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DATA INSIGHT: ANALYZING GROCERY STORE DATA FOR ENHANCED RETAIL STRATEGIES

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Business Data Management Capstone Project

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MAMTA KIRANA & GENERAL STORES

ABOUT ORGANIZATION:

Mamta Kirana & General Stores

Established 1983, Katni (M.P.)

Owners: Kamla Prasad Gupta, Anand Kumar Gupta

Groceries: Rice, Oil, Pulses, Flour, Dairy, etc.

Focus: Affordability & Trust

- Location: [City][State]
- Address: [Address of the store]
- Business Model: B2C, B2B
- Efficiently managed by Mr. Kamla Prasad Ji and supported by his son Mr. Anand for marketing and operations.
- Monthly revenue approximately [Amount] INR.
- Operational expenses around [Amount] INR.

Project Summary

Key objectives:

To analyze sales, inventory, and credit data of Mamta Kirana Stores to drive smarter retail strategies.

Problem statements:

1. Inventory Management

- Requires regular analysis of sales and stock intake to maintain accuracy.

2. Low Net Profit Margins

- Identifying patterns in profitable items can drive overall profitability.

3. Prolonged Product Borrowing

- Borrowed items often untracked, leading to inventory gaps.
- Affects availability, customer satisfaction, and results in revenue leakage.

Significance:

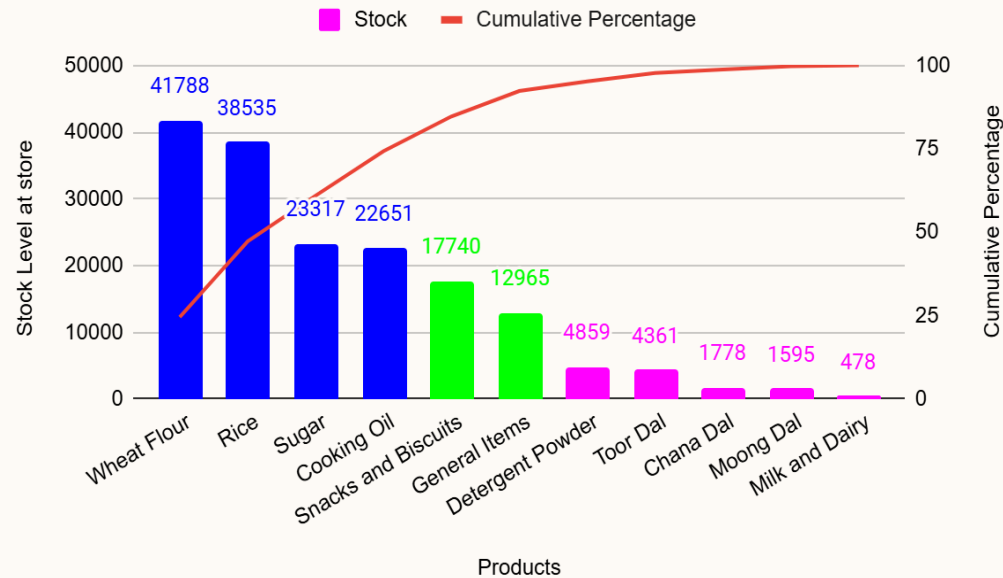Helps retailers like Mamta Kirana Stores make data-driven decisions for procurement, pricing, and credit control.

Data Collection and Methodology

- **Data Collection:** Primary data collected for 1st October 2024 to 30th November 2024 that is for 61 days.

- **Data Sources:**
    1. Internal sales and inventory records.
    2. Supplier invoices and purchase records.
    3. Customer transaction history, including borrowing records.

- **Data Cleaning:** Missing values were handled, duplicates removed, and date formats standardized. Currency fields were converted to numeric format for accurate analysis.

