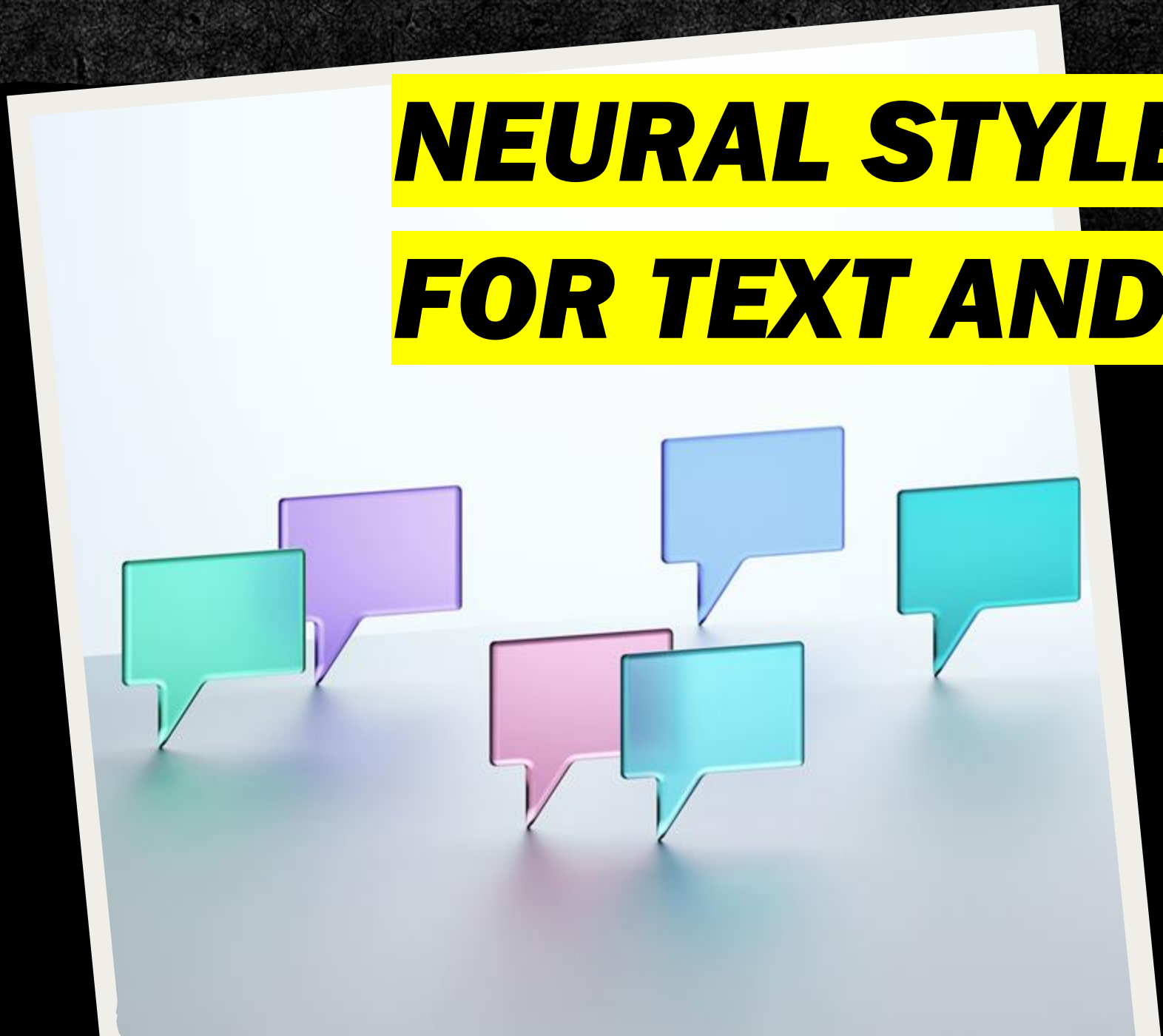
NEURAL STYLE TRANSFER FOR TEXT AND CHATS



