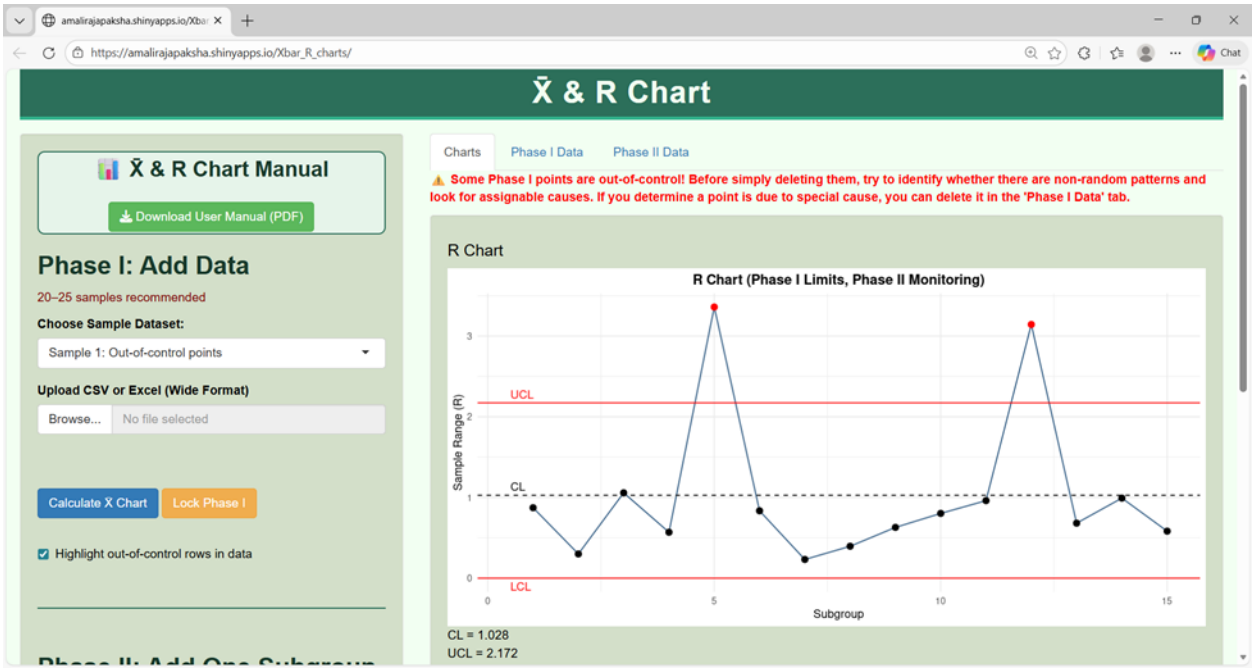
X̄ & R Chart Shiny App Manual

1. Launching the App

You can access the app directly through this link: X̄ & R Chart Shiny App.



2. Overview of the App Interface

The app has two main sections:

- **Sidebar Panel:** For data input, calculations, and controls.
- **Main Panel:** Displays charts and data tables.

Tabs in Main Panel: 1. Charts – Visual representation of X̄ and R charts.

