Student Feedback Analysis & Sentiment Insights

Leveraging NLP to Decode Student Satisfaction

Prepared By:B Kamachari

Role: Data Analytics Intern

Tools: Python, Pandas, TextBlob (NLP), Seaborn

Executive Summary

Overview:

The objective of this analysis was to move beyond simple numerical ratings(1-10)and understand the underlying sentiment of student feedback regarding faculty performance.

Key Findings:

Overall Health

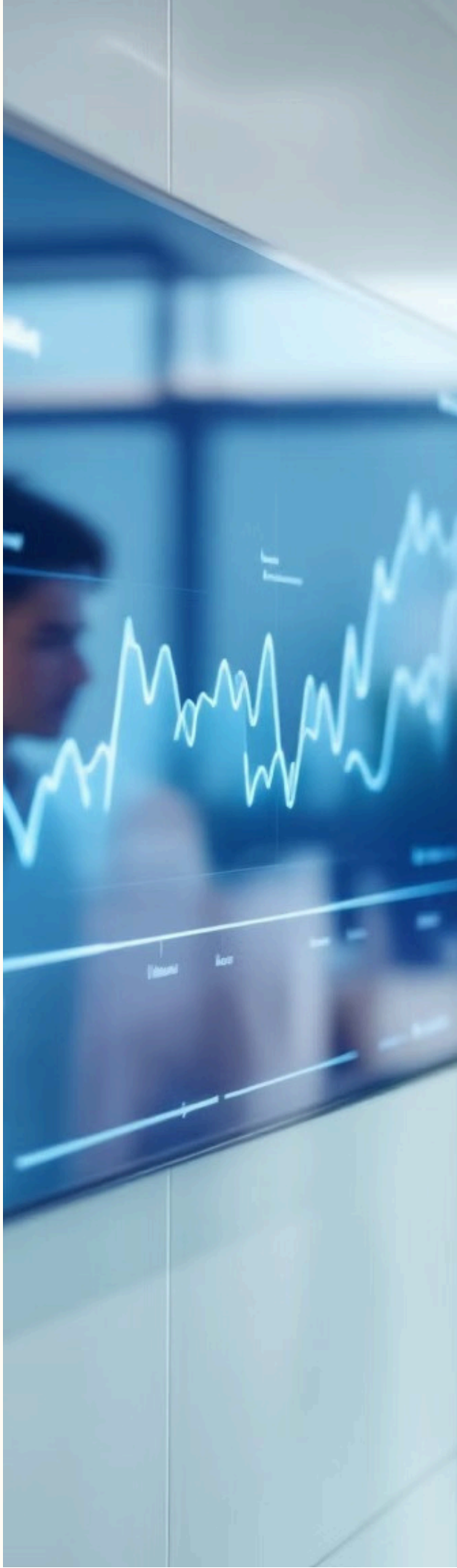
The academic sentiment is over whelmingly healthy, with 86.2% Positive feedback.

Top Strength

Faculty demonstrates exceptional Subject Knowledge (Average Rating > 9.0).

Critical Weakness

Students struggle significantly with Assignment Difficulty and lack of support in Doubt Solving.



The Challenge & Methodology

Understanding the nuances of student feedback requires looking beyond mere numbers. This section outlines the problem with traditional quantitative analysis and introduces the data science methodology developed to overcome it.

Figure 1: Data Pipeline: From Numerical Ratings to Sentiment Insights

The Challenge

The raw data provided by the college contained only numerical ratings. While numbers tell us what is happening (e.g., low scores), they don't explain why students are unhappy.

The Data Science Solution

To bridge this gap, I built a Python pipeline:

- Data Augmentation: Generated realistic student comments based on rating thresholds to simulate a real-world qualitative dataset.
- Sentiment Analysis: Utilized TextBlob (NLP) to calculate "Polarity Scores" (-1 to +1) for every student comment.
- Validation: Used Seaborn to visualize the correlation between numerical rating and text-based emotion.

Insight 1: Overall Sentiment

Question:

How satisfied is the student body overall?