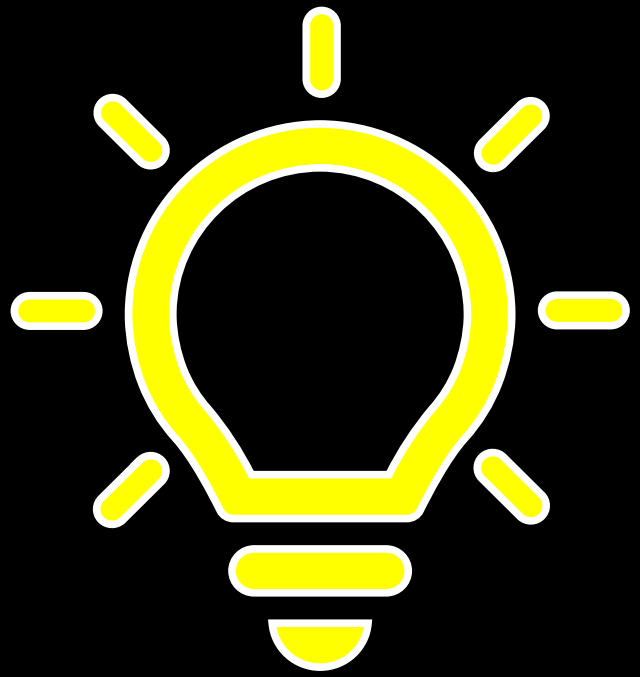
Mentors:

- Abhinav Raghuvanshi
- Siddhesh Pawar

Mentees:

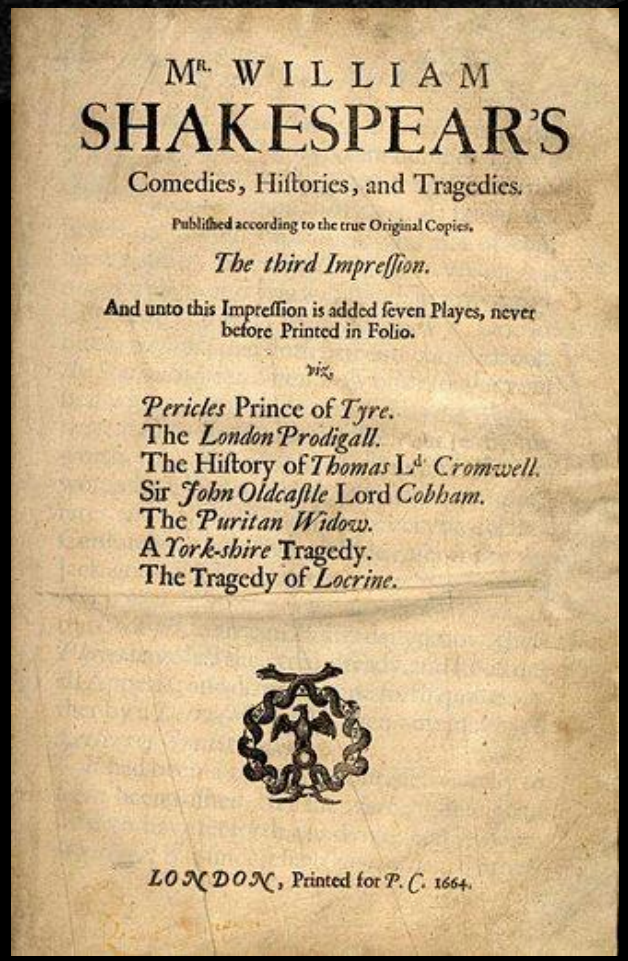
- Amruta Parulekar
- Sanika Padegaonkar
- Ritesh Bahl

MOTIVATION



- In the modern world, humans often use informal language, especially while texting.
- Our team wanted to build a model, that would convert modern language to formal, Shakespearean language and further use it to have conversations with a chatbot.
- For this, we used a pipeline-based approach for Neural Text-Style-Transfer to build a Shakespearean Paraphraser.
- We used the HuggingFace Transformers Library and LSTM RNNS to achieve this.