2. Phase I Data – Raw and calculated Phase I data.

3. Phase II Data – New subgroups added for Phase II monitoring.

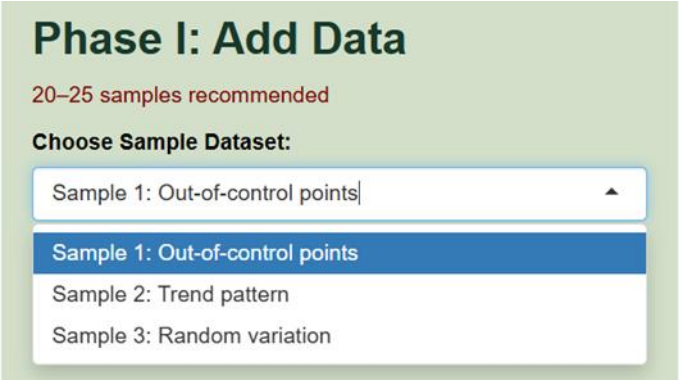
3. Phase I: Add Data

3.1 Uploading Phase I Data

3.1.1 Selecting a Sample Dataset

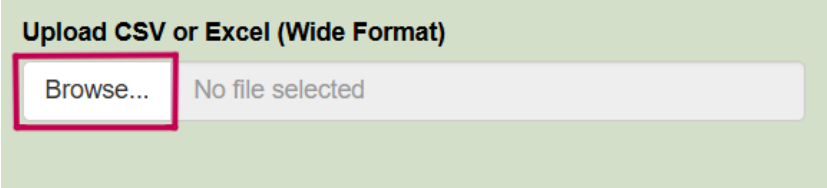
Note: The sample datasets provided are for illustrative and learning purposes only. They are not based on real data and are intended to demonstrate various scenarios in Phase I control chart analysis.

1. Use the “Choose Sample Dataset” dropdown.
2. Options:
    - Sample 1: Out-of-control points
    - Sample 2: Trend pattern
    - Sample 3: Random variation
3. Selecting a sample loads the data.



3.1.2 Uploading Your Own Data

1. Click “Upload CSV or Excel (Wide Format)”.



2. Choose a CSV or Excel file. Requirements:
    - First column: Subgroup numbers
    - Remaining columns: Numeric values.

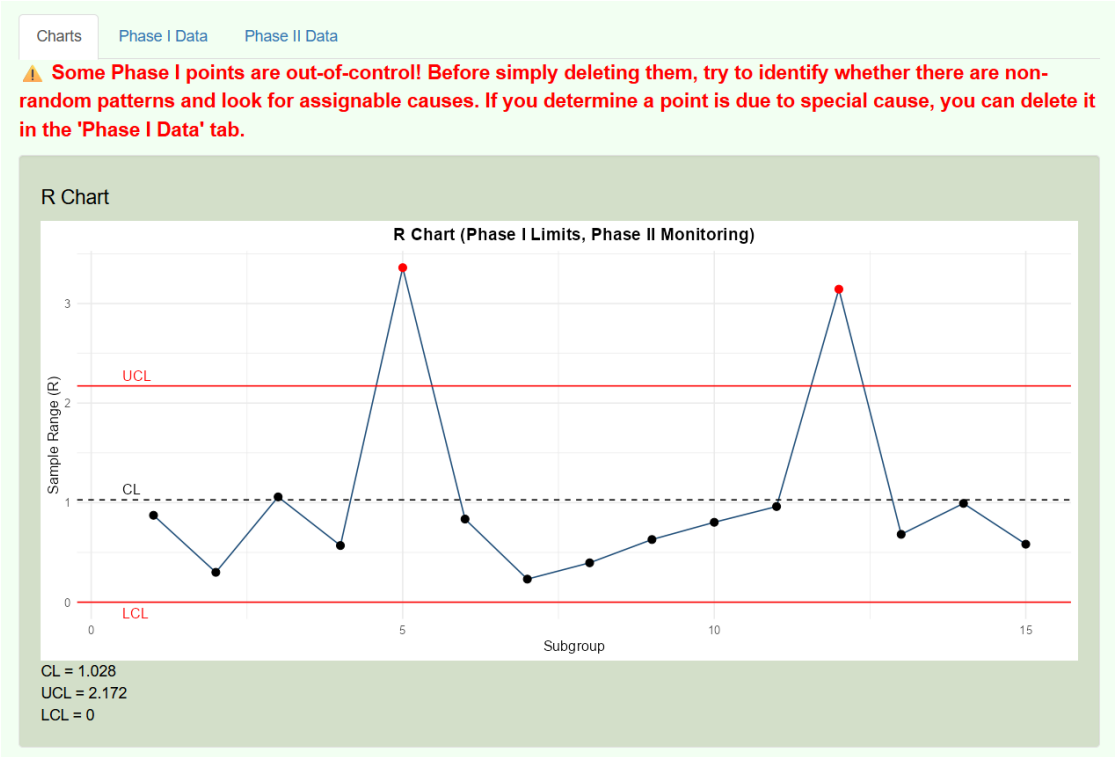
The data file should follow the format shown below.

