Hackathon Challenge: Conversational 3D CAD Modeling Interface

Challenge Statement:

Develop an AI-powered chat interface that transforms natural language prompts into fully editable 3D models ready for use in popular CAD software (e.g., Autodesk). Your solution should not only generate a 3D model from a given prompt but also allow for real-time modifications based on subsequent instructions. For instance, a user might first request a model with a prompt like, “Create a 3D model of a bracket with standard dimensions,” and then follow up with, “Increase the length on the left side by 2 mm and decrease the overall thickness by 1 mm.”

Key Requirements:

1. **Chat-Driven 3D Model Generation:**
    - Build a chat interface that accepts natural language prompts and outputs a 3D model.
    - Ensure that the initial model creation leverages state-of-the-art AI techniques.
2. **Dynamic Model Modification:**
    - Enable users to modify the generated 3D model via subsequent prompts.
    - For example, users should be able to command changes like “increase the left side by 2 mm” and see the model update accordingly.
3. **CAD Software Compatibility:**
    - The generated and modified 3D models should be in a format that can be imported into and edited within CAD software such as Autodesk.
    - Ensure interoperability and ease of integration with existing CAD tools.
4. **Integration with CAD Environments:**
    - Design the interface so it can be integrated within CAD environments, with a particular focus on Autodesk.
    - Consider developing APIs or plugins that facilitate this integration.

Bonus Considerations:

- **User Experience (UX):** A seamless and intuitive chat interface that lowers the barrier for users who may not have extensive technical knowledge.
- **Performance:** Optimize the system to handle real-time requests and modifications.

- **Scalability:** Ensure your solution is modular and extensible to support future enhancements or additional CAD platforms.

Example Case:

- **Explore and implement innovative methods, such as NVIDIA's LLM-based meshing for creating and refining 3D models. [2411.09595] LLaMA-Mesh: Unifying 3D Mesh Generation with Language Models**
- **You may also consider other advanced algorithms and methodologies to enhance model quality and generation speed.**
- **New Innovative method or optimization to LLaMA-Mesh method in terms of token used or accurate model with LLM having less parameters will be given priority.**

Submission Guidelines:

- Provide a working demonstration of the chat interface generating and modifying a 3D model.
- Include documentation outlining the architecture, tools used, and instructions for integration with CAD software.
- Highlight any innovative techniques (e.g., NVIDIA's LLM-based meshing) and mention alternative methods you explored.

Duration: 15 days

Get creative and push the boundaries of AI-driven design in the CAD space. Good luck, and may the best solution win!