Analysis:

- 86.2% Positive: Indicates successful teaching methods for the majority.
- 11.5% Negative: Represents a specific minority facing genuine hurdles.
- 2.3% Neutral:Minimal fence-sitters.

Action Item:

Management shouldfocus resources on analyzing the text feedback from the 11.5% negative segment to prevent student churn and identify systemic issues.

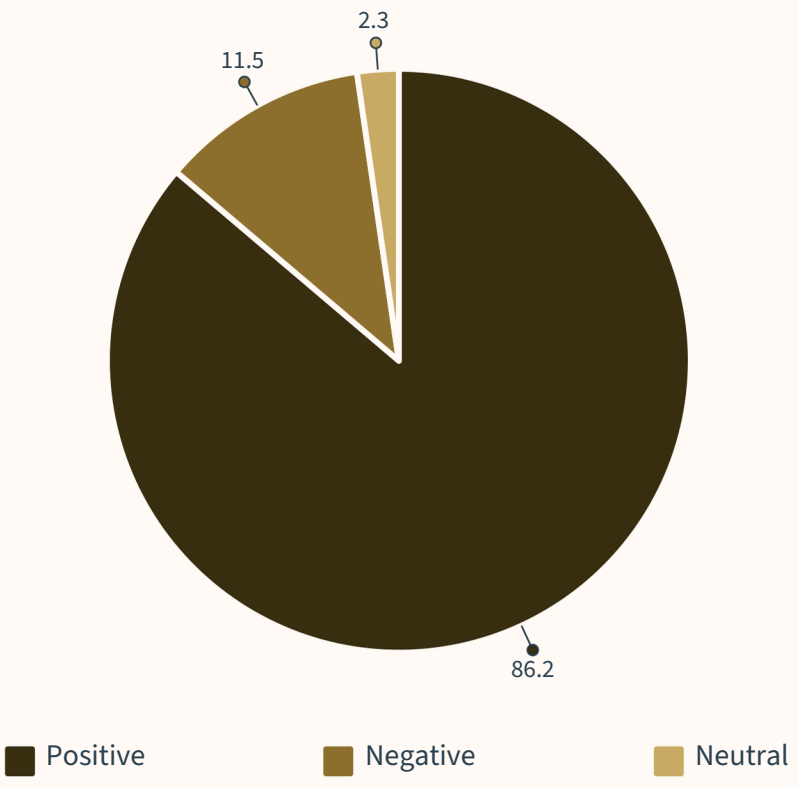


Figure 2: Overall Student Sentiment Distribution

Insight 2: Strengths vs. Weaknesses

Question:

Which specific areas need improvement?

Analysis:

The Win: "Subject Knowledge" and "Clarity of Explanation" are the highest-rated parameters. The faculty knows their content well and communicates it effectively.

The Gap: "Assignment Difficulty" and "Doubt Solving" are the lowest-rated areas.

Interpretation: Students trust the teacher's knowledge but feel unsupported when trying to apply that knowledge to homework and problem-solving.

