DeepFake Shakespeare: The Theater That Never Was

DeepFake Shakespeare: O Teatro que Nunca Existiu

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This work presents an application that uses language models (LLMs) to generate stories in the style of William Shakespeare. The proposal consists of adapting a pipeline based on pre-trained LLMs with customized prompt inputs to create short plays that simulate the author's narrative style. The goal is to evaluate the coherence of the writing and its similarity to Shakespearean plays, aiming to assess the creative capacity of the AI.

Keywords: text generation, artificial creativity, Shakespeare

Este trabalho apresenta uma aplicação que utiliza modelos de linguagem (LLMs) para gerar histórias no estilo de William Shakespeare, a proposta consiste em adaptar um pipeline baseado em LLMs pré-treinados com entrada de prompts personalizados, para criar peças curtas que simulem o estilo narrativo do autor. O objetivo é avaliar a coerência da escrita e a similaridade com peças shakespearianas, em busca de identificar a capacidade criativa da IA.

Palavras-chave: geração de texto, criatividade artificial, Shakespeare

1.   INTRODUCTION

One of the most notable advances in artificial intelligence in recent years, especially with the use of large language models (LLMs), is the generation of fluent, coherent texts with varied styles. As a result, its application has become the subject of much debate. In this article, we will address artificial creativity to understand the extent to which a machine can imitate human originality.

The poet and playwright William Shakespeare is widely recognized for his construction of dialogues, emotions, and timeless human conflicts. His works remain a benchmark of creativity, depth, and dramatic innovation, continuing to inspire many 21st-century writers. In this context,

proposing that an AI attempt to imitate the Shakespearean style is not only a technical challenge but also a philosophical inquiry into the limits of computational creativity.

This work presents an interactive application that uses a pipeline based on an LLM to generate original texts in the style of Shakespeare. The main tool used was GPT-4, after fine-tuning, for text generation, and DALL·E for image generation. The environment is executed via Google Colab. The objective of this article is to analyze the quality and originality of the generated texts and to understand the extent to which AI can simulate the classical style of one of the greatest writers in history.

2.   METHODOLOGY

2.1 Application Architecture

The developed system consists of three main components:
- Preprocessing pipeline:
  - Extraction and formatting of scenes and monologues;
  - Creation of examples for fine-tuning in JSONL format;
  - Automatic thematic classification.
- *Supervised fine-tuning of the model:*
  - 5 versions of GPT-4-mini with different configurations;
  - Hyperparameter configuration (epochs = 2, learning rate = 0.2, batch size = 16).
- Analysis module:
  - Automatic evaluation based on GPT-4 using Chain of Thought (CoT);
  - Scoring system for language, structure, and literary devices.
- User interface:
  - Web application developed with Gradio;
  - Integration with DALL-E for image generation.
  - Intensive use of Prompt Engineering for text and image generation functions.

2.2 Implemented Algorithms

2.2.1 Pseudocode: Fine-tuning Pipeline

1. Load datasets of Shakespeare's plays (Hamlet, Macbeth, Romeo and Juliet)
2. For each play:
   2.1 Extract complete scenes
   2.2 Identify monologues (consecutive lines exceeding 5 lines)
   2.3 Automatically classify by theme
   2.4 Create examples in prompt-response format
3. Combine examples from all plays
4. Limit to 100 examples (random sampling if necessary)
5. Save in JSONL format
6. Submit for fine-tuning via OpenAI API

2.2.2 Pseudocode: Content Generation

```
Function generate_shakespeare_text(theme, text_type, characters):
    If text_type == "scene":
        prompt = "Create a scene about {theme} with {characters} characters"
    Else:
        prompt = "Create a monologue about {theme}"

    response = API_call(
        model="gpt-4-fine-tuned",
```

```
messages=[
    {"role": "system", "content": "You are Shakespeare"},
    {"role": "user", "content": prompt}
],
temperature=0.8
)
Return response
```

2.3 Datasets and Frameworks

Datasets:
- Shakespeare Play's Dialogues (Kaggle);
- 100 examples built from the dataset for fine-tuning.

Frameworks:
- OpenAI API (fine-tuning and generation);
- Gradio (web interface);
- Pandas (data processing).

