# 2024-05-23

## Project Requirement Document for Automated 3D Printing Slicing Tool

### Project Title:

Automated Slicing Tool for 3D Printing

### Problem Statement:

Slicing files for 3D printing requires specific knowledge and manual input of settings, which can be time-consuming and complex for users without technical expertise.

### Objective:

To simplify and automate the 3D printing preparation process by developing a tool that uses predefined settings for various slicing parameters, enabling users to prepare their 3D models for printing with minimal manual intervention.

### Proposed Solution:

Develop an automated slicing tool that leverages the capabilities of PrusaSlicer, an open-source slicing software. The tool will provide a basic user interface (UI) that allows users to upload or select files, specify input parameters for slicing, adjust orientation settings, and save the output code files in a designated folder.

### Key Features:

1. **User Interface (UI):**
    - A simple and intuitive UI for uploading or selecting 3D model files.
    - Input fields for adjusting slicing parameters such as layer height, infill density, and print speed.
    - Tools for modifying the orientation of the model to optimize the print.
2. **Automation Script:**
    - A script that takes user inputs and passes them to PrusaSlicer through a command-line interface.
    - Predefined settings for different print quality modes (e.g., draft, normal, high quality).
3. **Output Management:**
    - Automatic generation of sliced G-code files.
    - Saving the output files in a user-specified folder.

4. **Compatibility and Integration:**
    - Ensure compatibility with various 3D model file formats (e.g., STL, OBJ).
    - Integration with PrusaSlicer for backend processing.

## Expected Outcomes:

- A functional tool that automates the slicing process for 3D printing.
- Reduction in the time and technical knowledge required to prepare 3D models for printing.
- Enhanced user experience through a simplified process and easy-to-use interface.

## Evaluation Metrics:

- User satisfaction and ease of use assessed through feedback.
- Accuracy of the slicing parameters and quality of the generated G-code.
- Performance metrics such as processing time and resource utilization.