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AI Content Generation Technology based on Open AI Language Model

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Abstract

The Open AI language model is a powerful tool for generating AI content. A Large amount of text data is trained through the language model, which can generate new text that is similar in style and tone to the training data. This language model can assist writers in generating high-quality content by offering suggestions and insights for improving language usage, sentence structure, and overall readability. This study represents the development of a content generation tool based on the open AI language model by utilising GPT 3 in the backend as an API to generate the necessary information for the model. With the help of this tool, businesses and individuals can produce high-quality, engaging content more efficiently than ever before. This content generation tool uses a recurrent neural network (RNN) architecture, which enables it to make more accurate predictions than rule-based chatbots. All the features, like Facebook ads, LinkedIn posts, Amazon product descriptions, blogs, company bios, chat bots, and so on, will be presented in the dashboard. This tool is powered by advanced machine learning algorithms that can analyse and understand natural language, allowing them to produce content that is grammatically correct, free of errors, and tailored to specific audiences. They can also help optimize content for search engines, ensuring that it reaches a wider audience and generates more traffic with fine-tuning templates.

Keywords: OpenAI, Language Model, GPT 3, API, Recurrent Neural Network (RNN), Chat Bot.

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1. Introduction

The advent of Artificial Intelligence (AI) has revolutionized the way interaction with technology can be established, and one area where it has made a significant impact is in content generation. OpenAI's language models, such as GPT-3, GPT 3.5, and GPT 4.0, have been at the forefront of this transformation, providing an unprecedented level of efficiency to content creation.

This study represents the AI content generation tool based on the OpenAI language model, which has been built using the Bubble.io software platform. This tool provides a user-friendly interface that allows anyone to generate high-quality content for various purposes, such as Facebook and LinkedIn posts, blog writing, product descriptions, and even chatbots. The system leverages the GPT-3 API to generate content that is coherent, relevant, and engaging. All users need to do is input their desired pretext and user details, and the system takes care of the rest. It sends the entries to the API request, which then generates the content based on its extensive training and experience before displaying the output to the users. Also, there are a few pre-set templates, which users can directly use according to their needs. This technique is perfect for businesses and individuals who want to streamline their content creation process while maintaining a high level of quality. By using AI-generated content, users can save time and resources while still producing content that resonates with their target audience. We are confident that this AI content generation tool will transform the way people create content, making it more efficient, effective, and accessible than ever before.

1.1 Problem Statement

The importance of AI content generation tools cannot be overstated, as they enable businesses to create more content in less time, freeing up resources to focus on other aspects of their operations. Moreover, they help ensure that the content is of consistently high quality, which is essential for building trust with readers and customers. As AI technology continues to evolve, it is likely that content generation tools will become even more advanced and capable. It is, therefore, imperative for individuals and businesses to embrace these tools and stay up-to-date with the latest advancements in AI content generation technology to remain competitive in today's rapidly changing landscape.

The problem statement based on the study is as follows:

1. What gap or need does this tool address?

This tool addresses the need for users to generate high-quality content quickly and easily for various purposes, without the need for extensive writing skills or experience.

2. What problem does it solve?

    - This tool solves the problem of time-consuming and labor-intensive content creation by automating the process and generating relevant and effective content quickly and efficiently.
    - It can assist with answering questions and providing information, suggestions, or recommendations on a wide range of topics.
    - It can help with language proficiency and assist in language learning.
    - It will generate human-like text based on prompts or inputs, making it useful for various creative writing or content creation purposes.
    - It has a wider range of functionality, such as pre-set templates and various options to choose from, whether you are looking for any social media posts or helping for the content creators of marketing companies.

3. Who is the target audience, and what are their pain points?

The target audience for the tool could be individuals or businesses that need to create content for various purposes but may lack the time, resources, or expertise to do so effectively. Their pain points may include a lack of writing skills or experience, limited time or resources for content creation, or the need to create large volumes of content quickly.

