Task Progress Update Report

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1. Overview of Tasks

Task 1 : Convert CLAHE function into double 2D pointer method

Objective : Ready for integration and fit to the library that is given.

Status : Completed

Details :

- Ensured that the image that input and output for CLAHE function are neither normal nor threshold method is displayed in double 2D pointer method instead of vector method.

Task 2 : Window geometry constraints at Windows and UI

Objective : Ensure the error message will not show in the console while it does not affect the program.

Status : Delayed until main task complete

Details :

- Removed all `setFixedHeight()` calls from the labels and buttons
- Replaced them with `setSizePolicy()` calls using `QSizePolicy::Preferred` to let the widgets size themselves naturally
- Maintained the existing layout structure but allowed it to be more flexible

Task 3 : Linked library and header files to the program

Objective : Make the calibration and other functions the same, and make it easy for another process.

Status : Check on Details

Details :

1. Load Function

   Status: Completed

- Able to load the txt file via the 1D or 2D method and merge with the previous button to load the image in multiple types.
- Show the time for loading the file.
- Created a unique dialogue box to show the load file type and some short notes for each load type.

2. Save Function

   Status: Cancelled

   - Changed the save function into the function inside the library.
   - I tried many times but was unable to save it, and the output is saving in whole black output.
   - Cancelled for this linking process, delayed until the current task is completed.

3. Interlace & Merge function

   Status: Cancelled

   - Able to interlace in unfold mode, but if requested into fold mode, which shows only one image, the program crashes.
   - Cancelled until the current task is completed.

Task 4 : Threshold CLAHE's result

Objective : Ensure that result of Threshold CLAHE is clear and also easy to check the detail

Status : Completed

Details :

- Conducted a short meeting regarding the Threshold CLAHE effect.
- Received a new concept regarding the Threshold CLAHE.
  - Categorised the threshold region into a dark mask.
  - Processed the CLAHE in the dark mask.
  - Once CLAHE is processed, the dark region from the dark mask will be distributed into the whole image instead of kept in its region.

- Completed the function, but the image, if only done in the threshold CLAHE mode the effect will not show better; but if applied normal CLAHE, then with the threshold CLAHE, some dark parts are able to see the detail very clearly.
- Conducted a short meeting again to show the result and requested to do the slide for showing the comparison.

Task 5 : Convert all functions into Double 2D pointer

Objective : Ensure all functions can show in Double 2D pointer without any helper function for converting from vector to double 2D pointer, vice versa.

Status : Completed

Details :

- Converted all very successfully and using the same library function for memory release for certain functions like malloc2D, etc.

Task 6 : CLAHE histogram graph

Objective: To check is there the CLAHE will affecting on the histogram graph.

Status : Completed

Details :

- Moved the "Show Histogram" button from the fixed zone into a unique graph group.
- Added the CLAHE graph, which will mark out the clipLimit set to the CLAHE processing; then the CLAHE graph will be green, and the original graph will be blue.
- Update that the y-axis of the graph is using the probability distribution of those pixel intensities.
- The CLAHE function will be updated for the CLAHE graph.

2. Roadblocks/Challenges

- Memory management issues caused many functions to crash during the program runs, but they were fine for the code, like the detect and remove line function.
- The Interlaced & Merge function linked from the library is unable to be used, but we are still investigating the issues.

3. Conclusion

- The project has achieved substantial progress, with key tasks like converting functions to double 2D pointers, enhancing the Threshold CLAHE process, and implementing CLAHE histogram graphs completed successfully.
- Despite delays in some tasks, such as the Save function and Interlace & Merge functionality, the completed tasks contribute significantly to the program's functionality and integration readiness.
- Challenges, including memory management issues and instability in certain library-linked functions, have been identified and are being addressed.