Subgroup	X1	X2	X3	X4	X5
1	1.3235	1.4128	1.6744	1.4573	1.6914
2	1.4314	1.3592	1.6075	1.4666	1.6109
3	1.4284	1.4871	1.4932	1.4324	1.5674
4	1.5028	1.6352	1.3841	1.2831	1.5507
5	1.5604	1.2735	1.5265	1.4363	1.6441
6	1.5955	1.5451	1.3574	1.3281	1.4198
7	1.6274	1.5064	1.8366	1.4177	1.5144
8	1.419	1.4303	1.6637	1.6067	1.5519
9	1.3884	1.7277	1.5355	1.5176	1.3688

Note: The size of the subgroup can be any value. The app will automatically detect the actual sample size. However, the recommended sample size is 3-6

3.2 R Chart (Automatic Calculation)

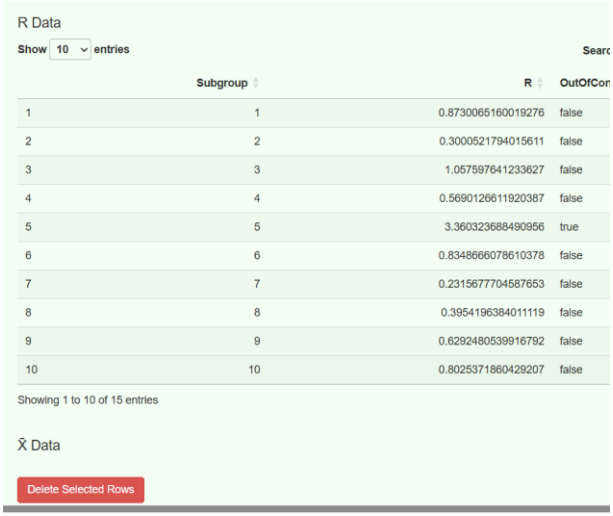
1. After selecting or uploading Phase I data, the **R Chart is calculated automatically**.
2. No additional button is required for the R Chart calculation.



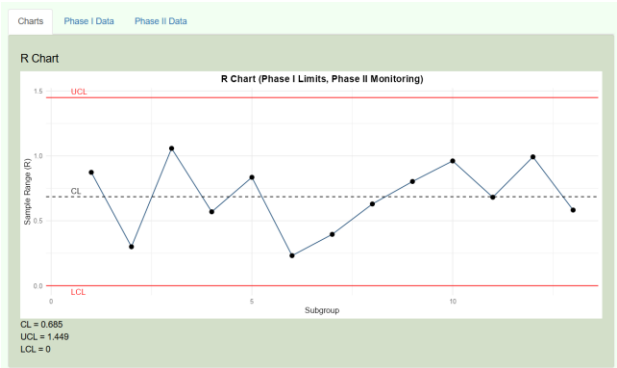
3.3 Deleting Out-of-Control Points

1. Out-of-control points appear in red in Phase I data table.
2. Warning messages appear for out-of-control points.
3. Go to Phase I Data tab, select rows to delete.