2. Related Work

The growing use of AI has led to a need for better understanding the relationship between AI language processing and human language analysis. It is important to consider the cultural and social context in which language is produced to improve the application of natural language processing in AI. According to [1], they talked about how the analysis of interpersonal function, individuation, and multimodality in Black English used in "The Color

Purple" novel can provide insights into the relationship between language and society for AI language processing and discourse analysis. The article [2] discussed the arrival of ChatGPT, a natural language processing model that combines GPT-2 and supervised and reinforcement learning techniques to fine-tune GPT-3 language patterns. It enables users to interact naturally with AI systems through text-based conversations and has several features, such as emotion detection and sentiment analysis capabilities. The article explores ChatGPT's potential to improve various sectors, including e-commerce, education, finance, health, news, and productivity. Additionally, it discussed how ChatGPT can create personalized content and enhance customer service efficiency for businesses. This article [3] discussed the increasing importance of AI literacy and proposes an open-source tool called "Build-a-Bot" to help students and teachers learn about AI by creating their own transformer-based chatbots. The tool allows customization of the model to answer questions based on course material and teaches data collection, augmentation, intent recognition, and question answering through each step of the process. The tool is designed to be intuitive for middle-school students, and further work is needed to evaluate its effectiveness in schools. Similarly, the author of this research [4] has described a highly advanced conversational AI model that has been trained on massive amounts of data and can perform a range of language-related tasks. While the model's potential benefits are significant, there were concerns about the ethical and social implications of its deployment. Ethical considerations and principles are essential in developing and deploying the AI models of ChatGPT. In various industries, such as customer service and content creation, ChatGPT has the potential to revolutionize the way we interact with technology, changing the way we communicate and access information. However, we must approach its development and deployment with caution, taking into account potential ethical and social implications.

This study [5] discussed the potential of conversational AI, specifically chatbots, in education. The study presented an experimental use case of an educational AI chatbot called AsasaraBot, which teaches high school students' cultural content in a foreign language. The chatbot-based educational program has been evaluated at public and private language schools in Greece, and the findings show that the use of AI chatbot technology is suitable for learning foreign languages and cultural content at the same time. The AsasaraBot AI chatbot has been designed and implemented in the context of a postgraduate project using open-source and free software. Another article of [6] discussed the limitations of non-interactive evaluation of language models (LMs) and proposed a framework called Human-AI Language-based Interaction Evaluation (H-LINE) to expand evaluation along three dimensions, including the

interactive process, subjective experience, and preference beyond quality [7], [8]. The study presented five tasks to capture different forms of human-LM interaction and evaluated four state-of-the-art LMs, finding that non-interactive performance does not always result in better human-LM interaction and emphasizing the importance of examining the nuances of human-LM interaction. The article [7] [9] explained how OpenAI is developing deep learning techniques to solve complex problems and discusses Natural Language Processing (NLP) as a key application. GPT-3 is highlighted as an auto-regressive language model with many capabilities. The article also discussed the use of behaviour analytics in responsive AI systems to enable faster corporate decisions and concluded with the applications of fine-tuning deep learning models through GPT-3 under the Open AI system.

In the context of the existing literature review encompassing ten papers, this comprehensive exploration of generative artificial intelligence (AI) further enriches our understanding. The highlighted papers include the transformative impact of generative AI on the metaverse [10], its integral role in computer science education [11], and the essential aspects for effective implementation. This synthesis provides a cohesive narrative that contributes to the broader discourse on generative AI, integrating insights from diverse perspectives and offering valuable implications for researchers, educators, and practitioners.

3. Proposed Work

This content generation tool uses a recurrent neural network (RNN) architecture to learn from previous conversations and contextual information provided by the user's input sentence(s). This allows it to make more accurate predictions than rule-based chatbots like ELIZA or AIML. Unlike these rule-based approaches, RNN architectures can be trained on large datasets and can be scaled up almost indefinitely. The training process involves using reinforcement learning techniques along with supervised machine translation models to quickly learn new ideas based on what users say and adapt to different situations in each conversation thread. It can also generate useful answers even when given incomplete sentences, making it suitable for real-world applications where people may not always provide all the necessary information to their virtual assistants or chatbots.

