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Movie Review Sentiment Analysis and AI-Story Generation Web Application

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Abstract: ***This paper presents a web application designed to enhance the interaction between users and multimedia content through two innovative platforms: "MOVIE REVIEW SENTIMENT ANALYSIS" and "AI-STORY GENERATION." The first platform leverages the Fastai library and LSTM networks to perform sentiment analysis on user-submitted movie reviews, determining their polarity as positive or negative. This analysis directly influences the movie's aggregate rating, with the system capable of processing extensive textual input with high accuracy. Ratings are dynamically updated and stored in JSON format. The second platform, AI-STORY GENERATION, introduces a creative avenue for generating novel stories based on user prompts. It utilizes Natural Language Processing (NLP) techniques and a Generative Pretrained Transformer (GPT-2 Large) model, trained on tokenized movie scripts, to produce coherent and engaging narratives. The Flask web framework supports the application's backend, providing a robust and scalable foundation for user interaction and content delivery.***
This dual-platform approach not only demonstrates the practical application of advanced machine learning and NLP techniques in enhancing digital entertainment experiences but also showcases the potential for AI-driven tools to foster creative storytelling. The integration of sentiment analysis and story generation within a single application illustrates a novel use case of AI in the context of web-based entertainment, potentially paving the way for more personalized and interactive user experiences.
Keywords: Movie review sentiment analysis, AI-story generation, Fastai library, LSTM, Natural Language Processing (NLP), Generative Pretrained Transformer (GPT), GPT-2 Large, Flask framework.

I. INTRODUCTION

In an era characterized by the ubiquitous presence of digital entertainment platforms, the fusion of artificial intelligence (AI) and web technology has revolutionized user experiences. This paradigm shift is exemplified by the development of a novel web application featuring two innovative platforms: "MOVIE REVIEW SENTIMENT ANALYSIS" and "AI-STORY GENERATION." Leveraging cutting-edge technologies such as the Fastai library, LSTM networks, Natural Language Processing (NLP), and Generative Pretrained Transformer (GPT), this application aims to redefine how users interact with multimedia content. By seamlessly integrating advanced machine learning techniques with user-generated input, it offers a dynamic and personalized entertainment experience. This introduction sets the stage for exploring the intricate workings and transformative potential of this groundbreaking web application.

Moreover, this web application represents a convergence of creativity and computational prowess, presenting users with unprecedented opportunities for engagement and exploration. The "MOVIE REVIEW SENTIMENT ANALYSIS" platform empowers users to contribute to the collective understanding of cinematic experiences, while also influencing the trajectory of movie ratings in real-time. On the other hand, the "AI-STORY GENERATION" platform transcends traditional storytelling boundaries by harnessing the vast repository of human narratives and transforming user prompts into captivating, AI-generated tales. Through these interconnected platforms, users are not merely passive consumers but active participants in shaping the digital landscape, ushering in a new era of interactive entertainment.

II. LITERATURE SURVEY

A. Literature Survey1

Title: Sentiment Analysis of IMDB Movie Reviews, 2020 by Lakshmipathi. In this he predicts the number of positive and negative reviews based on sentiments by using different classification models. In this project he used algorithms are Logistic regression, Navie bayes classifier and Support Vector Mission. The primary goal of this project is to predict the sentiment (positive or negative) of IMDB movie reviews. The author aims to employ various classification models to achieve accurate sentiment predictions, providing insights into the overall sentiment distribution of the movie reviews dataset.

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Differences Between the Mentioned Project and Yours:

1) Scope and Purpose

- *His Project:* Lakshmipathi N focuses on predicting the number of positive and negative reviews, emphasizing sentiment analysis using classification models.
- *My Project:* Your Flask-based project involves a broader scope, integrating natural language processing, sentiment analysis, and web development. It includes a GPT-2 language model for generating movie reviews, a fine-tuned sentiment analysis model, and a web interface for users to interact with the system.

