An Interdisciplinary Collection of Adaptable Generative AI Assignments and Model Cards

Edited by Jason A. Clark and Taylor Moorman, Montana State University Library

Contents

Preface

Faculty across disciplines are navigating the integration of generative AI into their teaching environments while also supporting students grappling with the technology in their learning. We know that teachers and students are experimenting with this emerging technology and finding exciting learning opportunities. We also know that questions arise around creating and assessing equitable and explainable implementations of this technology in courses and coursework. This Open Educational Resource (OER) collection represents a collaborative faculty response to these questions, developed from the work of an interdisciplinary faculty learning community at Montana State University in Fall 2024 as part of an OCHE grant titled, "Modeling Transparency: Adapting Model Cards for Responsible Generative AI Assignments."

About This Collection

Drawing from a need for ethical, explainable implementations of this technology in courses and coursework and supported by an OCHE MUS Teaching Scholars award, two faculty librarians brought together a group of 8 additional faculty from a diverse range of departments: Library and Information Science, English, Industrial Engineering, Nursing, Mathematical Sciences, Precision Agriculture, Food Systems/Nutrition/Kinesiology, History & Philosophy, and Business. An instructional designer also joined in an advisory capacity. Our cohort met for three in-person sessions with the goal of creating a collection of assignment materials that situate generative AI use within frameworks of authority, credibility, and responsible research.

This collection brings together assignment templates and model cards for the generative AI technology utilized. Model cards are concise summaries of machine learning models, documenting and promoting AI exploration. By disclosing technical details and potential biases, they impower informed discovery and responsible use.[1] Adapting model cards as a framework for assignment templates was foundational for responsible AI implementation within the assignments designed by each faculty member for their classrooms. The resulting templates are concrete yet adaptable tools, each with a Creative Commons license, allowing faculty from any institution to utilize these tools in their unique environments.

Why It Matters

As generative AI continues to develop, higher education students require new opportunities for responsibly engaging with these tools. This collection of assignments builds upon the idea of responsible AI in instruction through the application of two strategic learning goals:

- Building critical literacy in applied AI usage, ethics, transparency, and responsibilities for university instructors engaging with and teaching generative AI in student learning environments.

[1] Zaldivar, A., Hutchinson, B., Spitzer, E., Raji, I.D., Vasserman, L., Mitchell, M., Barnes, P., Wu, S.S.M. and Gebru, T. (2019) "Model cards for model reporting." FAccT: Fairness, Accountability, and Transparency, 220-229. DOI: 10.48550/arXiv.1810.03993

- Creating visibility and learning networks to support classroom generative AI implementations across MSU colleges and departments.

These assignments highlight AI applications in the classroom, increasing transparency and ethical considerations of the generative AI tools to support equitable access to this technology for student communities.

How to Use This Collection

Assignments in this collection include details about the generative AI tool used, assignment notes, structure, and may include assessment suggestions or rubrics as well. Each assignment includes a model card of the generative AI tool chosen, which provides a snapshot of the technology at the time of assignment generation as well as a discussion starting point for technical details, usage guidelines, training data, purpose/limitations, potential biases and more.

1. Adapt the assignments to meet the specific needs of your teaching context
2. Engage students in thoughtful conversations about responsible generative AI usage utilizing these assignments and model cards
3. Consider finding ways to share your resulting assignment to contribute to a growing body of resources for responsible AI in higher education

This collection is available via Montana State University's institutional repository Scholarworks, as well as the OER Commons with the purpose of sharing these resources broadly.

The Value of Faculty Community Building

This collection of work emerged from the willingness of our faculty community to collaborate, engage, and grapple, together, with the emerging pedagogical challenges of generative AI in higher education. The faculty learning cohort approach to generative AI in the classroom created both content and connections, and the diverse, interdisciplinary perspectives enriched the final products. This community-focused approach allowed for the sharing of un-siloed knowledge and experiences of the generative AI landscape at our university.

As universities and higher education spaces continue to navigate generative AI in teaching and learning, we believe that proactive, interdisciplinary faculty engagement in this shifting landscape will be essential.

Acknowledgements

Our deep gratitude to the OCHE Montana University System Teaching Scholars program for awarding us support for our faculty learning community on generative AI. We'd also like to thank Ken Silvestri, instructional designer for the Center for Faculty Excellence at Montana State University, for his valuable insights and contributions to our sessions. Finally, we'd like to acknowledge the MSU Library Open Educational Resources fund which allowed us to offer a

stipend to our faculty members in support of their participation in our cohort and work to develop these OER materials.

Assignment Template

Course Name

Author name, Discipline

Assignment Notes: Any relevant information from the author to facilitate contextual understanding of the assignment, notes on usage, or other components to help a future faculty member utilize this document.

License:

Purpose:

Duration:

Learning Objectives

By the end of this assignment, students will be able to:

1. Apply generative AI tools to solve a discipline-specific problem
2. Critically evaluate AI-generated content for accuracy, bias, and relevance
3. Other

Materials Needed

- If needed

Generative AI Tool for Assignment

For more in-depth information on this AI tool, see attached model card.

- Name of tool:
- Purpose:
- Who created it/Version used:
- Any known limitations/biases:

Assignment Structure

1. Description of discipline-specific problem or task
2. Use the chosen generative AI tool to_____.
    - Document your process, including:
        1. Prompts used
        2. AI responses
        3. Modifications of follow-up prompts needed
3. Analyze the AI-generated content
4. Discuss ethical considerations related to using generative AI for this assignment. Issues may include:
    - Academic honesty
    - Privacy
    - Bias/limitations

    - Impact on learning

Submission Guidelines

- Format:
- Length:
- Citation Guidelines:
- Rubric, if applicable

Additional Resources

- **Links to relevant resources on generative AI, discipline specific related content, etc.**

Model Card Template

Model Card: [Model Name]

Model Details

Developed by: [Organization Name] **Model type:** [e.g., Large Language Model, Computer Vision Model] **Version:** [Version number] **Last updated:** [Date] - **Model Name**: [Model Name] - **Model Type**: [e.g., Transformer, CNN, etc.] - **Version**: [e.g., 1.0] - **Release Date**: [YYYY-MM-DD] - **License**: [e.g., MIT, Apache 2.0] - **Authors**: [List of authors or organizations]

Intended Use

[Brief description of the primary intended uses and applications of the model]

Usage Guidelines

- **Best Practices**: [Provide guidelines for using the model effectively and responsibly]
- **How to Cite**: [Include a citation format for academic or professional use]

Training Data

- **Dataset(s):** [Names or descriptions of datasets used]
- **Data composition:** [Brief overview of data types, sources, and diversity]
- **Preprocessing:** [Any significant data cleaning or preprocessing steps]

Performance and Limitations

Performance Metrics

- [Metric 1]: [Score]
- [Metric 2]: [Score]
- [Metric 3]: [Score]

Known Limitations

- [Limitation 1]
- [Limitation 2]
- [Limitation 3]

Ethical Considerations

- **Bias:** [Known biases or potential areas of concern]
- **Privacy:** [Any privacy implications or considerations]
- **Environmental impact:** [Information on computational resources and environmental impact]

Technical Specifications

- **Model Architecture:** [Brief description of model architecture]
- **Parameters:** [Number of parameters]
- **Input:** [Expected input format]
- **Output:** [Description of model output]

Additional Information

- **License:** [License information]
- **Contact:** [Contact information for questions or support]
- **Citation:** [How to cite the model]

Version History

- v1.0 (YYYY-MM-DD): Initial release
- v1.1 (YYYY-MM-DD): [Brief description of updates]

Acknowledgements and Citation Guidance

[Include any acknowledgements for contributions, funding, or support received during the development of the model.]

NRSG 673: Writing for Scholarly Projects Assignment

- Jean Arthur-Sellegren (Nursing Graduate Program, Scholarly Writing, Nursing)

Assignment Notes: The students studied PICOT creation in an earlier lesson; the students engaged in lecture and Q&A regarding AI use in the classroom and the clinical setting, discussing academic honesty, privacy, bias/limitations, impact on learning and other ethical considerations they encountered or recognized from their professional experience.

The revision portion of the assignment aims to offer succinct writing and asks students to use active-voice verbs to replace passive voice, and power verbs (no be verbs such as is, am, are, were, was, be, been, being) to replace weak verbs. The revision also asks students to use concrete nouns instead of most pronouns ("patient" instead of "they" for example) or vague nouns such as "things/s." The verb and noun challenges follow lecture, readings and tutorials regarding succinct and clear writing. Students read, assess, and comment on other students' posts using the same writing criteria in responses to peers.

Purpose: The assignment's purpose includes using actual clinical challenges, artificial intelligence, and deep editing to find a solution that aligns with the student's professional nursing position and experience, the clinic's rules, state/federal laws, and the nursing code of ethics, while aiming for professional succinct and clear writing.

Duration: The assignment opens for 1 week during 1 semester.

Learning Objectives

By the end of this assignment, students will be able to:

1. **Recognize that nursing scholars have a voice in policy change or procedural steps**
2. **Evaluate the AI-generated policy/procedure for accuracy, quality, legality and plausibility**
3. **Implement earlier editing lessons for power verbs and concrete nouns instead of pronouns**
4. **Evaluate and respond to peers' submissions**
5. **Reflect on the AI-use plausibility, value, quality and potential future use**

Materials Needed

Computer or internet-accessible device, internet access, MS Word, AI platform ChatGPT 4.0 login (see attached model card for ChatGPT details), and online course platform.

Generative AI Tool for Assignment

For more in-depth information on this AI tool, see attached model card.

- Name of tool: ChatGPT 4.0

- Tool Purpose: ChatGPT is primarily a large language model and has myriad uses. However, for the tasks at hand, the purpose of using the tool is to provide students an assistant that can help them with data wrangling tasks, resolve issues with importing data, and guidance with errors in coding
- Developer/Version: Open AI/ChatGPT-4o
- Known Limitations/Biases: ChatGPT primarily uses English Language texts for model training. It has known gender biases as well (c.f. Babaei, G., Banks, D., Bosone, C., Giudici, P., & Shan, Y. (2024). Is ChatGPT More Biased Than You? Harvard Data Science Review, 6(3). https://doi.org/10.1162/99608f92.2781452d)

Assignment Structure

1. Description of discipline-specific problem or task
2. Use the chosen generative AI tool to create a new policy or procedure for the clinical setting that addresses a problem or flaw at the student's clinic.
    - Document your process, including:
        1. Prompts used
        2. AI responses
        3. Modifications of follow-up prompts needed
3. Analyze the AI-generated content
4. Discuss ethical considerations during the reflection-writing session related to using generative AI for this assignment. Issues may include:
    - Academic honesty
    - Privacy
    - Bias/limitations
    - Impact on learning
5. Student reflection component (see below)

Assignment: Create a new policy or procedure for the rural clinical setting using ChatGPT 4.0

1. Identify a problem in policy or procedure that you witness in your professional nursing position at your rural clinic or hospital. Explain with 5-10 sentences
2. Create an original PICOT without using AI.
3. Ask ChatGPT4 to write a PICOT question (one sentence) for your new policy or new procedure topic. (Question: In POPULATION, does INTERVENTION as compared to COMPARISON/CONTROL GROUP over TIME result in OUTCOME?) (Note that you will post both with titles revealing "original" and "AI version" with the below revised PICOT and policy/procedure into Discussions forum)
4. Revise the ChatGPT PICOT question as needed, using MS Word's Track Changes.
5. Ask ChatGPT to write a 350-word clinic-wide new policy OR procedure, regarding the problem/solution, and ask ChatGPT to include in the policy or procedure the legalities of the suggested intervention. Copy/paste into MS Word.
6. Use APA citation for ChatGPT. (Note that the correct References link derives from Share + Public Link Created + clipboard link + paste, and NOT the URL at the top of your ChatGPT page.)
7. Proofread for grammar, correct medical terminology, succinct message, power verbs instead of be verbs, and nouns instead of pronouns. Use MS Word track change to show your alterations in the new policy/procedure document.
8. Submit all of the above into the class online Discussions forum.

9. Comment on 2 Writing Partners' policy/procedure with a 250-300-word response for each post using thoughtful reflections, questions and concerns while revising your own response to align with the verb and pronoun challenges as per lecture and tutorials. Does the policy/procedure align with recognized clinic rules, state/federal laws and the nursing code of ethics? If not, please reveal the rule, law, code flaw (link/URL) and offer suggestions in MS Word.
10. After receiving feedback from 2 peers, revise using MS Word track change. Please do NOT click on "accept all" so that your work shines in the document. Submit into the Assignments folder.
11. Reflect on the assignment with a 350-word, thoughtful response to "What do you think of the results of your AI project that addressed a needed policy or procedure change? What worked well, what perhaps failed, and what might you do differently if you used AI in the future?" Consider academic honesty, privacy, bias/limitations, impact on learning and any other ethical considerations you encounter.

