

Ethics & Professional Responsibility

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HADES: Holistic Astronomical
Database Exploration System

Project Overview

- **Objective:** Develop a system to manage and analyze simulated binary star data
- **Key Features:**
 - Import multivariate time-series simulation data into relational database
 - Provide sample SQL queries
 - Enable custom queries through natural language processing
- **Deliverables:**
 - Relational database
 - User Interface for writing and viewing SQL queries
 - Sample SQL queries



What We're Doing Well

Our Strength:

- Work Competence

Relevance:

- Our project involves a front end, back end, and tools
- We rely on each team member to deliver high quality work in a timely manner to eventually combine our parts into a fully working product
- Emphasis on professional competence to ensure each technical area has progress being completed consistently

Approach:

- Consistent updates on individual progress
- Demos with client when major components are completed
- Weekly meeting to review progress and assess shifts in priority

How We're Upholding This:

- Relying on peer and advisor feedback to uphold high quality work
- Regular demos to ensure integrity and professional competence
- Weekly meetings to ensure timeliness and deadlines are met

What We Need to Improve On

Problem:

- Our plan poorly accounts for sustainability

Relevance:

- Generative AI requires large amounts of power
- High power usage is bad for the environment

Our Current Approach:

- Plan is to use GPT-4o, which is the highest performance variant
- Power requirements are higher

Proposed Changes:

- Will experiment with other models that require lower power requirements
- Aim to not overuse model beyond required amounts



Four Principles Chart

	Beneficence	Nonmaleficence	Respect for Autonomy	Justice
Public health, safety, and welfare	Design allows all users to perform queries	N/A	Design allows all users to perform queries	Design allows all users to perform queries
Global, cultural, and social	Design allows all users to perform queries	N/A	N/A	N/A
Environmental	N/A	We will demo with low power AI	N/A	N/A
Economic	Software is free and AI is optional	N/A	N/A	N/A

Potential Ethical Issues

Use of LLM for Query Generation

- LLM may not produce accurate queries 100% of the time
- Query may not reflect exactly what the user wants
- Would be unethical to present results without providing the “source material” used to generate them, i.e. the query statement

Database Version Used

- Using old database version for development purposes
- Up to the user's own discretion on which version they personally use

Solution: Transparency

- Inform the user of query statement used to generate results
- Communicate the database version used in development
- Boosts user satisfaction and confidence