ClimateScope Dashboard – Focused Bug Fix Report

This report documents specific bugs identified during ClimateScope dashboard development, focusing exclusively on data range handling, CSS styling issues, seasonal and monthly group-by logic, and KPI computation errors. All listed issues have been analyzed and resolved.

1. Data Range Selection Bugs

• Incomplete Date Range Selection Error

Issue: Visualizations failed or showed inconsistent results when only one date was selected.

Root Cause: Date input did not validate start and end dates before filtering.

Fix Applied: Implemented validation logic to ensure both start and end dates are selected before applying filters.

Status: Resolved

• Incorrect Data Filtering at Date Boundaries

Issue: Records at the start or end of the selected date range were excluded.

Root Cause: Timestamp values included time components, causing boundary mismatches.

Fix Applied: Normalized timestamps and applied inclusive date filtering.

Status: Resolved

2. CSS Styling & UI Issues

• Sidebar Label Visibility Issues

Issue: Sidebar labels were not clearly visible in dark mode.

Root Cause: Low-contrast color values applied globally.

Fix Applied: Updated sidebar CSS with high-contrast font colors and hover states.

Status: Resolved

• Plotly Legend Text Not Visible

Issue: Country names in legends were unreadable on dark backgrounds.

Root Cause: Default Plotly SVG text color conflicted with dark theme.

Fix Applied: Explicitly styled Plotly legend and SVG text colors via CSS overrides.

Status: Resolved

3. GroupBy Logic Bugs (Seasonal & Monthly)

• Incorrect Seasonal Aggregation

Issue: Seasonal averages were inconsistent across countries.

Root Cause: Season mapping was applied after aggregation.

Fix Applied: Applied season classification prior to group-by operations.

Status: Resolved

• **Monthly Trend Sorting Error**

Issue: Monthly charts displayed months in alphabetical order.

Root Cause: Month names were treated as plain strings.

Fix Applied: Converted month names to ordered categorical variables.

Status: Resolved

4. KPI Calculation Bugs

• **Division by Zero in Rainfall Variability KPI**

Issue: Rainfall variability returned incorrect values when precipitation was zero.

Root Cause: Mean precipitation used as divisor without validation.

Fix Applied: Added conditional checks and fallback values for zero precipitation.

Status: Resolved

• **Extreme Event Risk Percentage Miscalculation**

Issue: Extreme event percentage exceeded logical bounds in small datasets.

Root Cause: Lack of dataset size validation.

Fix Applied: Validated dataset length before computing percentages.

Status: Resolved

5. Conclusion

• **Bug Resolution Summary**

Issue: Multiple functional and UI-related issues impacted analytical accuracy.

Root Cause: Edge cases and theme interactions were not initially accounted for.

Fix Applied: Systematic debugging, validation checks, and styling refinements were applied.

Status: All identified issues resolved