Task 05: Syracuse University Women's Lacrosse — 2024 Season Statistical Analysis vs LLM Inference

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Files Analyzed: 2023 SU Womens Lacrosse Cumulative Statistics.xlsx, 2024 SU Womens Lacrosse Cumulative Statistics.xlsx
Tools Used: Python (pandas, matplotlib), Jupyter Notebook

Objective

This analysis aims to compare player and team performance across the 2023 and 2024 seasons for the Syracuse University Women's Lacrosse team. Furthermore, it evaluates the accuracy and reliability of Large Language Models (LLMs) such as ChatGPT, Gemini, or Copilot in answering data questions using only 2024 data, against a Python-based data analysis pipeline that utilizes full historical context.

Methodology

1. Data Sources

Two Excel files containing cumulative player and team statistics for the 2023 and 2024 seasons were provided:

- 2023 SU Womens Lacrosse Cumulative Statistics.xlsx
- 2024 SU Womens Lacrosse Cumulative Statistics.xlsx

These include player names, goals, assists, points, ground balls, draw controls, caused turnovers, shooting percentages, and team totals per game.

2. Python Script Overview

A custom Python script was developed to:

- Clean and standardize player names
- Convert relevant stats to numeric
- Compute individual player improvement (Points_2024 - Points_2023)
- Aggregate and compare team-level metrics across seasons
- Export CSV summaries

3. LLM Prompt Simulation

Tested a prompt asking:

"Summarize the 2024 Syracuse Women's Lacrosse season: Who was the most improved player, who led in scoring, what trends are visible, and how would you describe the team's play style?"

The evaluated how accurately an LLM like ChatGPT might respond using only 2024 data.

Findings from Python Script (Ground Truth)

Most Improved Player

Player	Points 2023	Points 2024	Improvement
Payton Rowley	2	38	**+36**
Olivia Adamson	51	83	+32
Natalie Smith	29	54	+25
Emma Tyrrell	68	92	+24

Insight: Payton Rowley had the largest statistical leap, making her the most improved player.

Top Scorers in 2024

Player	Goals	Assists	Points
Emma Tyrrell	61	31	**92**
Olivia Adamson	52	31	83
Natalie Smith	47	7	54

Insight: Emma Tyrrell led in goals and total points. Adamson had equally high assists.

Team Performance Trends

Metric	2023 Avg	2024 Avg	Trend
Goals/Game	24.31	24.53	⬆ Slight increase
Assists/Game	13.78	11.33	⬇ Drop in assists
Shots/Game	52.3	55.1	⬆ More attempts
Shooting %	29.6%	20.6%	❌ Lower efficiency
Turnovers/Game	22.75	26.58	⬆ Sloppier possession
Ground Balls/Game	26.3	27.9	⬆ More hustle
Draw Controls/Game	26.1	27.8	⬆ Better possession
Fouls/Game	43.3	27.8	⬇ Less physicality

How Would an LLM Answer (Without Full Context)?

LLMs without access to 2023 data will likely:

- **Hallucinate improvement**: They may choose top 2024 scorers like Tyrrell or Adamson as "most improved" without knowing 2023 values.
- **Miss trends**: They can't compute trends (e.g., assists/game down, shooting% drop) from a single year's data.
- **Assume styles**: LLMs may assume play styles like "balanced team" or "dominant midfield" based on general language patterns, not stats.

Example of Likely LLM Mistakes:

- "Most improved player was Emma Tyrrell." (She was already elite in 2023)
- "The team improved in efficiency." (Shooting % dropped by ~9%)
- "They were less physical." (Fouls dropped, but could be due to recording method changes, not play style)

Why Python Was More Accurate

Criteria	Python Script	LLM Model Alone
Uses both 2023/2024	✅ Yes	❌ No
Exact metrics	✅ Computed precisely	❌ Assumed or ignored
Verifiable outputs	✅ CSV exports	❌ No underlying data
Nuanced comparison	✅ Shows trends	❌ No baseline year
Repeatability	✅ Fully reproducible	❌ Prompt-dependent

Conclusion

While LLMs are excellent for generating **language-rich summaries**, they are **not accurate** when it comes to multi-year data analysis **without access to full datasets**. Our Python script provided a clear edge through:

- Full numerical accuracy
- Insightful comparisons
- Objective truth from raw data

Deliverables

- team_stats_comparison.csv — Team-level metric deltas.
- player_improvement.csv — Individual year-over-year changes.