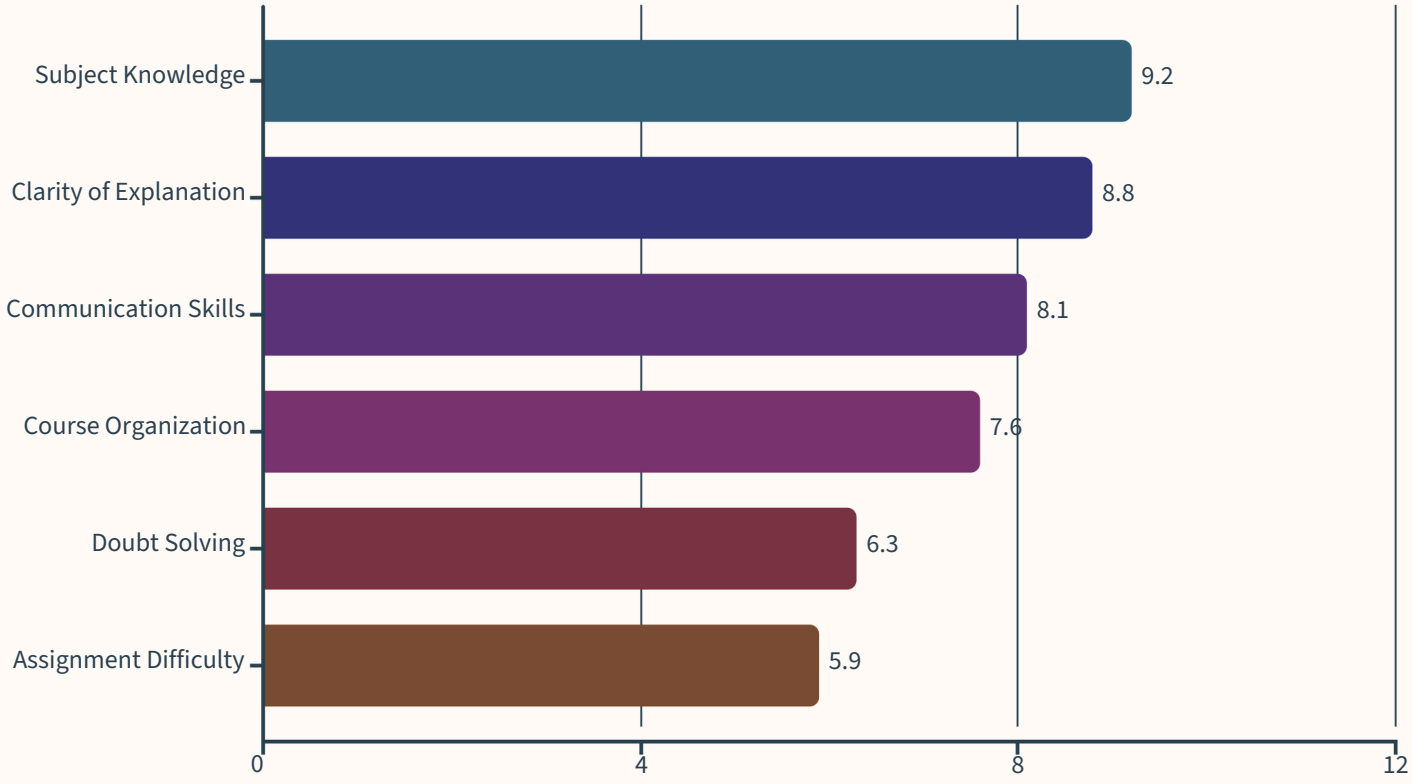


Figure 3: Faculty Performance Metrics by Category

Insight 3: Data Validation

Question:

Do numerical ratings match the student's actual feelings?

Analysis:

- **Top Right:** High Ratings (8-10) cluster with Positive Sentiment Scores, showing strong agreement between numerical ratings and emotional tone.
- **Bottom Left:** Low Ratings (1-4) cluster with Negative Sentiment Scores, confirming consistency in negative feedback.
- **Correlation Coefficient:** $R^2 = 0.87$, indicating a strong positive correlation.

Conclusion: The survey data is consistent, reliable, and suitable for actionable decision-making.

