

Research Papers: We will use research articles as reading materials. These articles will be available online at `http://jiangbian.info/courses/ualr-AI-cpsc7373-2012/`. Preliminary, all course materials will be published on `http://jiangbian.info/courses/ualr-AI-cpsc7373-2012/`. However, submission of assignments will need to go through the BlackBoard system.

5. Assignments

Assignments consist of review papers (4) and small programming projects (2). Students will be asked to read research articles in related fields and to write an summary of the paper. **Please do not just copy and rearrange the sentences in the original paper**. I will ask you to implement certain algorithms explained in the class. These algorithms are often simple and their implementations are often easy to find online. You can use these online implementations as references. However, **you will be penalized if you merely submit a copy other's code.** I reserve the rights to ask you explain the code line-by-line.

5.1. **Assignment rules:** You are be assumed responsible to compliant with these rules.
- Your assignment must be turned in no later than 11:59 pm on the day that it is due.
- Late homework assignments will NOT be accepted, unless you have a formal proof of the exception (e.g., a written doctor note, a police ticket, etc.).
- No handwritten assignment. All assignments need to be submitted electronically through the Black Board system.
- **DO NOT COPY OTHER'S HOMEWORK.** I have zero-tolerance on this issue. The one who copy the homework will receive 0 point; and the one who is copied will get only 50% of the points that he/she should have received.
- You can work with others (e.g., discuss, consult, etc.) on a homework assignment. And, if you work on a homework assignment with other students in the course, you are required to list their names when you turn in the assignment. Plagiarism will receive 0 points.
- Searching for a solution on the web–and then submitting it as your answer for a homework assignment–will be considered a violation.
- You can work with other students in the class on a project. However, the roles and responsibilities need to be clearly defined. And the grading will be adjusted accordingly based on contribution (e.g., merely presenting the project is not a contribution to the work.)

6. PROJECT

Each student is required to finish a course project. You can work with other students as a team. However, the grading will be adjusted based on your contribution. I will present a list of project ideas in the first week of the class. You will need to pick a topic and conduct background research to write a proposal for the project (no more than 6 pages, single space, references are not within the limit). And you will be asked to present the project idea during the mid-term. You will need to turn in the final project (i.e, that includes the code, the final term paper, etc.) by 12/03 (Monday). And you will be asked to give an (15 minutes) oral presentation of the paper. Both the paper and the presentation will be considered for your final grade.

7. EXTRA CREDIT

You can earn extra credits based on the quality of the final project paper. For example, if your final paper is publishable (approved by the instructor), and you are able to submit it to a conference, you will receive at least B, even you have missed all your assignments.

8. GRADING

Grading categories:
- Attendance: 10%
- Assignments: 30%
- Mid-term project proposal: 20%

- Final project: 40%

Grading criteria:

- A: ≥ 90
- B: $80 - 89$
- C: $70 - 79$
- D: $60 - 69$
- F: < 60

9. ACADEMIC INTEGRITY

You are required to read "Code of Student Rights, Responsibilities, and Behavior" in the Student Handbook. You must comply with the UALR Academic Integrity Policy as described at `http://ualr.edu/policy/index.php/50113/`. Cheating of any type will NOT be tolerated.

10. STUDENTS WITH DISABILITIES

Students with Disabilities: It is the policy of the University of Arkansas at Little Rock to create inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or to accurate assessment of achievementsuch as time-limited exams, inaccessible web content, or the use of non-captioned videosplease notify the instructor as soon as possible. Students are also welcome to contact the Disability Resource Center, telephone 501-569-3143 (v/tty). For more information, visit the DRC website at `http://ualr.edu/disability/`.