4. Click “Delete Selected Rows” at the bottom of this tab

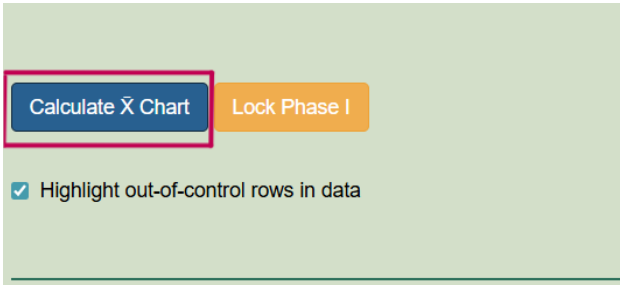


5. Again, go to the Charts tab. R Chart automatically update.

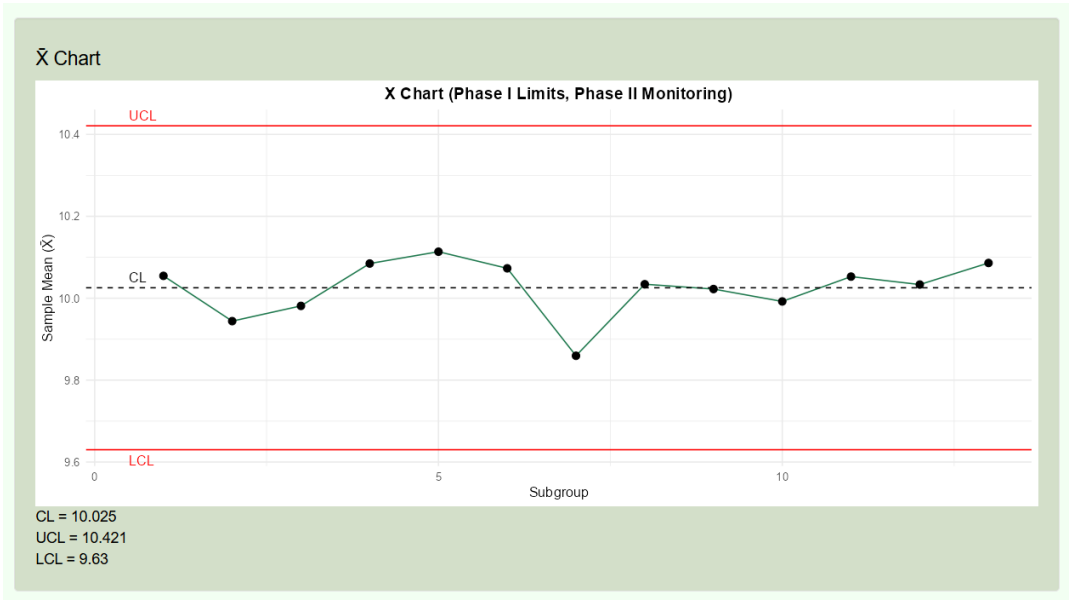


3.4 X̄ Chart

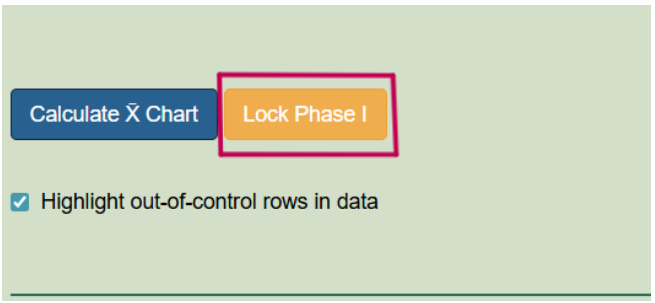
1. After deleting out-of-control points, if the R chart is in control, construct the X̄ Chart.
2. Click "Calculate X̄ Chart" in the sidebar.



3. Then, the X̄ Chart will appear in the Charts tab below the R chart.



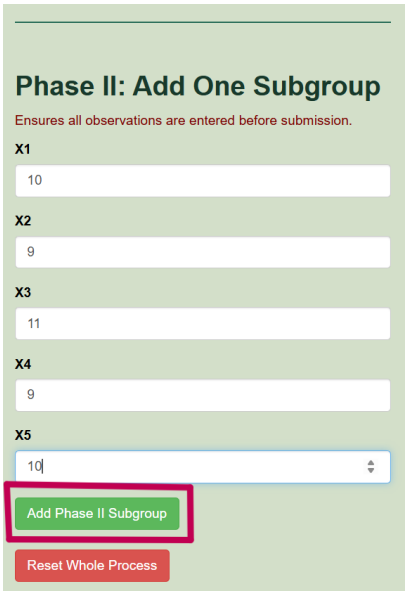
4. After finalising the control limits, lock Phase I.