RESPONSIVE MODEL



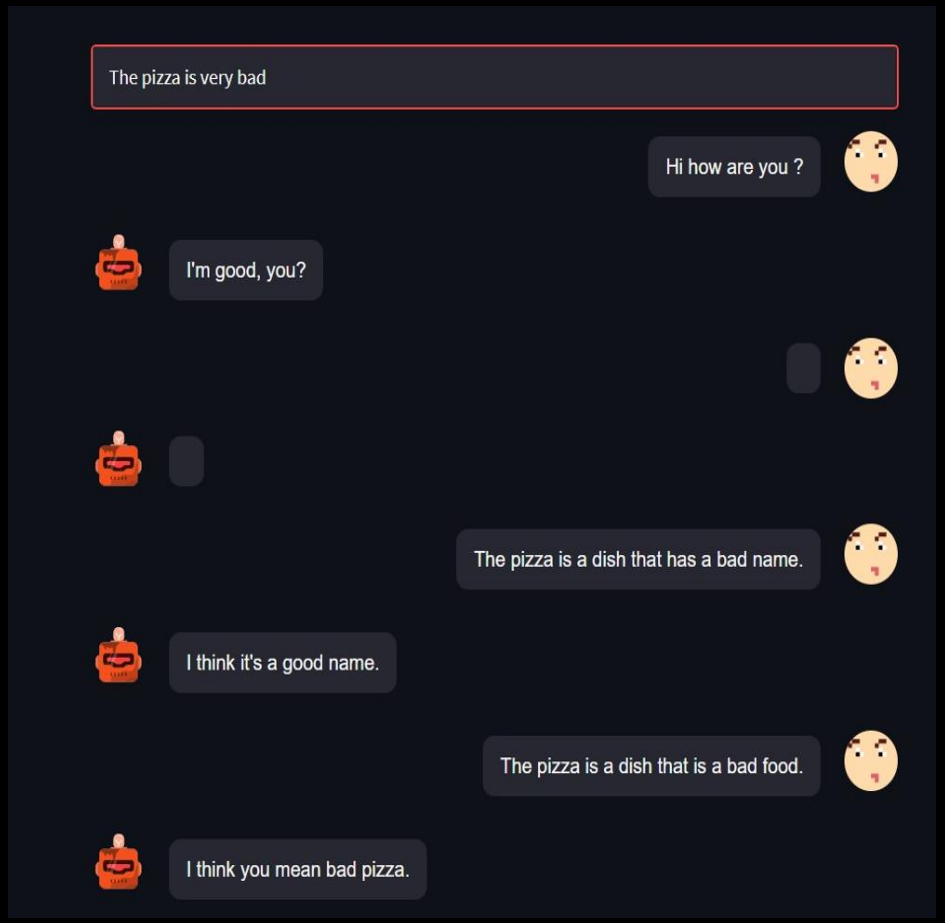
Mr. WILLIAM
SHAKESPEAR'S
Comedies, Hiſtories, and Tragedies.
Publiſhed according to the true Original Copies.
The third Impreſſion.
And unto this Impreſſion is added ſeven Playes, never before Printed in Folio.
viz.
Pericles Prince of *Tyre.*
The *London Prodigall.*
The Hiſtory of *Thomas* L.d *Cromwell.*
Sir *John Oldcaſtle* Lord *Cobham.*
The *Puritan Widow.*
A *York-ſhire* Tragedy.
The Tragedy of *Locrine.*
LONDON, Printed for P. C. 1664.

- We used the DialoGPT model to generate conversational responses to the output of our Shakespeaerean paraphraser.
- DialoGPT is a large, tunable neural conversational response generation model, trained on 147M conversation-like exchanges extracted from Reddit comment chains over a period spanning from 2005 through 2017.

