CIS 380 Professional Practice

Ethics Essay

The purpose of this assignment is for you to examine and discuss in depth a software failure. The failure may be a problem of bias in the software, typically in an artificial intelligence (AI) system, or another type of software failure. The assignment will have 4 phases: topic submission and approval, an outline and annotated bibliography, an initial draft, and a final draft. The full process and essay requirements are outlined below.

Topic Selection and Topic Registration – 10%

- You will find your own topic. You will need to register your topic with me as part of the grade. There will be a separate Brightspace hand-in for that purpose.
- You will find an artificial intelligence software that has been shown to exhibit biased behavior. The sources for your paper (please see "Mechanical Requirements" below) must be within the last 5 years (*i.e.,* since September 2018). If you find a source that you feel is critical to your paper but it is older than this, please come talk to me and I'll determine if I will allow you to use the source.
- I will approve (or reject) topics within 24 hours of the topic submission deadline. If I reject your topic, I am available to help you find other possible topics.
- You may NOT change topics without explicit permission from me. Such permission can be obtained ONLY through an individual meeting (in person or virtual), either during office hours or through appointment. I will not discuss topic changes through email, Discord, or other text messaging platforms.
- Your topic registration must include the following information:
  - Identify the topic or give a tentative paper title.
  - A short description of the issue you will explore and initial ideas for the direction of your paper. This will be a short paragraph (around 100 words, 3-4 sentences).
  - A minimum of two sources you have identified for your paper. Please include enough relevant information that I can find the source myself. I will spot-check sources.

Paper Outline and Annotated Bibliography – 20%

- You will draft an outline of your paper with an accompanying annotated bibliography of a subset of your references.
- Outline
  - The outline should reflect the intended structure of the paper.
  - Sufficient detail must be given in the outline to demonstrate the organization of ideas and key points of the arguments of the paper.
  - Sources should be indicated in cross-references in the outline, to facilitate proper cross-references in the paper.
- Annotated bibliography
  - The annotated bibliography will include at least 3 of the sources for your paper. All 3 of these references must be used in the finished paper.
  - Each annotation must include (see sample annotation, below):
    - Reference citation.
    - A brief summary (150-300 words) of the paper.
    - Keyword list.
  - Additional information:
    - Reference citation: You will include the full reference citation for each paper. Please use a consistent citation style. I prefer IEEE, ACM, and APA, but I'm not that concerned as long as you use a standard style and are consistent.
    - Summary: The summary for each paper must be written in your own words, and should be approximately 200-300 words long. It is NOT acceptable to copy the paper's abstract for your summary. WARNING: I may check the

papers. Since this is a bibliography, you do not need to include in-text citations in your summary unless you are using a quote. For quotes, you need only cite the page number for the quotation.
- Key words: You may copy key words from the paper (if they are listed), create your own list (required if the paper does not have key words listed), or add to the list from the paper.

- I will give you feedback on the outline to help improve the structure of the paper.
- Sample Annotation:

Vickerstaff, Robert. J., & Di Paolo, Ezequiel. A. 2005. Evolving neural models of path integration. *Journal of Experimental Biology*, 208, 3349-3366.

The paper presents evolved neural models of path integration, based on the behavior of Saharan desert ants (*Cataglyphis fortis*). Path integration, also known as dead reckoning, is a method of navigation used across many animal species, including humans. Path integration functions without the need for landmarks, using a compass and distance traveled to monitor the path the animal travels, continually updating this information throughout the journey to give a running estimate (the "home vector", or HV) of the animal's current position relative to a fixed point, usually the animal's nest. The paper includes overviews of three well-known computational models of path integration: Wittman & Schwegler (1995), Müller & Wehner (1988), and Mittelstaedt (1962, 1985).

