Synopsis

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Development of Parser for PyVnt and Visual Representation of PyVnt Node in Blender

OpenFOAM is a powerful open-source CFD software, yet its configuration through manually edited, text-based dictionary files presents a significant usability barrier. This leads to a steep learning curve, error-prone setup, and a lack of visual clarity for complex simulations, ultimately limiting its accessibility and efficient workflow. Recognizing these challenges, the FOSSEE initiative at IIT Bombay embarked on developing a comprehensive solution, including a VenturialGUI and the PyVNT module, to simplify OpenFOAM case configuration. Within this ongoing development, my project specifically addressed the crucial need for: (1) a robust parser to interpret and structure OpenFOAM data, and (2) a visual, node-based Graphical User Interface (GUI) to enable intuitive interaction.

1. Parser

The core problem of OpenFOAM's text-based files is their lack of a standardized, machine-readable structure and GUI Implementation. This necessitated the development of a robust parser within the PyVNT (Python Venturial Node Trees) library. This parser interprets and validates OpenFOAM dictionary files and custom YAML format, transforming them into a coherent, hierarchical tree data model. This model serves as a programmatic interface for GUI interaction.

2. PyVnt Node Representation in Blender

The PyVnt Node representation developed within Venturial GUI (Blender addon) visualizes this data as an interactive node graph. It allows users to directly manipulate case settings through drag-and-drop operations, making the workflow more accessible and efficient. Blender's node editor serves as an ideal platform for this interface.

References

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