CHATBOT

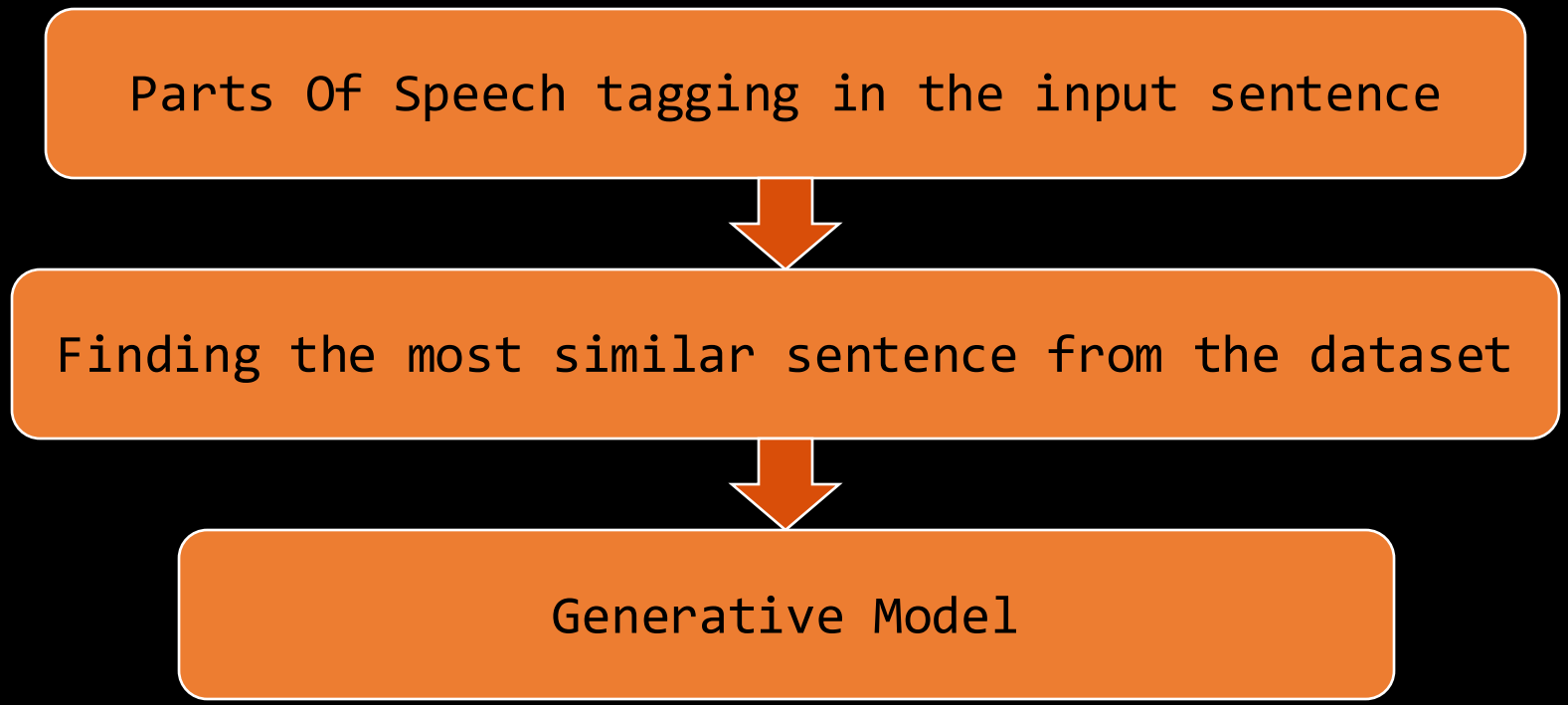
- The output of our Shakespearean Paraphraser was sent to a chatbot.
- We developed a user interface for the chatbot.
- The chatbot uses the responsive model to have a normal conversation with us.

CHATBOT USER INTERFACE




```
 * Serving Flask app "__main__" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: off
INFO:werkzeug: * Running on http://127.0.0.1:5000/ (Press CTRL+C to quit)
 * Running on http://2c6f-34-86-134-116.ngrok.io
 * Traffic stats available on http://127.0.0.1:4040
{'message': 'Hi, how are you ?'}
INFO:werkzeug:127.0.0.1 - - [07/Aug/2022 11:39:45] "POST / HTTP/1.1" 200 -
Message:  Hi, how are you ?
Reply:  I'm good, you?
{'message': 'The pizza was very bad'}
INFO:werkzeug:127.0.0.1 - - [07/Aug/2022 11:39:55] "POST / HTTP/1.1" 200 -
Message:   The pizza is a dish that is a bad food.
Reply:  I think you mean bad pizza.
```

