Task Progress Update Report

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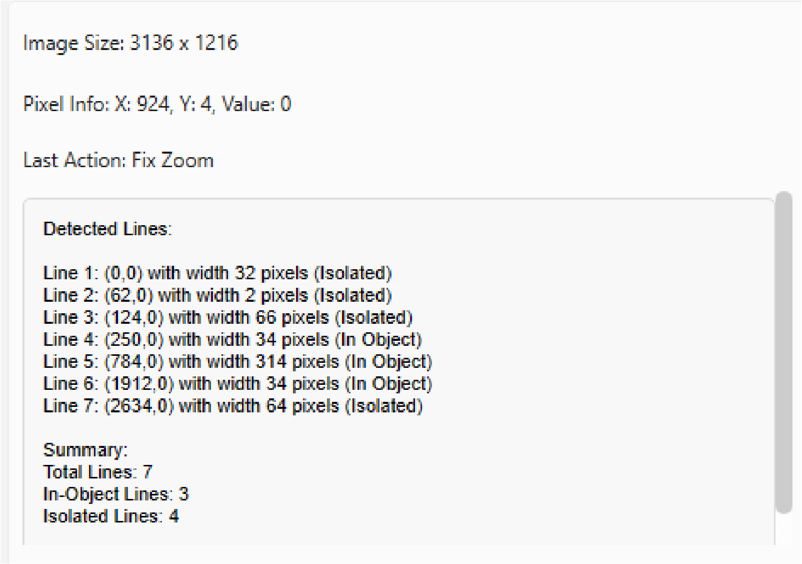
1. Overview of Assigned Tasks

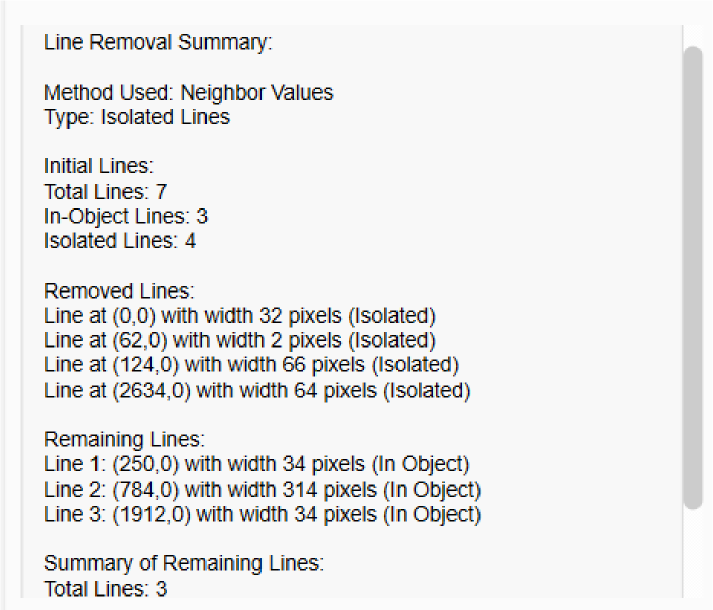
Task 1: Line Information Box for Detect and Remove Line function

- **Objective:** Display information about detected and removed lines to facilitate tracking of total lines detected and removed.
- **Current Status: Completed**
- **Details:**
  - The detected lines display includes coordinates, width, and line type (e.g., isolated or within-object lines).
  - The removed lines display includes details such as the removal method, line types, initial quantity of lines, removed line data, remaining line data, and a summary of remaining lines.
- **Image:**



```
Image Size: 3136 x 1216

Pixel Info: X: 924, Y: 4, Value: 0

Last Action: Fix Zoom

Detected Lines:

Line 1: (0,0) with width 32 pixels (Isolated)
Line 2: (62,0) with width 2 pixels (Isolated)
Line 3: (124,0) with width 66 pixels (Isolated)
Line 4: (250,0) with width 34 pixels (In Object)
Line 5: (784,0) with width 314 pixels (In Object)
Line 6: (1912,0) with width 34 pixels (In Object)
Line 7: (2634,0) with width 64 pixels (Isolated)

Summary:
Total Lines: 7
In-Object Lines: 3
Isolated Lines: 4
```

