Synopsis

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Development of a Graphical User Interface for SnappyHexMesh Dictionary Configuration in OpenFOAM

SnappyHexMesh in OpenFOAM is a versatile mesh generation utility that creates hexahedral-dominant meshes. However, it requires manual editing of the `snappyHexMeshDict` file, which is complex, verbose, and prone to syntax errors. This project proposes the development of a graphical user interface (GUI) built using Blender's Python API to simplify this process.

The GUI provides an intuitive environment that organizes configuration parameters into logical sections, reducing user confusion and minimizing setup time. It incorporates real-time validation mechanisms to prevent invalid parameter combinations and errors before file generation. The interface dynamically adapts to user inputs, displaying only the relevant parameters based on previous selections. This context-aware behavior significantly improves usability and reduces the learning curve for new users.

The tool also ensures automatic generation of syntactically correct dictionary files, maintaining complete compatibility with OpenFOAM's input format. Integrated tooltips and links to documentation are provided for user guidance. By streamlining the mesh setup process, the GUI enhances user productivity and encourages wider adoption of OpenFOAM in engineering workflows.

References

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