

# Targeted Writing Style Text Generation

## Related Work and Bibliography for Final Project

An overview of academic papers relating to my final project. Each source contains a summary, application to project, and citation.

### [Creative Writing with an AI-Powered Writing Assistant: Perspectives from Professional Writers](#)

Ippolito, Daphne, et al. "Creative Writing with an AI-Powered Writing Assistant: Perspectives from Professional Writers." arXiv preprint arXiv:2211.05030v1, 9 Nov. 2022

A Google research team commissioned 13 professional writers to use an AI powered writing assistant with built in text editor. This study highlights the strengths and challenges of using a Large Language Model to help writers achieve tasks. Some of the benefits were idea generation, brainstorming, improvisation, and research support. The study highlights one of the main challenges is that the tool struggled to maintain distinctive authorial voice and style, defaulting to bland and elementary language. This is most apparent for professional writers who have developed a specific writing style for their target audience while LLM's are trained on a much wider audience of internet users. An even more specific example would be when a creative writer is crafting a scene with different characters conversing and there is no distinct style differentiating the characters.

This paper provides a foundational overview for the field of AI powered writing tools. Even though it is already dated and covers wide ground, the findings are still relevant. The biggest takeaway is that the data that the model was trained on leans heavily towards large volumes of generic writing from the internet. This confirms that fine tuning a model with direct control over the input data is worthwhile to attempt for my project.

### [LLM-Based Text Style Transfer: Have We Taken a Step Forward?](#)

Toshevskaa, Martina, and Sonja Gievska. "LLM-Based Text Style Transfer: Have We Taken a Step Forward?" IEEE Access, vol. 13, 2025, pp. 44707-44721, doi:10.1109/ACCESS.2025.3548967.

This paper provides a survey of three main groups of style transfer approaches with Large Language Models. Prompting techniques, Fine-tuning techniques, and Memory-augmented LLMs. Fine-tuning generally outperforms prompting techniques and while larger models tend to perform better, there reaches a point where improvement diminishes with increasing size. The paper lays out a key struggle for building these type of tools where

as quality of style increases, content preservation decreases and while content preservation increases, accuracy of style decreases. In addition, the paper highlights that memory augmentation is a promising but underexplored area for future research.

This paper confirms that fine tuning a model will provide good results for style transfer. I found it interesting that there is a cut off point where increasing the model's size begins to diminish the model's improvement and I will have to look for this in my own implementation.

## Customizing Large Language Model Generation Style using Parameter-Efficient Finetuning

Liu, Xinyue, et al. "Customizing Large Language Model Generation Style using Parameter-Efficient Finetuning." arXiv preprint arXiv:2409.04574, 6 Sept. 2024,

The authors identified the same growing concern from my project proposal where a homogenization of language develops as people rely on a few commercial LLMs for writing assistance and therefore may hinder the development of diverse personal writing styles. StyleTunedLM uses Parameter-Efficient Fine-Tuning (PEFT) with Low-Rank Adaptation (LoRA) on LLaMA-2-7b models with works from ten different authors from Project Gutenberg. In addition, the project explored named entity masking and maintaining instruction-following ability through LoRA module merging. The limitations on this project is that it uses well known authors with plenty of data.

Even though this implementation has limitations, I noticed all of the methods are readily available on hugging face as well as tutorials on how to use PEFT and LoRA adapters. This could represent a baseline project before I approach working on the limitations with less known and low data authorship. It's good to know that the techniques in this paper are approachable.

## Authorship Style Transfer with Policy Optimization

Liu, Shuai, et al. "Authorship Style Transfer with Policy Optimization." *arXiv preprint arXiv:2403.08043* (2024).

Authorship Style Transfer aims to transform written text from one author's writing style to another author's writing style without losing the original meaning. This work draws a distinction from classic text transfer tasks that previously use large amounts of data from a well-known author and instead focuses on low-resource authorship style from non-famous authors. ASTRAPOP (Authorship Style Transfer with Policy Optimization) is a two stage framework that combines supervised fine-tuning with policy optimization techniques to directly optimize for style transfer. The first stage removes the original author's style and

transforms the writing style to a neutral tone. The second stage uses policy optimization algorithms. What's interesting is that it uses a reward function to train the model to move towards the targeted writing style and away from the original writing style. This internal writing coach is one of the techniques that allows for the model to learn despite limited resources.

I found that the focus on computation resources, authorship resources, and privacy to be some of the most important topics to keep in mind when implementing my own project. The ASTRAPOP model may be too elaborate for me to replicate in my own short time frame but the concept of sanitizing text to anonymize the author is not something I had previously considered.

### [Cheap and Effective Personalization of Foundation Language Models for Imitating a User's Writing Style](#)

Nicolicioiu, Armand, et al. "Cheap and Effective Personalization of Foundation Language Models for Imitating a User's Writing Style." ICLR 2025 Workshop on Foundation Models in the Wild, 2025.

Panza is a system designed to create personalized email writing assistants that can mimic a user's writing style while maintaining privacy through local deployment. The system does not require a substantial number of emails as 50-100 emails are sufficient. Limited GPUs and CPU resources were tested as well as a chrome extension to emphasize using the system locally for privacy concerns. Panza uses a two step process where the system first pre-trains a language model to convert existing user emails in to synthetic training instructions then fine tunes the model on these instruction-email pairs.

This process combines the two different approaches I initially conceived, fine tuning a model, and engineering a prompt for specific writing generation. By having the model create a prompt in the first phase, it combines both unsupervised learning and supervised learning techniques.