Par Delta Dashboard

Complete Technical Documentation

Database Schema, Tables, Columns & Analysis Features

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1. Project Overview

The Par Delta Dashboard is a modern Streamlit-based operational analytics platform designed for Dunkin' locations managed by Par Delta. The system provides real-time analytics across multiple operational domains including labor management, inventory tracking, donut waste analysis, employee performance monitoring, and variance reporting.

Key Features:

• Real-time data integration with Supabase (PostgreSQL backend)

• Interactive visualizations using Plotly and Matplotlib

• Modular dashboard architecture with 10+ analysis modules

• AI-powered chat interface for conversational analytics

• Automated data ingestion from multiple sources (CrunchTime, Labour systems)

• Comprehensive labor and inventory variance analysis

• Multi-store operational comparison and monitoring

Technology Stack:

Component	Technology
Frontend	Streamlit
Backend Database	Supabase (PostgreSQL)
Data Visualization	Plotly, Matplotlib
AI Integration	OpenAI GPT, LangChain
Data Processing	Pandas, NumPy
Language	Python 3.x

2. Database Schema Overview

The database consists of 9 primary tables organized to track store operations, inventory, labor management, and sales data. All tables are interconnected through foreign key relationships, primarily using store identifiers (pc_number) and product type references.

Database Entity Relationships:

Core Entities:
• **stores** → Referenced by all operational tables via pc_number
• **product_types** → Referenced by products, usage_overview, donut_sales_hourly
• **products** → Catalog of all products with supplier information

Operational Data:
• **employee_clockins** → Actual work hours and wages
• **employee_schedules** → Planned work schedules
• **hourly_labor_summary** → Aggregated labor metrics by hour

Inventory & Sales:
• **usage_overview** → Daily product usage, waste, and ordering
• **donut_sales_hourly** → Hourly donut sales transactions
• **variance_report_summary** → Inventory variance and theoretical vs actual analysis

3. Data Tables & Columns

3.1 stores

Store location master data

Column Name	Data Type	Description	Constraints
pc_number	VARCHAR(6)	6-digit store code	UNIQUE, NOT NULL
name	TEXT	Store name	
address	TEXT	Store address	

3.2 product_types

Product category classifications

Column Name	Data Type	Description	Constraints
product_type_id	SERIAL	Auto-increment ID	PRIMARY KEY
name	TEXT	Product type name (e.g., Donut, Coffee)	UNIQUE

3.3 products

Complete product catalog with supplier information

Column Name	Data Type	Description	Constraints
product_id	SERIAL	Auto-increment ID	PRIMARY KEY
name	TEXT	Product name	
product_type_id	INT	Foreign key to product_types	REFERENCES product_types
supplier	TEXT	Supplier name	CHECK IN ('CML', 'NDCP')
unit	TEXT	Unit of measurement	

3.4 usage_overview

Daily product usage, waste, and consumption tracking

Used in: Donut Waste & Gap Analysis

Column Name	Data Type	Description	Analysis Use
store_id	INT	Store identifier	Filter by location
date	DATE	Date of record	Time series analysis
product_type_id	INT	Product type reference	Category filtering
ordered_qty	NUMERIC	Quantity ordered	Supply calculation
wasted_qty	NUMERIC	Quantity wasted	Waste analysis
waste_percent	NUMERIC	Waste percentage	Efficiency metrics
waste_dollar	NUMERIC	Waste cost in dollars	Financial impact
expected_consumption	NUMERIC	Expected usage	Variance calculation
product_type	TEXT	Product type name	Display/filtering

3.5 donut_sales_hourly

Hourly donut sales transaction data

Used in: Donut Waste & Gap, Hourly Sales

Column Name	Data Type	Description	Analysis Use
store_id	INT	Store identifier	Location filtering
sale_datetime	TIMESTAMP	Sale timestamp	Hourly aggregation
product_name	TEXT	Product name	Product-level analysis
product_type_id	INT	Product type reference	Category analysis
quantity	NUMERIC	Units sold	Sales volume tracking
value	NUMERIC	Sales value in dollars	Revenue analysis