2.4 Hardware Environment:

Google Colab

3.   TESTS PERFORMED

Comprehensive tests were conducted with five versions of the fine-tuned model (varying in dataset size, number of epochs, learning rate, and batch size), evaluating the generation of scenes and monologues based on modern themes, such as "The Industrial Revolution." Each model underwent an automatic authenticity analysis, which considered three main criteria: language and vocabulary (use of archaisms and lexical richness), metric structure (iambic pentameter and free verse), and figures of speech (metaphors and wordplay). The quantitative results, presented on a scale from 1 to 10, revealed that Model 5 (trained with 100 examples, 2 epochs, and batch size 16) achieved the best performance, with an average score of 8/10, standing out for its use of complex metaphors and archaic language, although showing limitations in strict metrical patterns and wordplay. Additional tests with different temperature settings (0.8) demonstrated a balance between creativity and stylistic coherence.

The automatic evaluation was carried out using the GPT-4 model, which, through the use of the Chain-of-Thought (CoT) technique, was able to provide a detailed analysis of the textual structure (Figure 1).

```
Forneça uma análise detalhada considerando (escala de 1-10 para cade criterio):
1. Linguagem e vocabulário (uso de arcaísmos, riqueza vocabular)
2. Estrutura métrica (pentâmetro iâmbico, verso livre)
3. Figuras de linguagem e retórica (metáforas, trocadilhos)

4. Realize uma média dos criterios de autenticidade avaliados.

Realize uma análise sucinta, pórem precisa.
Destaque apenas os principais pontos.
Não leve em consideração a análise de temas e elementos sobre os quais Shakespeare nunca escreveu antes!
Se necessário, inclua exemplos específicos do texto que justifiquem sua avaliação.
"""
```

Figure 1: Automatic evaluation.

3.1 Model Configuration

Modelo	Exemplos	Épocas	Learning Rate	Batch Size
Model1	20	3	0.2	16
Model2	20	1	0.1	16
Model3	20	1	0.1	8
Model4	50	1	0.15	8
Model5	100	2	0.2	16

4.   RESULTS AND DISCUSSION

The experiments conducted demonstrated that the fine-tuned models outperformed the standard GPT-4 in generating texts in the Shakespearean style, with Model 5 achieving the highest average authenticity score (8/10).

Model 2 (20 examples, 1 epoch) exhibited overfitting, generating repeated excerpts from the original plays, whereas Model 5 showed better generalization to modern themes.

4.1 Quantitative Analysis

Tema Testado: "A Revolução Industrial" (temperatura=0.8)				
Modelo	Linguagem	Estrutura	Figuras	Média
GPT-4	7.0	6.0	7.0	6.67
Model1	7.0	6.0	8.0	7.00
Model2	8.0	7.0	9.0	8.00
Model3	7.0	6.0	7.0	6.67
Model4	8.0	7.0	9.0	8.00

4.2 Qualitative Analysis

Best Result (Model 5):

"Ah! Que visão horrenda em meu peito se agita!
Eustáquio, conde de novos inventos,
Em teu coração pulsa um amor ignóbil!
A revolução é como um rio tempestuoso,
Que arrasta tudo, e apenas deixa
Os destroços de suas margens desfeitas."

Strengths:
- Creative adaptation of anachronistic themes (e.g., the Industrial Revolution) to the Elizabethan style;
- Complex metaphors and vivid imagery;
- Consistent poetic rhythm.

Limitations:
- Difficulty maintaining strict iambic pentameter;
- Lack of characteristic wordplay.

5. CONCLUSION

The project demonstrated the feasibility of using fine-tuned LLMs to generate content in the Shakespearean style—and by extension, in the style of any author or creator whose works are widely documented and publicly available. One key insight gained was the ability of "off-the-shelf" LLMs such as GPT-4 and LLaMA to generate the desired content through Prompt Engineering alone. This technique, besides being powerful, is remarkably simple to implement and, when used effectively, can yield results comparable to those of a properly fine-tuned model.

For future improvements, it is important to consider model tuning aspects such as the number of training epochs, dataset size, and formatting, which in this project were underutilized due to time constraints. Hardware is also a critical factor; thus, scaling the project in terms of

both training and infrastructure will exponentially enhance model performance. Moreover, the application's interactive interface could be improved by implementing a frontend using JavaScript and CSS. Integration with an orchestration framework such as LangChain could also enrich the application by enabling access to external sources and tools. Finally, incorporating a mechanism to collect human feedback would be essential for the ultimate validation of the DeepFake Shakespeare creations.

6. ACKNOWLEDGMENTS

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