3.1 Model Architecture Design

This system responds intelligently to user queries while maintaining contextual and structural relevance. It does this by sequentially pre-setting templates for user entry details by combining pretext and entries. Once it gets the command from the user, it calls the API of GPT 3 in the back end, generates the output, and shows it to the user. The general architectural structure of this system is divided into two parts. One is for the server request, and another is user interface.

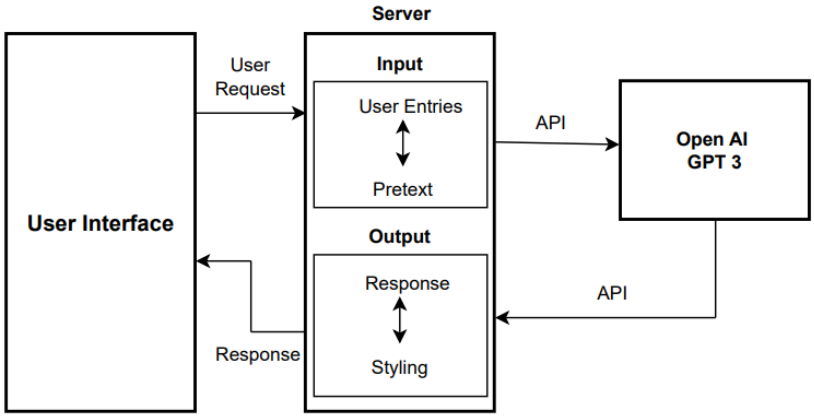

Figure 1. General model Architecture Design

The general model architecture design of the implemented system is shown in the figure 1. The system is designed to facilitate user requests for content from a website. On the server, the user entries and pretext are analysed to generate suitable content that meets the user's requirements. It is essential that the user's entries and pretext are clear and concise to enable the system to provide the appropriate content. Once the user entries and pretext are completed, the API is called. The system uses OpenAI GPT–3 for the backend API to generate the necessary content for the user. The API checks the user's requirements and generates the appropriate content based on their needs. The output is sent back to the server as a response, which then proceeds to style the content based on the user's preferences. The styling ensures that the content is visually appealing and easy to read. Finally, the server sends the response to the system, which displays the generated content and information on the user interface. The user can then access the generated content by the system and use it for their intended purpose.

3.2 Recurrent Neural Networks (RNNs) for Text Generation

Language modelling involves learning meaningful vector representations for language or text by utilizing sequence information. It is typically trained to predict the next token or word-based language modelling framework.

3.2.1 Overview of RNN Architecture

The Recurrent Neural Network (RNN) architecture is well-suited for processing free-flowing natural language due to its sequential nature. Unlike feedforward neural networks, RNNs, as highlighted by , have the ability to learn and compress entire sequences, rather than focusing solely on individual input items. The key components of RNNs include sequential processing, a memory mechanism, hidden states, and training for prediction. These elements collectively enable RNNs to understand and generate sequences of data, making them well-suited for applications in text and content generation.

How RNN works in text generation or content generation:

1. **Sequential Processing:** RNNs process input data sequentially, considering the order of elements in a sequence.
2. **Memory Mechanism:** RNNs have a memory component that enables them to retain information from previous steps in the sequence. This memory allows them to capture context and dependencies over time.
3. **Hidden States:** At each time step, RNNs update a hidden state, which serves as a representation of the current input and the information from previous steps.
4. **Training for Prediction:** RNNs are trained using sequences of data by predicting the next element in the sequence. This involves adjusting the network's parameters to minimize the difference between predicted and actual outputs.
5. **Backpropagation Through Time (BPTT):** RNNs use a variant of backpropagation called Backpropagation Through Time to update weights and learn from sequences. The BPTT considers the entire sequence during training.

