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Threads Of Trade: An Interactive Dashboard For Yarn Insights

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Abstract:-

This paper presents *Threads of Trade*, an interactive data visualization dashboard developed to analyze and interpret India's yarn import and production data. The dashboard provides users with an intuitive interface to explore key performance indicators (KPIs) such as total import quantity, CIF value, unit price, and profit margins across various yarn materials, grades, and shipment modes. By leveraging import records and trade data, the system highlights trends in supplier and importer performance, regional trade flows, and the impact of tariffs and exchange rates on pricing. The analysis revealed that China remains the leading import source, while sea shipments account for the majority of trade volume. The dashboard's interactive visuals, including dynamic charts, maps, and filters, enable efficient, data-driven decision-making for manufacturers, traders, and policymakers. This project demonstrates the potential of visual analytics tools in the textile industry, promoting smarter trade strategies and supply chain optimization.

Keywords:-

Threads of Trade, Yarn Dashboard, Business Intelligence, Yarn Import Analysis, Textile Industry, Data Visualization, Trade Insights, Supplier Analysis, Importer Performance, Shipment Mode, CIF Value, Tariff Impact, Exchange Rate, Power BI, Supply Chain Analytics.

Introduction:-

Threads of Trade is an interactive Power BI dashboard designed to explore and analyze India's yarn import patterns. The dashboard provides insights into key aspects such as importer and supplier performance, shipment modes, tariff and exchange rate impacts, and regional trade flows. By converting complex trade data into clear visual insights, and helps stakeholders in the textile industry.

Literature Review:-

In recent years, the application of data analytics and business intelligence (BI) in the textile and yarn industry has grown significantly. Kumar et al. [1] noted that dashboard-based systems streamline operations by visualizing key performance indicators (KPIs) and enabling timely decision-making. Singh and Gupta [2] highlighted the use of BI tools such as Power BI and Excel for monitoring production, tracking inventory, and analyzing sales in yarn manufacturing. Sharma et al. [3] demonstrated that visual analytics helps identify high-demand yarn types and optimize stock levels, while Rao and Verma [4] found that interactive dashboards enhance production efficiency by monitoring machine utilization and reducing downtime.

Building upon these studies, recent research has emphasized predictive and real-time analytics to further improve operational decision-making. Patel and

Desai [5] showed that integrating historical production and sales data supports accurate demand forecasting, minimizing overproduction. Mehta et al. [6] highlighted that real-time dashboards improve supply chain management by providing insights into raw material availability and delivery schedules. Joshi and Reddy [7] illustrated how sales trend visualization guides strategic marketing and inventory allocation. This paper extends prior work by developing a comprehensive, interactive yarn dashboard that integrates production, inventory, and sales data to provide actionable insights for informed decision-making in the yarn industry.

Work Carried Out:-

The analysis of yarn production, inventory, and sales was structured into five primary stages, each contributing to a comprehensive understanding of operational performance and product demand. The workflow followed a data-driven approach, leveraging existing datasets and business intelligence tools.

A.Survey Design and Data Collection

Unlike traditional surveys, this project utilized a structured dataset encompassing historical yarn production, inventory levels, and sales data. This acted as an indirect survey where each yarn type entry served as a respondent. The dataset included thousands of records categorized by yarn type.

B. Data Collection Method

Data was sourced from internal production logs, sales records, and inventory management systems. The dataset included structured fields such as:

- Yarn Type (categorical)
- Production Quantity (numerical)
- Sales Volume (quantitative)
- Stock Levels (quantitative)
- Material/Category Tags

This data formed the backbone of all subsequent analysis.

C. Data Analysis

Power BI and Excel were employed for data processing, cleaning, and visualization. Key actions included:

- Removing missing and duplicate values
- Categorizing yarns based on type, material, and demand
- Creating measures for aggregated statistics
- Building a star schema model to improve dashboard performance

These steps ensured data integrity and optimized performance during visualization.