- **Methodologies used for Analysis:**
    a) Data Visualization Techniques: Mainly used Line chart, Pareto chart, Bar chart, Histogram and Pie chart.
    b) ABC Analysis for Inventory Optimization
    c) Sales Demand Forecasting
    d) Relationship Between Sales, Revenue, Expenditure, and Profit
    e) Borrowing Pattern Analysis & Revenue Loss Estimation

ABC Analysis for Inventory Optimization
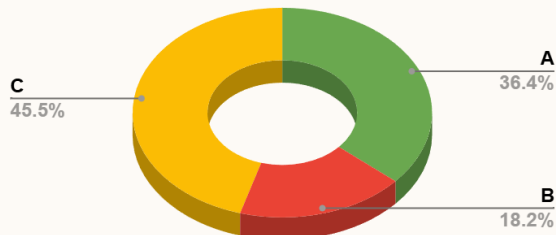
Inventory Stock per SKUs

Table 1: Stock Level of different Products

	Products	Stock Value	Inventory Stock %	Cumulative %
A	Wheat Flour	41788	24.57	24.57
	Rice	38535	22.66	47.23
	Sugar	23317	13.71	60.94
	Cooking Oil	22651	13.32	74.26
B	Snacks & Biscuits	17740	10.43	84.69
	General Items	12965	7.62	92.31
C	Detergent Powder	4859	2.86	95.17
	Toor Dal	4361	2.56	97.73
	Chana Dal	1778	1.05	98.78
	Moong Dal	1595	0.94	99.72
	Milk and Dairy	478	0.28	100.00

ABC Category Distribution

Figure 1: Pareto chart

- A total of SKUs (~4 out of 11) contribute to most of the inventory stock value.

- General Items include Body care products, Toiletries and Utilities.

- Milk and Dairy holds lowest inventory level at the store.
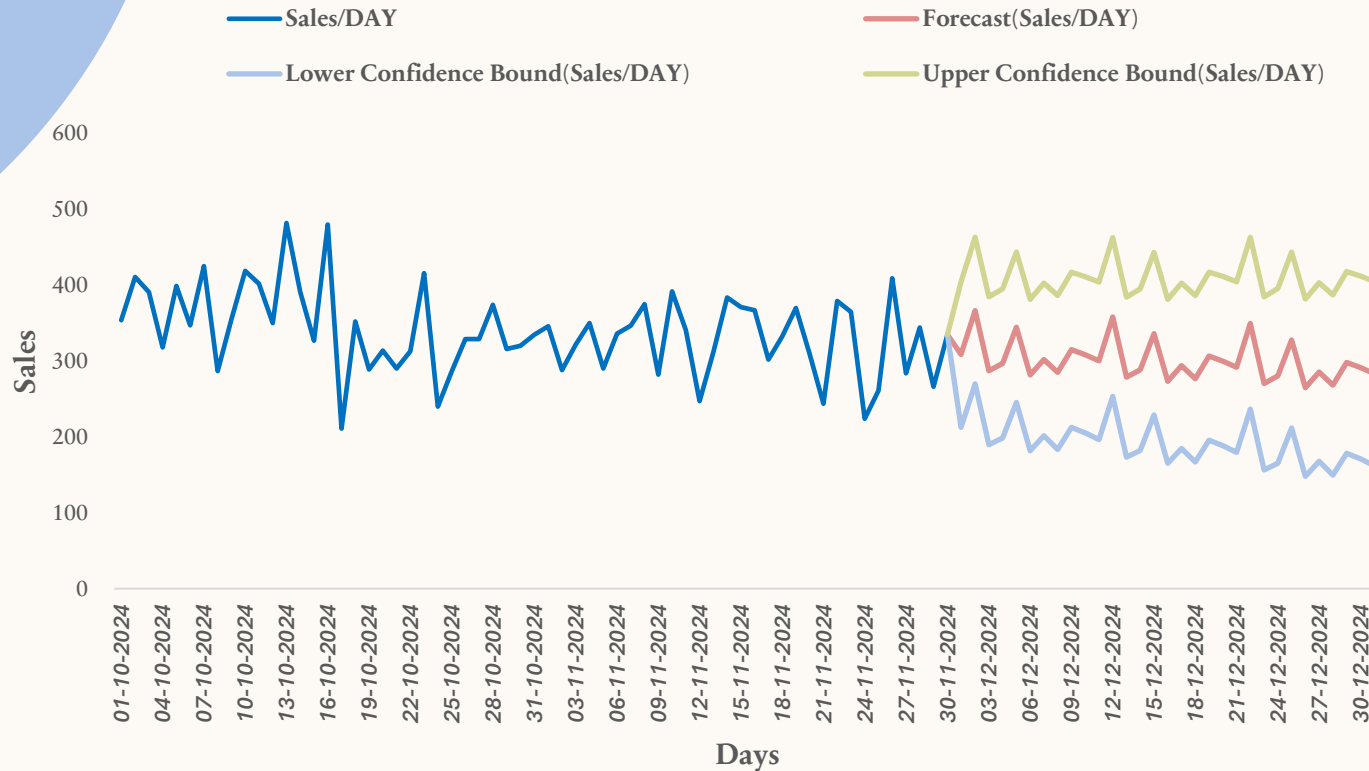
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Sales Demand Forecasting