The RNN architecture surpasses rule-based chatbots in content generation by virtue of its sequential processing capabilities and adaptability to variable input lengths. RNNs inherently capture sequential dependencies, allowing them to comprehend the context of preceding elements in a conversation. Unlike rule-based systems, RNNs learn from data patterns during training, enabling adaptive responses to specific linguistic nuances and user behaviours. The dynamic maintenance of hidden states in RNNs facilitates the retention of relevant information throughout a conversation, ensuring coherent and contextually aware content generation. Additionally, RNN's generative capabilities, especially in models like GPT, enable the production of creative and contextually meaningful content. The ability to handle varied input lengths and learn from contextual embeddings further contributes to RNN's superiority in making accurate predictions compared to rule-based chatbots.

3.3 User Interface

The implemented system is designed to provide users with relevant content based on their requirements. The use of Open AI GPT-3 for the backend API ensures that the generated content is accurate and meets the user's needs. The system's ability to style the content based on user preferences ensures that the generated content is visually appealing and easy to read.

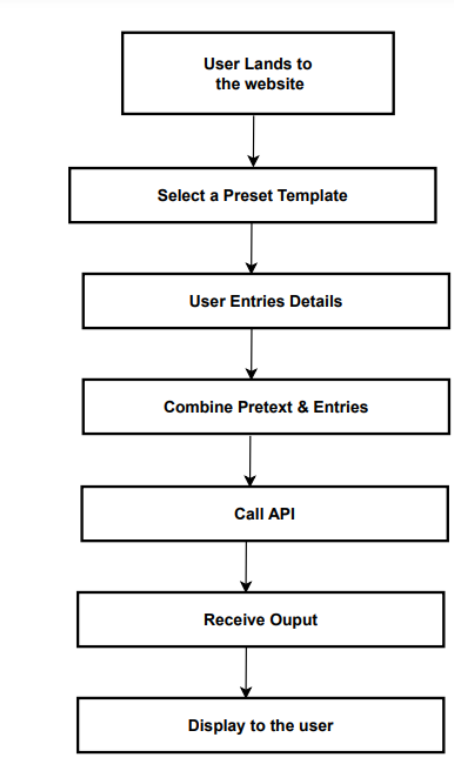

Figure 2. User Interface

According to Figure 2, the user begins by accessing the landing page of the website, which presents them with various options to choose from. They can either select a pre-set template for social media content or utilize the chatbot to generate information. For example, if the user chooses the blog writing feature, they will input the blog topic, description, and frequently asked questions to provide clear instructions for the GPT. The pretext and entries are combined, and the API is called to generate the required information. The API generates the necessary information, and the output is displayed on the system for the user. Another example is that they can use the pre-set templates for social media content, which is useful for those who may not be as experienced in crafting content for social media. Overall, the GPT appears to be an efficient tool for users who require assistance in generating content. Its ability to generate necessary information based on user input is likely to be a valuable resource for those who need to create content for various platforms. The website seems to offer a streamlined process for accessing the GPT, making it easy for users to take advantage of its capabilities.

```
{
    "id": "cmpl-6q6lSf5tXIuFnjatt5UpSljlbdXMK",
    "object": "text_completion",
    "created": 1677877078,
    "model": "text-davinci-003",
    "choices": [
        {
            "text": "\n\nI'm doing well, thanks for asking. How about you?",
            "index": 0,
            "logprobs": null,
            "finish_reason": "stop"
        }
    ],
    "usage": {
        "prompt_tokens": 4,
        "completion_tokens": 15,
        "total_tokens": 19
    }
}
```


Figure 3. Request Header and Body

Request headers contain metadata about a client's request to a server, such as the requested resource and acceptable content types. The request body contains the payload or the data being sent by the client to the server, such as form data or JSON data. The figures 3 and 4 represent the snapshots of the request header, body, and API response from Open AI.