Figure 1.1 The line information box when detecting the lines



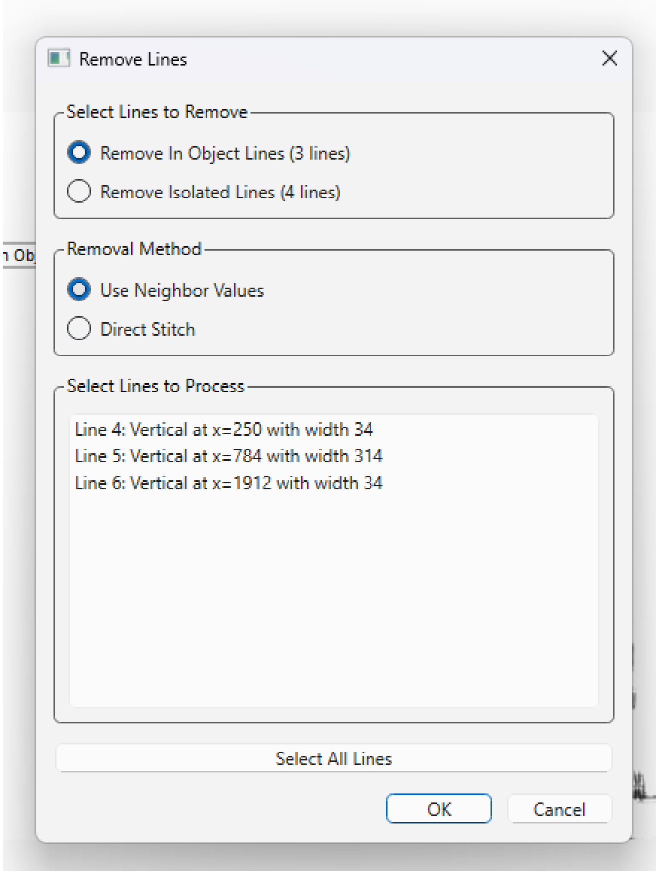
```
Line Removal Summary:

Method Used: Neighbor Values
Type: Isolated Lines

Initial Lines:
Total Lines: 7
In-Object Lines: 3
Isolated Lines: 4

Removed Lines:
Line at (0,0) with width 32 pixels (Isolated)
Line at (62,0) with width 2 pixels (Isolated)
Line at (124,0) with width 66 pixels (Isolated)
Line at (2634,0) with width 64 pixels (Isolated)

Remaining Lines:
Line 1: (250,0) with width 34 pixels (In Object)
Line 2: (784,0) with width 314 pixels (In Object)
Line 3: (1912,0) with width 34 pixels (In Object)

Summary of Remaining Lines:
Total Lines: 3
```

Figure 1.2 Line information box after removed line

Task 2: Remove Line Method

- **Objective:** Enable removal of lines with larger widths through a direct stitch method.
- **Current Status:** Completed
- **Details:**
    - The function now supports two removal methods:
        - **Use Neighbor Values:** Detects line width automatically and dynamically sets the `SEARCH_RADIUS` to 1.5 times the actual line width, ensuring that neighboring values are replaced efficiently.
        - **Direct Stitch:** Removes the line directly, decreasing the image size if it exceeds a specific width (recommended for wide images).
    - Users can select line types, removal methods, and specific lines to process (applicable for in-object lines):

- **For Neighbor Values:** Users can select individual lines or use the “Select All Lines” option.
- **For Direct Stitch:** Only a single line can be processed at once to avoid affecting the output quality.


Remove Lines

Select Lines to Remove

● Remove In Object Lines (3 lines)

○ Remove Isolated Lines (4 lines)