2) Algorithms Used

- *His Project:* Logistic regression, Naive Bayes, and Support Vector Machine
- *My Project:* GPT-2 (Generative Pre-trained Transformer 2) for text generation, Fastai for sentiment analysis, and Flask for web development.

B. Literature Survey2

Title: A Web Application to generate multiple genre stories based on GPT2 Model, by Ekagrashukla.

The primary objective of this project is to develop a web application that leverages the GPT-2 language model to generate multiple genre stories interactively. The focus is on providing users with the ability to input prompts or choose genres, and in return, receive creative and contextually relevant story outputs from the GPT-2 model.

The project involves incorporating the GPT-2 language model, a state-of-the-art transformer-based model for natural language processing, to generate coherent and diverse stories. The generated stories are presented to users in a readable and engaging format through the web interface. Proper formatting and presentation enhance the overall user experience.

III. SYSTEM ANALYSIS

A. Existing System

The current landscape of movie review platforms lacks a unified and sophisticated approach to sentiment analysis and review aggregation. Existing systems often fall short in providing users with a seamless and insightful experience when exploring movie sentiments.

Key characteristics of the existing system include:

1) *Fragmented Review Platforms:* Movie reviews are scattered across various platforms, making it cumbersome for users to obtain consolidated and sentiment-aware insights for a particular movie.

2) *Static Review Displays:* Many platforms present movie reviews in a static format without incorporating dynamic sentiment-aware ratings.

3) *Simplistic Sentiment Analysis:* Traditional sentiment analysis tools employed by existing systems may lack the nuance required for accurate categorization of movie reviews.

4) *Untapped Text Generation Potential:* Existing platforms may not leverage advanced language models for interactive text generation based on user prompts.

B. Proposed System

The Movie Sentiment Analysis and Review Aggregation Web Application proposes a revolutionary approach to enhance the user experience in exploring movie sentiments. Leveraging advanced technologies, the system addresses the shortcomings of existing platforms and introduces innovative features to create a more interactive, informative, and engaging movie review ecosystem.

Key features

1) *Centralized Movie Sentiment Hub:* The proposed system consolidates movie reviews and sentiments, offering users a centralized platform to explore, contribute, and engage with sentiments for a diverse range of movies.

2) *Dynamic Sentiment-Aware Ratings:* Real-time sentiment updates provide users with dynamic and accurate sentiment aware ratings for each movie, ensuring they can quickly assess the overall sentiment surrounding a film.

3) *Text Generation for User Interaction:* The application introduces a text generation feature powered by the GPT-2 model, allowing users to interact with the system creatively by generating contextually relevant text based on their prompts.

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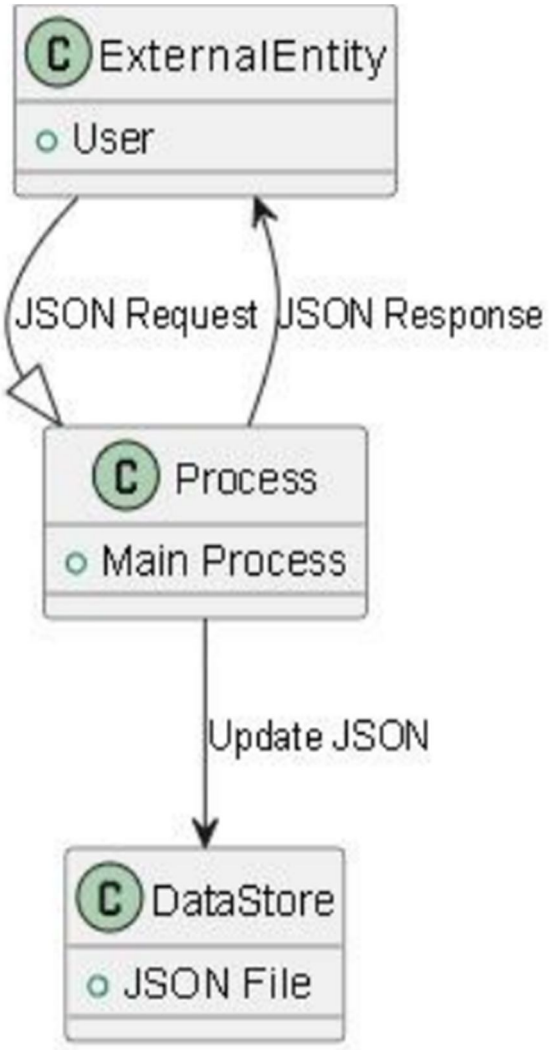
IV. SYSTEM ARCHITECTURE