POST /v1/completions curl Copy

```
curl https://api.openai.com/v1/completions \
  -H "Content-Type: application/json" \
  -H "Authorization: Bearer $OPENAI_API_KEY" \
  -d '{
  "model": "text-davinci-003",
  "prompt": "",
  "temperature": 0.7,
  "max_tokens": 256,
  "top_p": 1,
  "frequency_penalty": 0,
  "presence_penalty": 0
}'
```

Figure 4. API Response from OpenAI

The OpenAI API response typically includes the requested data in a structured format such as JSON. The response may also contain metadata such as the HTTP status code, content type, and response headers. Error messages or additional information may also be included in the response to assist with debugging or troubleshooting.

3.4 How API Works?

An API, or Application Programming Interface, is a set of guidelines and protocols that enable communication between different software systems. Acting as a mediator between two systems, an API facilitates the exchange of information and the execution of actions. For instance, when a client, such as a website or mobile app, sends a request to a server through an API, the server processes the request by retrieving data from a database, performing calculations, or communicating with other systems. The server then responds to the request with the appropriate data or outcome of the action, or an error message if necessary. APIs often use specific syntax, like HTTP, to structure requests and responses and may require keys or tokens to authorize access. APIs are widely used for system integration and data sharing and are a critical component of modern web and mobile development.

The API functions as a crucial intermediary between the content generation tool and the GPT-3 language model in the backend. The workflow involves a series of steps:

1. **User Input:** Users interact with the content generation tool by inputting their requirements or queries into the user interface.

2. **API Request**: The content generation tool, upon receiving user input, initiates an API request to communicate with the GPT-3 server.

3. **GPT-3 Processing:** The GPT-3 language model processes the received input, leveraging its extensive training on large text datasets to generate contextually relevant content.

4. **API Response:** The GPT-3 server responds to the API request, providing the content generated based on the user's input.

5. **User Display:** The content generation tool then displays the generated content to the user through its interface, completing the interaction.

4. Results and Discussion

In this section, we will see the design and implementation of our system. We have created a web-based platform using the Bubble.io software, from which we connected to the GPT 3 API to access the training data to give the user's answers. The images below provide a visual overview of the system's user interface. To use the system, users must first register with their email address and password to login. On the home screen, users can see all the features in the dashboard, templates in the templates section, an AI chatbot as another feature of the system, and all the files that will be saved to the system for future use.