HOW THE MODEL OPERATES



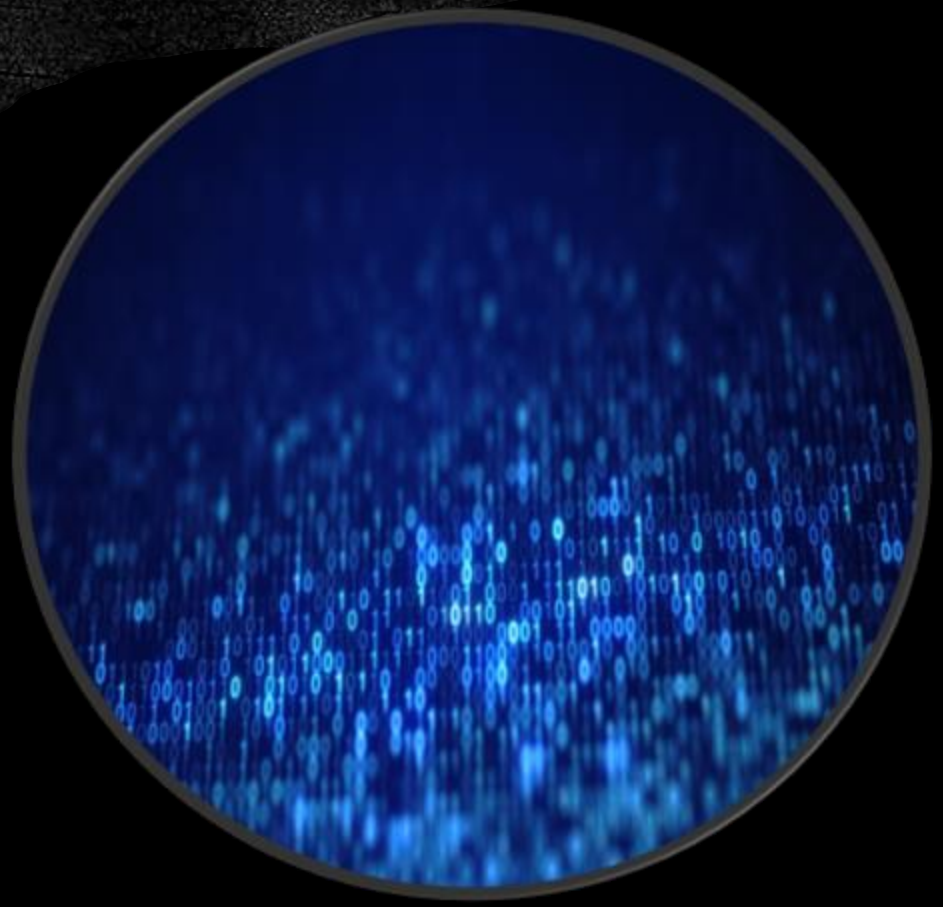
POS TAGGING

- The overall sentiment of a sentence is generally determined by the adjectives used in it.
- We have used the POS Tagger provided by nltk to identify the adjectives in the input sentence.
- A part-of-speech tagger, or POS-tagger, processes a sequence of words, and attaches a part of speech tag to each word.

SENTENCE SIMILARITY

- We now want to find the sentence in our dataset which is closest to our input sentence.
- For this purpose, we use cosine similarity.
- Cosine similarity measures the similarity between two vectors of an inner product space.
- It is measured by the cosine of the angle between two vectors and determines whether two vectors are pointing in roughly the same direction.
- To measure the cosine similarity, we encode our input sentence to produce an input vector.
- Similarly, the sentences in our dataset are also encoded to produce vectors.

GENERATIVE MODEL



- The adjectives in our input sentence are replaced with the adjectives in the sentence from our dataset and this new result is sent to a generative model.
- This model generates a coherent output sentence that carries the same sentiment as our input sentence but with better phrasing.
- We can see this output in our chat window.
- This output is then sent to our conversational chatbot which responds accordingly.

FUTURE WORK

- In this model, we used replacement of informal adjectives with formal adjectives for style transfer.
- In the future, we aim to use attention weights, for better results.
- We also aim to improve the user interface of the chatbot.

CONCLUSION

- Thus, we have successfully created a Neural Style Transfer model that converts modern English statements to formal, Shakespearean language.
- We have also integrated our Shakespearean Paraphraser with a chatbot.
- We are excited to research on this model and improve it further.

THANK YOU

REFERENCES

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- Paper Implemented: https://medium.com/agara-labs/the-generative-style-transformer-3564bce04d04
- The Hugging Face course on Transformers: https://huggingface.co/course/chapter0/1?fw=pt
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- https://datachef.co/blog/neural-language-style-transfer-with-wordmentor/
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- https://github.com/fuzhenxin/Style-Transfer-in-Text
- https://github.com/topics/text-style-transfer
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- https://www.guru99.com/pos-tagging-chunking-nltk.html
- https://aclanthology.org/D19-1322/

PRESENTATION