Submission Guidelines

- Format: Word doc
- Length: 350 words + 2 peer responses of 250-300-words each + 350-word reflection
- Citation Guidelines: APA

Rubric = 10 pts

- Unique problem (5-10 sentences) = 1 pt.
- Original PICOT + revised ChatGPT PICOT question (please post both in Discussions with the policy/procedure) = 1 pt.
- ChatGPT policy + Track-changed revision of policy or procedure, including correct APA citation for ChatGPT & any other References, posted in Discussions forum = 4 pts.
- 2 Discussions responses = 2 pts.
- 350-word Reflection = 2 pts.

Additional Resources

1. American Nurses Association. (2022). *The ethical use of artificial intelligence in nursing practice*. https://www.nursingworld.org/~48f653/globalassets/practiceandpolicy/nursing-excellence/ana-position-statements/the-ethical-use-of-artificial-intelligence-in-nursing-practice_bod-approved-12_20_22.pdf
2. Bumbach, M. D. (2024). The use of AI powered ChatGPT for nursing education. *The Journal of Nursing Education*, 63(8), 1–567. https://doi.org/10.3928/01484834-20240318-04
3. Bumbach, M., Carrington, J., Love, R., Bjarnadottir, R., Cho, H., & Keenan, G. (2024). The use of artificial intelligence for graduate nursing education: An educational evaluation. *Journal of the*

American Association of Nurse Practitioners, 36 (9), 486-490. https://pubmed.ncbi.nlm.nih.gov/39051986/

4. Lane, S. H., Haley, T., & Brackney, D. E. (2024). Tool or tyrant: Guiding and guarding generative artificial intelligence use in nursing education. *Creative Nursing*, *30*(2), 125–132. https://doi.org/10.1177/10784535241247094
5. Reid, J. A. (2024). Building clinical simulations with ChatGPT in nursing education. *The Journal of Nursing Education.*, 1–2. https://doi.org/10.3928/01484834-20240424-05
6. Sallam, M. (2023). ChatGPT Utility in Healthcare Education, Research, and Practice: Systematic Review on the Promising Perspectives and Valid Concerns. *Healthcare (Basel)*, *11*(6), 887. https://doi.org/10.3390/healthcare11060887
7. Sun, G. H., & Hoelscher, S. (2023, May/June). The ChatGPT Storm and What Faculty Can Do. *Nurse Educator* 48(3), 119-124. https://pubmed.ncbi.nlm.nih.gov/37043716/
8. Taskiran, N. (2023, September/October). Effect of Artificial Intelligence Course in Nursing on Students' Medical Artificial Intelligence Readiness: A Comparative Quasi-Experimental Study. *Nurse Educator* 48(5). E147-E152. https://pubmed.ncbi.nlm.nih.gov/37133231/

Notes on Model Card Intended Use

Please see Model Card.

Model Card for NRSG 673: Writing for Scholarly Projects

- Jean Arthur-Sellegren (Nursing Graduate Program, Scholarly Writing, Nursing)

Model Card: Write a New Policy

Model Details

Developed by: [OpenAI]
Model type: [ChatGPT, Computer Vision Model]
Version: V2version of API [Version number]
Last updated: [04/2024]

- **Model Name**: ChatGPT 4o[Model Name]
- **Model Type**: [e.g., Transformer, CNN, etc.]
- **Version**: [e.g., 1.0]
- **Release Date**: [2024-04]
- **License**: [e.g., MIT, Apache 2.0]
- **Authors**: [Jean Arthur-Sellegren]

Intended Use

Create a new Policy Statement via Chat GPT that aligns with best practices in the clinical setting.

Usage Guidelines

- **Best Practices**: Create an Open AI account, avoid any personal information, especially patient information, and follow assignment.
- **How to Cite**: OpenAI. (2024). *ChatGPT* (Apr 2024 version) [Large language model]. https://chat.openai.com/chat

Training Data

- **Dataset(s):** [Names or descriptions of datasets used]
- **Data composition:** [Brief overview of data types, sources, and diversity]
- **Preprocessing:** [Any significant data cleaning or preprocessing steps]

Performance and Limitations

Performance Metrics

- [Metric 1]: Perplexity Score, F1 Score, and BLEU Score. Benchmarking against pre-existing datasets that mirror real-world conversations allows for a more accurate assessment of the model's capabilities.

- [Metric 2]: [Score]
- [Metric 3]: [Score] limited context, limited memory, limited medical language

Known Limitations

- [Limitation 1] Potential bias
- [Limitation 2] florid language
- [Limitation 3] **GPT-4** has a **limit** of 40 messages every 3 hours
- [Limitation 4] limited context, limited memory, limited medical language

Ethical Considerations

- **Bias:** cost,
- **Privacy:** privacy implications
- **Environmental impact:** [Goldman Sachs has researched the expected growth of data centers in the U.S. and estimates they'll be using 8% of total power in the country by 2030, up from 3% in 2022.

Technical Specifications

- **Model Architecture:** GPT-4o uses a transformer-based architecture with decoder-only design. It employs self-attention mechanisms and has been optimized for multimodal capabilities, including text, images, and audio processing.
- **Parameters:** The exact parameter count is not publicly disclosed by OpenAI, but it's believed to be comparable to or larger than GPT-4, which is estimated to have hundreds of billions of parameters.
- **Input:** Text prompts, images, and audio. The model can process and understand content from multiple modalities simultaneously.
- **Output:** Text responses, with capabilities to analyze and discuss visual content and audio input. The model can reason across these modalities in its responses.

Additional Information

- **License:** Proprietary, available through OpenAI's commercial API and subscription services.
- **Contact:** For support or inquiries, users can contact OpenAI through their help center at https://help.openai.com or through their official website.
- **Citation:** OpenAI. (2024). *GPT-4o* [Large multimodal model]. https://openai.com/gpt-4o

Version History

- v1.0 (2024-05): Initial public release of GPT-4o
- v1.1 (2024-06): Performance improvements and expanded API capabilities

Acknowledgements and Citation Guidance

GPT-4o was developed by OpenAI's research team, building upon their previous language models. The development was supported by Microsoft as a major investor and strategic partner. OpenAI is currently valued at $29 billion, and the company has raised a total of $11.3B in funding over seven rounds so far. When citing GPT-4o in academic or professional contexts, users should reference OpenAI as the developer and include the version of the model used.

This work was funded by a Montana University System (MUS) Teaching Scholars grant program titled "Modeling Transparency: Adapting Model Cards for Responsible Generative AI Assignments in a Faculty Learning Community".

EIND 364: Principles of Operations Research I Assignment

- Faraz Dadgostari (Industrial and Systems Engineering)

Assignment Notes: This assignment introduces students to building and solving mathematical optimization problems by writing Python code using the *gurobipy* library. Gurobot helps students enhance their modeling and coding skills.

Purpose: In this assignment, students will learn how to design, debug, and solve mathematical optimization problems using *Python* and the *gurobipy* library. The assignment utilizes *Gurobot* to support students in building their coding skills, understanding optimization modeling, and effectively debugging their solutions. Through hands-on practice, students will gain experience in formulating real-world optimization problems, translating them into mathematical models, and implementing these models in Python. Gurobot will provide guidance, automated feedback, and debugging support, ensuring students can identify and resolve errors while refining their programming and optimization techniques.

The goal is to familiarize students with real-world optimization problems, enhance their ability to modify and solve them, and critically engage with AI tools like Gurobot for model support.

Duration: Approximately 3-4 weeks.

Learning Objectives

By the end of this assignment, students will be able to:

1. **Formulate a real-world problem as a mathematical optimization model.**
2. **Construct, debug, and solve a mathematical optimization model using *Python* and the *gurobipy* library.**
3. **Use *Gurobot* to enhance problem modeling and solution accuracy.**
4. **Interpret and validate the solution while identifying its practical implications and limitations.**

Materials Needed

- Access to Gurobi optimization tools and the Gurobot AI assistant.
- Access to the repository of Gurobi example problems on GitHub (optional).

Generative AI Tool for Assignment

- **Name of tool:** *Gurobot*
  Purpose: To equip students with the skills to address real-world optimization problems by

constructing, modifying, debugging, and solving optimization models through critical and effective engagement with a specialized AI tool, Gurobot.

- **Who created it:** Developed by Gurobi Optimization
- **Version used:** Version 1.0 (2024).
  Any known limitations/biases:
  - Potential inaccuracies in responses ('hallucinations').
  - Limited depth for highly specialized topics.
  - Dependence on the quality of user queries.

Assignment Structure

1. Each team selects an optimization problem from the official Gurobi GitHub repository.
2. Analyze, run, and extend or modify the problem to solve a new, more complex version.
3. Use *Gurobot* to assist in problem formulation, extension, model construction, debugging, validation, and solution.
   Document your process, including:
   - Prompts used.
   - AI responses.
   - Modifications or follow-up prompts are required.
   - Comparative analysis of the original and extended problems.
   - Insights and reflections on the AI tool's utility.
4. Final code documentation.
5. Prepare a presentation.
6. Prepare a final report.

Submission Guidelines

- Format: Written report and oral presentation
- Length: Report: 4-6 pages; Presentation: 7 minutes
- Citation Guidelines: Cite all tools, including Gurobot, using proper academic formats.

Grading Rubric

Category	Criteria	Points
Implementation	- Successful execution of the original problem using Gurobi.	15
	- Accuracy and functionality of the Python code.	10
	- Effective use of Gurobot for problem debugging and modeling.	5
Problem Modification	- Complexity and originality of the modifications/extensions.	10
	- Logical explanation of the new model and implications of changes.	10
Analysis and Results	- Correct interpretation and validation of results.	10
	- Insightful discussion of the implications of the modified model.	5
	- Comparative analysis of original and modified models.	5
Presentation	- Clarity and organization of the 7-minute presentation.	10
	- Ability to answer questions effectively during the Q&A session.	5

Report	- Comprehensive explanation of the problem, model, and modifications.	10
	- Adherence to formatting guidelines and proper citation of tools and resources.	5

Total Points: 100

Additional Resources

- Gurobi official GitHub repository
- Gurobot
- Gurobot model card: See attached.

Model Card for EIND 364: Principles of Operations Research I

- Faraz Dadgostari (Industrial and Systems Engineering)

Model Card: Gurobot

Model Details

Developed by: Gurobi Optimization
Model type: Large Language Model
Version: 1.0
Last updated: 2024-07-09

- **Model Name**: Gurobot
- **Model Type**: Transformer-based GPT
- **Version**: 1.0
- **Release Date**: 2024-07-09
- **License**: Proprietary
- **Authors**: Gurobi Optimization

Intended Use

Gurobot is designed to assist users with Gurobi-related queries, including optimization modeling, API questions, and troubleshooting. It provides insights and suggestions to enhance models, answers technical questions about Gurobi's API, and can run and debug gurobipy code.

Usage Guidelines

- **Best Practices**:
    - Verify responses, as Gurobot may occasionally provide incorrect information.
    - Provide feedback to help improve Gurobot's accuracy.
    - Use Gurobot as a supplementary tool alongside official documentation and expert consultation.
- **How to Cite**:
  Gurobi Optimization. (2024). Gurobot: A Custom GPT for Gurobi Modeling and API Questions. Retrieved from Gurobi Help Center.

Training Data

- **Dataset(s):** Proprietary datasets, including Gurobi documentation and user queries.
- **Data composition:** Text data related to optimization modeling, Gurobi's API, and troubleshooting scenarios.

- **Preprocessing:** Data cleaning and formatting to align with Gurobi's domain-specific language and terminology.

Performance and Limitations

Performance Metrics

Gurobi has not publicly disclosed its performance metrics.

Suggested Performance Metrics for Gurobot:

- **Enhancement of Learning Quality:** Measures how effectively Gurobot helps users understand and learn optimization modeling, algorithms, and implementation techniques in coding.
- **Enhancement of Learning Speed:** Evaluates how much Gurobot accelerates the user's learning process by providing quick and relevant answers, reducing the time required to grasp optimization concepts and coding techniques.
- **Model Accuracy:** Assesses the correctness and relevance of the modeling approaches and solutions suggested by Gurobot.
- **Versatility:** Evaluates how well Gurobot supports a diverse range of optimization modeling and algorithm design approaches across various scenarios.

Known Limitations

- May generate incorrect or fabricated information ("hallucinations").
- Responses may lack depth in complex or highly specialized topics.
- Dependent on the quality and specificity of user queries.

Ethical Considerations

- **Bias:** Potential biases based on the training data; users should critically evaluate responses.
- **Privacy:** Users should avoid sharing sensitive or personal data when interacting with Gurobot.
- **Environmental impact:** Training and deploying large language models consume significant computational resources.

