Summary

Throughout the semester, you have used various computational tools and techniques to explore a number of intelligent questions. The final project invites you to explore, in greater detail, a real-world application of artificial intelligence. You will research in more depth a real-world AI project that is interesting to you and carry out a computational investigation through the use, implementation, testing, and evaluation of different types of software.

For your final project, you can work individually or in groups of two or three. If you decide to work in a group, each member of the team will be evaluated separately based on his or her contributions to the project. This evaluation will be determined largely from the feedback of the team members. If you work in a team, team work guidelines below should still apply to your work, communication is especially critical given the remote setting.

Team Work Guidelines

1. Organization and function:
   - Team will delegate one member to be a team manager. In teams of two, the role of the team manager will be restricted to initiating the project on GitHub and resolving merge issues.
   - The project work will be distributed evenly among the team members. The work of being a team manager should count toward work distribution.
   - The team will work collaboratively to create a detailed project work plan with clear deadlines.
   - Teams must ensure that the project’s scope is feasible and that every member of the team is comfortable with the projected scope.

2. Communication:
   - All team members must promptly respond to the other team members’ communication.
   - All team members must regularly check and respond to Slack messages and GitHub issues.
   - Each team member should keep their communication clear and concise.

3. Interaction:
   - Conflicts within the team should be first brought to the team leader first. If unresolved, they should be elevated to the instructor.
• All team members must recognize and avoid biases.
• Each team member must act in a professional and in a respectful manner.
• All team members must attend any scheduled remote team meetings and be punctual.

4. Project Problem Solving and Decision Making:
• During problem solving teams should utilize collaborative brainstorming and researching tactics.
• During brainstorming each team must ensure that every member is able to express their ideas, solutions, concerns, etc.
• The decisions about the project are to be made collaboratively. If a decision cannot be reached, a majority vote should be the deciding factor, or, in case of a draw, the instructor’s input should be the deciding vote.

Configuring Git and GitHub

To access the template directory for the project assignment, you should go into the #labs channel in our Slack team and find the announcement that provides a link for it. The team leader should accept the laboratory assignment first, create a team and set up the GitHub repository for the team to access the assignment’s starting materials and to store the completed version of your assignment. Once the team has been created, the other members of the team can click on the given GitHub Classroom link and join the team. Every team member can clone the team’s lab03 repository, and use regular Git commands, such as `git commit`, `git push` and `git pull`. Please ensure your team practices standard GitHub practices to avoid merge conflicts.

Assignment Specifications

For the project assignment you may choose an AI problem that is of the most interest to you and can be investigated through computational technique(s). Pick something realistic and useful, for example, you can choose specific question(s) related to the topics we discussed in class. You may use anything and everything we have learned (or will learn) in class and you are expected to research additional resources beyond of what we discussed in class. You may also extend any of the programs or concepts we have developed in the labs or in class. However, the problem that you choose should not just be a copy of one of the lab assignments, or the class exercises, or the programs in the book with slight modifications. Remember, you must adhere to the Honor code! Please be original!

Requirements

1. Select a real AI question(s) to investigate.
2. Research relevant background.
3. Identify and utilize computational techniques for answering your question(s) (you may use existing tools and/or develop programs).
Timeline: Deliverables

1. **Ideas** Deadline: Monday, 6 April, 2020 by midnight:
   Develop an idea for your project. If you are not certain on what you may want to do, develop 3-5 ideas. For each idea describe it in one or two sentences. The instructor will give you feedback on your idea, perhaps with some leading questions, by Wednesday, April 9th.

2. **Proposal** (at least 500 words) Deadline: Monday, 13 April, 2020 by midnight:
   Develop a detailed idea for your project including preliminary research on the importance of the problem. Write a description of what you propose to do for your project and share it with your instructor through your project GitHub repository. Your proposal should include at least three references that motivate the importance of the problem. You do not need to include any specifications on how exactly you will solve your proposed problem at this point, however you should discuss potential tools or algorithms you maybe able to utilize for your project.

3. **Progress report** (at least 1000 words) Deadline: Friday, 24 April, 2020 by midnight:
   Describe everything you have done so far in your progress report. By this point, you should have conducted necessary research on the background of the problem, started developing an approach to solve it, and made a significant progress towards implementing the solution to your proposed project. Describe anything new that you have learned so far and any unexpected challenges that you have encountered. Explain what implementation work you have completed and outline steps that are needed to complete this work, with an exact timeline of when you plan to accomplish each task.

4. **Completed Project: final report** (at least 2000 words), programs, sample output, and README Deadline: Tuesday, 5 May, 2020 by midnight:
   Your programs should be well documented and conform to Google styling conventions. Your repository should have a modified README that contains detailed instructions on the tools and steps needed to run your system. Submissions without reproducible set up instructions will receive a grade reduction.

   Your final report should highlight the key contributions of your work and consist of at least 2000 words (you are welcome to integrate text from your proposal and your progress report into your final report). The report should include a description of why the chosen application and solution is important and discuss the implementation that you undertook. The written material should be precise, formal, appropriately formatted, grammatically correct, informative, and interesting. In summary, your report should include:

   - The motivation for your project. Why is the question you decided to address important and useful?
   - Background for the proposed investigation. What have others done for it already? What resources have you used? Include references.
   - Detailed description of the work you completed for this project. Provide algorithms if necessary. If you extended an existing project, clearly explain what new components you have contributed to.
• Sample output. You can include it directly in your report, or if it is lengthy, put it into a separate document and reference it in your report.

• Analysis of your results. Make graphs, tables, snapshot of output, or anything else that can help us understand your results and incorporate them into your Markdown document.

• Conclusion. Give a short overview of your project and its results. Describe what you learned, what were the biggest challenges and the biggest rewards.

**Grading rubric**

GatorGrader and Travis will not be used in the evaluation of your project. Each project will be graded manually, therefore, it is important for each submission to adhere to the requirements and deliverables outlined above.

5 points: **Ideas**

10 points: **Proposal**

25 points: **Progress report**

60 points: **Final report, documentation and project implementation**

In adherence to the Honor Code, students should complete this assignment while exclusively collaborating with the other member of their team. While it is appropriate for students in this class who are not in the same team to have high-level conversations about the assignment, it is necessary to distinguish carefully between the team that discusses the principles underlying a problem with another team and the team that produces an assignment that is identical to, or merely a variation on, the work of another team. Deliverables from one team that are nearly identical to the work of another team will be taken as evidence of violating Allegheny College’s Honor Code.