Project 23 - Emotion-Based Poem Generation using NLP

CONTENTS

2. Motivation

1. Emotions deeply influence human expression and creativity.
2. Automating emotional poem generation blends AI and literature.
3. Useful for education, therapy, creative writing aids.
4. Demonstrates how NLP models interpret and generate emotional text.

3. Problem Statement

Develop an NLP-based system that:

- Takes a user-given emotion as input.
- Identifies a contextually similar poem from dataset.
- Generates a new poem using a generative language model.
- Ensures emotional alignment and creativity in the output.

4. Related Work

1

Transformer-based embedding models (BERT, RoBERTa) for semantic understanding.

2

GPT-2 and GPT-3 used widely for creative text generation.

3

Emotion classification and sentiment-based generation models.

4

Prior works focus on story generation; poem generation less explored.

5. Datasets

ABIEMO_2334.csv – poems labeled with emotions.

BAPEMO_6346.csv – extended emotion-poem dataset.

Combined 200 cleaned samples used.

Preprocessing: lowercase, punctuation removal, HTML tag removal.

6. Methodology

System Pipeline:

1. Clean and preprocess poem dataset.
2. Generate embeddings using DistilRoBERTa.
3. Compare emotion embeddings using cosine similarity.
4. Retrieve closest poem.
5. Use GPT-2 to generate final poem with emotional prompt.

7. Experiments

Tested multiple embedding lengths (128–256 tokens).

Evaluated cosine similarity accuracy for emotion-poem matching.

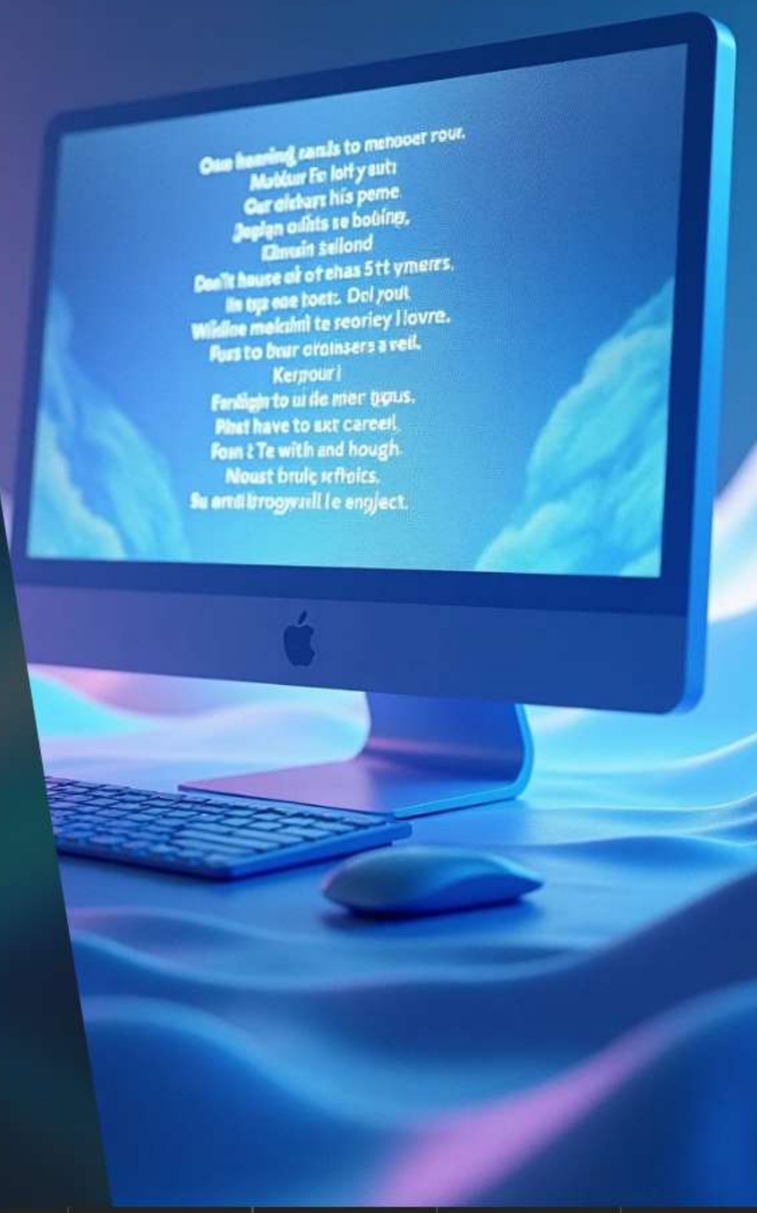
Sampled various GPT-2 decoding strategies:

- Temperature = 0.8
- Top-p (nucleus) = 0.95

Generated poems for emotions: joy, sadness, fear, love.

8. Results

1	2
System generated meaningful poems consistent with emotional tone.	Similarity-based retrieval improved contextual grounding.
3	**4**
GPT-2 produced creative, readable poems with good fluency.	Joy, sadness emotions showed best alignment in generated output.