Technical Specifications

- **Model Architecture:** Transformer-based Generative Pre-trained Transformer (GPT)
- **Parameters:** Not publicly disclosed
- **Input:** Text prompts related to Gurobi optimization
- **Output:** Textual responses providing information, code snippets, or troubleshooting guidance

Additional Information

- **License:** Proprietary
- **Contact:** For support, visit the Gurobi Help Center.
- **Citation:**
  Gurobi Optimization. (2024). Gurobot: A Custom GPT for Gurobi Modeling and API Questions. Retrieved from Gurobi Help Center.

Version History

- v1.0 (2024-07-09): Initial release

Acknowledgements and Citation Guidance

Gurobot is developed by Gurobi Optimization to enhance user interaction and support for Gurobi's products. Users are encouraged to cite Gurobot in publications as follows:

Gurobi Optimization. (2024). Gurobot: A Custom GPT for Gurobi Modeling and API Questions. Retrieved from Gurobi Help Center.

This work was funded by a Montana University System (MUS) Teaching Scholars grant program titled "Modeling Transparency: Adapting Model Cards for Responsible Generative AI Assignments in a Faculty Learning Community".

ENT 237: Secondary English Curriculum Assignment

- Will Fassbender (English Education)

Assignment Notes: This lesson is based on a project the spans the latter half of the ENT 237 course. Typically, this course serves as one of the introductory courses for students majoring in English Education and is comprised of mostly freshman and sophomores. That said, this lesson is content-agnostic and could apply to any course that involves the lesson planning process.

This specific lesson plan is part of the summative element of the ENT 237 course, as students are completing their final projects which tasked students with creating a unit plan and two embedded lesson plans from that unit. So, pre-requisite knowledge includes significant understanding of curriculum and the unit and lesson planning process.

Directions and relevant materials can be found in THIS GOOGLE DRIVE FOLDER.

Purpose: The purpose of this activity is to help pre-service teachers identify affordances and constraints related to unit and lesson planning with generative AI.

Duration: One 75-minute class

Learning Objectives

By the end of this assignment, students will be able to:

1. Apply generative AI tools to solve a discipline-specific problem
2. Critically evaluate AI-generated content for accuracy, bias, and relevance
3. Determine the utility of generative AI platforms for unit and lesson planning.

Materials Needed

- Unit and Lesson plan template (found within the linked Google Drive folder in the Assignment Notes).
- Device with access to generative AI platforms

Generative AI Tool for Assignment

For more in-depth information on this AI tool, see attached model card.

- Name of tool: Brisk Teaching
- Purpose: This is a Google Chrome extension that is most commonly used with Google Docs to provide line feedback on student writing or general feedback through a "glows and grows" format. A free version is available for teachers as well as a paid version, which provides additional functionality.
- Who created it/Version used: Brisk Labs Co./ v. 1.0.195
- Any known limitations/biases: No known limitations or bias. Uses a range of LLMs to support different uses cases in education, so bias implicit with mainstream LLMs would likely apply to Brisk tools.

Assignment Structure

1. Ask students to pull up their unit and lesson plans that they have been working on for the past few weeks.
2. Introduce the objective for the day: to use generative AI to revise unit/lesson plans and to create instructional materials.
3. Start by having students use their computers to turn to ChatGPT: chat.openai.com
4. Students will start editing their unit plan by uploading it to ChatGPT and using the following prompt:
    - "I am teaching a (grade level) English language arts course. I am developing a unit on (topic). Please review my unit plan and provide me feedback with possible ways to improve my ideas. Specifically provide me with feedback on the following: my essential questions and whether they are provocative enough; formatting of my objectives and their ability to reflect the Montana Content Standards; my summative assessment and its ability to measure the objectives. Please provide any other suggestions for making this unit as focused as possible."
5. Students will then make a note of any suggestions that ChatGPT offers, determining whether they want to accept for decline the suggested changes.
6. Next, students will start editing their lesson plans by uploading it to ChatGPT and using the following prompt:
    - "As a reminder, I am teaching a (grade level) English language arts course. I am also developing a lesson plan on (topic) based on the unit plan you just reviewed. Please review my lesson plan and provide me feedback with possible ways to improve my ideas. Specifically provide me with feedback on the following: my essential questions and whether they are provocative enough; formatting of my objectives and their ability to reflect the Montana Content Standards; my formative assessment and its ability to measure the daily objectives and to help guide students toward mastery on their summative assessment; my learning plan and providing sufficient details for implementing the lesson with students. Please provide any other suggestions for making this unit as focused as possible, specifically how well this lesson plan fits with the larger goals listed on my unit plan."
7. Students will then make a note of any suggestions that ChatGPT offers, determining whether they want to accept for decline the suggested changes.
8. Next, students will turn to the Brisk Teaching website in their Chrome browser: https://www.briskteaching.com/. Students will follow the directions for adding the Chrome extension to their browser.
    - Students will then search for a resource that they would consider using for their lesson plan. I will model what it would look teach Romeo & Juliet using a resource from the Folger Shakespeare Library. I then show how the Brisk extension works, clicking on the extension in the extension bar and then clicking on the icon that appears on the bottom right of the screen. I will demonstrate different options, including how to create a Google Presentation and then direct students to the "create" button, and then the "Lesson Plan" button. I will then show students how to tailor the lesson to their teaching context by selecting the grade level, time constraints, and content standards. I then click "Brisk It" and show students how Brisk creates the lesson plan.

    - Students will then do the same thing for their lesson plans, which will be included with their final unit/lesson plan projects.
9. Class will conclude with a discussion of what students are discovering about generative AI technologies geared toward teacher. Students will turn and talk and discuss the following questions:
    - Discuss the feedback you received from ChatGPT on your unit and lesson plans. How would you evaluate the quality of the feedback? Did you make any changes to your unit or lesson plan? What feedback did you ignore?
    - Talk about the content created by Brisk. What original resource did you look for and what presentation and/or lesson plan did Brisk create based on that resource? Evaluate the quality of the products and whether you would use it as is or with some revision.
    - What impressed you about generative AI capabilities? What concerns you about what you saw from AI today? Do you think that technologies like this could lead to de-professionalization of our teaching by suggesting that AI could do as good (or better) job with lesson planning than humans? Could you use these tools without feeling as though you were being dishonest about your lesson planning process?
    - Are there any other concerns you have? Did you observe any bias in your results? Are you worried about potential privacy issues as you consider creating lesson plans for your future students?
10. After students have had a chance to discuss with their peers, class will conclude with a whole class discussion.
11. As class wraps up, students will be instructed to make some notes from class discussion as they will be expected to write a brief half-page reflection based on their experiences today with generative AI.

Submission Guidelines

- Format: Submit the lesson created by Brisk along with a reflection on the quality of the AI-generated feedback and content based on experiences with AI and class discussion.
- Length: Half-page reflection
- Citation Guidelines: Brisk Teaching. (n.d.). Retrieved from https://www.briskteaching.com/

Additional Resources

- Refer to THIS GOOGLE DRIVE FOLDER for final project details.
- ChatGPT
- Brisk Teaching
- Folger Shakespeare Library

Model Card for ENT 237: Secondary English Curriculum

- Will Fassbender (English Education)

Model Card: Brisk Teaching

Model Details

Developed by: Brisk Labs Co.
Model type: Chrome Extension
Version: 1.0.195
Last updated: October 17, 2024

- **Model Name**: "uses a range of LLMs to support different cases"
- **Model Type**: see above
- **Version**: 1.0.195
- **Release Date**: 2023-03-20
- **License**: [e.g., MIT, Apache 2.0]
- **Authors**: Arman Jaffer

Intended Use

This is a Google Chrome extension that is most commonly used with Google Docs to provide line feedback on student writing or general feedback through a "glows and grows" format. A free version is available for teachers as well as a paid version, which provides additional functionality.

Usage Guidelines

- **Best Practices**: Download the Chrome Extension and then open a Google Doc. An icon will open in the bottom right corner of the screen. Choose "Brisk It" and it will provide feedback based on the type of feedback you have selected.
- **How to Cite**: Brisk Labs Co. (2024). *Brisk Teaching* (Oct 17 version) [Google Chrome extension]. https://www.briskteaching.com/

Training Data

- **Dataset(s):** Unclear…It says that it uses a variety of LLMs for training and "employs a Large Language Model that is hosted by our cloud provider, which ensures additional privacy and security models are in place."
- **Data composition:** Again, this is obscured because of Brisk's insistence that it uses a variety of LLMs and that they have a data privacy agreement because they work with students.
- **Preprocessing:** Again, not available on the website.
- **Data Policy:** https://www.briskteaching.com/privacy-center

Performance and Limitations

Performance Metrics

None provided on the website.

Known Limitations

None provided on the website.

Ethical Considerations

- **Bias:** The website does not offer any suggestion of bias, but it is clear to me that any tool that is going to purport to provide feedback on student writing is likely to provide what we have traditionally understood as "good" writing in terms of linguistic practices from a dominant culture.
- **Privacy:** The website talks a lot about privacy and the need to be attentive to COPPA guidelines and has signed the Student Data Privacy Pledge to ensure that this can be used with data provided by students under the age of 13. The lack of clarity around privacy and what happens with student writing once it is used with Brisk is concerning nonetheless.
- **Environmental impact:** No mention of the environmental impact.

Technical Specifications

Not provided on the website.

- **Model Architecture:** [Brief description of model architecture]
- **Parameters:** [Number of parameters]
- **Input:** [Expected input format]
- **Output:** [Description of model output]

Additional Information

- **License:** [License information]
- **Contact:** partner@briskteaching.com
- **Citation:** Brisk Labs Co. (2023). *Brisk Teaching* (Oct 17 version) [Google Chrome extension]. https://www.briskteaching.com/

Version History

- v1.0 (2023-03-20): Initial release
- v1.1 (2024-10-17): Addressed some bugs that were leading to the platform stalling out when in use.

Acknowledgements and Citation Guidance

Brisk Teaching raised $6.9 from venture capitalists such as Owl Ventures, South Park Commons, Springbank Collective, Coherence Fund, and Coalition Operators

This work was funded by a Montana University System (MUS) Teaching Scholars grant program titled "Modeling Transparency: Adapting Model Cards for Responsible Generative AI Assignments in a Faculty Learning Community".

STAT 412/512: Methods of/for Data Analysis II Assignment

- Mark Greenwood (Statistics, Department of Mathematical Sciences)

Assignment Notes: STAT 412/512 is a senior level/graduate co-convened course in statistical modeling and interpretation that is taken by both statistics students and students from other departments. A primary focus of the course is on communicating statistical results accurately, which includes framing results correctly based on the design of the study. This relates to how we write research questions as well as a discussion that we call "Scope of Inference" (SOI) where students address generalizability and causality of results based on the study design. Communicating statistical results starts with having clear and concise writing - if the writing is poor, can the reader really trust the statistical analysis results you are presenting were also done with care and attention to details?

Before students write their own report, they work with a "Demonstration Report" to learn about the intended structure of reports for the course, with some key sentences left for the students to fill in and the statistical analysis to complete to match the description in the report. The writing in the provided report is not perfect and could be improved but the improvements and edits might not be supported by the details in the results. This lab would occur a few weeks into the semester after they have seen/reviewed all of the statistical tools used in the models discussed.

Purpose: This lab will involve using generative AI to potentially improve the introduction and to develop the SOI that would wrap up the report as well as to more easily generate citations to use in writing reports. By working with components of this demonstration report, students are more prepared to write their own reports in the desired style as well as learn about aspects of the study used to motivate the report. This would be completed in groups of 3 or 4 with circulating instructors available for clarifications/discussions.

Duration: 1 hour

Learning Objectives

By the end of this assignment, students will be able to:

1. How to use generative AI to edit and improve writing but also learn to use those suggested edits with caution.
2. How to write an SOI for a given study using generative AI by providing aspects of the study and then edit/modify results to match the study design.
3. How to use generative AI to aid in developing a references section for a report.

Materials Needed

- Personal computer, likely with R and RStudio installed and internet access.

Generative AI Tool for Assignment

For more in-depth information on this AI tool, see attached model card.

- Name of tool: https://gemini.google.com/app (suggested, but not required)
- Purpose: AI assistance, especially for writing support
- Who created it/Version used: Google AI/ Gemini 1.5 Flash
- Any known limitations/biases: Biases are based on the data used to train the model

Assignment Structure

Task 1:

Input the following paragraph from the introduction to the "Demonstration Report" into your selected generative AI with a request to modify/edit/improve some aspect or aspects of the provided writing:

"Streams play an important role in the emissions of greenhouse gases (GHGs) such as CO2. To better characterize this role, data were collected on three rivers on the Tibetan Plateau: the Yangtze (YZ), the Yarlung-Tsangpo (YT), and the Yellow (YL). Sampling was performed in 2014-2015, collecting partial CO2 pressure (pCO2) at each river site in µatm (Qu et al., 2017) as well as site elevation (in meters) and river name. Since both intra- and inter-river elevations variations may influence atmospheric pressure on dissolved gases, and river characteristics can impact CO2 emissions, we investigated how elevation impacts pCO2 and if those impacts vary across rivers."