A. System Architecture Overview

Our system architecture is designed to provide a scalable, maintainable, and responsive environment for the deployment of the Movie Review Sentiment Analysis application. Below is a detailed breakdown of the key components and their interactions

1) *Web Application Layer:* At the forefront of our architecture is the web application layer powered by Flask, a lightweight and flexible web framework. This layer handles user interactions and interfaces with both the backend and frontend components.
2) *Backend Components:* The backend is responsible for processing user requests, managing data, and executing machine learning predictions.
3) *Frontend Components:* The frontend layer is built using HTML, CSS, and JavaScript to create an intuitive and engaging user interface. The application's look and feel are designed to provide a seamless experience for users navigating through different features and functionalities
4) *Data Storage:* JSON files are employed for storing user reviews and movie ratings. This approach ensures data persistence and simplifies data management tasks.

B. Data Flow Diagram



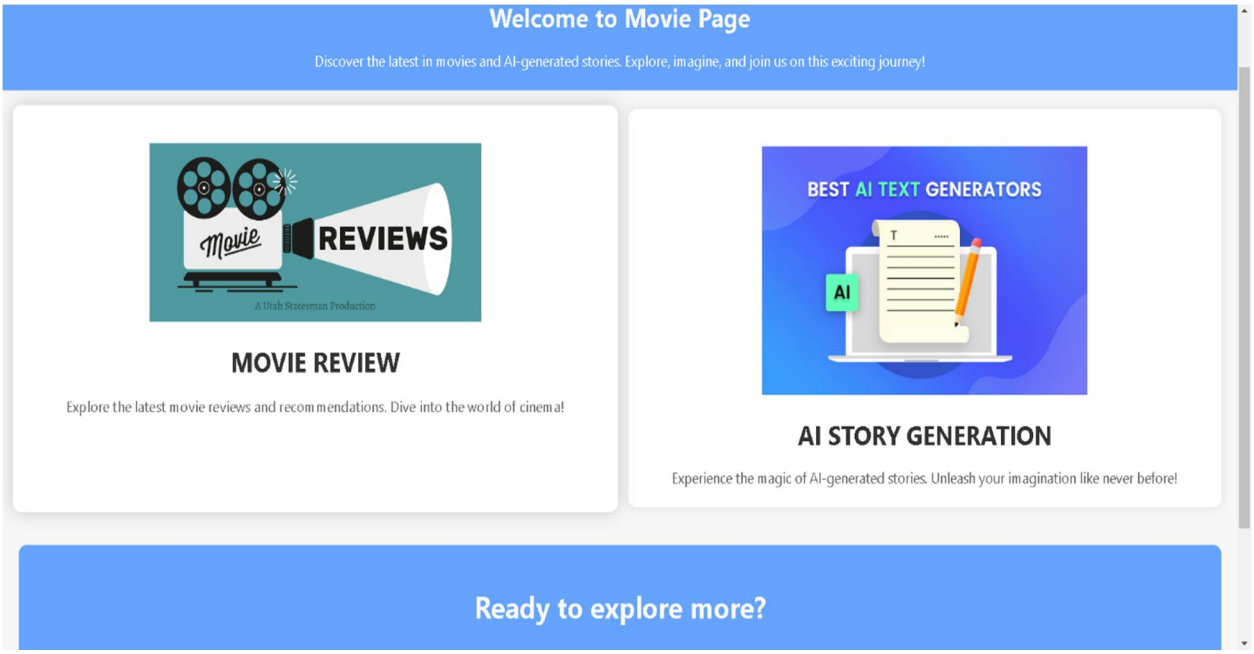
This Data Flow Diagram provides a comprehensive view of how data moves through the various components of our Movie Review Sentiment Analysis application. The image visually represents the interaction between users, the web application, and backend.

