Analyzing College Campus Dining Patterns

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PROBLEM STATEMENT

- To empower RIT Dining with business insights to enhance the dining experience across campus through advanced menu analysis and operational insights.

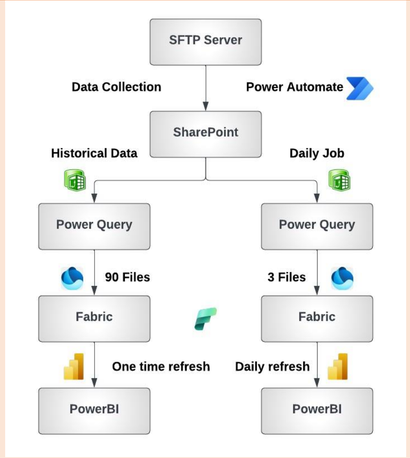
PROJECT OVERVIEW

- How we can use Data Science and analytics to uncover student dining patterns on campus.
- Created PowerBI report which shows
  1. Recommendations for combo meals
  2. Peak dining hours for each location
  3. Preferred menu items

PROJECT FLOW

- **Data Source**: Schema and data structure analysis
- **Data Collection**: SFTP Server: Automated Data Extraction
- **Storage**: Data files transferred to SharePoint
- **Data Cleaning**: Clean, preprocess, and transform in Power Query
- **Analyze Data**: Analyze the organization of data in 31 interconnected tables
- **Data Lakehouse**: Perform MBA and PTA using algorithms in Fabric
- **PowerBI Analysis**: Create visualizations and dashboards in PowerBI

DESIGN & IMPLEMENTATION



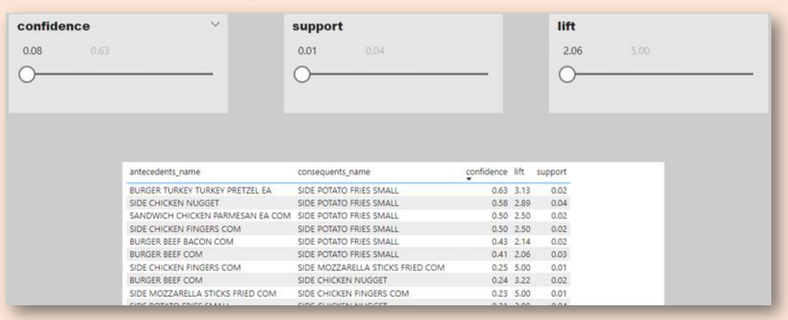
Market Basket Analysis:

- The 'Check' table, one of the main fact tables, is pivotal for storing all transaction-related data.

```
# Generating Frequent Itemsets with Apriori Algorithm
frequent_itemsets = apriori(basket_pd, min_support=0.01,
                            use_colnames=True)

# Deriving Association Rules with a Minimum Lift of 1
rules = association_rules(frequent_itemsets,
metric="lift", min_threshold=1)
```

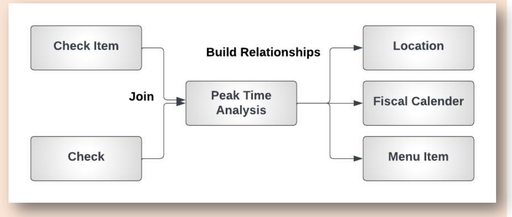
Visual representations reveal popular item combinations, providing actionable insights for menu optimization and promotional strategies.



INTEGRATION & RESULTS

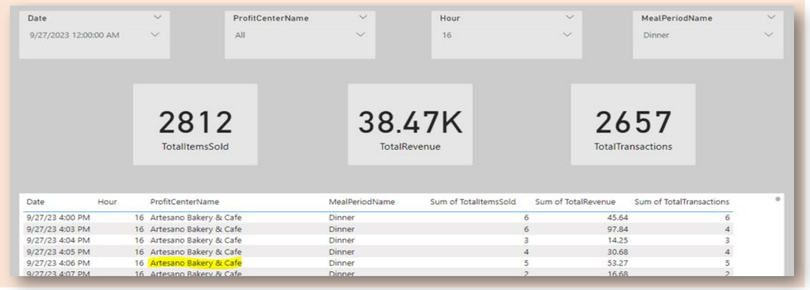
Peak Time Analysis:

Joined Check and Check Item tables to calculate the revenue and other attributes below at different hours




```
SELECT C.TenderedDateTime AS HourOfDay,
SUM(NULLIF(TRY_CAST(C.GrossRevenue AS DECIMAL(15, 5)), 0)) AS TotalRevenue,
SUM(NULLIF(TRY_CAST(C.DiscountAmount AS DECIMAL(15, 5)), 0)) AS TotalDiscount,
SUM(NULLIF(TRY_CAST(CI.ItemsSold AS INT), 0)) AS TotalItemsSold,
COUNT(C.Covers) AS TotalCovers,
C.LocationID, C.MealPeriodID, COUNT(*) AS TotalTransactions
```

The PowerBI report shows the peak dining hours, highest and lowest selling items by location and time periods



CONCLUSION & FUTURE ANALYSIS

The real-time PowerBI dashboard provides crucial insights by revealing customer dining patterns, identifying peak dining hours, and understanding preferred menu items, enabling campus management to make informed decisions that cater to the dynamic dining needs of students.

Future Analysis: Incorporate Kronos data for workforce management insights. Integrate on-campus housing data for a comprehensive view of student life.