Report the suggested edits to the paragraph. Then discuss each edit - would you accept them or not, do they suggest other edits you might consider? Do the suggestions match the state of (your) knowledge about the field and the study being considered?

- *Optional: Subtask: Ask for modified edits based on a persona (something like: revise those suggested edits as if you were a … working on …) and/or more detailed prompt (make the writing more … or condense the writing or ….). Do the suggested edits change? In what way did they change? You can use these modified versions or your original prompt results.*
- *Optional Subtask: Complete this part of the assignment using different generative AI platforms and compare results. Which platform provided the most useful edits?*

Task 2:

Provide information about the variables and the study design (is there random assignment and, if so, what variables were assigned? and was there random sampling? when and where were the data collected?) and request a sentence that addresses generalizability of the results (can you make inferences to a larger population or not?) and then request a second sentence that addresses whether causal inference is possible in this situation based on the similarly provided context of this study. Make sure you focus on a particular model for the discussion, as the causal aspects might change based on the variables being considered and how they are being used in the model you are focused on.

Report the suggested generative AI sentences and then edit/modify them to be versions you would want to include at the end of the report in the SOI section. Discuss how you had to edit the results.

Task 3:

Formatting citations can often be challenging when they come from disparate sources. Extract the noted citation information from various locations in the provided report using `citation("Rpackagename")` in R for obtaining citation information for the R packages used and other sources for other citations. Note that all citations were highlighted in the demonstration report to help you to identify the needed citations. Provide the information to your selected generative AI and use it to make sure the formatting is consistent with a particular citation style and in alphabetical order. Submit your citations/references section.

Task 4:

Reflect on the use of generative AI for each of the three tasks. How well did your chosen generative AI do the requested tasks? Rank your chosen generative AI in its usefulness on the three previous tasks and explain the reason for your ranking.

Task 5:

Moving forward, will you use generative AI for similar tasks in the future? What ways have you or do you expect to use generative AI in your academic career?

Submission Guidelines

- Format: Inline answers for each task, saved as a PDF document.
- Length: approximately 4 pages, might exceed based on prompts used.
- Citation Guidelines: No specific style, but consistency is important in the section on generating citations.
- Grading Rubric: Each task will be assessed on a scale from 0 to 5, with 0 being not attempted, 1 being minimal effort or incomplete reporting of results, 2 being partially incomplete or poor effort, 3 being a moderate effort but notable missing/incorrect on some parts, 4 being good work on some parts but missing/incomplete on others, and 5 being excellent and complete work.

Additional Resources

- Data for the report were extracted from https://static-content.springer.com/esm/art%3A10.1038%2Fs41598-017-16552-6/MediaObjects/41598_2017_16552_MOESM1_ESM.pdf

Additional pages below provide the demonstration partial report that motivates the previous tasks with additional coding and writing tasks for a follow-up assignment that would put the missing results and writing into the report, which relates to the indicated Qs that are incomplete in the following.

Impacts of Elevation and River on partial CO2 concentrations

I. Introduction

Streams play an important role in the emissions of greenhouse gases (GHGs) such as CO_2. To better characterize this role, data were collected on three rivers on the Tibetan Plateau: the Yangtze (YZ), the Yarlung-Tsangpo (YT), and the Yellow (YL). Sampling was performed in 2014-2015, collecting partial CO_2 pressure (pCO_2) at each river site in µatm (Qu et al., 2017) as well as site elevation (in meters) and river name. Since both intra- and inter-river elevations variations may influence atmospheric pressure on dissolved gases, and river characteristics can impact CO2 emissions, we investigated how elevation impacts pCO_2 and if those impacts vary across rivers.

II. Statistical Procedures Used

All analyses were conducted using R (R Core Team, 2024). The pCO_2 observations for the three rivers were visualized with enhanced strip charts from the catstats2 package (Greenwood, 2024) in Figure 1. Summary statistics for pCO2 and elevation by river are provided in Table 1 based on the modelsummary package (Arel-Bundock, 2022). The estimated means pCO2 of YZ and YL were similar at 1054.25 and 1083.364 µatm, respectively, while the mean of YZ was noticeably lower at 595.4 µatm. However, pCO_2 observations, particularly in the YT and YL rivers, had a wide range of pCO_2 values, from 300 to more than 1700 µatm. The number of sites varied by river with $n_{YZ} = 4$, $n_{YT} = 15$, and $n_{YL} = 11$, respectively, providing unbalanced design with respect to the rivers and a total sample size of n = 30. A scatterplot was utilized to examine the relationship between pCO_2 and elevation by river with both linear and nonparametric smoothing lines (Figure 2, ggplot2 package, Wickham, 2016). From Figure 2, a negative relationship between pCO_2 pressure and elevation was evident but the slope of the relationship for YT was more negative than for YZ or YL. There may be some curvature in the relationship for YT and increasing variance in the YT observations as elevation increases or what might be a possible outlier.

Linear models were used to model pCO_2 using the lm function. After fitting a preliminary model of µ{pCO_2|River&Elevation} ~ River*Elevation, a suite of diagnostic plots were generated using the ggResidpanel package (Goode et al., 2024, Figure 3). In the Residuals vs. Fitted plot (Fig. 3, upper left), the spread of the residuals increases as fitted values increase, which raises concerns about the assumption of constant variance and a slight curve may suggest a violation of the linearity assumption. From the QQ-plot (Fig. 3, upper right), there is evidence of a violation of the normality assumption with a clear right-skewed distribution of the residuals. To address the potential violations of linearity, constant variance, and normality assumptions, the response variable pCO_2 was log transformed (natural log) and the model was refit and new diagnostic plots were produced (Figure 4). After log transformation of the response variable, there was little or no evidence against the assumptions of constant variance (Residuals vs. Fitted does not show changing spread in the residuals as a function of fitted values), linearity is less clearly violated (limited curvature in Residuals vs. Fitted), and normality of residuals (QQ-plot of residuals does not show clear deviations from normality of the residuals). The partial residuals in the effects plots (Fox and Weisberg, 2018, Figure 5) for this model suggest that ...[Q1]

To address the question of interest, it was necessary to determine if a River by Elevation interaction term was needed in the model. To assess this, a Type II F-test (car package, Fox and Weisberg, 2019) was used on the $\mu\{\text{log}pCO_2\} \sim$ River * Elevation model. Weak evidence was found against the null hypothesis of no interaction between River and Elevation on the log-pCO2 was found (F(2,24) = 1.0759, p-value = 0.357), so the interaction term was dropped from the model.

Diagnostic plots of the additive model with River and Elevation did not indicate further issues with the normality or constant variance assumptions (Figure 6). However, one observation had a Cook's distance value of XXX [Q2] in the Residuals vs Leverage Plot (Figure 6, lower right), qualifying as potentially influential observation. Examining that YL observation more closely, this point had both the highest elevation (4091 m) and pCO_2 (1771 µatm) measurement in the data set. This was contrary to the generally observed trend of decreasing pCO_2 values with increasing elevation (see Figure 2). However, without information about this observation that explicitly showed it to be in error, we did not exclude it from the data analysis.

Due to the sampling of sites with multiple observations in each river and some closer or further apart geographically, there might be an issue with a violation of the independence assumption as some sites might be more similar than others even after accounting for river and elevation information. If river is not included in the model, the repeated measures on a river would create a clear violation of the independence assumption. Because samples were taken sequentially in time in the study years, there could be an additional violation of independence by some observations being taken closer in time and others taken later. The results may be biased because the sampling locations in the rivers were not randomly selected and easy-to-access sites may have been selected and they might have systematically higher or lower pCO_2 on average than the population of sites.

III. Summary of Statistical Findings

The final estimated model was: $\hat{\mu}\{log.pCO2 \mid River, Elevation\} = 7.788 - 0.000228Elevation - 0.615I_{River=YT} - 0.195I_{River=YL}$, where River is a three-level categorical variable represented by the indicator variables $I_{River=YT}$ (which takes on a value of 1 if the River is YT, and 0 if not), and $I_{River=YL}$ (which takes on a value of 1 if the River is YL, and 0 if not). This means that the third level of River, YZ, is treated as the reference.

A Type II F-test was generated to assess including River in the model. Accounting for elevation, there is very strong evidence against the null hypothesis of no difference in the true mean log.pCO_2 for all three rivers (F(2, 26)= 6.75, p-value = 0.0044), so we would conclude that there is some difference in mean log.pCO_2 across the rivers. Accounting for the river, there is moderate evidence against the null hypothesis that elevation is not linearly related to log.pCO_2 pressure (2-sided t-test, t(26)= -2.19, p-value = 0.0381), so we would also conclude that there is a linear relationship between elevation and pressure after accounting for rivers. The model has an R-squared of XXX, which suggests that a model with … and … explains ……., which suggests that this model is …….. [Q3]

For two otherwise similar locations that differ in elevation by 1 m in elevation, the median pCO_2 pressure of the higher elevation location is 0.99977 times as much as the lower elevation, controlling for river (95 % CI: 0.99956 to 0.99998). Controlling for elevation, the median pCO_2 pressure in river YT is 0.54 times as much as YZ (95 % CI: 0.368 to 0.795) and the median pCO_2 pressure in river YL is 0.82 times as much as YZ river (95% CI: 0.53 to 1.27). To visualize the impact

of both River and Elevation on the response log.pCO_2, effects plots for the additive model with partial residuals are displayed in Figure 7.

IV. Scope of Inference

To be completed with assistance from generative AI based on final selected model and study details [Q4]

References:

[Q5 – complete remainder of references section, remember – alphabetical order and consistent citation style.]

Greenwood, M. (2024) catstats2: Upper Level Statistics for Montana State University Bobcats. R package version 0.2.

R Core Team (2024) R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria. https://www.R-project.org/

Figures:

[Q6 – make figure 1 and insert here]

Figure 1. Enhanced stripchart of pCO2 by river.

[Q7 – make figure 2 and insert here]

Figure 2. Scatterplot of …

[Q8 – make figure 3 and insert here]

Figure 3

[Q9 - make figure 4 and insert here]

Figure 4

[Q10- make figure 5 and insert here]

Figure 5

[Q11 - make figure 6 and insert here]

Figure 6

[Q12 - make figure 7 and insert here]

Figure 7

Tables:

[Q13 – make table 1 and insert here]

Table 1. Table of …

Model Card for STAT 412/512: Methods of/for Data Analysis II

- Mark Greenwood (Statistics, Department of Mathematical Sciences)

Model Card: Using generative AI for statistical report writing improvement

Model Details

Developed by: Google AI
Model type: Large Language Model
Version: 1.5 Flash
Last updated: [accessed December 4, 2024]

- **Model Name**: Gemini 1.5 Flash
- **Model Type**: Transformer
- **Version**: Gemini 1.5 Flash 002
- **Release Date**: 2024-09-24
- **License**: Not specified
- **Authors**: Google AI

Intended Use

As provided by Gemini AI, its intended use is to assist users with a wide range of tasks and requests through informative and comprehensive responses:

- Providing summaries of factual topics.
- Creating stories.
- Offering different perspectives on a variety of topics.
- Translating languages.
- Writing different kinds of creative text formats.
- Answering questions in an informative way.

Usage Guidelines

- **Best Practices**:

    1. **Be Aware of Biases**:

        - Recognize limitations: AI models can inherit biases from training data.
        - Critically evaluate outputs.
        - Encourage diverse datasets to mitigate bias.

    2. **Use AI as a Tool, Not a Replacement**:

        - Human oversight is essential for reviewing/editing content.
        - Augment creativity; human input remains vital.

3. **Protect Privacy and Security**:
    - Avoid inputting sensitive/confidential data.
    - Be mindful of privacy implications.
4. **Ethical Considerations**:
    - Avoid misinformation and respect copyright/fair use.
5. **Continuous Learning**:
    - Stay updated on AI developments and provide feedback to improve models.

- **Additional Tips**:
    - Use clear prompts.
    - Refine outputs iteratively.
    - Disclose AI use when sharing content.
- **How to Cite**:
  Google AI. (2024). Gemini 1.5 Flash [Large Language Model]. https://ai.google/

Training Data

- **Dataset(s)**: Data published by Qu et al. (2017) in their supplemental materials.
- **Draft writing**: See assignment template for text input/modification.
- **Data composition**: Refer to Qu et al. (2017) for original writing.
- **Preprocessing**: Preliminary data wrangling provided for secondary assignment; none required here.

