Overview

Module Description

This module provides easily integrable course material that exposes students to the ethical and responsible usage of artificial intelligence (AI) in the realm of biomechanics. As AI can be viewed as an academic tool, the aim of this module is to present the current capacities of AI, provide multiple hands-on experiences with AI usage on an individual level, and offer a structured environment for the contemplation of societal level usage of AI through student-led presentations. To accomplish these aims with minimal course adjustments, the module requires two full course meetings, once at the beginning of the semester for content introduction and one near the end of the semester for group discussion on societal level situations. Embedded ancillary assessments into existing course assignments are used throughout the semester to provide ample interactions with AI and reinforce the need to utilize an ethical framework to determine responsible usage.

Learning Outcomes

- Students will gain a basic understanding of the current capacity of AI technology in the field of biomechanics.
- Students will recognize the ethical implications of using AI at an individual level for academic work and in societal applications.
- Students will effectively use open-source generative AI (ChatGPT 3.5) in an ethical and responsible manner to evaluate coursework and provide accurate practice problems for course topics.
- Students will critically evaluate the use of AI in individual and societal level situations to determine ethical and responsible usage via an established ethical framework.

Module Organization and Timeline

Pre-Module Assessment (Week 1)

The students will complete a Responsible AI literacy quiz to gauge their understanding of AI, ethical frameworks, and situational awareness/ethical implications of the usage of AI. Additionally, the students will complete a survey on their comfort level discussing AI and the ethical implications of its usage in society.

Introduction to AI (Week 1 or 2)

This component provides basic information on the status of AI technology and hands-on experience with a large language model (LLM) program (ChatGPT 3.5) that will be used throughout the semester.

Assignments (Weeks 3-12)

There are 4 assignments that provide details on how to integrate hands-on experiences with an LLM through various topics biomechanics integrating linear and angular kinematics and kinetics. Each assignment outlines an Ancillary AI Assessment (AAA) that will require the students to integrate AI usage into their assignment and reflect on the ethical implications of each task.

This material was developed by Dr. Michael Jarrett as a part of Winston-Salem State University's Center for Applied Data Science (CADS) Faculty Adopter Program 2023-2024

Project on Gait Recognition (Weeks 13-14)

Groups of students will critically evaluate current real-world situations where AI technology is being utilized for biomechanical analysis specifically with gait recognition. Each group will research their assigned situation, apply an ethical framework to the situation, and present their findings during a class discussion.

Post-Module Assessment (Last week)

The students will complete the same Responsible AI literacy quiz as before the module to provide quantitative evidence of a change in AI literacy. Additionally, the students will complete the same self-efficacy survey on their comfort level discussing AI and the ethical implications of its usage in society to provide evidence of improvement.

Assessment Rubric

The student learning outcomes are assessed by two methods. First, the pre/post module assessment is used to gauge the degree to which students have developed the basic understanding of current AI technology, ethical frameworks, and situational awareness in relation to the ethical implications of AI. Second, a student's ability to review, analyze, evaluate, and communicate societal situations involving the use of AI are gauged based on their score for the Group Project. The group project is assessed using the AAC&U Ethical Reasoning VALUE Rubric available at VALUE Rubrics - Ethical Reasoning | AAC&U (aacu.org)

For this course, all five evaluation criteria of the AAC&U ER Value Rubric are utilized.

ETHICAL REASONING VALUE RUBRIC

for more information, please contact value@aacu.org

Association of American Colleges and Universities

Definition

Ethical Reasoning is reasoning about right and wrong human conduct. It requires students to be able to assess their own ethical values and the social context of problems, recognize ethical issues in a variety of settings, think about how different ethical perspectives might be applied to ethical dilemmas, and consider the ramifications of alternative actions. Students' ethical self-identity evolves as they practice ethical decision-making skills and learn how to describe and analyze positions on ethical issues.

Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet benchmark (still one) level performance.

	Capstone	Milestones		Benchmark
	4	3	2	1
Ethical Self-Awareness	Student discusses in detail/analyzes both core beliefs and the origins of the core beliefs and discussion has greater depth and clarity.	Student discusses in detail/analyzes both core beliefs and the origins of the core beliefs.	Student states both core beliefs and the origins of the core beliefs.	Student states either their core beliefs or articulates the origins of the core beliefs but not both.
Understanding Different Ethical Perspectives/Concepts	Student names the theory or theories, can present the gist of said theory or theories, and accurately explains the details of the theory or theories used.	Student can name the major theory or theories she/he uses, can present the gist of said theory or theories, and attempts to explain the details of the theory or theories used, but has some inaccuracies.	Student can name the major theory she/he uses, and is only able to present the gist of the named theory.	Student only names the major theory she/he uses.
Ethical Issue Recognition	Student can recognize ethical issues when presented in a complex, multilayered (gray) context AND can recognize cross-relationships among the issues.	Student can recognize ethical issues when issues are presented in a complex, multilayered (gray) context OR can grasp cross-relationships among the issues.	Student can recognize basic and obvious ethical issues and grasp (incompletely) the complexities or interrelationships among the issues.	Student can recognize basic and obvious ethical issues but fails to grasp complexity or interrelationships.
Application of Ethical Perspectives/Concepts	Student can independently apply ethical perspectives/concepts to an ethical question, accurately, and is able to consider full implications of the application.	Student can independently (to a new example) apply ethical perspectives/concepts to an ethical question, accurately, but does not consider the specific implications of the application.	Student can apply ethical perspectives/concepts to an ethical question, independently (to a new example) and the application is inaccurate.	Student can apply ethical perspectives/concepts to an ethical question with support (using examples, in a class, in a group, or a fixed-choice setting) but is unable to apply ethical perspectives/concepts independently (to a new example.).
Evaluation of Different Ethical Perspectives/Concepts	Student states a position and can state the objections to, assumptions and implications of and can reasonably defend against the objections to, assumptions and implications of different ethical perspectives/concepts, and the student's defense is adequate and effective.	Student states a position and can state the objections to, assumptions and implications of, and respond to the objections to, assumptions and implications of different ethical perspectives/concepts, but the student's response is inadequate.	Student states a position and can state the objections to, assumptions and implications of different ethical perspectives/concepts but does not respond to them (and ultimately objections, assumptions, and implications are compartmentalized by student and do not affect student's position.)	Student states a position but cannot state the objections to and assumptions and limitations of the different perspectives/concepts.