3.6 employee_clockins

Actual employee work hours and payroll data

Used in: Labor Punctuality, Employee Performance, Ideal vs Actual Labor

Column Name	Data Type	Description	Analysis Use
employee_id	VARCHAR(20)	Employee identifier	Employee tracking
employee_name	TEXT	Employee name	Display/reporting
store_id	INT	Store reference	Location filtering
date	DATE	Work date	Time analysis
time_in	TIME	Clock in time	Punctuality analysis
time_out	TIME	Clock out time	Shift duration
total_time	NUMERIC	Total hours worked	Labor hours calculation
rate	NUMERIC	Hourly pay rate	Wage calculation
regular_hours	NUMERIC	Regular work hours	Standard pay calculation
regular_wages	NUMERIC	Regular wages paid	Labor cost
ot_hours	NUMERIC	Overtime hours	OT analysis
ot_wages	NUMERIC	Overtime wages	OT cost analysis
total_wages	NUMERIC	Total wages	Total labor cost

3.7 employee_schedules

Planned employee work schedules

Used in: Labor Punctuality, Ideal vs Actual Labor

Column Name	Data Type	Description	Analysis Use
employee_id	VARCHAR(20)	Employee identifier	Schedule tracking
date	DATE	Scheduled date	Time analysis
start_time	TIME	Scheduled start	Punctuality comparison
end_time	TIME	Scheduled end	Shift planning

3.8 hourly_labor_summary

Aggregated hourly labor and sales metrics

Used in: Ideal vs Actual Labor, Hourly Sales

Column Name	Data Type	Description	Analysis Use
store_id	INT	Store identifier	Location filtering
date	DATE	Record date	Time series analysis
hour_range	TEXT	Hour range (e.g., 06:00-07:00)	Hourly analysis
forecasted_checks	NUMERIC	Predicted customer count	Demand planning
forecasted_sales	NUMERIC	Predicted sales value	Revenue forecasting
ideal_hours	NUMERIC	Optimal labor hours	Efficiency target
scheduled_hours	NUMERIC	Planned labor hours	Planning analysis
actual_hours	NUMERIC	Actual labor hours	Performance tracking
actual_labor	NUMERIC	Actual labor cost	Cost analysis
sales_value	NUMERIC	Actual sales value	Revenue tracking
check_count	NUMERIC	Actual customer count	Traffic analysis

3.9 variance_report_summary

Inventory variance and theoretical vs actual analysis

Used in: Inventory Variance, Retail Merchandise

Column Name	Data Type	Description	Analysis Use
store_id	INT	Store identifier	Location filtering
product_name	TEXT	Product name	Item-level analysis
subcategory	TEXT	Product subcategory	Category filtering
unit	TEXT	Unit of measurement	Quantity tracking
qty_variance	NUMERIC	Quantity variance	Shrinkage analysis
dollar_variance	NUMERIC	Dollar variance	Financial impact
cogs	NUMERIC	Cost of goods sold	Cost analysis
units_sold	NUMERIC	Units sold	Sales volume
theoretical_qty	NUMERIC	Expected quantity	Variance calculation
theoretical_value	NUMERIC	Expected value	Expected cost
beginning_qty	NUMERIC	Starting inventory	Inventory flow
purchase_qty	NUMERIC	Purchases made	Inventory additions
ending_qty	NUMERIC	Ending inventory	Inventory balance

beginning_value	NUMERIC	Starting value	Financial tracking
purchase_value	NUMERIC	Purchase cost	Cost tracking
waste_qty	NUMERIC	Waste quantity	Waste analysis
ending_value	NUMERIC	Ending value	Asset value
transfer_in	NUMERIC	Transfers in	Inter-store movement
transfer_out	NUMERIC	Transfers out	Inter-store movement

4. Dashboard Analysis Features

The Par Delta Dashboard consists of 10 analytical modules, each providing specific operational insights. Below is a comprehensive breakdown of each module, the tables it uses, and the analyses performed.