Performance and Limitations

Known Limitations

- Potential biases from training data.
- Risk of generating misleading/false information.
- Privacy concerns (Google may store interactions for improvement/advertising).

Ethical Considerations

- **Bias**: Dependent on training data.
- **Privacy**: Google may store prompts/responses for model improvement or advertising.
- **Environmental impact**: A single generative AI search may use 10x more energy than a standard Google search (varies by complexity).

Technical Specifications

- **Model Architecture**: Transformer-based (Mixture of Experts, MoE).
- **Parameters**: 1.25 trillion (estimated for Gemini 1.5 series).
- **Input**: Text prompts (multimodal capabilities not specified here).
- **Output**: Textual responses (summaries, translations, creative content, etc.).

Additional Information

- **License**: Governed by Google's Terms of Service and Privacy Policy.
- **Contact**: Google AI.
- **Citation**:
  Google AI. (2024). Gemini 1.5 Flash [Large Language Model]. https://ai.google/

Version History

- v1.0 (2023-12-06)
- v1.5 (2024-02)

Acknowledgements

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AGTE 411: Precision Agriculture Assignment

- Paul Nugent (Precision Agriculture)

Purpose: This assignment aims to introduce students to the concepts of pseudocode and its application in programming. By leveraging generative AI tools, such as Google Gemini, students will gain hands-on experience in self-guided learning, evaluation of AI-generated content, and the iterative development of pseudocode. This assignment aims to help students build confidence in integrating AI technologies to overcome programming hurdles. This process will be used throughout the semester as we develop the shared codebase to implement our Internet of Things (IoT) sensor network.

Duration: 2 hours

Learning Objectives

By the end of this assignment, students will be able to:

1. Apply generative AI tools to solve a discipline-specific problem
2. Critically evaluate AI-generated content for accuracy, bias, and relevance
3. Apply AI generative content in self-guided learning
4. Develop pseudocode that can be systematically converted into functional Arduino code using AI tools
5. Demonstrate understanding of the programming logic and hardware interactions on the Arduino platform.

Materials Needed

- Arduino MRK Wifi 1010
- HMP35C Temperature and Humidity Sensor
- Relay Module (5V)
- 12V DC Fan
- LED Module with integrated 220-ohm current limiting resistor
- Connector Wires
- 12V DC Fan

Generative AI Tool for Assignment

See the attached model card for more in-depth information on this AI tool.

- Name of tool: Gemini 2.0 Advanced
- Purpose: Conversational AI designed to assist with generating text-based outputs
- Who created it/Version used: Developed by Google, 2.0 Advanced
- Any known limitations/biases:
    - Knowledge cutoff of October 2023.
    - responses are based on patterns in training data, which may include cultural or systemic biases present in the data.
    - performance depends on the clarity and detail of user inputs

Assignment Structure: Introduction to Arduino and Pseudocode in Agricultural IoT Systems

This assignment is designed to introduce you to the Arduino platform and the concept of pseudocode, key components we will use this semester to build our Internet of Things (IoT) sensor network.

Objective: Students will explicitly use Google Gemini to guide their process of pseudocode development.

1. You will use the Google Gemini Large Language Model (LLM) as a learning tool to understand how to write pseudocode and apply this knowledge to develop a system that measures and responds to temperature and humidity.
2. In class, your pseudocode will be reviewed by the instructor, shared with peers for discussion, and collaboratively converted into functional Arduino code using an AI LLM. This assignment lays the groundwork for future projects where you will create more advanced IoT systems.

Ethical Considerations: The assignment demonstrates how students can use LLMs like Google Gemini to self-learn and tackle tasks beyond their comfort zone. However, the impact of generative AI on learning depends on its use. At the same time, it can enhance understanding when used thoughtfully; over-reliance on AI-generated content without active engagement risks academic dishonesty and undermines genuine learning.

To ensure the ethical and beneficial use of generative AI:

- Within the AGTE 411 class, the use of AI is acceptable and even expected for these types of tasks, but this is only because it is stated within the assignment definition. This expectation will be established early in the class.

- Student are required to disclose how AI was used, including a full history of their prompts.

- This process will ensure that assignments promote genuine understanding and skill development by requiring systems to assess and reflect on the AI outputs

Pre-Reflection:

Review the full assignment and answer the following topics in your **Analysis and Reflection** document.

1. **AI Experience:** Have you used AI tool (ChatGPT, Gemini, Claude) in the past? If so, describe your experience with these AI tools.
2. **Programming Comfort:** On a scale of 1-10 how comfortable are you with computer programming. What challenges do you anticipate using programing to accomplish tasks with the Arduino systems?
3. **Learning with AI:** How do you feel about relying on an AI tool to teach you a new skill? What concerns or expectations do you have about using AI for this purpose?

Pseudocode Exploration:

1. In this section, you will use Google Gemini to learn how to write out the flow of a computer program in common English through pseudocode. This process will start with the following standard prompt

   "Explain pseudocode and how it's used to design programs for Arduino. Provide beginner-friendly examples that involve reading data from analog inputs (like a temperature sensor) and controlling digital outputs (like turning an LED on or off)."

2. After Gemini has responded to this prompt, follow up with at least four additional prompts asking for further information, examples, or use cases of pseudocode. You will define these prompts. Your goal is to learn about pseudocode, how it is used, and how it can be written. Document this exploration in your **Process Documentation** document that will be turned in on D2L.

3. Once you feel confident in your understanding of pseudocode, request Gemini to give you scenarios and test your ability to write the code with the following prompt

   "Give me a beginner-friendly Arduino scenario that requires using pseudocode with both analog inputs and digital outputs. I'll write the pseudocode, and you evaluate it."

   Work through at least three of these scenarios and save the output in your **Process Documentation** document. You are welcome to work through more, but you are only required to submit three examples.

Pseudocode Generation:

Once you are comfortable writing pseudocode, you will write pseudocode that defines the lab software required to complete the lab assignment for lab this week. In Lab 3, you will use the Arduino MKR Wifi 1010, connected to the HMPC25C temperature and humidity sensor (from the previous labs), to control a fan. The fan will turn ON when the temperature exceeds 30°C and turn OFF if it falls below 29°C.

Setting up Gemini to help you with this process will require three prompts. At first, we will tell it what we are doing and how we want it to respond, but ask it to wait for future input:

"I will describe an Arduino-based system to you. Help me write a clear and well-structured pseudocode. Do not provide any information until you have received the system definition and prompted to respond"

The second defines the system:

"This system uses an Arduino MKR WiFi 1010, an HMP35C sensor (0-1V calibrated output), an LED, a relay, and a 12V fan. The system calculates a 1-minute average temperature from the HMP35C sensor to control the fan: the fan turns ON if the temperature exceeds 30°C and OFF if it falls below 29°C."

The third prompts the system to request additional information that is required to assist you in writing pseudocode. NOTE: there is a high probability that prompt number three is not needed as Gemini will launch into the conversation on its own, but if needed use the following.

"Help me outline pin assignments and any special considerations for integrating these components before we write pseudocode for this task"

Now that you have set the stage, complete the following. Be sure to document this process in your **Process Documentation** file and submit the resulting code in your **Pseudocode** text file, both which will be submitted on D2L.

1. With the assistance of Google Gemini, write pseudocode to accomplish the tasks described above. Work through any questions that arise along the way.
2. Refine your pseudocode based on feedback from Google Gemini. Ask Google Gemini to evaluate your code and identify any weaknesses or areas that could be improved.
3. Test the clarity of their pseudocode by simulating a conversion to operational code.

Document the entire process, including:

1. Prompts Used: Record the exact prompts students input into Google Gemini.
2. AI Responses: Save Google Gemini's replies for reference.
3. Modifications: Document how the prompts evolved to refine pseudocode.

Reflection and Analysis:

Analyze the feedback provided by Google Gemini, from your analysis answer the following questions and add them to you **Analysis and Reflection** document.:

1. **AI Understanding of Prompts**: How accurately did Google Gemini interpret and respond to your initial prompts? Were there any instances where the AI misunderstood or required additional clarification? Provide examples to illustrate your observations.
2. **Clarity and Relevance of Responses**: Were the AI-generated responses clear and directly applicable to your task? Share specific examples of responses you found either helpful or confusing, and explain why.
3. **Pseudocode Refinement**: How effective was Google Gemini in helping you understand and refine your pseudocode? Compare your initial pseudocode to the final version and describe specific improvements suggested by the AI.

After completing the task, reflect on your experience by answering the following questions:

4. **Post-Task Reflection**: How do you feel about the process now that you've completed the task? What aspects of the assignment contributed to your sense of accomplishment or frustration?
5. **Comfort with AI-Driven Learning:** Compare your initial comfort level with using AI as a learning tool to how you feel now. How has this experience influenced your willingness to use AI in future learning?
6. **Evaluation of AI Usage**: What did you find most helpful about using Google Gemini during this task, and why? Conversely, what aspects were least helpful, and how could these be improved in future assignments?

7. **Overall Experience:** Reflecting on the entire process, how did using Google Gemini impact your learning experience? What did you find most helpful, and what aspects could have been improved?

In Lab Work:

1. In lab this week we will compare your pseudocode with the pseudocode of your peers. This will result in a finalized and shared version of the pseudocode from which we will use a generative AI tool to create a shared Arduino code that will become the foundation of our Arduino code base. See the lab handout for additional information.

Submission Guidelines:

Prior to lab, students will submit the following three documents to D2L:

- **Pseudocode:** [Text (.txt) document.] A well-organized and functional pseudocode that accomplishes the task set out in this assignment.
- **Process Documentation:** [MS-Word (.docx) document.] A summary of your interactions with Google Gemini, including prompts, responses, and modifications.
- **Analysis and Reflection:** [MS-Word (.docx) document.] A written response to the analysis and reflection questions (including pre-reflection questions).

Assessment Criteria

1. Clarity and Accuracy of the Pseudocode
    - Pseudocode is logically structured and follows a clear, step-by-step process.
    - System functionality is described accurately (e.g., correct pin assignments, logical flow).
2. Reflection
    - Student demonstrates thoughtful engagement with the task.
    - Responses to the reflection questions are clear and insightful, indicating an understanding of the assignment's technical and experiential aspects.

3. Rubric: Arduino and Pseudocode Assignment

15 Points Total

Criteria	Excellent (5 points)	Proficient (4 points)	Basic (3 points)	Needs Improvement (2 points)
Pseudocode Clarity	Pseudocode is logically structured, easy to follow, and accurately represents functionality.	Pseudocode is clear and mostly accurate, with minor issues in structure or functionality.	Pseudocode has significant issues in clarity or functionality but demonstrates some understanding.	Pseudocode lacks clarity, structure, and functionality, demonstrating minimal understanding.
Effective AI Usage	AI tools were used effectively to generate, refine, and enhance the pseudocode, with clear documentation.	AI tools were used well, with some documentation of interactions.	AI tools were used minimally or with limited documentation.	Little to no evidence of effective AI tool usage or documentation.
Reflection & Analysis	Reflection is insightful and detailed and demonstrates critical thinking about the process and learning outcomes.	Reflection is thoughtful, with some critical analysis and clear insights.	Reflection lacks depth but covers basic aspects of the task.	Reflection is minimal or missing, with little evidence of engagement.

Additional Resources

- Gemini by Google: Gemini
- Other LLM's: Chat GPT by OpenAI, Claude
- Arduino MRK WiFi 1010 MKR WiFi 1010 | Arduino Documentation
- HMP45C hmp45c.pdf
- Arduino language documentation Language Reference | Arduino Documentation

AGTE 411: IoT in Agriculture Lab

- Paul Nugent (Precision Agriculture)

Purpose:

This lab introduces students to basic circuit measurements, sensor calibration, and control logic implementation using Arduino. The goal is to develop skills in connecting and programming environmental sensors to collect calibrated data and apply control logic for hardware interactions.

Students will gain practical experience in integrating sensors and actuators, writing Arduino code, and building a simple micrcontroller system for temperature and humidity control.

Duration: 2 Hours

Learning Objectives

By the end of this assignment, students will be able to:

1. Demonstrate the operation and calibration of electronic sensors for temperature and humidity.
2. Apply their knowledge of Arduino programming to produce and display calibrated sensor outputs.
3. Implement logic to control hardware components (LED and fan) based on sensor input.

Materials Needed

- Rigol DC Power Supply
- HMP45 Temperature and Humidity Sensor
- Arduino MKR WiFi 1010
- Groov LED and relay attachments
- 12V computer case fan
- Assorted wires and connectors

Assignment Structure

Assignment Title: Lab 4: Calibrated Temperature and Humidity Sensors

This assignment is part of a course on the Internet of Things (IoT) in agriculture. It serves to reinform knowledge on electronic sensors and the Arduino microcomputer and introduce relays and sensor calibration. The lab is broken into two parts.

