

Exploring Coffee Quality Data with Power BI

Introduction

In the domain of coffee production, quality is extremely important. The Coffee Quality Institute (CQI), is a non-profit organization dedicated to enhancing the quality and value of coffee globally. It has provided a comprehensive dataset that includes sensory evaluations, defect counts, processing methods, and origin information. This project aims to leverage Power BI to analyze this rich coffee quality data and uncover insights about the factors that contribute to coffee quality.

Objectives

The primary goals of this project are:

1. To identify the key determinants of coffee quality as evaluated through sensory attributes such as aroma, flavor, and acidity.
2. To explore the correlation between processing methods, origin regions, and coffee quality scores.
3. To identify trends or patterns in defect occurrences and their impact on overall coffee quality.
4. To analyze how different variables interact to influence the Total Cup Points, an overall measure of coffee quality.

Data Overview of Coffee Quality Data from CQI

The Coffee Quality Data from CQI includes various features such as:

- **Sensory Evaluations:** Aroma, Flavor, Aftertaste, Acidity, Body, Balance, Uniformity, Clean Cup, Sweetness.
- **Defects:** Category One (visual defects) and Category Two (taste defects).
- **Processing Methods:** Washed/Wet, Natural/Dry, Pulped Natural/Honey, etc.
- **Origin Information:** Country of origin, harvest year, and coffee variety.

Coffee Quality Analysis: Evaluating Coffee Origins, Attributes, and Quality Scores

Discover a deep dive into global coffee quality, exploring origins, attributes, and quality scores. This analysis sheds light on what makes your coffee experience exceptional around the world!

Sensory Attributes Analysis :

Heatmap: Processing Method vs. Total Cup Points & Sensory Attributes

A heatmap comparing processing methods against sensory attributes and Total Cup Points highlights the superior performance of “Double Anaerobic Washed” and “Honey, Mossto” methods. These methods consistently achieve higher scores across all sensory attributes, indicating their effectiveness in enhancing coffee quality.

Correlation Between Processing Methods, Origin regions, and Coffee Quality Scores :

Processing Methods Distribution Across Countries

The Part Two Whole Analysis shows the distribution of different coffee processing methods across countries. The dominant processing method is “Washed/Wet,” accounting for 59.9%, followed by “Natural/Dry” at 22.22%, and “Pulped Natural/Honey” at 12.08%.

This distribution highlights the prevalent techniques used in coffee processing, which can significantly influence the flavor profile and quality of the coffee.

Average Quality Score by Country of Origin and Region

This chart shows the average quality score for each country, with potential breakdowns by region. Each bar represents the average score of coffee quality attributes from a specific country. If regions are added, different segments within each bar represent the average scores of different regions within that country.

In top 3, we have Taiwan, Guatemala, Honduras which produces consistently higher quality coffee. In Taiwan Country, Chiayi region has contributed most to the overall quality with 1,027.66 average quality score. The country with lower quality scores is Madagascar.

Average Quality Score by Processing Methods

The chart will display the average quality score for each processing method. We will be able to observe processing method tends to produce higher quality coffee based on the average scores.

Among all the processing, Washed/Wet has the highest average quality i.e 142.08 followed by Natural/Dry (124.20) and Pulped natural/Honey (109.94)

Defect Analysis :

Distribution of Defects by Country

In the Coffee Quality Data the distribution of Category One and Two defects across countries reveals that Colombia, and Ethiopia have higher counts of category II defects compared to other regions and for Category I defect have higher counts in Mexico and Nicaragua Countries.

Distribution of Defects by Variety

In the Coffee Quality Data the distribution of Category One and Two defects by varieties shows that caturra has highest score in category II defect whereas for category I defect is more in SHG variety.

Impact of Defects on Total Cup Points

An analysis of how defects impact the Total Cup Points across different processing methods shows that certain methods like “Double Anaerobic Washed” and “Honey, Mossto” have higher average scores despite the presence of defects. This suggests that some processing methods might mitigate the negative effects of defects better than others.

Category One and Two Defects Count

Defects play a crucial role in determining the overall coffee quality. The dashboard shows 28 instances of Category One defects and 466 instances of Category Two defects. Category One defects are more severe and visually identifiable, whereas Category Two defects are subtle and detected through tasting.

Variety Distribution by Country of Origin

The variety distribution chart shows the diversity of coffee varieties across different countries. Colombia, Guatemala, and Brazil have a wide range of coffee varieties, which contributes to the rich flavor profiles and high-quality scores from these regions.

Grading Date Trend

The trend of samples graded over time reveals fluctuations in the number of coffee samples evaluated each month. Notably, the peak grading month is November, with 51 samples graded, followed by January with 31 samples, and April with 24 samples. This trend indicates a seasonality in coffee production and grading activities, which could be linked to harvest cycles and market demands.

Grading Completion Status

Out of the total samples graded, all 207 have completed the grading process. This status update ensures that the evaluation process is on track and helps in identifying any bottlenecks in the grading pipeline.

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Key Findings and Insights from Coffee Quality Data

Processing Methods and Quality

The “Double Anaerobic Washed” and “Honey, Mossto” processing methods consistently produce high-quality coffee, as evidenced by their high scores across all sensory attributes. These methods should be explored further and potentially adopted in other regions to enhance coffee quality.

Defects Impact

While defects negatively impact coffee quality, certain processing methods can mitigate these effects. Stakeholders should focus on improving processing techniques to reduce the occurrence of defects and enhance overall quality.

Regional Quality Trends

Ethiopia and Taiwan stand out for their high average quality scores, suggesting that these regions have optimized their production and processing methods. Other countries can learn from their practices to improve their coffee quality.

Seasonality in Grading

The seasonal trends in grading highlight the importance of timing in the coffee production and evaluation process. Aligning production cycles with peak grading periods can ensure timely evaluation and market readiness.

Diversity in Coffee Varieties

The wide range of coffee varieties in Colombia, Guatemala, and Brazil contributes to their high-quality scores. Promoting varietal diversity in other regions can enhance flavor profiles and meet diverse consumer preferences.

Suggestions for Future Research

1. **Processing Method Optimization:** Further research into the specific steps and conditions of high-performing processing methods like “Double Anaerobic Washed” can provide detailed guidelines for producers looking to adopt these techniques.
2. **Defect Reduction Strategies:** Investigating the root causes of defects and developing targeted interventions can help reduce the incidence of defects and improve overall coffee quality.
3. **Consumer Preferences:** Understanding consumer preferences for different sensory attributes can help producers tailor their products to meet market demands, thereby increasing satisfaction and market share.
4. **Sustainability Practices:** Exploring the relationship between sustainable farming practices and coffee quality can highlight the benefits of environmentally friendly methods, encouraging wider adoption.

Conclusion

This project provides a comprehensive analysis of coffee quality data using Power BI, uncovering valuable insights into the factors that influence coffee quality. By focusing on processing methods, defect impacts, and regional trends, stakeholders can make informed decisions to enhance the quality and value of coffee worldwide. The findings and suggestions presented here offer a roadmap for future research and quality improvement initiatives in the coffee industry.