Project Proposal Guidelines

Introduction

Welcome to your CS 4632 project proposal! This document will guide you through the process of planning, designing, and implementing your simulation project. Your proposal is the first step in creating a successful project, so read these guidelines carefully and reach out if you have any questions.

Scope and Focus

Your project should:

- Focus on a discrete or continuous model with clear goals.
- Be based on scientific or mathematical foundations.
- Include a comparison between modified and standard systems, if applicable.
- Follow the scientific method to test and refine your hypotheses.

Keep your objectives specific and achievable. For example:

- Simulate water flow and analyze parameter changes.
- Develop a traffic simulation using discrete-event modeling.
- Optimize an existing simulation tool.
- Create a predator-prey ecosystem simulation and analyze population dynamics.
- Model the spread of a disease in a population and study the effects of vaccination.
- Simulate customer service in a queueing system, such as a call center or a bank.
- Analyze heat distribution in a 2D material using a finite difference method.
- Simulate an inventory management system to study supply chain efficiency.
- Build a physics-based simulation of a ball bouncing with varying elasticity in Unity or Unreal Engine.
- Create an interactive fluid dynamics simulation to model water or smoke in a game engine.
- Simulate AI agents for navigating a maze or solving a puzzle using Unity or Unreal Engine.
- Develop a crowd simulation in a game engine to study movement patterns in large groups.

Avoid overly simple ideas (e.g., basic calculators) that don't meet the minimum requirements. If you're unsure, feel free to discuss your idea with me.

Research Foundation

In your proposal, you need to:

- Provide a brief review of relevant research to support your model.
- List the tools, software, or programming languages you plan to use.
- Use LaTeX to format your proposal. Overleaf is a great tool for this.

Cite any resources you use appropriately. There's no minimum number of citations, but all sources must be credited.

Milestones and Grading

Your project will be broken down into these milestones. Each milestone contributes to your overall grade, so plan your work accordingly:

1. **Milestone 1**: Project Proposal (10%, 50 points)
2. **Milestone 2**: Literature Review and Research (10%, 50 points)
3. **Milestone 3**: UML Diagram and Initial Design (10%, 50 points)
4. **Milestone 4**: Model Implementation (25%, 100 points)
5. **Milestone 5**: Simulation Runs and Data Collection (15%, 75 points)
6. **Milestone 6**: Sensitivity and Scenario Analysis (15%, 75 points)
7. **Milestone 7**: Validation and Verification (15%, 50 points)
8. **Milestone 8**: Final Report and Presentation (35%, 300 points)
9. **C-Day Submission and Poster (Bonus)**: Optional, 25 points

Collaboration and Group Rules

Here's what you need to know if you're working in a group:

- Groups can have up to two members (three for capstone projects).
- Clearly document each member's role and contributions.
- Use source control tools (like Git) to manage your work.

Remember, teamwork is key, but everyone should contribute equally.

Submission Guidelines

Follow these guidelines to submit your work:

- Format: PDF
- File Name: CS_4632_[FirstName]_[LastName]_MilestoneX.pdf

- Use LaTeX templates (Overleaf is recommended).

Late submissions may not be accepted, so keep track of deadlines.

Evaluation Criteria

Here's how your proposal will be evaluated:

- Are your objectives clear and specific?
- Is your project idea feasible and aligned with course goals?
- Have you included sufficient research to support your model?
- Is your proposal well-written and formatted correctly?

Put effort into your work—it will set the tone for your entire project.

Conclusion

This proposal is your chance to plan and set up a great project. Use these guidelines to ensure your proposal is thorough and well-organized. If you have any questions or need help, don't hesitate to reach out. Good luck!