BarQ Data

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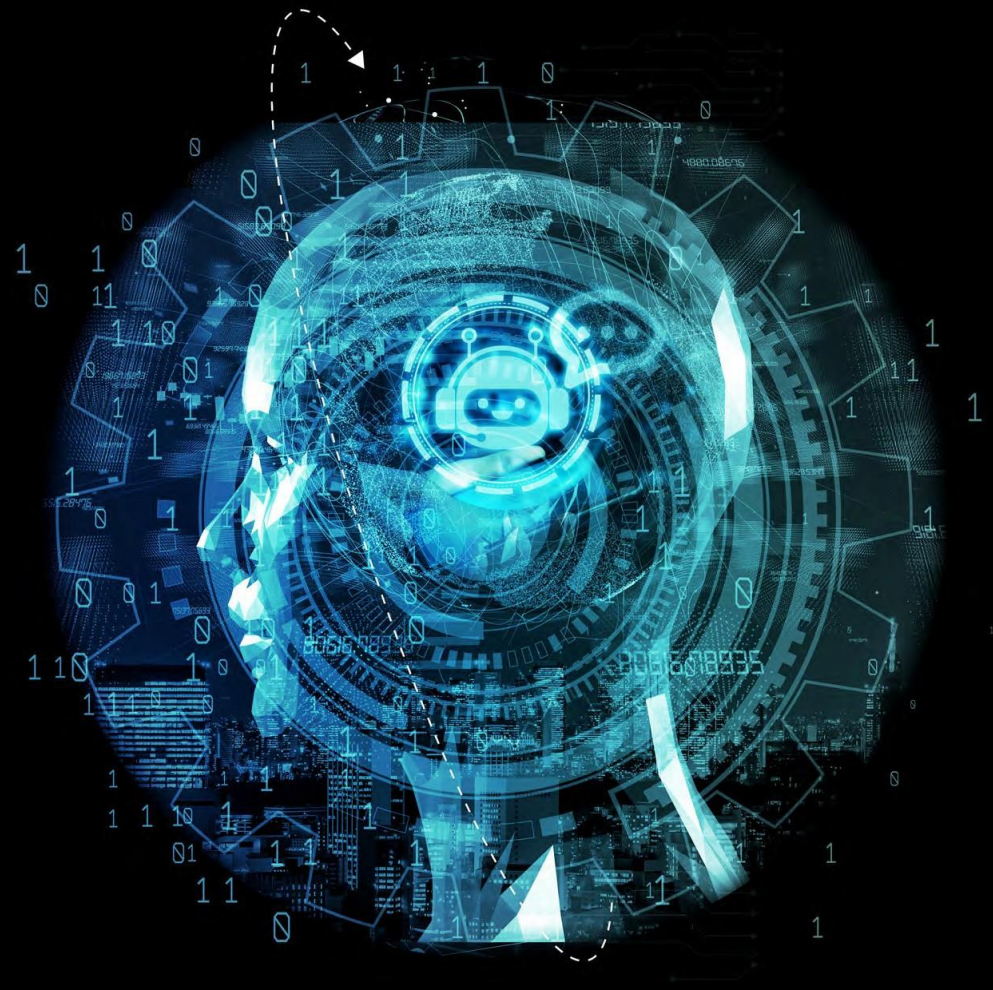

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Introduction

Company Overview: BarQ operates bar kiosks at airports, railway stations, and bus terminals

Service Details: Limited seating, offers alcoholic/non-alcoholic beverages, and simple food been

Leadership Vision: New leadership aims to shift to data-driven decision-making, moving away from intuition-based approaches

POS System Implementation: Installed POS systems across locations to capture data but faces challenges in data analysis and utilization

We was asked to provide my view on the quality of the data:

- What is my approach?
- What have I checked and what data quality issues have I found?
- How have I resolved these issues?