4.1 Donut Waste & Gap Analysis

Aspect	Details
Tables Used	• usage_overview • donut_sales_hourly
Key Columns	• ordered_qty, wasted_qty, SalesQty • date, pc_number, product_type
Calculations	• CalculatedWaste = ordered_qty - SalesQty • Gap = CalculatedWaste - wasted_qty • DonutCost = wasted_qty × $0.36
Visualizations	• Ordered vs Sales vs Waste trend line chart • Daily waste comparison charts • Cost impact analysis
Business Value	Identifies discrepancies between reported and calculated waste, helping reduce losses and improve or

4.2 Ideal vs Actual Labor

Aspect	Details
Tables Used	• hourly_labor_summary • actual_table_labor • ideal_table_labor • schedule_table_labor
Key Columns	• ideal_hours, scheduled_hours, actual_hours • actual_labor, sales_value • date, hour_range, pc_number
Calculations	• actual_labor_pct_sales = (actual_labor / sales_value) × 100 • Weekly aggregations • Variance: actual vs ideal
Visualizations	• Labor % of Sales line chart • Ideal vs Scheduled vs Actual hours comparison • Weekly trend analysis
Business Value	Monitors labor efficiency, identifies over/under-staffing, and tracks labor cost as percentage of sales

4.3 Labor Punctuality Report

Aspect	Details
Tables Used	• employee_clockins • employee_schedules • stores
Key Columns	• employee_id, time_in, start_time • date, pc_number, employee_name
Calculations	• Late = time_in > (start_time + threshold) • Early = time_in < (start_time - threshold) • On Time = within threshold • Absent = scheduled but no clock-in • On Call = clock-in without schedule
Visualizations	• Punctuality status breakdown (pie/bar charts) • Employee-level punctuality table • Time-based trends
Business Value	Tracks employee attendance reliability, identifies chronic lateness, supports performance management

4.4 Inventory Variance Analysis

Aspect	Details
Tables Used	• variance_report_summary
Key Columns	• qty_variance, variance (dollar) • theoretical_qty, theoretical_value • cogs, units_sold • subcategory, product_name
Calculations	• Theoretical Cost Variance = theoretical_value - cogs • Unit Gap = theoretical_qty - units_sold • Variance percentage calculations
Visualizations	• Top 10 variance by quantity • Top 10 variance by dollar value • Category-level summaries • Period-over-period comparisons
Business Value	Identifies inventory shrinkage, theft, or recording errors; highlights high-variance products for investigat

4.5 Employee Performance Overview

Aspect	Details
Tables Used	• employee_profile • employee_clockins • employee_schedules
Key Columns	• employee_id, employee_name • total_wages, total_time • status, hired_date, primary_location
Calculations	• Total hours worked • Total wages paid • Attendance rate • Punctuality metrics • Employee tenure
Visualizations	• Individual employee performance cards • Attendance and punctuality trends • Wage and hours comparisons • Status breakdowns
Business Value	Comprehensive employee analytics for performance reviews, identifying top performers and problem a

4.6 Hourly Sales & Labor

Aspect	Details
Tables Used	• hourly_labor_summary
Key Columns	• hour_range, sales_value, check_count • actual_hours, actual_labor • forecasted_sales, forecasted_checks
Calculations	• Sales per hour • Checks per hour • Labor cost per hour • Forecast vs actual variance • Sales per labor hour
Visualizations	• Hourly sales trend charts • Labor vs sales correlation • Forecast accuracy analysis • Peak hour identification
Business Value	Identifies peak sales hours for optimal staffing, validates forecasting models, optimizes labor scheduling

4.7 Retail Merchandise Analysis

Aspect	Details
Tables Used	• variance_report_summary (filtered)
Key Columns	• Subcategories: Retail Coffee, Mugs & Tumblers, Holiday & Gift Baskets • qty_variance, variance, units_sold • cogs, purchases_qty, purchases_value
Calculations	• Theoretical Cost Variance • Unit Gap • Sales performance by category • Purchase efficiency
Visualizations	• Top 10 retail variance charts • Category performance comparison • Purchase vs sales analysis
Business Value	Monitors retail merchandise performance, identifies slow-moving items, optimizes retail inventory levels

4.8 Inventory Quality Assurance

Purpose: Validates inventory data quality and identifies data inconsistencies.
Tables Used: variance_report_summary, usage_overview
Checks Performed:
• Missing or null critical values
• Negative quantities where not expected
• Unusually high variance percentages
• Inconsistent date ranges
• Product name standardization issues

4.9 AI-Powered Chat Interface

Purpose: Conversational analytics using OpenAI and LangChain.
Capabilities:
• Natural language queries about operational data
• Automated insight generation
• Data trend explanations
• Recommendations based on patterns
Integration: Connects to all database tables for comprehensive query responses.