In the first part, students are given an HMP45 temperature and humidity sensor and an Arduino. They must use the Arduino to collect the output voltages and convert them to calibrated temperature and humidity measurements.

In the second half of the lab, the students need to implement logic in their board to turn on and off an LED and a 12V fan connected to the Arduino via a relay.

Student 1 _____

Student 2 _____ Date _____

Lab 4: Calibrated Temperature and Humidity Sensors

HMP45 Temperature and Humidity Measurement

The HMP45 is a scientific-grade temperature and humidity sensor often used in climate weather stations. Although these sensors have been replaced in the field and may not provide fully accurate measurements, they remain reliable for laboratory exercises. In this lab, you will connect the HMP45 sensor to an Arduino, calibrate its output, display the temperature and humidity readings, and implement control logic to activate a fan using a relay.

Wiring Tables

In this lab we will be using wiring tables rather than drawn wiring diagrams to describe the connections of your boards. Wiring tables document and organize the connections between components in an electronic circuit. They provide a structured reference of how each pin on a sensor, microcontroller, or power supply is connected. By first outlining connections in a table format, we can ensure accuracy during setup, identify potential wiring problems, and easily modify the configuration before the circuit is built. An example wiring table is below.

Wiring Table Example:

HMP45 Pins	Connection
Temperature	Analog Pin A0 (Arduino)
Humidity	Analog Pin A1 (Arduino)
12V Power	12V Power Supply

Part 1 Wiring the HMP45 to the Arduino

Refer to the diagrams in Figure 1 which show the MKR WiFi 1010 and carrier board pinouts and Figure 2 which shows the HMP45 sensor wiring. Use these diagrams, along with your knowledge of power supply connections and grounding, to connect the power supply, Arduino (in the carrier board), and the HMP45 sensor. Document your connections in the table on page 3, noting that some pins may require multiple connections. Ensure all connections are accurate and secure before powering the circuit.

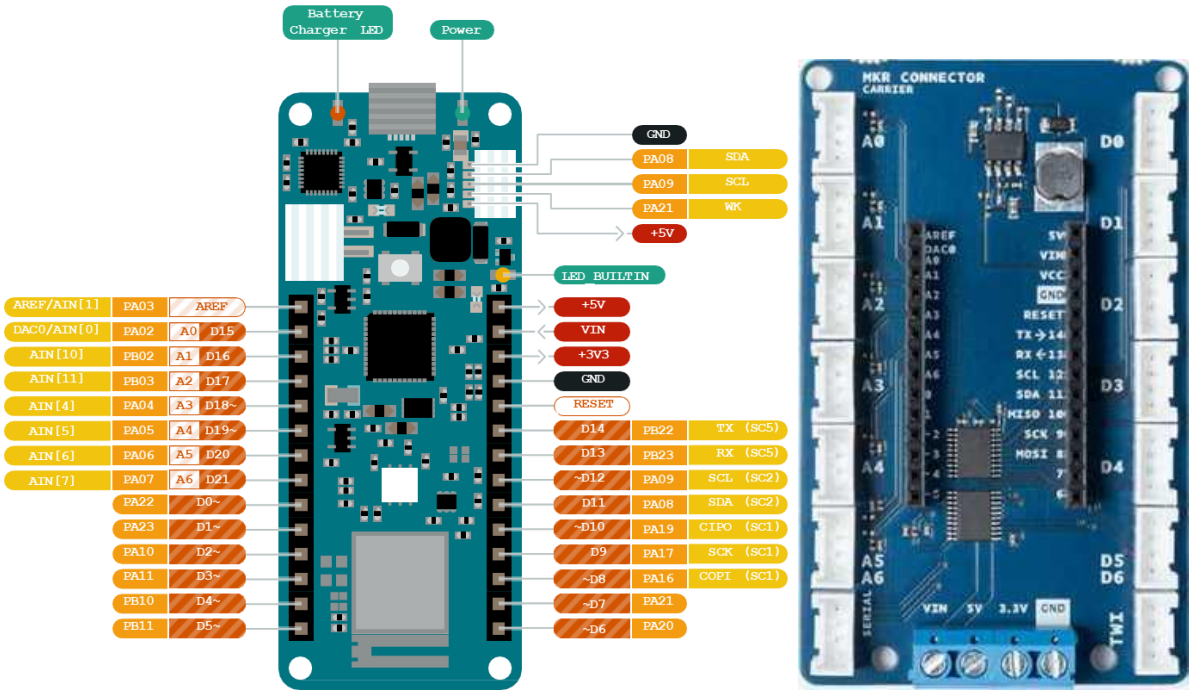

Figure 1. Arduino MKR WiFi 1010 Pinout (left), MKR Carrier board (right). Figure adapted from Arduino Nano 33 IoT Full Pinout by Arduino, n.d. (ABX00023-full-pinout.pdf), and (MKRConnectorCarrier.jpg) licensed under CC BY-SA 4.0. (https://creativecommons.org/licenses/by-sa/4.0/)

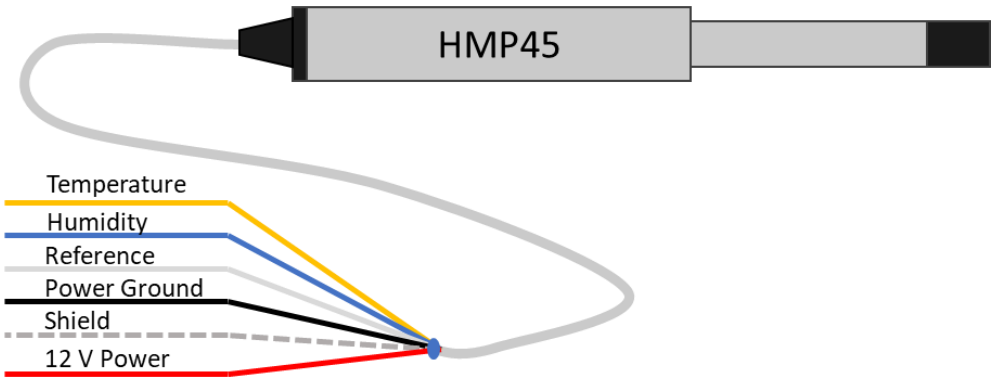

Figure 2. Campbell Scientific HMP45, showing the sensor and cable wires.

HMP45 Pins	Connection
Temperature	
Humidity	
Reference	
Shield	
12V Power	
Power Ground	

Arduino Pin	Connection
Carrier Vin (12V)	
Carrier GND	
A0	
A1	

Power Supply Pin	Connection
12V+	
Negative (12V)	
Earth GND	

Instructor Checkpoint: Have your instructor review your wiring tables and sign off before proceeding _____.

After approved by your instructor, build the circuit described in the wiring tables.

Instructor Checkpoint: Have your instructor review your circuit and sign off before proceeding _____.

Once all connections are approved, carefully power your circuit using the DC power supply.

Implement and upload Arduino code to read temperature and humidity data from the HMP45 sensor. Display the temperature (in Celsius) and humidity (%) on the serial monitor.

Instructor Checkpoint: Accurate Temperature and humidity display _____.

Part 2: Implementing Control Logic with LED and Relay-Controlled Fan

Step 1: Install and demonstrate the LED

1. **Power Down Your Board**
2. Install the LED into digital port 0 (D0) on the carrier board.
3. Power on your board
4. Show your instructor that the LED is functioning according to your specified logic.
    a. The LED should turn on and off as expected with no flicker when transitioning states.

Instructor Checkpoint: LED Operation _____.

Step 2: Connect the Relay and Fan

1. **Power Down Your Board**
2. Relay Connections:
    a. Connect the relay control input to digital port D1 on the carrier board.
    b. Connect the relay's 12V input to the power supply.
    c. Connect the relay's output terminals to the 12V fan, ensuring the polarity matches the fan's specifications.
3. Power on your board
4. Show your instructor that the fan is turning on according to your specified logic.
    a. The fan and LED should turn on and off as expected with no flicker.

Instructor Checkpoint: Fan Operation _____.

Analysis

To be completed digitally and submitted on D2L.

1. How did this lab improve your understanding of integrating hardware and software in an IoT system? Provide specific examples from the lab.

2. What was the most challenging part of this lab, and how did you overcome it?

3. Imagine you want to expand this system to measure additional environmental parameters, such as soil moisture or light intensity. What additional components would you need, and how would you modify your code to accommodate them?

4. How would you implement error handling in your Arduino code to manage potential sensor failure or incorrect readings?

Why is error handling critical in real-world IoT systems?

Model Card for AGTE 411: Precision Agriculture

- Paul Nugent, Precision Agriculture

Model Card: Google Gemini 1.5 Flash - Pseudocode for Precision Agriculture software (Lab)

Model Details

Developed by: Google AI
Model type: Large Language Model
Version: 1.5 Flash
Last updated: 2024-10-09

- **Model Name**: Gemini 1.5 Flash
- **Model Type**: Transformer
- **Version**: 1.5 Flash 002
- **Release Date**: 2024-10-09
- **License**: Proprietary
- **Authors**: Google AI Research Team

Intended Use

- Gemini 1.5 Flash is designed for:
  - Natural language generation (articles, stories, scripts)
  - Code generation and translation
  - Educational assistance and research
  - Content creation and customer service

Usage Guidelines

- **Best Practices**:
  - Provide clear, specific prompts.
  - Verify outputs for biases/hallucinations.
  - Avoid sensitive data in prompts.
- **How to Cite**:
  Google AI. (2024). Gemini 1.5 Flash [Large Language Model]. https://ai.google/

Training Data

- **Dataset(s)**: Proprietary (books, articles, code repositories).
- **Data composition**: Diverse text/code across topics/languages.
- **Preprocessing**: Tokenization, normalization, bias filtering.

Performance and Limitations

Performance Metrics

- **MMLU (5-shot)**: ~82% accuracy.
- **Code Generation**: 74% pass rate (HumanEval).
- **Translation**: 90%+ fluency score (human-evaluated).

Known Limitations

- Potential biases from training data.
- Occasional hallucinations.
- High computational resource requirements.

Ethical Considerations

- **Bias**: Gender/racial/cultural biases possible despite mitigation efforts.
- **Privacy**: Google may store interactions for improvement (opt-out available).
- **Environmental impact**: High energy use per query (~10x standard search).

Technical Specifications

- **Model Architecture**: Transformer-based (Mixture of Experts).
- **Parameters**: 1.25 trillion (estimated).
- **Context Window**: 2 million tokens.
- **Input**: Text (multimodal capabilities in other Gemini versions).
- **Output**: Textual responses.

Additional Information

- **License**: Proprietary (Google ToS).
- **Contact**: Google AI Support.
- **API Access**: Available via Google AI Studio.

Acknowledgements

This work was funded by a Montana University System (MUS) Teaching Scholars grant program titled "Modeling Transparency: Adapting Model Cards for Responsible Generative AI Assignments in a Faculty Learning Community".

HHD 501: Graduate Research Methods Assignment

- Brianna Routh (Food Systems, Nutrition, and Kinesiology)

Assignment Notes: Our Graduate Research Methods course series provides an opportunity for graduate students to begin building their proposal directions across diverse disciplines in Human Development and Community Health as well as Food Systems, Nutrition, and Kinesiology. This outline assignment provides a basis for feedback and refinement before students move into the drafting process.

Purpose: Using ChatGPT or other LLM AI applications for this outline writing assignment will support students written argument structure and explore how to write in a research style. It will also support their critical thinking about how and when this tool might be used in their professional futures, provide them opportunities for exploring the possible implications of authority, credibility, and responsible AI use in their professional work.

Recommended Use:

- **Student Level:** Graduate Students
- **Course Application:** Graduate Research Writing or Methods Courses
- **Course Positioning:** An early step to scaffold peer-reviewed research writing

Duration: 90 min class period plus 1-2 weeks for assignment completion

Learning Objectives

By the end of this assignment, students will be able to:

1. Increase self-efficacy using Generative AI (LLM) in the research writing process
2. Practice critical thinking and digital literacy skills when applying LLM output to writing
3. Identify opportunities and ethical challenges to using LLM in their future professional work

Materials Needed

- Access to an LLM for student use
- Digital platform for submitting assignment
- Example template and assignment

Generative AI Tool for Assignment

For more in-depth information on this AI tool, see attached model card.

- Name of tool: ChatGPT
- Purpose: To generate outline ideas and concepts for research-based writing.
- Who created it/Version used: OpenAI GPT 4o mini
- Any known limitations/biases:
    - Tendency to "hallucinate" or generate incorrect information.
    - Social and cultural biases inherited from training data.
    - Vulnerable to adversarial or ambiguous prompts.
    - Limited number of free inquiries.