Figure 2: Forecasted Sales

- Daily sales fluctuate between 200–500 units (Oct–Nov 2024).

- Slight dip in sales observed in late November.

- December forecast predicts stable sales (~280–350 units/day).

- Confidence interval highlights moderate uncertainty, especially in early December.

- Planning tip: Consider upper bound (~450 units) for inventory safety.

- A noticeable downward trend in overall sales was observed over the analyzed period, with fluctuations influenced by seasonal demand.

Relationship between Revenue and Profit

Figure 3: Profit v/s Revenue

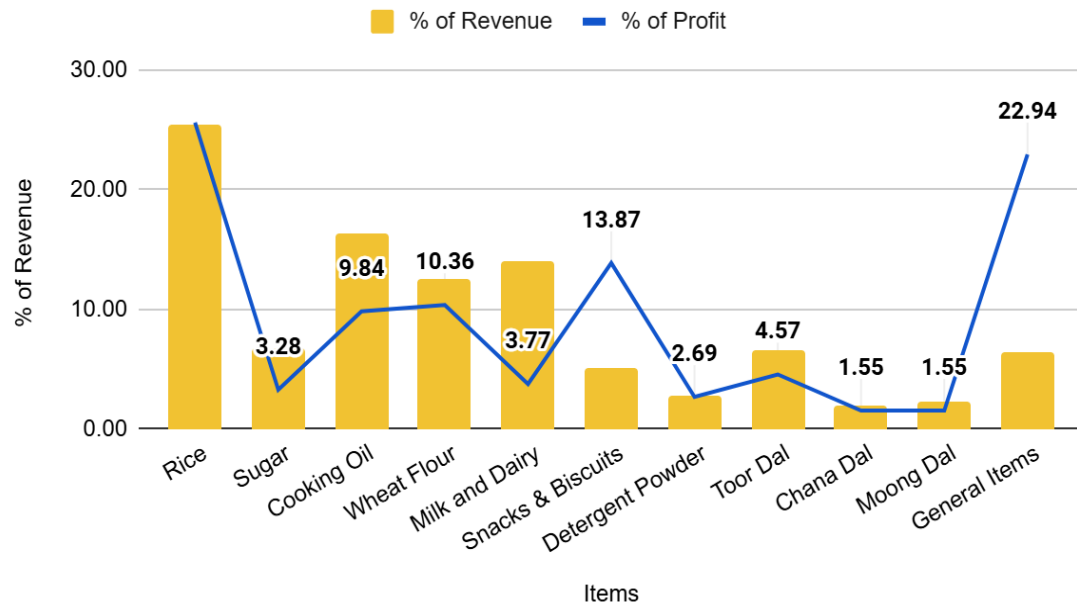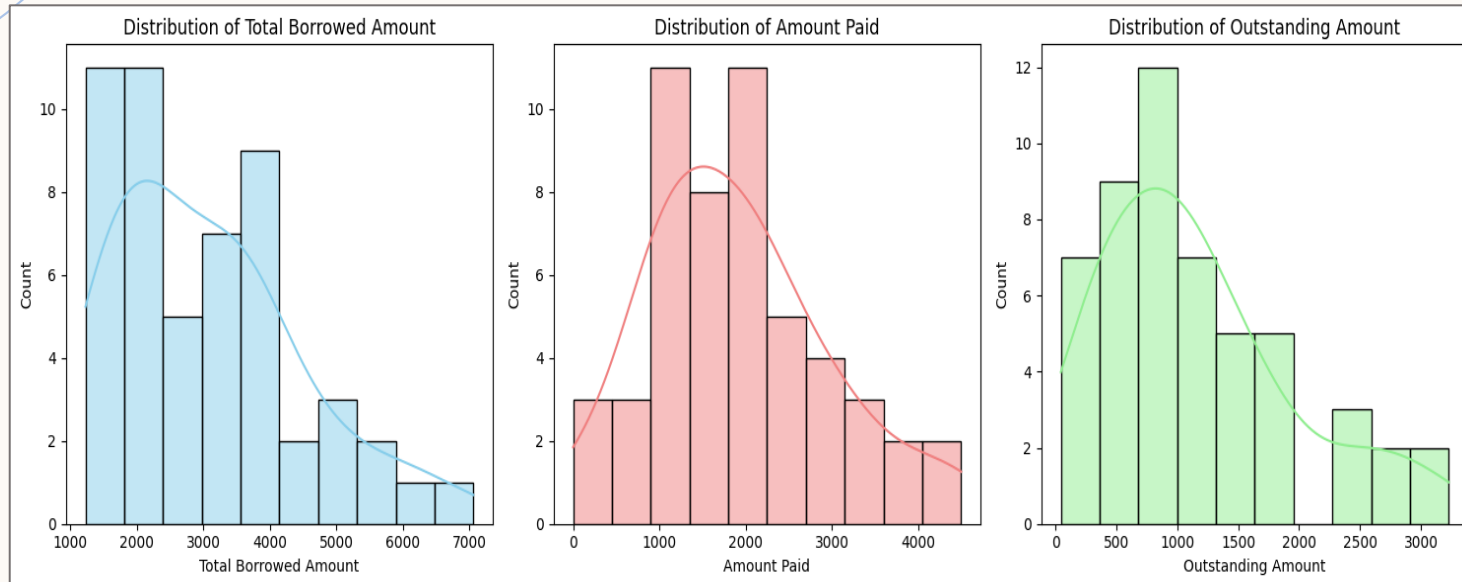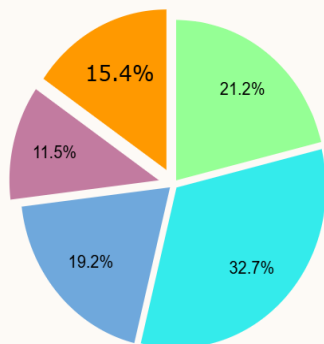| Products	Profit	Revenue	% of Profit	% of Revenue	Profit Margin
Rice	26482.5	283599	25.59	25.49	9.34%
Sugar	3398	75435	3.28	6.78	4.50%
Cooking Oil	10183	180965	9.84	16.27	5.63%
Wheat Flour	10725.5	138790	10.36	12.48	7.73%
Milk and Dairy	3897	155880	3.77	14.01	2.50%
Snacks & Biscuits	14350	57400	13.87	5.16	25.00%
Detergent Powder	2784	30160	2.69	2.71	9.23%
Toor Dal	4726	72885	4.57	6.55	6.48%
Chana Dal	1601.5	21287.5	1.55	1.91	7.52%
Moong Dal	1601.5	24835	1.55	2.23	6.45%
General Items	23740	71220	22.94	6.40	33.33%
SUM	103489	1112456.5		AVERAGE	10.70%

Table 2: Profit, Revenue and Profit margin of Products

- Rice drives revenue but low profit margin of 9.34 %; General Items and Snacks & Biscuits give high profits margins with lower revenue.

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Borrowing Pattern Analysis & Revenue Loss Estimation

Distribution of Total Borrowed Amount / Distribution of Amount Paid / Distribution of Outstanding Amount

Pending and Delayed Payments

- A significant portion (26.9%) of payments face delays or remain unpaid, leading to potential revenue loss and cash flow constraints.
- The majority of customers credit small amounts (₹1,000–4,000), but repayment is often delayed or made in small installments, accumulating outstanding balances.