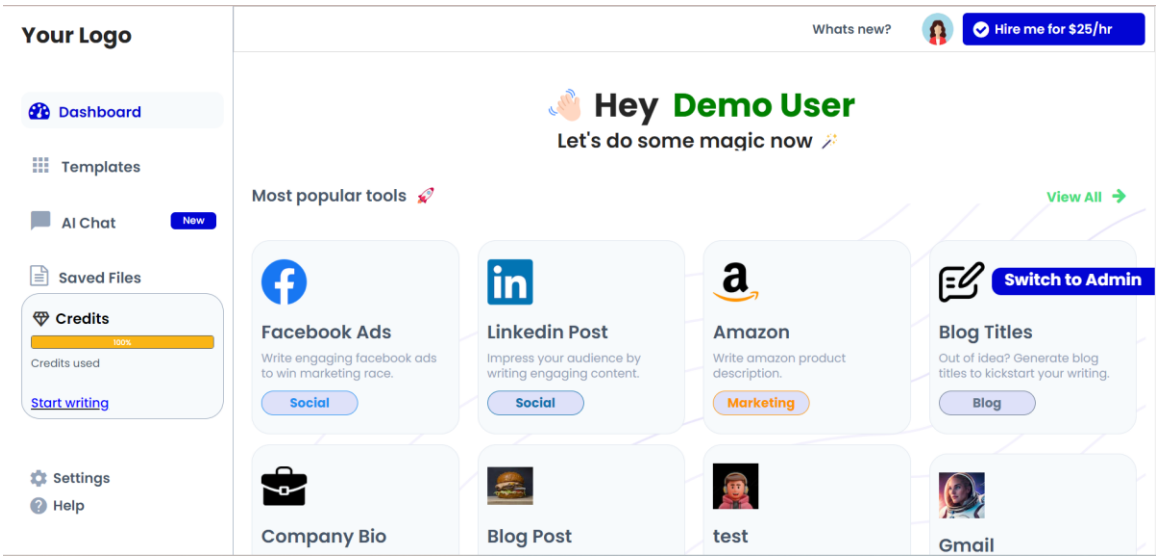

Figure 5. Dashboard of the System

In figure 5, we can see the dashboard, templates, AI chat, saved files, settings, and help in the navigation bar, whereas the most popular tools are Facebook ads, LinkedIn posts, Amazon product descriptions, blog writing, and so on. The top right corner defines the search bar in the what's new section, user profile, and hire me option if you are a developer, and if clients like your work, they can hire you for $25 per hour.