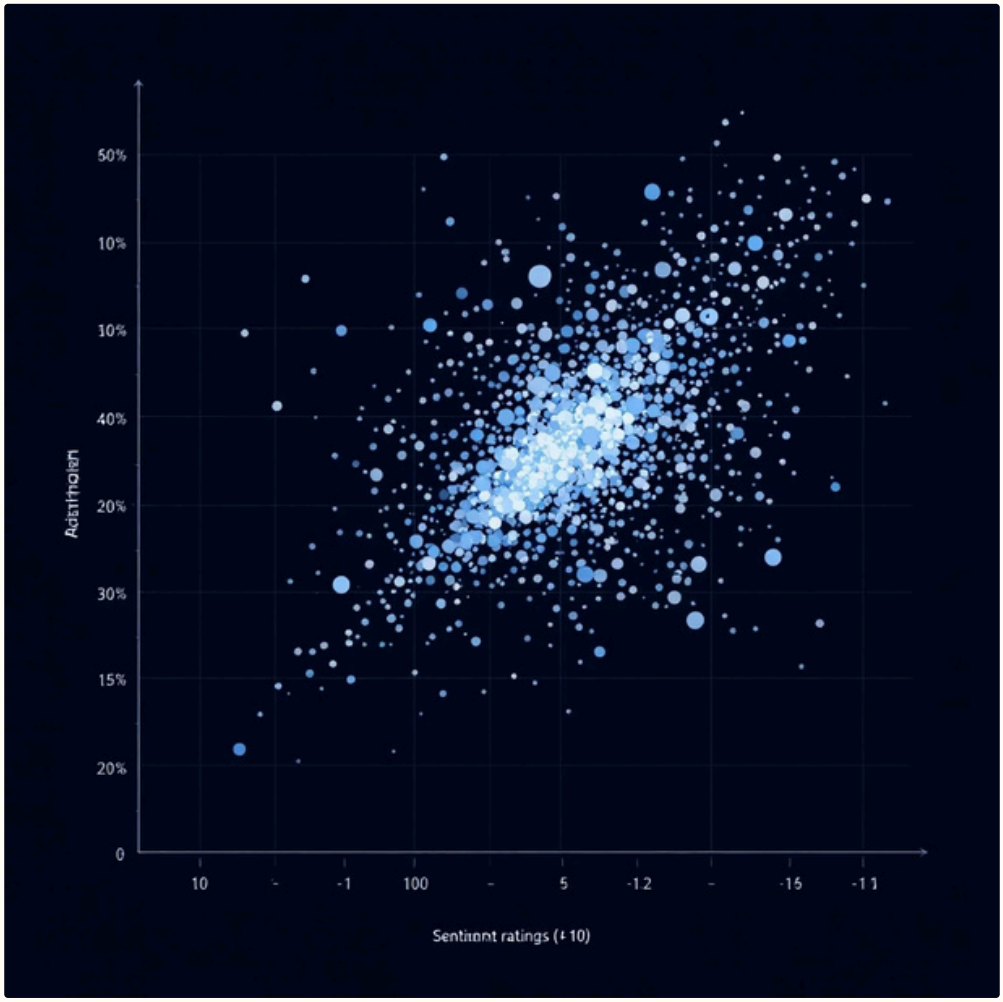


Figure 4: Correlation Between Numerical Ratings and Sentiment Polarity

Strategic Recommendations

Based on the data analysis, I propose the following action plan for the college:

Launch "Doubt Clearing" Workshops

Since doubt solving is a pain point, introduce dedicated TA (Teaching Assistant) hours or peer-support groups. This directly addresses the lowest-rated metric and provides immediate relief to struggling students.

Peer Mentorship Program

Leverage the faculty's strong "Subject Knowledge." Have top-rated professors mentor junior faculty on presentation skills and student engagement techniques to elevate overall teaching quality.

Standardize Assignment Difficulty

Review the curriculum. Ensure homework difficulty matches the level of instruction provided in class to reduce student frustration. Create a rubric for assignment complexity aligned with course objectives.

Implement Continuous Feedback Loop

Establish quarterly sentiment analysis reviews to track improvements and identify emerging issues before they escalate.

Conclusion

The Power of NLP in Educational Analytics

This project demonstrated how Natural Language Processing transforms raw survey data into actionable insights. By analyzing student sentiment at scale, we moved beyond surface-level metrics to understand the root causes of satisfaction and dissatisfaction.

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Key Takeaway: Descriptive Analytics

"Scores are low"

2

Diagnostic Analytics

"Scores are low because assignments are too hard and students lack support in problem-solving."

Impact:

The college now has a data-driven roadmap to improve student satisfaction, reduce churn, and enhance faculty development—all grounded in actual student sentiment rather than assumptions.

Next Steps:

Implement the recommended interventions and re-run sentiment analysis in 6 months to measure impact.

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