Internship Assignment: Machine Learning Insight Evaluation

Candidate Submission | **Date:** 11 January 2026

Scenario Overview

- **Dataset:** Retail Sales & Inventory Data for a national grocery chain.
- **Assumptions:** The existing pipeline generates natural language insights such as: *"Store X should increase organic dairy stock by 15% next Tuesday due to a localized trend in health-conscious purchasing."*
- **System Logic:** Insights are derived from a time-series forecasting model integrated with external localized trend data.

Chosen Question:

Describe how you would measure whether the insights are useful and reliable.

Response:

To measure reliability, I would implement a Backtesting and Error Tracking framework. This involves applying the algorithm's historical insights to past data to see if the predicted outcomes actually occurred. Specifically, I would calculate the Mean Absolute Scaled Error (MASE) to determine if the insight-driven forecast is significantly more accurate than a simple "naive" forecast (e.g., assuming next Tuesday will be exactly like last Tuesday). Reliability is also measured through Stability Testing; if the algorithm provides wildly different inventory recommendations when the data is slightly updated with a single day of sales, the insights are likely "brittle" and cannot be relied upon for consistent supply chain operations.

To measure usefulness, I would shift from statistical metrics to Impact-Based A/B Testing. I would deploy the insights to a "Test" group of stores while keeping a "Control" group on the standard inventory protocol. Usefulness would then be quantified by a Conversion-to-Action Rate—measuring how often store managers actually followed the recommendation—and the resulting Economic Lift (e.g., reduction in food waste or increase in revenue). An insight is only truly useful if it is actionable; therefore, I would track the delta between the cost of implementing the recommendation versus the profit gained. If the insight leads to a statistically significant improvement in margins without increasing operational complexity, it is deemed highly useful.

Name : Raj Raushan Kumar
Gmail id : rajraushankumar749@gmail.com
Mob No : 7667364120