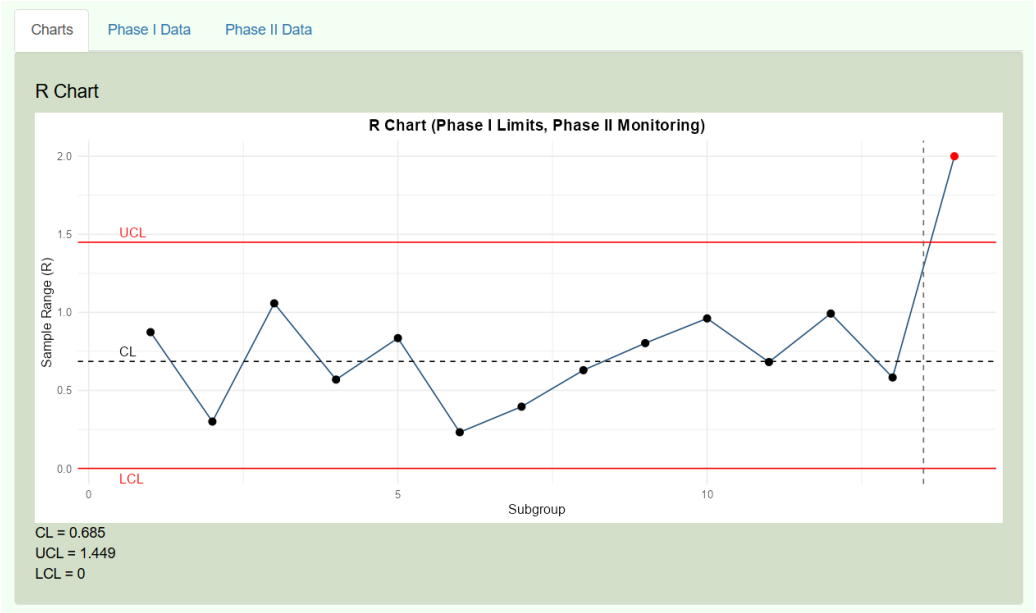
4. Phase II: Add New Subgroup

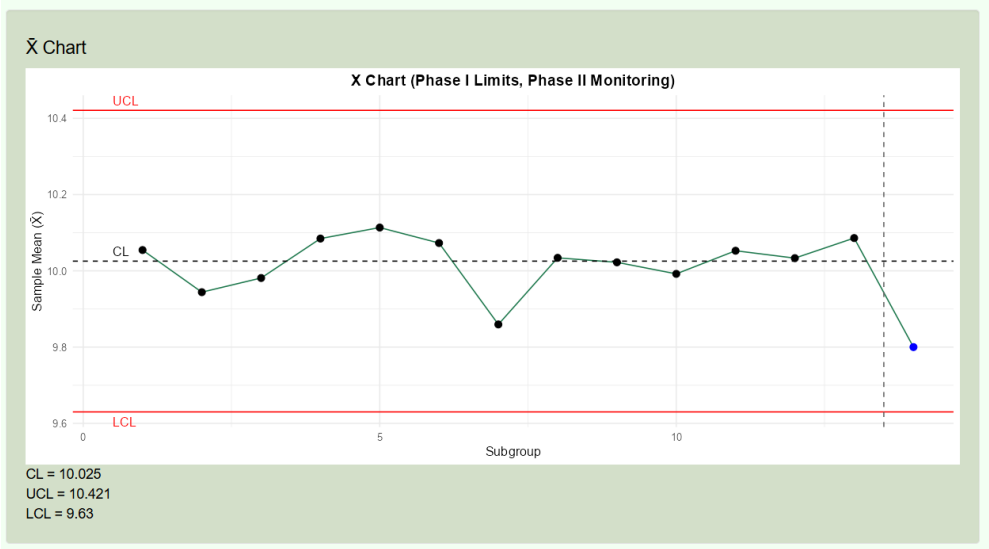
Note: Phase II data cannot be entered until the $\bar{X}$ chart has been constructed.

1. Scroll to “Phase II: Add One Subgroup”.
2. Enter numeric values for the new subgroup.



3. Click “Add Phase II Subgroup”.
4. Charts update to include Phase II:
   - Phase I: **black points**
   - Phase II: **blue points**
   - Out-of-control: **red points**