Removal Method

● Use Neighbor Values

○ Direct Stitch

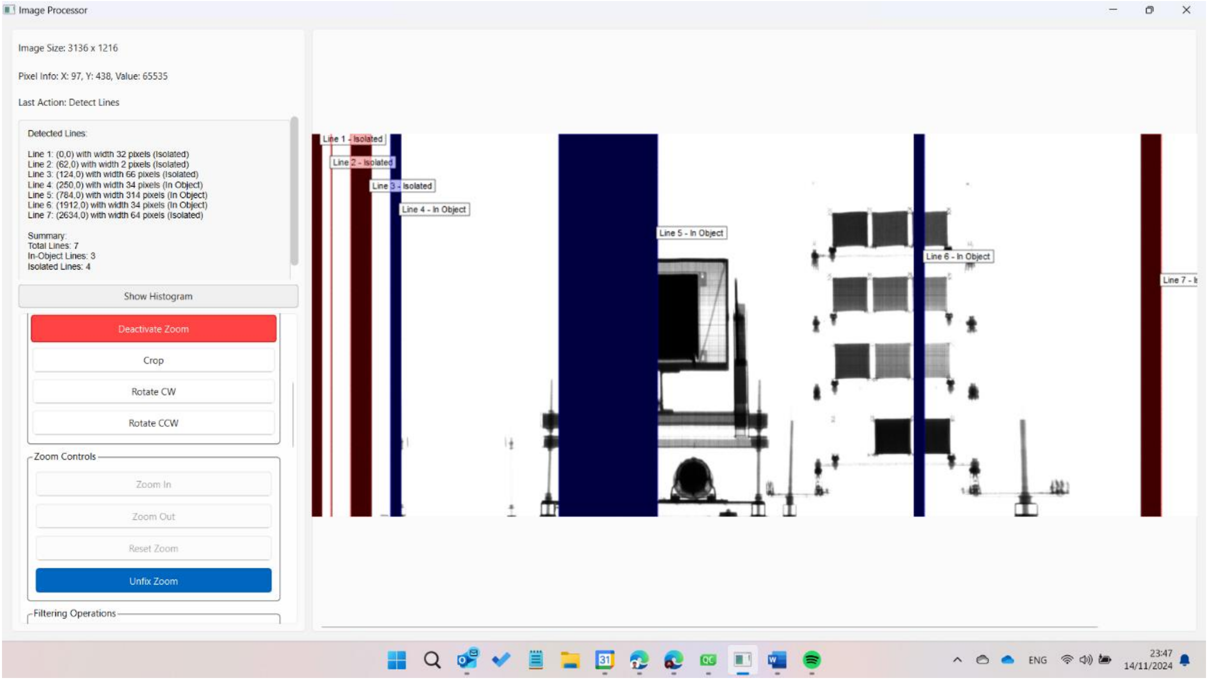
Select Lines to Process

Line 4: Vertical at x=250 with width 34
Line 5: Vertical at x=784 with width 314
Line 6: Vertical at x=1912 with width 34

Figure 1.3 Control Panel for Removing Line

Task 3: Zoom Mode Updating

- **Objective:** Allow users to zoom in or out, fix the image at a specific zoom level, and view processing results without scrolling.
- **Current Status:** Completed
- **Details:**
    - Implemented zoom functionality with zoom-in, zoom-out, and reset features. When zoom mode is active, other process buttons are disabled to prevent conflicts.
    - Once zoom mode is fixed, users can proceed with processing at the desired zoom level.
    - Visual cues for zoom status: “Zoom” button changes to blue when activated and red when fixed; “Fix Zoom” button also changes to blue when fixed. These indicators help users easily identify the current zoom status.
- **Image:**



```
Image Size: 3136 x 1216

Pixel Info: X: 97, Y: 438, Value: 65535

Last Action: Detect Lines

Detected Lines:

Line 1: (0,0) with width 32 pixels (Isolated)
Line 2: (62,0) with width 2 pixels (Isolated)
Line 3: (124,0) with width 66 pixels (Isolated)
Line 4: (250,0) with width 34 pixels (In Object)
Line 5: (784,0) with width 314 pixels (In Object)
Line 6: (1912,0) with width 34 pixels (In Object)
Line 7: (2634,0) with width 64 pixels (Isolated)

Summary:
Total Lines: 7
In-Object Lines: 3
Isolated Lines: 4
```

Figure 1.4 Zoom Mode and Detect Line function

Task 4: Restructure Detect and Remove line into double 2D Pointer method

- **Objective:** Enhance the detect and remove line function by integrating a double 2D pointer structure and incorporating it into the existing system.
- **Current Status:** In Progress
- **Details:**
  - The function has been restructured into `ImageData`, a struct for storing double 2D pointers and integer values for rows and columns.
  - Successfully integrated the current detect and remove functionality.
  - Output remains consistent with the previous implementation.
  - Dark lines are stored using a vector; confirmation on this storage approach is pending.

2. Roadblocks/Challenges

- updateImageDisplay() Reconstruction: Required to modify updateImageDisplay() to accommodate the detected line functionality in a new method, as the detected line label size was affected.
- Pointer Linkage Issues: Encountered frequent crashes due to pointer linkage with the control panel.
- Zoom Button Color Change: Initial challenges with color change for zoom buttons were resolved by implementing a logic-based approach to detect button names, enabling accurate color changes.
- Control Panel Testing: Multiple tests are necessary to ensure smooth functionality of the Control Panel for removing lines, along with verifying the processing logic to maintain image integrity.

3. Conclusion

- Successfully implemented enhancements for line detection and removal, including a detailed line information display.
- Refined line removal methods to support both neighbor-value replacement and direct stitch, expanding versatility for different line types and widths.
- Updated zoom mode to allow users to fix the zoom level during processing, with clear visual indicators for zoom status.

- Overcame challenges related to:
    - **updateImageDisplay()** adjustments for new line detection methods,
    - Pointer linkage issues causing crashes,
    - Zoom button color change inconsistencies, and
    - Control panel testing for line removal functions.
- Remaining tasks include finalizing the 2D pointer-based approach for line detection and removal and conducting additional tests to ensure performance and user-friendliness.