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V. OUTPUT SCREENS

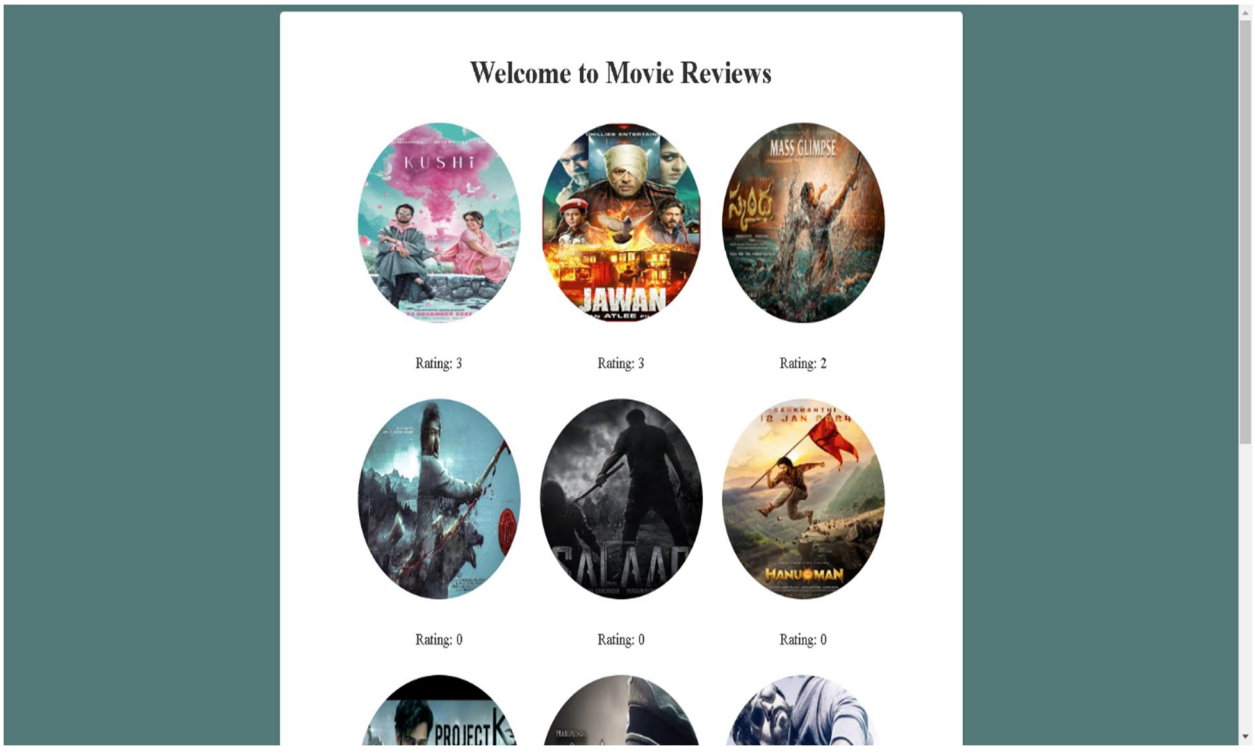
A. Output Screen-1

The first web page when the user enters my page, there are two platforms one is Movie Review and other one is Ai-Story Generation. The remaining content is about our website information for further updates.