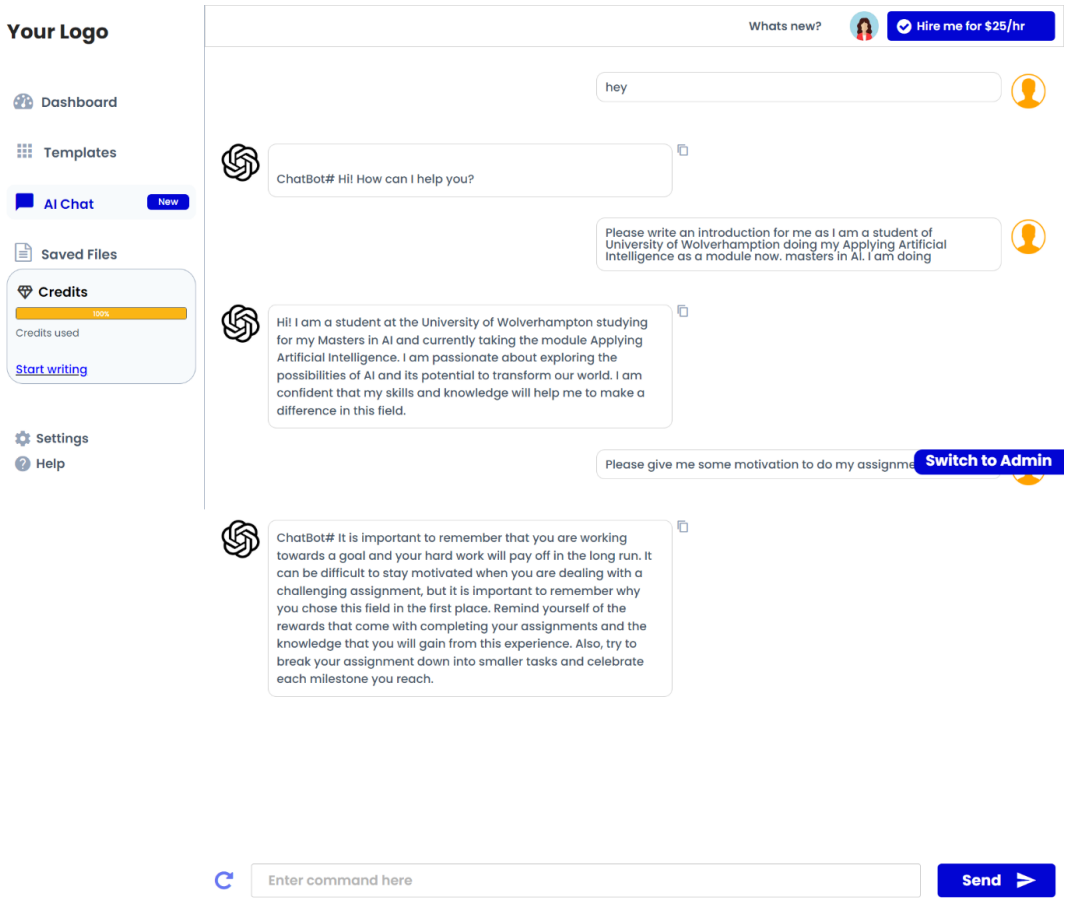

Figure 6. Chatbot Display Example

Another component in the system is a chatbot, which is shown in figure 6 using a straightforward use case. In this example, the user initiates the conversation by typing "hey" to the chatbot. The chatbot responds by greeting the user with "Hi, How can I help you?" Subsequently, the user requests the chatbot to introduce them by providing some key information, such as their student status, university name, and course details. The chatbot processes this information and generates a brief, professional introduction paragraph.

Similarly, in the last question, the user inquiries about his motivation to complete his assignment. The chatbot provides a highly motivational response, aimed at inspiring and

motivating the user to complete their task. Overall, the chatbot component of the system offers an interactive and personalized experience for users, enabling them to obtain relevant information and support.

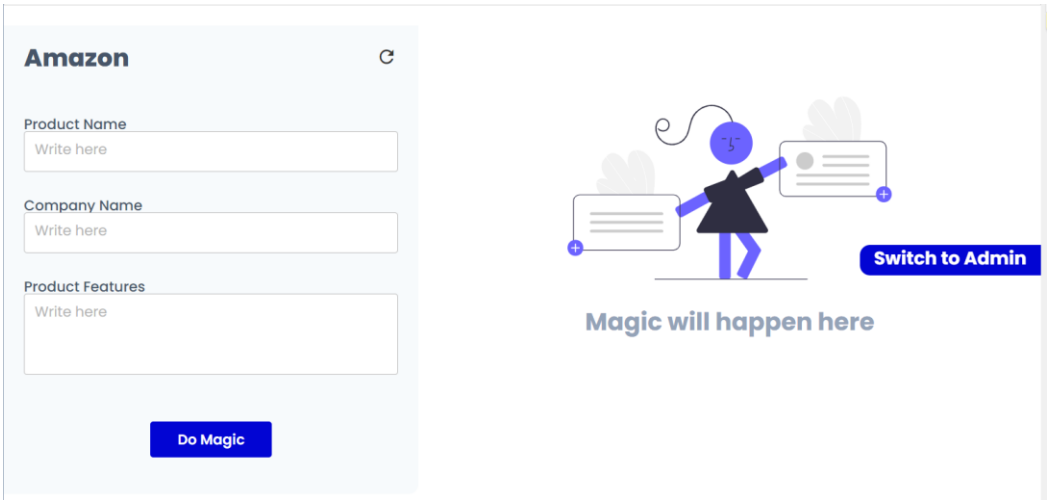

Figure 7. Amazon Product Description Sample

In order to obtain the product description for an Amazon product, the user needs to input the product name, the company name, and the product features as a command in the figure 7. Once these inputs are entered, the system will automatically generate the product description. This is an illustration of how the user provides inputs to the model and the system responds with the most suitable responses from its training model.

5. Conclusion

In summary, this content generation tool uses a recurrent neural network (RNN) architecture, which enables it to make more accurate predictions than rule-based chatbots. It can quickly learn new ideas based on what users say and adapt to different situations in each conversation thread. Additionally, the system responds intelligently to user queries while maintaining contextual and structural relevance. It sequentially pre-sets templates for user entry details by combining pretext and entries, calls the API of GPT 3 in the back end, generates the output, and shows it to the user. The use of OpenAI GPT-3 for the backend API ensures that the generated content is accurate and meets the user's needs. The system's ability to style the content based on user preferences ensures that the generated content is visually appealing and easy to read. With the help of pre-set templates, even those who are inexperienced in crafting

content can use this system to generate necessary information for social media or other platforms. The API plays a critical role in facilitating the communication and exchange of information between different software systems, and it is a crucial component of modern web and mobile development.

Overall, this content generation technology is an efficient and valuable resource for users who need assistance in generating content for various platforms.

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