Data Quality Assessment Approach

We can check through basic key areas to assess the quality of our data:

- **Completeness:** Check for Null values in key variables like identifiers and dates
- **Consistency:** With regards to data formats and relationship between our key variable (order_id) within the 2 tables
- **Integrity:** Check for duplicates in unique identifiers
- **Data Distribution & Grouping Validity:** Ensure the data groups make sense and the data is distributed evenly
- **Sanity:** Checking whether the data makes sense, e.g.: Time customer leaves is after the time customer enters
- **Accuracy:** Check for anomalies in calculatable fields like price per item and taxes to catch and correct anomalies

Analyzing Results and Fixing Issues

Completeness Check	No missing values were found in critical fields across both files.
Date-Time Formatting	Date-Time fields were improperly formatted **Solution:** Standardized formatting using functions like TO_TIMESTAMP and TO_DATE **Validation:** Verified that Order Start time < Order End time and Order Process time fell between start and end times
Sanity Checks on Financial Fields	Found zeroes and inconsistent values in tax columns **Solution:** For each Table_ID and Menu_Item_ID, replaced abnormal tax values with the median tax for each group
Updated Tax Values in Transaction Header	Added corrected tax values from transaction details to the transaction header table as Taxes_new to ensure consistency in totals
Guest Count vs. Spending Consistency Check	No significant relationship found to flag inconsistencies in customer spending based on guest count
Store Size consistency Check	We verified whether the store_grp_id correctly subdivides the stores into distinct groups, and the analysis confirmed that the grouping is accurate

Refer to Appendix for related Data Changes

Conclusion About Data Quality

The data provided by BarQ was generally sound. However, some areas did require my attention to make sure it met the standard required to meet to be fit for use during an analysis:

- **Consistency:** The formatting of datetime fields required adjustments to meet the database's standards. We used functions like TO_TIMESTAMP and TO_DATE to standardize these fields, ensuring consistency across the dataset
- **Sanity:** The data was mostly logical, but we identified some inconsistencies in tax amounts (e.g., zero values and abnormally high values). These issues were addressed by applying median values for tax amounts within specific groups, correcting the records.

Fixing these issues made the data ready for further analysis to aid the decision-making process.

Additional Recommended Analysis

- **Tip percentage analysis:** The analysis of tip percentages revealed that tip percentages remain consistent across all servers, locations, and bill sizes, ranging from 7.5% to 9.25%. This consistency suggests that the level of service is uniformly delivered across all stores and staff members, reaffirming the effectiveness of our Standard Operating Procedures (SOPs)
- **Loyalty Base Analysis:** We can conduct multiple analyses on the data for customers who we have the Loyalty number for:
  - **Customer Enrollment Rate:** Analyzing the percentage of customers who sign up for the loyalty program at each location versus those who do not, helping to identify which locations drive higher program engagement.
  - **Order Behaviors:** Examining order behavior to identify popular items frequently ordered by loyalty members, as well as items rarely reordered. Insights from this can guide promotional strategies for popular items and inform decisions to improve or phase out underperforming dishes
  - **Spend Behavior Analysis:** Analyzing average spending behaviors among loyalty members, providing insights into whether loyalty customers spend more on average
- **Seasonality Analysis:** Evaluating patterns in sales volume across different times of the year to uncover seasonal peaks or dips in customer demand, helping to align marketing efforts and staffing with high-traffic periods.

Additional Recommended Analysis – Continued

- **Wait Time Analysis:** Measuring the average time customers wait to place their order from their arrival to the order processing time, allowing us to assess service efficiency and identify potential areas to reduce wait time
- **Churn Time Analysis:** Analyzing the overall customer visit duration to explore trends in customer dwell time, especially identifying if certain stores or times of day see extended stays. This can support strategies to maximize profit by aligning promotions or service pacing with customer time spent