Remarks	No. of Customers	Outstanding Amount Range
Good Record	11	Amount < ₹500
Regular Payment	17	₹501- ₹1000
Partial Payment	10	₹1001-₹1500
Delayed Payment	6	₹1501-₹2000
Pending Payment	8	Amount > ₹2000
TOTAL	**52**	₹ 59,988.00

Table 3: Customer Credit Summary

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Interpretation and Recommendations

1. Inventory Optimization
- Focus on Category A items (Oil, Rice, Flour, Sugar):
Use real-time monitoring and minimum stock level alerts to avoid stockouts.
- ABC Analysis Insight:
Top 20% products contribute ~80% of revenue – prioritize tracking and shelf space.
- Category C products (e.g., Moong Dal, Milk):
Apply flexible stocking to minimize wastage and free up cash flow.
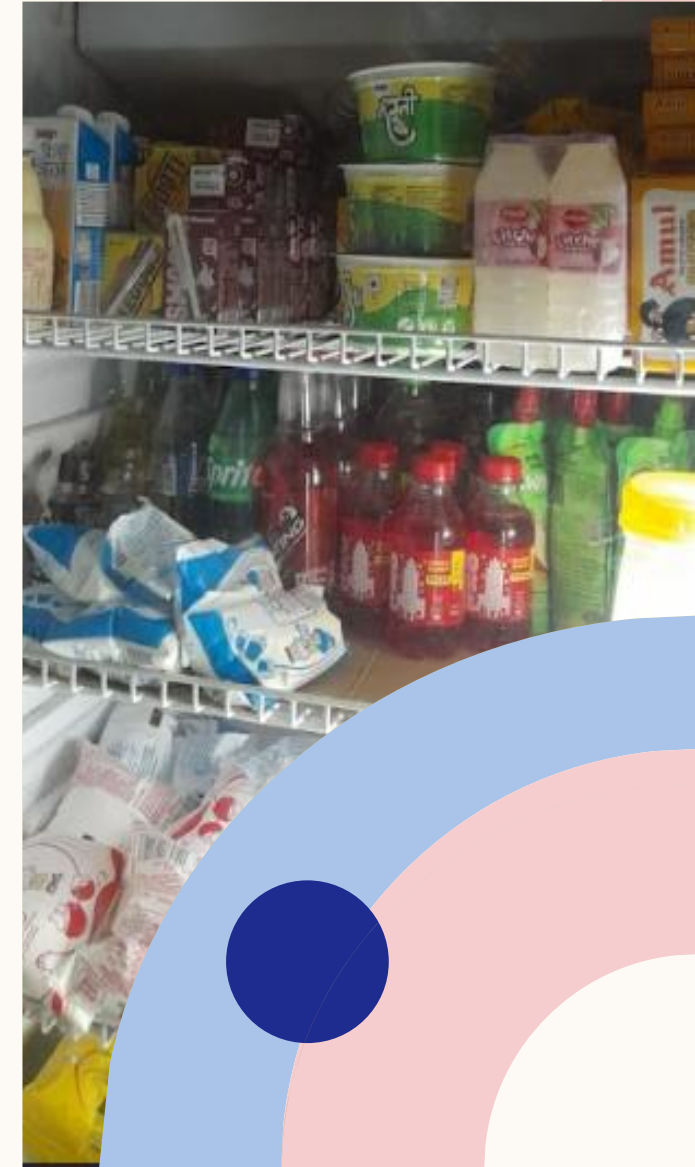
2. Demand Forecasting
- Use ARIMA & Holt-Winters models:
Historical sales data from Oct–Nov 2024 shows fluctuation between 200–500 units/day – model captures seasonality and trends.

3. Sales & Pricing Strategy
- Margin-focused product promotion:
Emphasize Snacks & General Items (higher margins), reduce deep discounts on staples.
- Dynamic pricing:
Adjust rates for high-demand items like Sugar & Oil to stay competitive yet profitable.
- Bundle offers for slow movers:
Pair low-selling items (e.g., Chana Dal) with fast-moving ones to reduce dead stock.

4. Credit Borrowing
- Introduce incentives for timely payments, such as discounts on future purchases or loyalty points, to encourage early repayments.
- Implement stricter credit policies, such as setting a maximum borrowing limit based on customer payment history, to reduce credit risk.
- Offer flexible repayment plans for trusted customers while tightening credit terms for those with repeated payment delays.

THANK YOU