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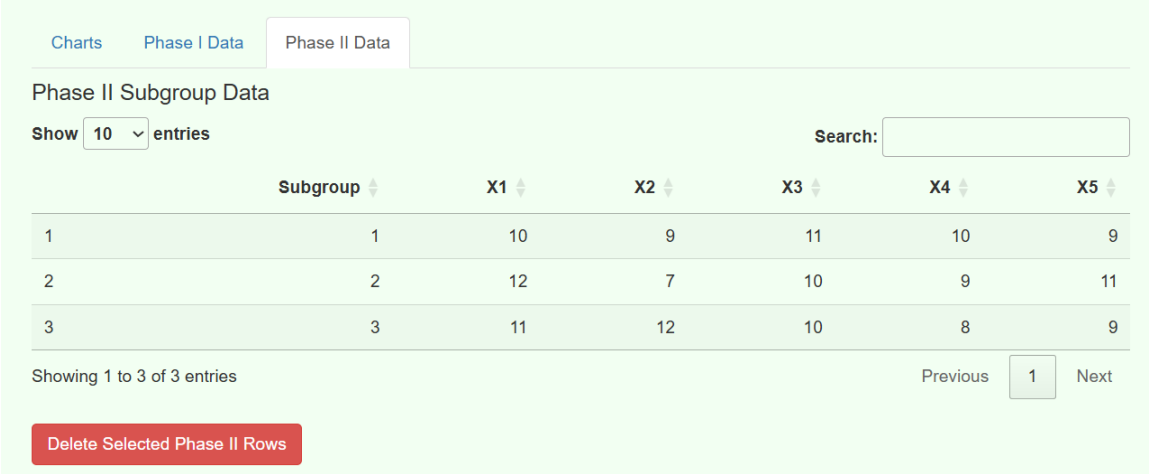
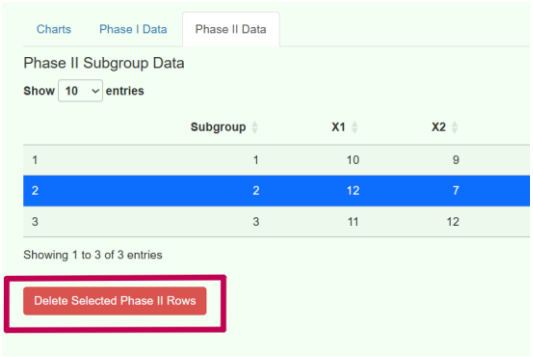
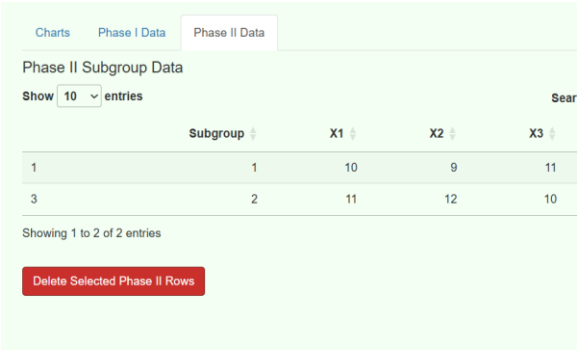
5. “Phase II Data” Tab

1. Initially empty. Once Phase II observations are entered, they will be stored in the Phase II Data tab.



2. If you need to remove a point (e.g., due to entry error), select the row(s) and click “Delete Selected Phase II Rows” .





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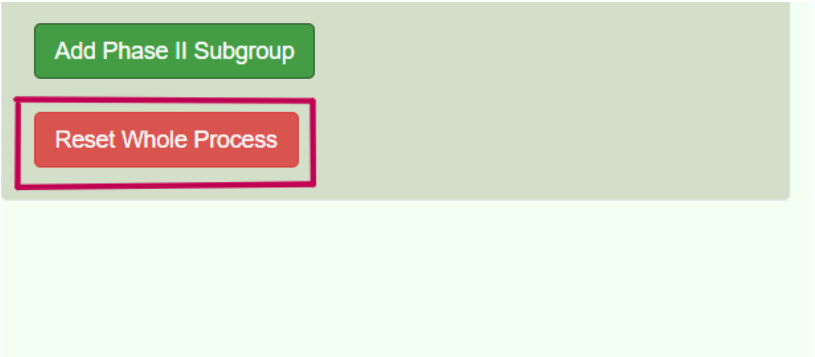
6. Resetting the App

3. Click “Reset Whole Process”.
4. Phase I and Phase II data are cleared.
5. Ready for a new study.



End of Manual

Reference

Montgomery, D. C. (2013). *Introduction to statistical quality control* (6th ed.). John Wiley & Sons.