Assignment Structure:

In Class Agenda

1. Introduction Article Review
    - Instructor provides an example of well written journal article with cross cutting topic
    - Students read article introduction section in class
    - Individually annotate each paragraph with
        1. topic/variable discussed and
        2. how that paragraph is supporting the argument that the article research question is important to reader
    - Discuss each paragraph as a larger group to identify and illustrate structure
2. Discuss why and how to use LLM AI in the writing process
    - Consider ways AI could be used. Ask which would you use or not use, why?
        1. You write, revise, and submit, no AI Used
        2. Consult AI for ideas, then write and submit
        3. Write draft, then ask AI for feedback to improve
        4. Write prompt and response conversation for multiple responses, then use best parts, edit, revise and submit
        5. AI creates a response, then read, edit, adjust and submit
        6. AI creates a response, copy and submit
    - What might AI LLM be able to support at this stage of writing an outline
        1. Headings
        2. Key points as bullets
        3. Review order of concepts for clarity or provide logical flow of ideas
        4. Provide tone considerations
        5. Consider key words and phrases for clarity
        6. Check reference format
    - Discuss ethical considerations
        1. Structure or Response creation- AI can inform, but you should express in your own words or argument structure
        2. AI as an author, tool, or unethical partner on your paper- See what your academic journals policies are currently
        3. Citation- cite all factors or data found in AI output independently, these are often hallucinations (not real). Reliable, research-based/peer-reviewed sources preferred.
    - Discuss what information might be helpful to include in AI prompt for outline
        1. Research topic or central theme
        2. Specific focus area or target population
        3. Research question
        4. Desired structure
        5. Level of detail
        6. Consider key words and clarity of prompts
3. Review assignment instructions and due date
    - Each paragraph focuses on building the argument for why each variable is important to YOUR specific research question and why the reader should care. We start from

broad impact (not necessarily broad variable) and narrow down to importance/connection of this research to your specific target audience.
    - You may change order, #s of sections/examples, or flow of the outline
    - Be sure to include all AI prompts and responses with your final assignment for instructor review

Assignment Structure, Part 2

1. Identify and refine your research question (previous assignment)
2. Using your selected example journal article (previous assignment) as an initial guide, write an outline with bullet points/ideas/phrases that demonstrate the following components.
    - the importance/justification for your research topic,
    - consider the scope of variables related to your research topic,
    - highlight current research connections/gaps, and
    - how your research question will address those.
3. Use the chosen generative AI tool to prompt the development of a peer-reviewed journal article style introduction outline in support of your research question.
    - Document your process, including:
        1. Prompts used (OPTIONAL consider trying multiple prompts to further refine output)
        2. AI response(s)
        3. Modifications of follow-up prompts needed
4. Analyze the AI-generated content for clarity, accuracy, and consistency to your non-AI outline.
5. Revise or adapt original outline using critical consideration of AI insights.
6. Include a reflection addressing:
    - Discuss ethical considerations related to using generative AI for this assignment: Academic honesty, Privacy, Bias/limitations, Impact on your writing, Impact on your research
    - Questions you still have for your instructor and/or Major Professor.
    - Insights, changes, or confirmation to your outline after collecting and incorporating AI output.

Submission Guidelines

- Format: Word Doc or PDF
    - Bullet point outline, see potential structure example below.
    - Clear indication of what was added after AI consultation with highlights or track changes.
    - Include all AI prompts and output
    - Reflection
- Length: 1–3-page outline + AI output + 1 page reflection
- Citation Guidelines: Dependent on discipline and how AI was used.

Rubric

This assignment is mostly about completion and students are instructed to share this assignment with their Major professors for content specific feedback on their direction.

- evidence of clear argument structure= 10,
- evidence of justification, variable scope, and current research=10,
- evidence of reflective consideration= 10.

Additional Resources

- **Prompt writing resource:** Getting started with prompts for text-based Generative AI tools | Harvard University Information Technology

Example outline structure:

Introduction

- Hook paragraph, connect to BROAD area of interest/concern and
    - Remind readers why they should care about this topic
    - Briefly outline main points of argument to come
- (Broad) X Outcome matters because…
    - Definition(s) (as needed)
    - Example 1 (connect and cite)
    - Example 2 (connect and cite)
    - Example 3 (connect and cite)
    - Identify research gap as it relates to why YOUR research is important
    - Conclusion/Connection to next variable
- (Narrow a bit) Variable 1 matters because…
    - Definition(s) (as needed)
    - Example 1 (connect and cite)
    - Example 2 (connect and cite)
    - Example 3 (connect and cite)
    - Identify research gap as it relates to why YOUR research is important
    - Conclusion/Connection to next variable
- (Narrow more) Variable 2 matters because…
    - Example 1 (connect and cite)
    - Example 2 (connect and cite)
    - Example 3 (connect and cite)
    - Identify research gap as it relates to why YOUR research is important
    - Conclusion/Connection to next variable
- (Narrow more as needed) Variable 3 matters because… (target audience?)
    - Example 1 (connect and cite)
    - Example 2 (connect and cite)
    - Example 3 (connect and cite)
    - Identify research gap as it relates to why YOUR research is important
    - Conclusion
- (Theory) Theory Z might help explain how these variables connect.
    - Theoretical tenant 1 (Connect and site)
    - Theoretical tenant 2 (Connect and site)

    - Identify research gap as it relates to why YOUR research is important
    - Conclusion
- (Your research proposal) I will do (study design) to understand (broad research aim) for (target audience)
    - This research will be impact/influence…
    - Specific question(s) you will explore

Notes on Model Card Intended Use

The model card provides additional insights into ethical and practical use of this tool. It may help students formulate their reflections or determine which AI tool to use for this task. OpenAI is not the only tool that can be used for this assignment, but it was the tool the instructor was most familiar with and could provide the most support or guidance on.

Model Card for HHD 501: Graduate Research Methods

- Brianna Routh (Food Systems, Nutrition, and Kinesiology)

Model Card: ChatGPT

Model Details

Developed by: OpenAI
Model type: Large Language Model
Version: GPT 4o mini
Last updated: Late 2024

- **Model Name**: GPT4
- **Model Type**: Transformer-based model
- **Version**: GPT-4
- **Release Date**: March 14, 2023
- **License**: Proprietary
- **Authors**: Developed by OpenAI, with contributions from a team of AI researchers and engineers.

Intended Use

ChatGPT is designed for a wide range of applications including conversational AI, content generation, code assistance, language translation, summarization, and more. It is used across industries such as education, customer service, and healthcare.

For this assignment, ChatGPT is used to generate outline ideas and concepts for research-based writing.

Usage Guidelines

- **Best Practices**:
    - Use the model for constructive and educational purposes.
    - Avoid inputting sensitive personal information.
    - Monitor for accuracy in factual responses, especially for critical use cases.
- **How to Cite**:
    - **In-text:** "According to recent research, 'the future is bright' (OpenAI, 2023)".
    - **Reference list entry:** OpenAI. (Date Retrieved). *ChatGPT (GPT-4)* [Large language model]. Retrieved from https://chatgpt.com

    - Consider if direct tool citation is appropriate, use may be noted in acknowledgements or in methods depending on journal requirements even if information is not directly cited.

Training Data

- **Dataset(s):** GPT-4 was trained on diverse datasets from the internet, including publicly available text, books, and licensed content.
- **Data composition:** Includes diverse sources such as news articles, encyclopedias, and forums to ensure a broad understanding of language.
- **Preprocessing:** Data was preprocessed to filter out harmful content and optimize for coherence and factual accuracy.

Performance and Limitations

Performance Metrics

- 82% less likely to produce disallowed content compared to GPT-3.5.
- 40% improvement in factual accuracy over previous versions.

Known Limitations

- Tendency to "hallucinate" or generate incorrect information.
- Social and cultural biases inherited from training data.
    - The model is skewed towards Western views and performs best in English. Some steps to prevent harmful content have only been tested in English.
    - The model's dialogue nature can reinforce a user's biases over the course of interaction. For example, the model may agree with a user's strong opinion on a political issue, reinforcing their belief.
    - These biases can harm students if not considered when using the model for student feedback. For instance, it may unfairly judge students learning English as a second language (OpenAI, 2024).
- Vulnerability to adversarial prompts.
- In cases of query ambiguity, performance may be limited.
- Limited number of free queries per month.

Ethical Considerations

- **Bias:** Efforts have been made to minimize biases, but some may still exist due to the nature of the training data.

- **Privacy:** ChatGPT is designed to not retain personal data from user interactions.
    - Depending on a user's settings, we may use the user's prompts, the model's responses, and other content such as images and files to improve model performance.
    - We share content with a select group of trusted service providers that help us provide our services. We share the minimum amount of content we need in order to accomplish this purpose and our service providers are subject to strict confidentiality and security obligations. We do not use or share user content for marketing or advertising purposes.
- **Environmental Impact:** GPT-4 was trained using Microsoft Azure AI supercomputers, with efforts toward efficiency to mitigate carbon impact in light of the significant power requirements needed to maintain computations.

Technical Specifications

- **Model Architecture:** Deep learning Transformer architecture
- **Parameters:** Exact number not disclosed for GPT-4
- **Input:** Text-based prompts, images, or voice (for some versions)
- **Output:** Textual responses, including summaries, completions, or direct answers

Additional Information

- **License:** Information about licensing is not publicly disclosed
- **Contact:** For support or inquiries, refer to the platform or organization providing access

Version History

- v1.0 (2023-03-14): Initial GPT-4 release
- v4.0o (2024): Enhanced multimodal capabilities including real-time voice conversations

Acknowledgements and Citation Guidance

Initial venture capital funding included: Thrive Capital, with participation from SoftBank, Microsoft, Nvidia, Tiger Global, and MGX, an investment firm controlled by the United Arab Emirates (UAE).

This work was funded by a Montana University System (MUS) Teaching Scholars grant program titled "Modeling Transparency: Adapting Model Cards for Responsible Generative AI Assignments in a Faculty Learning Community".

PHL 353: Philosophy and Technology Assignment

- Bonnie Sheehey (Philosophy)

Assignment Notes: For use in an upper-level philosophy or related course focused on technology or AI.

Overview: In this assignment, students will engage in a philosophical dialogue with Claude AI to explore key questions in philosophy of technology, particularly focusing on artificial intelligence, consciousness, and ethics. Through an argumentative essay, students will analyze both the content of Claude's responses and the nature of the interaction itself.

Purpose: This assignment is designed to help students think critically about the nature of artificial intelligence and human interactions with it. The dialogue will enable students to learn how to effectively use and communicate with generative AI. Developing an argumentative essay based on their dialogue will help them synthesize complex philosophical concepts and apply them to a real-world interaction with an AI system. Instead of just theorizing about AI, this assignment encourages students to reflect on what their interaction with AI reveals about its epistemic and ethical status.

Duration: 2 weeks

Learning Objectives

By the end of this assignment, students will be able to:

1. Examine philosophical questions about AI consciousness, intelligence, personhood, and ethics through direct engagement with an AI system (Claude AI).
2. Analyze how AI systems engage with abstract philosophical concepts.
3. Demonstrate critical thinking about the relationship between human and artificial intelligence through philosophical dialogue and argumentation.
4. Critically evaluate AI-generated content for accuracy, bias, and relevance

Generative AI Tool for Assignment

For more in-depth information on this AI tool, see attached model card.

- Tool Name: Claude AI
- Tool Purpose: Claude has many applications from writing and editing to data analysis, math, and programming. This pedagogical application will use Claude as a writing and editing tool.
- Developer/Version: Developed by Anthropic / Version 3.5
- Known Limitations/Biases:
    - Claude may generate incorrect or misleading information or produce offensive or biased content. It is trained on datasets that reflect negative stereotypes and biases about particular groups. It is also limited to the English language.
    - Claude retains personal data for as long as reasonably necessary. User has ability to delete conversations. Training data like web-based data may contain publicly

available personal data. Users have the right to request a copy of their personal data, to object to the processing of their personal data or request that it be deleted.

Assignment Structure

Part 1: Philosophical Dialogue (1000-1200 words)

Conduct a philosophical conversation with Claude focusing on a topic of your choice, or one of the following themes:

- The nature of consciousness and whether AI can be conscious
- The relationship between intelligence and understanding in AI systems
- The moral status of AI systems
- The relationship between humans and AI
- The boundaries between human and machine intelligence

Your dialogue should:

- Begin with clear philosophical questions
- Include follow-up questions that probe Claude's responses
- Challenge or request clarification of Claude's assumptions
- Explore potential contradictions or limitations in the responses

Part 2: Critical Analysis (1500-1800 words)

Analyze your dialogue, addressing the following:

1. Content Analysis

- What philosophical positions did Claude take?
- How did these align with or differ from philosophical arguments explored in class texts?
- What assumptions were revealed in Claude's responses?