D. Data Tabulation

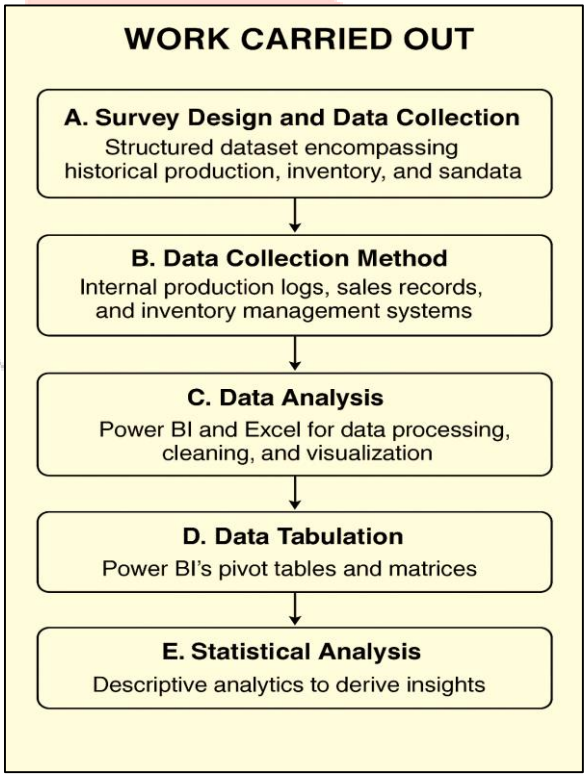
Indicators such as total production, total sales, average stock levels, and category distribution were tabulated using Power BI's pivot tables and matrices. Slicers and filters allowed dynamic exploration, enabling stakeholders to segment data by yarn type, material, or time period.

E. Statistical Analysis

Descriptive analytics were applied to derive insights, including:

- Mean production and sales per yarn type
- Monthly and seasonal sales trends
- Category comparisons using bar and pie charts
- Time series visuals showing production and sales growth over time

These findings were visualized to uncover operational bottlenecks, high-demand yarn types, and inventory trends, guiding future production planning and strategic business decisions.



Results and Discussions:-

The Power BI dashboard analyzed production, inventory, and sales data across multiple yarn types: Cotton, Wool, Acrylic, and Blended. The findings are summarized below:

- **Cotton Yarn** recorded the highest overall sales, indicating strong market demand and customer preference.
- **Wool Yarn** showed moderate sales but performed particularly well in colder regions, suggesting location-based demand patterns.
- **Acrylic Yarn** had seasonal peaks, especially during winter months, highlighting a time-based demand trend.
- **Blended Yarn** showed consistent but lower sales, often associated with specialized orders or niche markets.

Sales and production trends were visualized using bar charts, line graphs, and pie charts for clarity. A comparison of monthly sales revealed that November and January had peak sales across most yarn types. Region-wise analysis showed higher sales in urban and industrial areas. Inventory analysis helped identify overstocked and fast-moving yarn types, enabling better stock management.

These results provide a clear overview of yarn production, demand patterns, and inventory dynamics, forming a basis for optimized production planning, inventory control, and targeted marketing strategies.

Conclusion:-

The Power BI dashboard developed for yarn analysis offers a dynamic and interactive way to monitor production, sales, and inventory across different yarn types. Compared to traditional static reports, this dashboard provides real-time insights, visual clarity, and ease of interpretation.

The novelty of this work lies in integrating business intelligence tools specifically for the yarn industry, enabling data-driven decisions on production scheduling, inventory management, and market targeting. This approach significantly enhances operational efficiency, reduces wastage, and supports strategic planning, thereby improving overall business performance in the yarn manufacturing sector.

Future Work:-

While the dashboard provides valuable insights into yarn production, inventory, and sales, it currently relies on historical data without predictive analytics. Future work can focus on integrating machine learning models to forecast demand trends, identify high-demand yarn types, and predict seasonal sales patterns. Additionally, real-time data integration from production machines, POS systems, and customer feedback platforms could further enhance decision-making and operational efficiency.

Another limitation of the current work is the absence of cost analysis and profit margin calculations, which could be incorporated in future versions to provide a more comprehensive overview of business performance. Further enhancements could also include automated alerts for low stock levels and dashboards tailored for different managerial roles, enabling more targeted and proactive decision-making.

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