5. Data Ingestion Pipeline

The data ingestion pipeline consists of two main phases: data ingestion/cleaning and database upload. The system processes data from multiple sources including CrunchTime (inventory/variance reports) and labour management systems.

5.1 Data Ingestion Scripts

Script	Source Data	Output	Tables Populated
combined_labour.py	Schedule TXT files Consolidated time CSV	Clean employee schedules & clockins	employee_schedules employee_clockins
variance_report.py	CrunchTime variance report Excel	Formatted variance data	variance_report_summary
combine_hourly_labour.py	Hourly labor CSV Hourly sales data	Merged hourly metrics	hourly_labor_summary
clean_consolidated_employee.py	Employee CSV	Clean employee profiles	employee_profile
download_hourly_labour_attachments.py	Email attachments	Raw hourly labour files	Raw data folder

5.2 Database Upload Scripts

Script	Target Table	Upload Method	Key Features
upload_employee_clockin.py	employee_clockins	UPSERT	Incremental updates Duplicate prevention
upload_employee_profile.py	employee_profile	UPSERT	Batch processing Profile updates
upload_employee_schedule.py	employee_schedules	UPSERT	Schedule sync Conflict resolution
upload_hourly_labour.py	hourly_labor_summary	UPSERT/INSERT	Hourly aggregation Conflict handling
upload_variance.py	variance_report_summary	UPSERT	Weekly variance Period tracking
upload_labour.py	Multiple labor tables	UPSERT	Comprehensive labor data sync

6. Technical Architecture

The Par Delta Dashboard follows a three-tier architecture with clear separation of concerns:

6.1 Architecture Layers

Layer	Components	Responsibilities
Presentation Layer	• Streamlit web interface • Page modules • Interactive visualizations	• User interaction • Data visualization • Filtering and navigation
Business Logic Layer	• Data processing functions • Analysis calculations • Aggregation logic	• Metrics calculation • Data transformation • Business rule enforcement
Data Layer	• Supabase PostgreSQL • Table schemas • Foreign key relationships	• Data persistence • Query optimization • Data integrity
Integration Layer	• Ingestion scripts • Upload utilities • API connections	• Data extraction • Data cleaning • ETL processes

6.2 Data Flow

1. Data Collection:
• CrunchTime exports (variance reports, inventory data)
• Labour system exports (schedules, clock-ins, employee profiles)
• Email attachments (hourly labour reports)

2. Data Processing:
• Scripts clean and standardize data formats
• Validation checks ensure data quality
• Transformations prepare data for database schema

3. Database Upload:
• UPSERT operations prevent duplicates
• Batch processing for efficiency
• Error handling and logging

4. Dashboard Consumption:
• Streamlit pages query Supabase
• Data cached for performance (TTL: 1 hour)
• Real-time filtering and aggregation
• Interactive visualizations rendered

6.3 Key Performance Metrics Tracked

Category	Metrics	Tables Used
Labor Efficiency	• Labor % of Sales • Ideal vs Actual hours • Scheduled adherence	hourly_labor_summary employee_clockins employee_schedules
Inventory Management	• Waste quantity & cost • Variance (qty & $) • Theoretical vs actual	usage_overview variance_report_summary
Employee Performance	• Punctuality rate • Attendance rate • Total hours worked	employee_clockins employee_schedules employee_profile
Sales Analytics	• Hourly sales value • Check count • Forecast accuracy	donut_sales_hourly hourly_labor_summary

Summary

The Par Delta Dashboard provides comprehensive operational analytics across 9 database tables containing labor, inventory, sales, and employee data. The system processes data from multiple sources, maintains data quality through validation pipelines, and presents actionable insights through 10+ interactive dashboard modules. This architecture enables data-driven decision-making for store operations, labor optimization, inventory management, and employee performance tracking.

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