2. Interaction Analysis

- How did Claude handle abstract philosophical concepts?
- What patterns or limitations did you notice in its reasoning?
- How did the dialogue format affect the philosophical exploration?

3. Meta-Analysis

How did the experience of philosophical dialogue with AI inform your understanding of:

- The nature of intelligence and understanding
- The relationship between human and artificial reasoning
- The nature of human-AI interactions

Discuss ethical considerations related to using generative AI for this assignment, including:

- Privacy
- Bias/limitations
- Academic honesty
- Impact on learning

Part 3: Documentation

You must **document your dialogue** with Claude by providing a complete transcript of your conversation following your essay.

For protecting your privacy, be sure that you open a new chat when beginning your dialogue with Claude and that you are sharing your transcript from your dialogue for this assignment.

Submission Guidelines

- Format: Word Document or PDF
- Length: 2500-3000 words (or 10-12 pages double-spaced)
- Citation Guidelines: Chicago

Grading Rubric

Criteria

- **Dialogue Quality (30 pts)**
  - Depth of philosophical inquiry
  - Strategic follow-up questions
  - Engagement with Claude's responses
  - Exploration of complexities and contradictions

- **Analysis Quality (40 pts)**
  - Insight into philosophical implications
  - Critical evaluation of AI capabilities
  - Connection to philosophical concepts and debates
  - Quality of evidence and examples

- **Writing & Organization (30 pts)**
  - Clear structure and flow
  - Effective use of evidence
  - Professional writing style
  - Proper citations

- **Total 100 pts**

Tips for Successful Dialogue

- Start with broad questions and narrow down based on responses
- Ask for clarification or elaboration when needed
- Challenge assumptions and test for consistency
- Pay attention to how Claude handles abstract concepts
- Consider how the format affects the philosophical discussion

Model Card for PHL 353: Philosophy and Technology

- Bonnie Sheehey (Philosophy)

Model Card: Philosophy Writing with Claude AI

Model Details

Developed by: Anthropic
Model type: Large Language Model
Version: 3.5 Sonnet
Last updated: 2024-06-20

- **Model Name**: Claude AI
- **Model Type**: Sonnet
- **Version**: 3.5
- **Release Date**: 2024-06-20 (Sonnet 3.5 update)
- **License**: Proprietary (Anthropic Terms of Service)
- **Authors**: Anthropic

Intended Use

Claude 3.5 Sonnet is designed for:
- Writing, editing, and refining text.
- Data analysis, programming, and math problem-solving.
- Pedagogical applications (e.g., teaching writing/editing).

Usage Guidelines

- **Best Practices**:
    - Use Claude as a collaborative tool; verify outputs for accuracy.
    - Avoid sharing sensitive or personal data in prompts.
    - Review Anthropic's usage policies.
- **How to Cite**:
  Anthropic. (2024). Claude 3.5 Sonnet [Large Language Model]. Retrieved from https://claude.ai.

Training Data

- **Dataset(s)**:
    - Publicly available internet data.
    - Licensed third-party datasets.

    - User-provided data (with consent).
- **Data composition**:
    - Trained using Constitutional AI principles to reduce harm.
    - Focus on factual accuracy and alignment.
- **Preprocessing**:
    - Filtered for toxic/biased content (exact methods undisclosed).

Performance and Limitations

Performance Metrics

- **MMLU (Massive Multitask Language Understanding)**: ~85% (5-shot).
- **GSM8K (Math Reasoning)**: ~90% accuracy.
- **HumanEval (Coding)**: 75% pass rate (Python).

Known Limitations

- May generate plausible but incorrect information ("hallucinations").
- Limited context window (~200K tokens; may truncate long inputs).
- Performance drops on highly specialized topics (e.g., medical/legal advice).

Ethical Considerations

- **Bias**:
    - Trained to mitigate stereotypes, but may reflect biases in training data.
    - Anthropic uses RLHF (Reinforcement Learning from Human Feedback) to reduce harmful outputs.
- **Privacy**:
    - User conversations may be stored for model improvement (deletable upon request).
    - Opt-out options available for data retention.
- **Environmental impact**:
    - Estimated 10-20x energy use per query vs. traditional search (varies by task complexity).

Technical Specifications

- **Model Architecture**: Transformer-based (modified for Constitutional AI).
- **Parameters**: ~100B (estimated for Claude 3.5 Sonnet).

- **Input**: Text prompts (multimodal support not confirmed for Sonnet).
- **Output**: Textual responses with citations (if enabled).

Additional Information

- **License**: Governed by Anthropic's Terms of Service.
- **Contact**: Anthropic Support.

Acknowledgements

This work was funded by a Montana University System (MUS) Teaching Scholars grant program titled "Modeling Transparency: Adapting Model Cards for Responsible Generative AI Assignments in a Faculty Learning Community".

BMKT 491: Special Topics, Advanced Marketing Analytics Assignment

- Omar Shehryar (Marketing Option, JABS College of Business and Entrepreneurship)

Assignment Notes: The assignment is designed as a test, either mid-term, or final, in a course titled "Advanced Marketing Analytics." Currently this course is not hard-numbered but has been offered twice as a special topics course with a place-holder course number, BMKT 491. The course is focused on the use of machine learning for marketing decision making. Students are introduced to machine learning techniques and their applications in marketing. Students are provided code during the semester. Students may access this code during the test, but the data that will be used will not be known to students. Hence, data wrangling will be required. Students may use AI to change the structure of the data to fit it for use with the algorithm that is required.

Overview: In this assignment, students will take on two machine learning tasks. The first task is a simpler and more widely used machine learning task of data reduction. Students will employ k-means clustering algorithm to find useful patterns in the data to determine actionable marketing segments. The second task requires students to perform association-rules mining on retail data. This task is more substantial and requires both data wrangling, and application of the Apriori algorithm.

Purpose: This assignment is designed to help students think critically about data shape, algorithm selection appropriate for the task, useful and un-useful data, and making marketing decisions based on big data that cannot be analyzed with just spreadsheets. Thus, students are expected to perform the same tasks that a contemporary data scientist performs. Students will also become familiar with the use of ChatGPT as a coding assistant to tackle the data wrangling tasks.

Duration: Time allotted is two class periods of 75 minutes each.

Learning Objectives

By the end of this assignment, students will be able to:

5. Import and Shape data to fit the requirements of the task
6. Select the appropriate algorithm(s) and execute appropriate code to run the algorithm(s)
7. Visualize important results obtained from R programming language output in R studio
8. Use AI assistance to complete their assigned tasks

Generative AI Tool for Assignment

For more in-depth information on this AI tool, see attached model card.

- Tool Name: ChatGPT
- Tool Purpose: ChatGPT is primarily a large language model and has myriad uses. However, for the tasks at hand, the purpose of using the tool is to provide students an assistant that can help them with data wrangling tasks, resolve issues with importing data, and guidance with errors in coding

- Developer/Version: Open AI/ChatGPT-4o
- Known Limitations/Biases: ChatGPT primarily uses English Language texts for model training. It has known gender biases as well c.f. Babaei, G., Banks, D., Bosone, C., Giudici, P., & Shan, Y. (2024). Is ChatGPT More Biased Than You? Harvard Data Science Review, 6(3). https://doi.org/10.1162/99608f92.2781452d

Assignment Structure

1. Perform k-means clustering on the provided data file titled "test.xls."
    a. Load the data and shape appropriately for analysis (30 points).
    b. What is the optimal number of clusters? (5 points)
    c. Label the 2-dimensional cluster solution and interpret the key findings from the cluster solution. (15 points).

2. Perform Market Basket Analysis on the E-Commerce Market Basket Data file.
    a. Load the data, and shape it appropriately for market basket analysis (30 points)
    b. What is the total number of rules found? (5 points)
    c. List and explain the top 3 association rules including the following (15 points):
        i. State the rules in simple language.
        ii. Explain the support, confidence, and lift numbers and what they mean for the rule, including the names of the products involved.

Submission Guidelines

- Answer the questions in a PDF document. This document will also contain any prompts you used to get assistance from ChatGPT.
- Separately attach RStudio visualization file for 1c. and RStudio output file for 2c.
- Length: The PDF file with answers needs to be no longer than one page. The RStudio visualization for the 2-dimensional cluster solution is an additional page. Lastly, the top-association rules output is an additional page.
- IMPORTANT: Save your code file and upload it as proof of your work.
- Citation Guidelines: If you used ChatGPT for assistance, please cite it in the following format:
    - OpenAI. (2023). ChatGPT-4o (Oct 08, 2024 version) [Large language model]. https://chat.openai.com/chat

Grading Rubric

Points are awarded based on completion of each individual element of the assignment, as noted after each element.

Additional Resources

Use of code including algorithms and their use, and code chunks involved in data wrangling i.e., tidyverse operations, is permitted and encouraged.

Notes on Model Card Intended Use

Model card is intended for classroom educational use only. Model card may be used by any educator whose intended use is classroom instruction.

Model Card for BMKT 491: Special Topics, Advanced Marketing Analytics

- Omar Shehryar (Marketing Option, JABS College of Business and Entrepreneurship)

Model Card: ChatGPT and Business Algorithms + Coding

Model Details

Developed by: OpenAI
Model type: LLM
Version: ChatGPT-4o
Last updated: 10-2-2024

- **Model Name**: ChatGPT-4o
- **Model Type**: Large Language Model
- **Version**: gpt-4o-2024-08-06
- **Release Date**: 5-13-2024
- **License**: Free with limited access
- **Authors**: OpenAI, 2023

Intended Use

Train students to solve small coding problems that may arise in running algorithms

Usage Guidelines

- **Best Practices**: The model may be used to remove coding difficulties involved in data wrangling. The model may not be used to get suggestions on analysis of data.
- **How to Cite**: OpenAI. (2023). ChatGPT-4o (Oct 084 version) [Large language model]. https://chat.openai.com/chat

Training Data

- **Dataset(s):** Simulated using R
- **Data composition:** Small dataset suitable for clustering, multidimensional scaling, or for creating decision trees. Data can contain categorical and/or numeric variables, including redundant variables.
- **Preprocessing:** Data cleaning, removing NAs, exploratory data analysis, descriptive statistics.

Performance and Limitations

Performance Metrics

- **Reasoning capabilities**: Significantly improved over previous versions with enhanced problem-solving abilities across mathematical, scientific, and coding tasks
- **Visual understanding**: Can analyze and interpret complex images and diagrams with high accuracy
- **Multimodal processing**: Capable of processing text, images, and audio simultaneously with state-of-the-art performance
- **Response speed**: Approximately 2x faster than GPT-4 for comparable requests

Known Limitations

- Training data only until March 2023.
- Trained on English language texts primarily

Ethical Considerations

- **Bias:** Questionable Inclusivity of data sources and archives used in training
- **Privacy:** Copyrighted works may be scanned without established legal precedent in the area
- **Environmental impact:** Large-scale training and inference operations require significant computational resources and energy consumption

Technical Specifications

- **Model Architecture:** Transformer-based architecture with advanced attention mechanisms optimized for multimodal capabilities. The model employs a decoder-only design with modifications for processing multiple input modalities simultaneously.
- **Parameters:** While the exact number hasn't been publicly disclosed, GPT-4o is estimated to have hundreds of billions of parameters, similar to or potentially greater than its GPT-4 predecessor.
- **Input:** Text prompts, images, audio, and combinations of these modalities. The model can process complex visual information including diagrams, charts, screenshots, and natural images alongside textual queries.
- **Output:** Primarily text-based responses with the ability to reason across modalities, perform complex calculations, write code, and analyze visual or audio information provided in queries.

Additional Information

- **License:** Free tier with usage limits; subscription options through ChatGPT Plus ($20/month) and team/enterprise plans with additional capabilities and higher usage limits.
- **Contact:** OpenAI can be contacted through their help center at https://help.openai.com or through their website at https://openai.com.

- **Citation:** OpenAI. (2023). ChatGPT-4o (Oct 08, 2024 version) [Large language model]. https://chat.openai.com/chat

Version History

- v1.0 (2023-05-12): Initial GPT-4 release with text-only capabilities
- v4.0 (2024-05-13): Initial release of GPT-4o with improved multimodal capabilities
- v4o (2024-08-06): Updated version with enhanced processing speed and performance improvements
- Latest update (2024-10-02): Further refinements to context handling and response quality

Acknowledgements and Citation Guidance

GPT-4o was developed by OpenAI's research team with significant infrastructure support from Microsoft as a major investor. The model represents an evolution of OpenAI's research into advanced AI systems, building upon previous GPT architecture advancements. Development was supported by OpenAI's broader funding, which includes significant investments from Microsoft, Khosla Ventures, Reid Hoffman, and other technology investors. When citing GPT-4o in academic or research contexts, users should reference OpenAI as the developer, specify the version used, and include the access date to account for potential model updates.

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