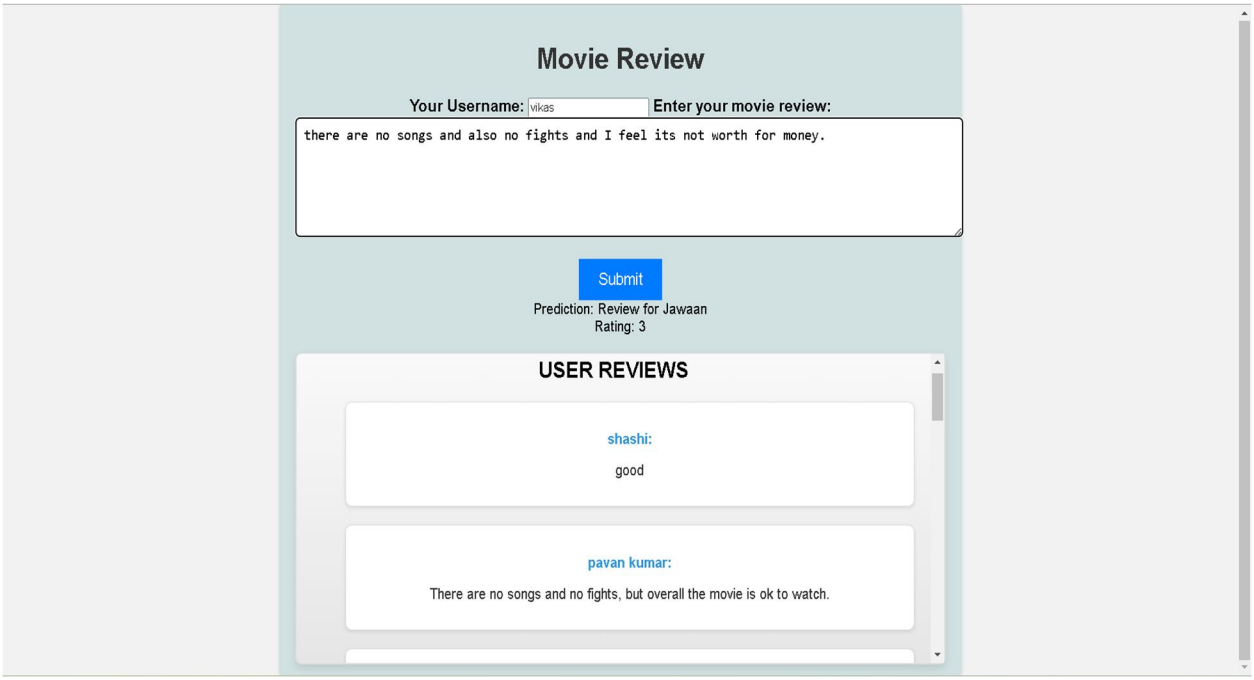
B. Output Screen-2

When the user chooses the “Movie Review” platform, then the index.html page will be rendered, consisting of number of movies and their ratings based on user reviews.



