POST 6 - GEN AI

UNDERSTANDING GENERATIVE AI TEXT GENERATION: A STEP-BY-STEP GUIDE MADE EASY

Fundamentals - Part 2

GENERATIVE AI FOR ALL

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- In this document we will go through the step by step process of text generation by Generative AI
- We will take an example of "Writing a story about Tom & Jerry" (famous cartoon character), if we ask this question to any Generative AI bot, how it will work
- The guide is in two sections, one looking it as non technical lens, the other section focuses with technical perspective

Learning from Stories:

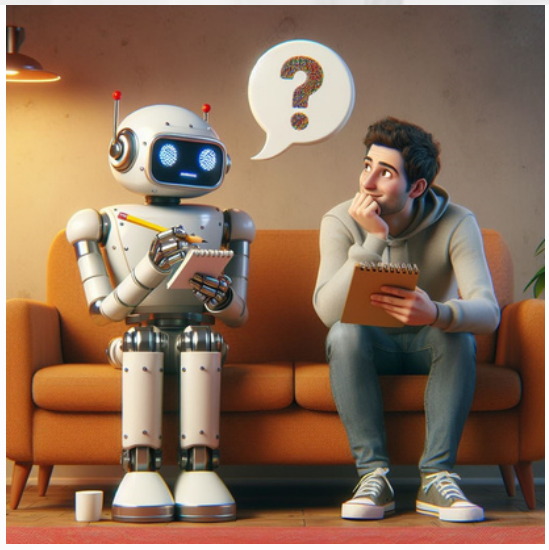
- Generative AI absorbs vast amounts of stories to understand language nuances, character dynamics, and narrative structures.
- It comprehends themes, emotions, and plot developments from diverse textual sources

Understanding Tom & Jerry:

- The AI comprehends the nuances of Tom and Jerry's personalities, their dynamic interactions, and the iconic scenarios they encounter.
- It captures the essence of their relationship, including rivalry, friendship, and comedic elements.

Putting Words into Numbers:

- Text is tokenized and converted into numerical representations, facilitating computational processing and analysis.
- Each word receives a unique numerical identifier, enabling the AI to interpret and manipulate language patterns effectively.



Guessing the Next Word:

- Leveraging contextual cues and statistical patterns, the AI predicts subsequent words based on preceding sequences.
- It considers syntactic structures, semantic meanings, and probabilistic distributions to make informed predictions

Making a Storyline:

- Drawing from its knowledge base, the AI orchestrates sequences of words to construct cohesive narratives with logical progressions.
- It weaves together plot elements, character interactions, and descriptive details to create engaging storylines.

Keeping it Interesting:

- The AI injects variety and unpredictability into the narrative by introducing twists, conflicts, and unexpected developments.
- It employs diverse vocabulary, sentence structures, and literary devices to maintain reader interest and immersion.

Checking for Mistakes:

- The AI performs syntactic and semantic checks to ensure coherence, grammaticality, and relevance in generated text.
- It verifies consistency, logical flow, and adherence to storytelling conventions to produce high-quality outputs.

Learning from Feedback:

- **User feedback serves as valuable input for refining the AI's text generation capabilities and enhancing its linguistic understanding.**
- **It adapts and iterates based on user interactions, incorporating corrections, preferences, and stylistic nuances into future outputs.**

TECHNICAL EXPLANATION

Learning from Stories:

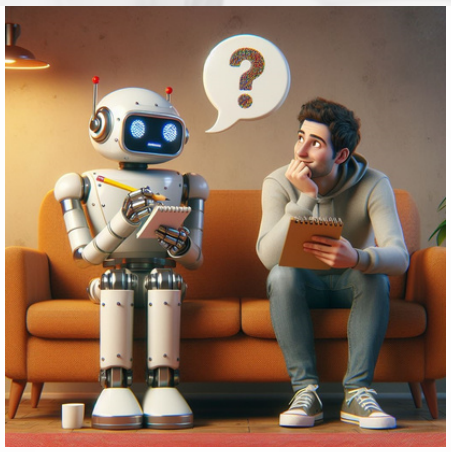
- Generative AI models undergo training using large-scale language corpora to develop contextual understanding and language modeling capabilities.
- Through techniques like transformer architectures, attention mechanisms, and recurrent neural networks, the model captures syntactic and semantic structures from textual data.

Understanding Tom & Jerry:

- The AI model leverages pre-trained language representations, such as word embeddings or contextualized embeddings like BERT, to encode information about characters, settings, and plot dynamics.
- It utilizes fine-tuning mechanisms to adapt its learned representations specifically to the domain of Tom and Jerry stories, optimizing for relevance and coherence.

Putting Words into Numbers:

- Tokenization processes tokenize input text into subword or word-level tokens, transforming textual inputs into numerical sequences understandable by the neural network.
- These tokens are mapped to embeddings or one-hot encodings, facilitating efficient computation and gradient-based optimization during training and inference stages.



Guessing the Next Word:

- **Utilizing probabilistic language models, such as autoregressive or transformer-based models, the AI calculates conditional probabilities of next tokens given preceding contexts.**
- **Beam search or sampling strategies generate next-token predictions by maximizing likelihoods or sampling from probability distributions, considering model uncertainties and diversity in generated outputs.**

Making a Storyline:

- The AI employs sequence-to-sequence architectures or autoregressive frameworks to generate coherent narratives, conditioning on input prompts and previous tokens.
- Attention mechanisms enable the model to focus on relevant parts of the input sequence and dynamically allocate context during text generation, enhancing narrative coherence and relevance.

Keeping it Interesting:

- Incorporating techniques like temperature scaling or nucleus sampling, the AI modulates output diversity and novelty while maintaining syntactic and semantic coherence.
- Diverse beam search or top-k sampling strategies introduce variability and creativity in generated text, promoting engaging storytelling and avoiding repetitive patterns.

Checking for Mistakes:

- During text generation, the AI model evaluates generated sequences using metrics like perplexity, BLEU score, or semantic similarity measures to assess grammaticality and semantic fidelity.
- Techniques like adversarial training or reinforcement learning frameworks fine-tune model parameters to minimize errors and improve text quality based on reward signals or evaluation criteria.

Learning from Feedback:

- User feedback loops enable iterative model refinement and adaptation through techniques like active learning, human-in-the-loop training, or meta-learning.
- Reinforcement learning algorithms or differential learning rates adjust model parameters based on user interactions and feedback signals, optimizing text generation performance and user satisfaction metrics.

Thank You

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