Objectives

1. Refine the threshold CLAHE function by applying a vector-based approach to target regions under a specified threshold and reduce noise.

2. Enhance the calibration and interlace methods for improved usability and control over stored calibration parameters.

3. Address issues with the line removal function to efficiently clear larger width lines without impacting the image.

Activities

1. Adjusted the threshold CLAHE function to accurately apply CLAHE below a threshold using a vector-based approach, moving away from dark mask creation:
   - **Status 1:** Made initial changes to ensure that CLAHE enhancement only affects regions below the threshold.
   - **Status 2:** Tested function outputs to ensure consistency with the intended effect.
   - **Status 3:** Implemented the vector-based CLAHE function but noted some noisy and unclear parts in the processed areas below the threshold.
   - **Status 4:** Experimented with dynamic threshold adjustments, such as clip limit and tile size, to improve clarity in affected regions, though no significant effect was observed.

2. Enhanced the interlace and calibration methods to make them more user-friendly:
   - **Status 1:** Created a CalibrationParams structure to store parameters like linesToProcessY, linesToProcessX, and a flag indicating stored settings.
   - **Status 2:** Developed setCalibrationParams to store calibration settings and applyCalibration to apply them when needed.
   - **Status 3:** Updated the control panel to allow users to save and reset calibration parameters, streamlining calibration adjustments.
   - **Status 4:** Enhanced the interlace function, allowing calibration to be applied automatically with a reminder for users about required calibration.
   - **Solved:** The calibration and interlace functions now operate smoothly, allowing multiple resets and recalibrations.

3. Investigated the line removal function's limitations, particularly with larger width lines:
   - **Status 1:** Tested a new approach where lines with width less than 50 are removed in one pass, while larger lines are divided and removed in parts. This approach, however, had a broader impact on the image quality.

o **Current Status:** Reverted temporarily to the original function to simplify further investigation.

Achievements

1. Completed the initial setup and testing for the vector-based threshold CLAHE, enhancing focus on regions under a threshold.

2. Created and implemented a more user-friendly calibration and interlace workflow with clear parameter storage, reset options, and control panel updates.

3. Improved the structure and reusability of the calibration and interlace functions, facilitating multiple recalibrations without error.

Problems & Solutions

- **Problem:** Threshold CLAHE function showed noise and unclear details in regions below the threshold, even with dynamic threshold adjustments.
  - o **Solution:** Attempted clip limit and tile size modifications to reduce noise, but no visible effect was noted. Further refinements will focus on alternative filtering or dynamic parameter adjustments within the vector-based approach.

- **Problem:** Large-width lines in the remove line function were challenging to clear in one pass without affecting the overall image.
  - o **Solution:** Tried a width-based conditional approach to remove larger lines in parts, though image quality suffered. Temporarily reverted to the original function to facilitate simpler debugging and future improvement.

- **Problem:** Consistency issues between GPU and CPU threshold CLAHE implementations.
  - o **Solution:** Ensured consistency by implementing the vector-based method for both CPU and GPU versions, aligning outputs for simpler debugging and parameter adjustments.