

Enhancing BTX Analysis Tools

Adding Intelligent Analysis Guidance

The Challenge

BTX provides automatic analysis, but users still need to:

- Interpret diagnostic plots and metrics
- Choose appropriate analysis parameters
- Debug unexpected results
- Make analysis decisions in real-time

Expert knowledge needed to guide automatic analysis

Example: Automated Analysis Guidance

Analysis agent provides feedback on automatic pipeline results:

User: The pump-probe curve for the current run looks weird. What might be wrong?

Response: Based on the p-value uniformity check results, the designated background ROI [80, 95, 5, 45] appears to contain signal when it should not. This is evidenced by:

- 1 Mean p-value of 0.394 (should be 0.5)
- 2 Highly significant KS test ($p=6.496e-17$)
- 3 Large z-score deviation (9.0)

This contaminated background ROI would affect the null distribution calculation, which in turn would distort the pump-probe curve. The solution would be to select a different background ROI location that shows proper uniformity in its p-values.

① Analysis Assistant Agent

- Monitors BTX pipeline metrics in real-time
- Interprets diagnostic results
- Suggests parameter adjustments
- Validates configuration changes

② Key Benefits

- Makes pipeline diagnostics more accessible
- Provides expert-level guidance
- Helps users learn analysis methods
- Accelerates problem solving

③ Development Path

- Start: ROI validation assistant
- Expand: Full diagnostic monitoring
- Goal: Interactive analysis guidance