StorePulse

Demand Forecasting Automation Platform using NB-INGARCH Models

MTech Technical Presentation - Complete System Architecture

🔄 Training Pipeline Flow

Complete end-to-end flow from data upload to model deployment.

sequenceDiagram autonumber participant U as User participant UI as Frontend participant API as API Server participant DB as Database participant FE as Feature Engineer participant ML as ML Trainer participant V as Validator participant FS as Forecast Service U->>UI: Upload CSV Data UI->>API: POST /data/upload API->>DB: Store visits in DB DB-->>API: Records stored API-->>UI: Upload successful U->>UI: Click Train Model UI->>API: POST /train/ingarch rect rgb(255, 243, 224) note right of API: Data Preparation API->>DB: Fetch historical visits DB-->>API: Return DataFrame API->>FE: Build feature matrix FE->>FE: Generate lags (1,2,7,14,21,30) FE->>FE: Add temporal features FE->>FE: Compute rolling stats FE->>FE: Add holiday indicators FE-->>API: Feature matrix ready (21 features) end rect rgb(252, 228, 236) note right of API: Model Training API->>ML: Train INGARCH(2,1) ML->>ML: Maximum Likelihood Estimation ML->>ML: Optimize ARCH terms ML->>ML: Estimate dispersion parameter ML-->>API: Model trained end rect rgb(232, 245, 233) note right of API: Validation API->>V: Run quality gates V->>V: Calculate model SMAPE: 37.91% V->>V: Calculate MA7 baseline: 39.91% V->>V: Compute lift: 5.0% V->>V: Check: lift > 0% PASSED V-->>API: Validation successful end rect rgb(227, 242, 253) note right of API: Deployment API->>DB: Save model metadata API->>FS: Register model artifact FS-->>API: Model ready for inference API-->>UI: Training complete UI-->>U: Display results end

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MTech Project | NB-INGARCH Implementation | Verified Metrics

All diagrams, metrics, and architecture details are based on actual implementation