

1. Objectives

- Resolve issues with mouse wheel zoom functionality, ensuring smooth operation without the need for modifier keys.
 - Fix and refine panning functionality based on team lead feedback, ensuring accurate and responsive user interactions.
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2. Activities

- **Mouse Wheel Zoom Fix:**
 - Identified issues with mouse wheel zooming:
 - Event handling required the Ctrl key, making the operation less intuitive.
 - Wheel events were not correctly passed to the view handler, and coordinate mapping failed during zoom operations.
 - Solutions implemented:
 - Removed the Ctrl key requirement, allowing the mouse wheel to directly control zooming.
 - Updated `GraphicsView::handleMouseWheel` to:
 - Calculate zoom factors based on wheel direction.
 - Map mouse coordinates to scene coordinates before and after zooming for smooth transitions.
 - Adjust the view matrix to ensure proper panning behavior during zoom operations.
 - Enhanced `ImageProcessor::handleMouseEvent` to pass wheel events to `GraphicsView` while ensuring compatibility with `ImGui`'s mouse capture behavior.
 - Added adjustments for viewport coordinates to account for control panel and title bar offsets.
 - **Outcome:**

- Mouse wheel zooming now works as expected:
 - Smooth transitions and proper zoom/pan behavior around the mouse pointer.
 - Dynamic zoom level updates reflecting accurate scaling and positioning.
- **Panning Functionality Fix:**
 - Identified issues with panning:
 - Offset calculations, scale factors, and zoom adjustments were inconsistent.
 - Control panel offsets were not accounted for, causing misalignment.
 - Solutions implemented:
 - Adjusted handleMouseEvent in ImageProcessor to:
 - Include a CONTROL_PANEL_HEIGHT offset for accurate Y-coordinate calculations.
 - Use a consistent scale factor derived from viewport dimensions to compute pan deltas.
 - Compensate for zoom levels during pan movements to ensure consistency across scales.
 - Correct the Y-axis direction to align with the expected coordinate system.
 - Add boundary checks to prevent panning beyond the valid viewport area.
 - Resolved type mismatch errors in scale factor calculations by explicitly casting m_windowWidth to float.
 - **Outcome:**
 - Panning functionality is now:
 - Smooth and responsive.

- Accurately reflects user interactions and maintains consistent behavior across zoom levels.
 - Free of issues related to offsets, scaling, and zoom adjustments.
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3. Achievements

- Fully resolved mouse wheel zooming issues, enabling intuitive and seamless zoom functionality without requiring the Ctrl key.
 - Fixed panning functionality, ensuring accurate and responsive movement across all viewport and zoom scenarios.
 - Improved user interaction consistency by addressing coordinate mapping, offset calculations, and boundary handling.
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4. Problems & Solutions

1. **Problem:** Mouse wheel zoom required the Ctrl key and had incorrect event handling.
 - **Solution:** Removed the Ctrl key requirement, updated `GraphicsView::handleMouseWheel` for smooth zoom transitions, and ensured correct viewport adjustments.
2. **Problem:** Panning functionality was inconsistent due to improper offset and scale factor calculations.
 - **Solution:** Updated `handleMouseEvent` with precise offset handling, zoom-level compensation, and boundary checks to ensure smooth and accurate panning.
3. **Problem:** Type mismatches in scale factor calculations caused errors.
 - **Solution:** Explicitly cast dimensions to float for compatibility in calculations.