Appendix

Comparison Between Old and New Date Time Formatting

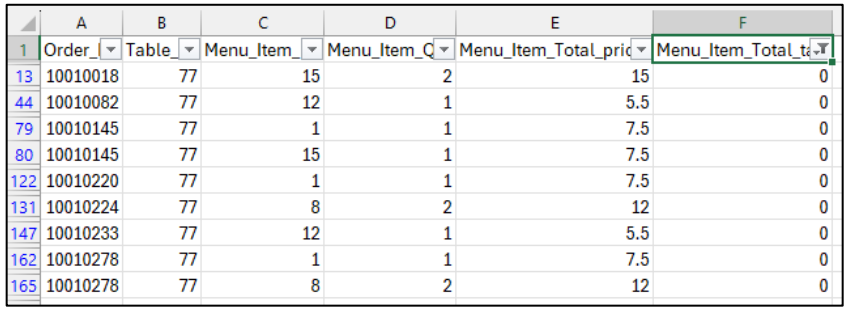
G	H	I
Order_Txn_Start_Dttm	Order_Txn_End_Dttm	Order_Process_Dttm
1/2/2022 18:09	1/2/2022 20:48	1/2/2022 20:40
1/2/2022 21:03	1/3/2022 0:10	1/3/2022 0:06
1/3/2022 18:22	1/3/2022 20:28	1/3/2022 20:26
1/3/2022 20:46	1/3/2022 22:20	1/3/2022 22:12
1/3/2022 22:35	1/4/2022 1:55	1/4/2022 1:51
1/4/2022 20:11	1/4/2022 21:40	1/4/2022 21:36
1/4/2022 21:52	1/5/2022 1:49	1/5/2022 1:45
1/5/2022 18:13	1/5/2022 21:05	1/5/2022 21:03
1/5/2022 21:34	1/5/2022 23:53	1/5/2022 23:51
1/7/2022 18:12	1/7/2022 21:22	1/7/2022 21:18
1/7/2022 21:45	1/7/2022 22:51	1/7/2022 22:43
1/9/2022 17:41	1/9/2022 19:23	1/9/2022 19:15
1/9/2022 19:41	1/9/2022 23:13	1/9/2022 23:07
1/10/2022 19:57	1/10/2022 22:22	1/10/2022 22:12
1/10/2022 22:32	1/10/2022 23:59	1/10/2022 23:51
1/11/2022 17:48	1/11/2022 19:54	1/11/2022 19:50
1/11/2022 20:19	1/11/2022 22:39	1/11/2022 22:29

Old Date Time Formatting

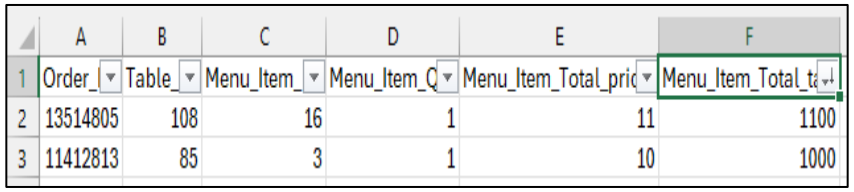
G	H	I
order_txn_start_dttm	order_txn_end_dttm	order_process_dttm
2023-12-29 21:21	2023-12-30 0:27	2023-12-30 0:25
2022-01-01 17:14	2022-01-01 20:19	2022-01-01 20:17
2022-01-01 20:44	2022-01-01 22:25	2022-01-01 22:19
2022-01-06 19:12	2022-01-06 22:23	2022-01-06 22:13
2022-01-06 22:42	2022-01-07 0:01	2022-01-06 23:59
2022-01-07 18:29	2022-01-07 20:07	2022-01-07 19:57
2022-01-07 22:05	2022-01-08 1:47	2022-01-08 1:45
2022-01-08 17:23	2022-01-08 19:21	2022-01-08 19:15
2022-01-12 21:13	2022-01-12 23:39	2022-01-12 23:35
2022-01-13 17:20	2022-01-13 20:13	2022-01-13 20:09
2022-01-13 20:41	2022-01-14 0:15	2022-01-14 0:11
2022-01-15 21:57	2022-01-15 22:58	2022-01-15 22:52
2022-01-18 19:57	2022-01-18 21:16	2022-01-18 21:14
2022-01-19 21:32	2022-01-19 23:30	2022-01-19 23:24
2022-01-21 17:27	2022-01-21 20:54	2022-01-21 20:50
2022-01-21 22:46	2022-01-22 1:49	2022-01-22 1:41
2022-01-22 17:37	2022-01-22 19:25	2022-01-22 19:19