9. Analysis & Discussion

Embedding-based similarity improved GPT-2 generation quality.

Model limitations:

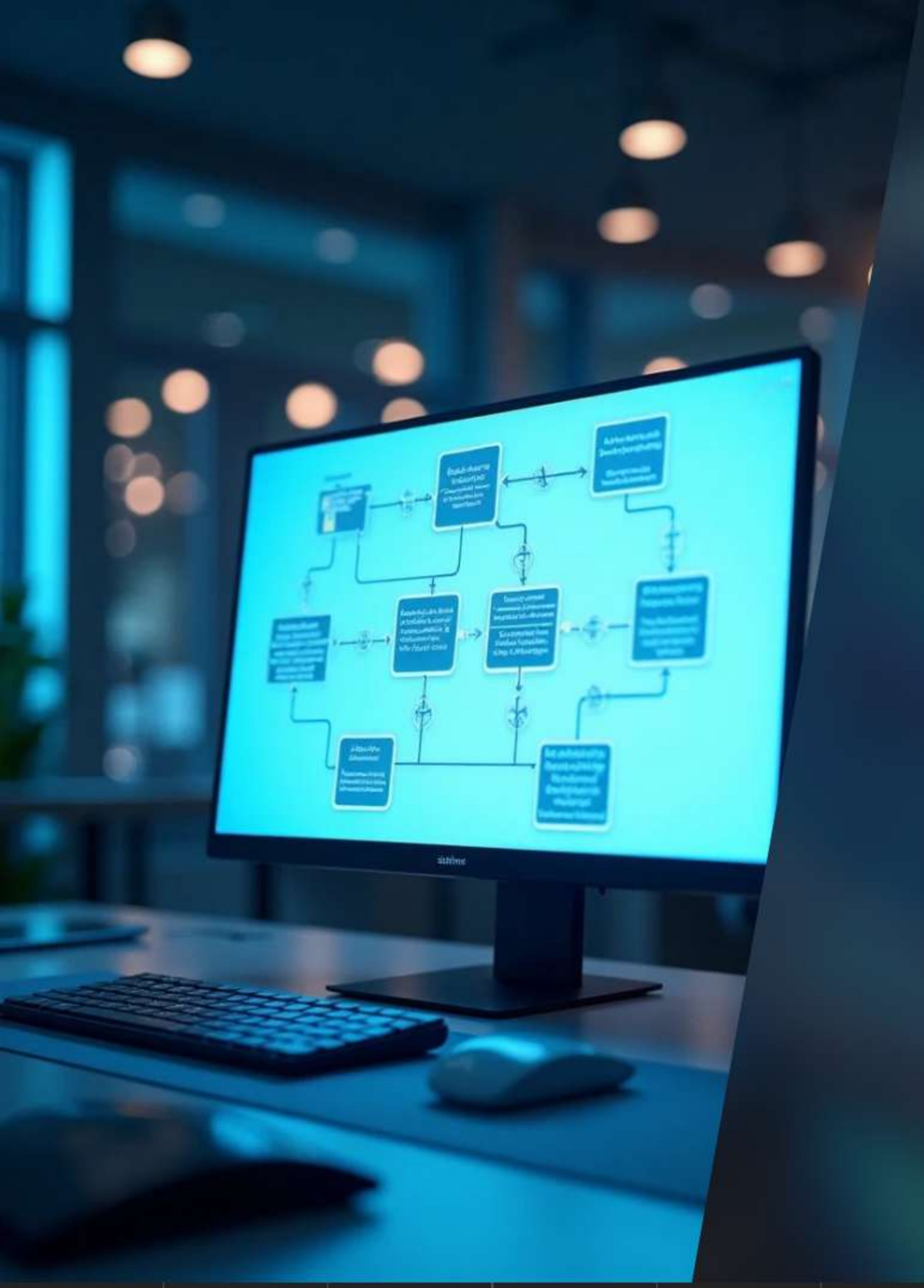
- Sometimes repetitive phrasing.
- Less accurate for complex emotions.

Future improvements:

- Fine-tuning GPT-2 on poem dataset.
- Larger dataset and emotion diversity.

10. Your Contributions

1. Implemented full NLP pipeline for poem generation.
2. Built custom dataset merging and preprocessing.
3. Designed embedding-based similarity retrieval.
4. Integrated GPT-2 generation with emotion prompts.
5. Conducted experiments and documented findings.



11. Proposed Timeline

Week 1–2

Dataset collection & preprocessing.

Week 3

Embedding model integration.

Week 4

Cosine similarity + retrieval.

Week 5–6

GPT-2 integration & testing.

Week 7

Evaluation & error analysis.

Week 8

Report + final presentation.

12. Demo / Application

1

User inputs 'joy' → system retrieves joyful poem → GPT-2 generates new poem.

2

Applications:

- Creative writing assistance.
- Emotional therapy & journaling tools.
- Educational use for poetry learning.

3

Full demo available in the project notebook.

Thank You