The authors used a genetic algorithm to evolve neural networks that reproduced the ants' behavior, without imposing any particular internal representation *a priori*. The model system used in the experiments included the nest and a varying number of visual beacons (1-3) that the agent was required to visit before returning to the nest. The agent was equipped with compass sensors, beacon sensors, a speed sensor, a food sensor, two rotation motors and one forward motor (movement was restricted to forward translation and rotation).

Several different experimental treatments were used, varying the number of pairs of compass sensors, the type of compass response, and the variability of the agent's speed. The best performing evolved network was analyzed and was found to resemble Mittelstaedt's model. The authors' model also reproduced the systematic navigation errors observed in desert ants, and the searching behavior that ants execute once they have reached the estimated position of the nest.

Key words: path integration, *Cataglyphis fortis*, genetic algorithm, leaky integration
[For your reference, this summary is 267 words long.]

Initial Draft – 30%

- You will write an essay about your approved topic, with a major emphasis on the bias and the ethical aspects of the problem in the software's behavior.
- Include the following components in your essay.
  - Describe the context in which the software was functioning, the problem, and the effects of porblem on the software's behavior.
  - Discuss what aspects of the design, development, data, *etc.* were linked to the issues.
  - Using the *ACM Code of Ethics and Professional Conduct*, discuss what aspects of the software violated the imperatives of the code, and how the software or the process in its development could have been improved in order to avoid the issues in the first place.
  - Keep in mind that the ethics are the focus of the essay. Include only as much

technical information as necessary to set the stage for the ethical discussion. As a heuristic, the technical background should occupy no more than 20% of the essay.

- You MUST submit a draft in order to receive credit. Like any other missed assignment, a missed initial draft will result in a score of 0 for that assignment. The final draft is a separate evaluation.
- **The first draft is NOT an incomplete "rough" draft! It must be a COMPLETE, FINISHED paper.**
- I will give you feedback on your first essay draft. Feedback will include comments on:
  - How to improve the essay (structure, arguments, fulfillment of intent of the essay, *etc.*).
  - Corrections needed in the mechanical aspects of your essay (minimum requirements, correct format, completeness, *etc.*).
- You are REQUIRED to use ACM Citation and Reference Style. Please see the link at the end of this document.

Revision and final draft – 40%

- You will revise your essay and submit the final draft, using the feedback provided in my review. While you are not obligated to incorporate all suggestions, you must carefully consider all feedback you receive.
- You will write a reflection about the feedback that discusses how you implemented the feedback or why you chose to not incorporate elements of the feedback.
- I expect the final draft to be completely free of spelling and grammar errors. Please proofread carefully and correct errors.

Essay Mechanical Requirements

- Length: 2000-2500 words (4-6 pages if single spaced), **excluding** bibliography/reference list.
- Margins: 1 inch, all sides.
- ID block: standard ID block at the top of the first page of your essay, *e.g.*:

  Frodo Baggins
  CIS 380 Professional Practice
  Computer Science Ethics Essay
  March 25, 3019

  Or use a title page.
- Spacing: Either single or double spaced is fine.
- Please use a single column layout for the paper.
- Page numbers: required. Page number placement is up to you.
- **Sources: You must use at least 4 topic-related sources for your essay. The ACM Code of Ethics and Professional Conduct does NOT count toward these 4, although you must include it in your reference list.**
- Reference and citation format: You are REQUIRED to use ACM Citation and Reference Style. Please see the link at the end of this document. Quotes and paraphrased information must be properly cited in the body text and cross referenced with your reference list. Reference listings must be on a separate page from the body text and do not count toward word/page count.
- File format: Both drafts may be either Word or a PDF. Please do not submit Pages files. I have to jump through format conversion hoops to read Pages documents, and the format is sometimes affected. Please do NOT submit LaTeX source files.

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Grading Breakdown

- Topic registration – 10%
- Paper outline and annotated bibliography – 20%
- Initial draft – 30%
- Completed draft – 40%

All deliverables will be submitted through Brightspace.

ACM Citation Style and Reference Formats:
https://www.acm.org/publications/authors/reference-formatting