New Date Time Formatting

Comparison Between Old and New Tax Values in Transaction Details

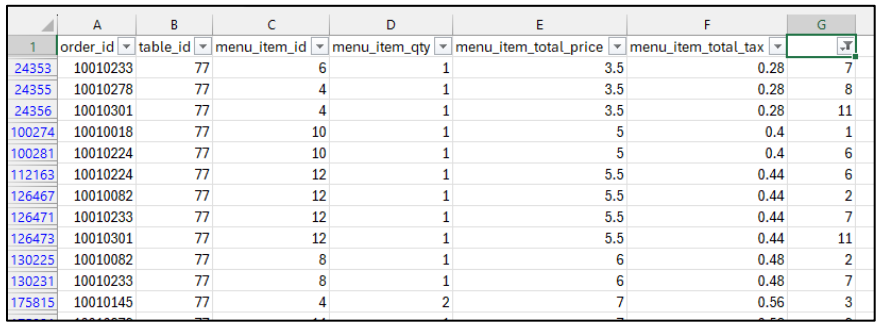


	A	B	C	D	E	F
1	Order_	Table_	Menu_Item_	Menu_Item_Q	Menu_Item_Total_pric	Menu_Item_Total_ta
13	10010018	77	15	2	15	0
44	10010082	77	12	1	5.5	0
79	10010145	77	1	1	7.5	0
80	10010145	77	15	1	7.5	0
122	10010220	77	1	1	7.5	0
131	10010224	77	8	2	12	0
147	10010233	77	12	1	5.5	0
162	10010278	77	1	1	7.5	0
165	10010278	77	8	2	12	0

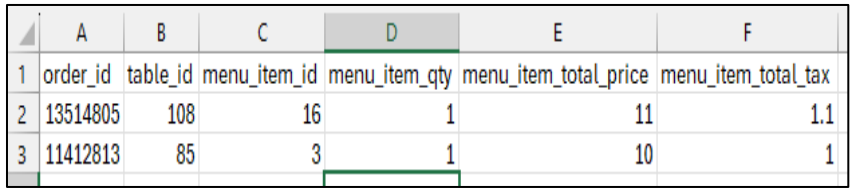


	A	B	C	D	E	F
1	Order_	Table_	Menu_Item_	Menu_Item_Q	Menu_Item_Total_pric	Menu_Item_Total_ta
2	13514805	108	16	1	11	1100
3	11412813	85	3	1	10	1000

Old Incorrect Tax Values



	A	B	C	D	E	F	G
1	order_id	table_id	menu_item_id	menu_item_qty	menu_item_total_price	menu_item_total_tax	
24353	10010233	77	6	1	3.5	0.28	7
24355	10010278	77	4	1	3.5	0.28	8
24356	10010301	77	4	1	3.5	0.28	11
100274	10010018	77	10	1	5	0.4	1
100281	10010224	77	10	1	5	0.4	6
112163	10010224	77	12	1	5.5	0.44	6
126467	10010082	77	12	1	5.5	0.44	2
126471	10010233	77	12	1	5.5	0.44	7
126473	10010301	77	12	1	5.5	0.44	11
130225	10010082	77	8	1	6	0.48	2
130231	10010233	77	8	1	6	0.48	7
175815	10010145	77	4	2	7	0.56	3



	A	B	C	D	E	F
1	order_id	table_id	menu_item_id	menu_item_qty	menu_item_total_price	menu_item_total_tax
2	13514805	108	16	1	11	1.1
3	11412813	85	3	1	10	1

New Correct Tax Values