Project Report: Anomaly Detection in Options Market Data

Anomaly:

> **An anomaly**, as defined in this project, refers to an unusual deviation in key market parameters (like price, volume, volatility) that stands out from the normal behavior pattern of an instrument.

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Feature Engineering & Anomaly Types Detected:

Anomaly Conditions	Features Computed	Threshold
Price Change Rate:	`pct_change()` on `ltp` values.	Absolute change rate > 5%
Volume Z-Score:	Z-normalized traded volume.	Volume z-score > 3
Bid-Ask Spread:	`best_offer - best_bid`	spread_ratio > 5%
IV Change	Absolute and percentage change in `iv`	IV z score > 3
IV Divergence	Difference between `iv` and average of `bid_iv`/`ask_iv`	|iv - mean(bid_iv, ask_iv)| > 0.15
Delta Flip	Change in sign of `delta`	Vega z-score > 3
Vega Spike	Sudden sensitivity changes captured by z-scores	Sign flip in delta (e.g. +0.2 → -0.3)

Output Summary:

- **Functionality**: All anomaly types detected and appended to a unified DataFrame
- **Output Columns**: `datetime`, `stock_id`, `anomaly_type`
- **Storage**: Option to export as CSV (`result_set1.csv`)