**CSI3007 – Advanced Python Programming**

**Lab Activity 10 (26-08-2025)**

**NAME : R.SONALI**

**REG NO : 22MID0061**

# Forgetting Cursive Writing – A Google Ngram Based Analysis

## Objective:

To study the decline of cursive writing and related practices such as penmanship in comparison to handwriting using Google Books Ngram Viewer. This analysis uses Python to fetch data, plot time-series graphs, generate summary statistics, and produce a word cloud with the help of a Large Language Model (LLM).

## Methodology:

Data Collection

- Queried Google Books Ngram Viewer for the terms: cursive, penmanship, handwriting (1800–2025).
- Downloaded JSON → converted to CSV (ngrams_output.csv).

Data Processing

- Used Pandas for DataFrame manipulations.
- Used NumPy for descriptive statistics.

Visualization

- Generated time-series plot of the three terms (ngrams_plot.png).
- Created a word cloud (wordcloud_handwriting.png) based on LLM-generated keywords.

LLM Integration

- Constructed a JSON prompt with statistics + top terms.
- Sent it to an LLM for human-style summary and keyword generation.
- Extracted keywords automatically using regex + text cleaning.

## Results:

Summary Statistics:

- Handwriting: Most frequent, peak in 1924.
- Cursive: Peaked in 1912, steady decline since.
- Penmanship: Peaked in 1925, declined after 20th century.

LLM-Generated Summary:

"Handwriting has consistently been the most prominent term, peaking in 1924. Cursive and penmanship showed lower frequencies, peaking in 1912 and 1925 respectively, but both declined significantly after their peak years. Handwriting remains comparatively stable in modern usage, while traditional writing styles fade with the rise of digital communication."

LLM-Generated Keywords for Word Cloud:

Handwriting, Cursive, Penmanship, Trends, Peaks, Decline, Communication, 1924, 1912, 1925

## Visualizations:

1. Time-Series Plot

   (ngram frequencies of cursive, handwriting, penmanship over 200 years)

   File: ngrams_plot.png

2. Word Cloud

   (based on LLM-generated keywords)

   File: wordcloud_handwriting.png

## Technologies & Functions Used:

- Libraries: requests, pandas, numpy, matplotlib, wordcloud, os, re.
- Pandas Functions:

  pivot(), to_csv(), read_csv(), dropna()

- NumPy Functions:

  np.mean(), np.median(), np.std(), np.max(), np.min()

## Business Note

This workflow demonstrates a data-to-insight pipeline:

- Data Source: Google Books Ngram (historical cultural/language trends).
- Processing: Automated with Python.
- LLM Summarization: Converts raw stats into a human-readable narrative.
- Visualization: Graphs and word clouds for quick insights.

## Business Idea:

This pipeline can be extended into a "Cultural Trend Analytics Platform".

- Universities and researchers could subscribe to explore forgotten practices (e.g., Ayurveda, letter writing, crafts).
- Publishers and media houses could use it for content inspiration.
- Businesses could use it for revival campaigns (e.g., stationery, handwriting courses, vintage branding).

The workflow can be fully automated into a SaaS product:

- Input: keyword list
- Output: CSV data + graphs + LLM-written summary + word cloud

## Conclusion:

This lab demonstrated how to combine historical data (Google Ngrams), Python analytics (Pandas + NumPy), and AI summarization (LLM) into a single automated pipeline. The

analysis revealed that cursive and penmanship are forgotten practices, while handwriting, though declining, has persisted longer.

## Report: Word Cloud Analysis

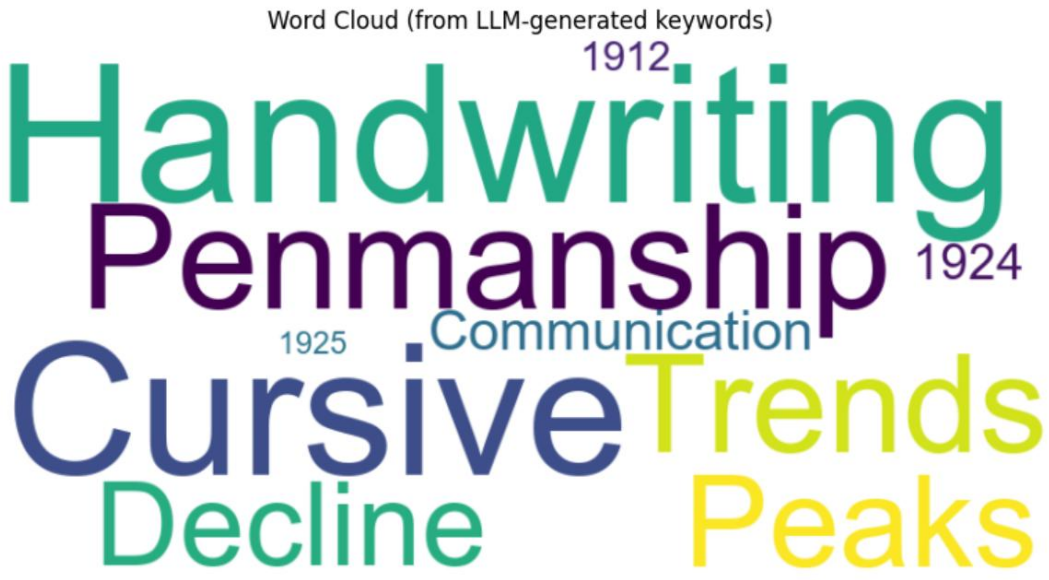
### LLM-Generated Summary

The analysis of the frequency time-series data reveals that handwriting has consistently been the most prominent term, peaking in 1924. In contrast, cursive and penmanship have shown lower overall frequencies, with cursive reaching its maximum in 1912 and penmanship peaking in 1925. Notably, both cursive and penmanship have seen a decline in usage since their peak years, while handwriting has maintained a more stable presence, particularly in recent years. The data suggests a shift in focus away from traditional writing styles towards more modern forms of communication.

### Extracted Keywords

- Handwriting
- Cursive
- Penmanship
- Trends
- Peaks
- Decline
- Communication
- 1924
- 1912
- 1925

### Word Cloud Representation



The Word Cloud highlights the relative importance of the extracted keywords. Terms such as handwriting, cursive, and penmanship are emphasized, along with their associated temporal peaks (1912, 1924, 1925) and trends like decline and communication.

## Conclusion:

The visualization reinforces the findings from the summary. While handwriting maintains consistent usage, cursive and penmanship exhibit a noticeable decline after their respective peaks. This shift indicates a broader cultural movement towards modern communication methods and away from traditional penmanship practices.

**Deliverables Saved:**

- ngrams_output.csv

https://drive.google.com/file/d/1GTTYkSA4eC3qg5Ta5yKrGwIo-1-uFQBI/view?usp=sharing

- ngrams_plot.png

https://drive.google.com/file/d/1QeKE5wssHOG7Tqsix5RXnCmm6-X9UN4o/view?usp=sharing

- ngrams_wordcloud.png

https://drive.google.com/file/d/1rhg01IZKtlysk_X4Ja_l7O7JbkFb3MSA/view?usp=sharing

- wordcloud_handwriting.png

https://drive.google.com/file/d/1cLmppxT9qFHV8aU5Df5GBgHPLdLv2gY9/view?usp=sharing