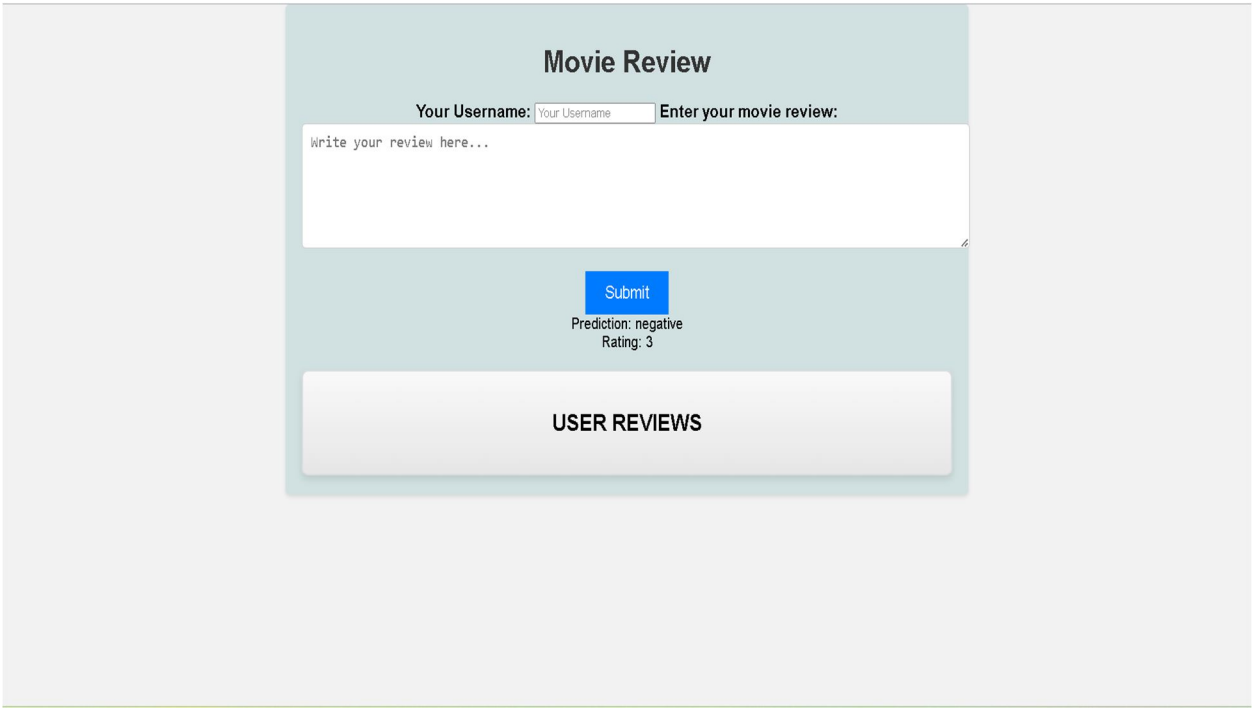
C. Output Screen-3:

Now, the user will have the movie page interface consisting of a few images, now user must select a movie for viewing the reviews or giving the review based on the experience.



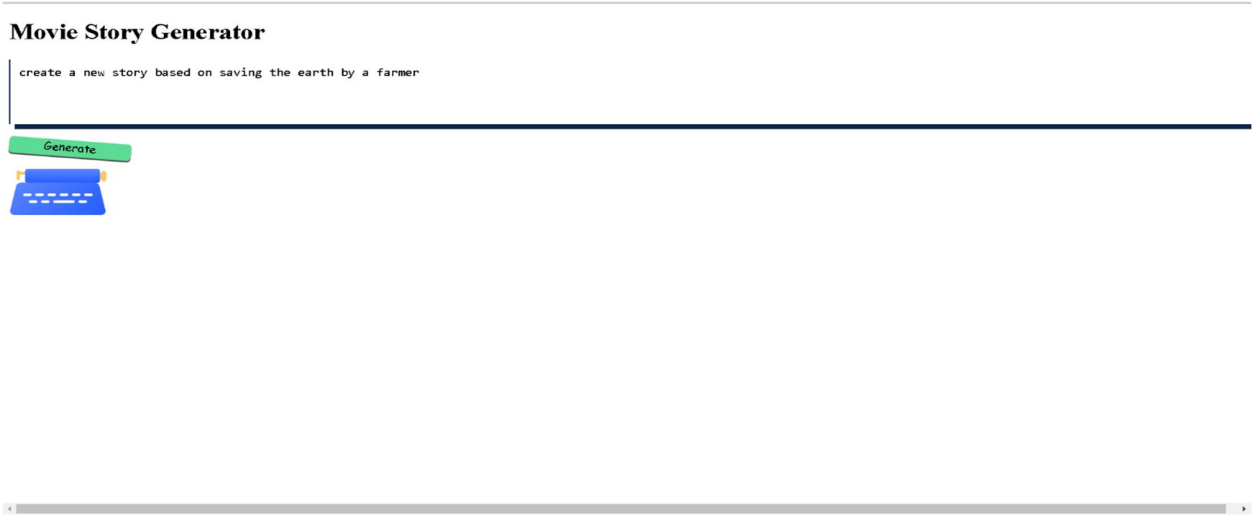
D. Output Screen-4

Now the user can give his prompt and based on his prompt the sentiment analysis process will be done and if the review is positive then the rating will be increased and if negative Rating will be decreased.



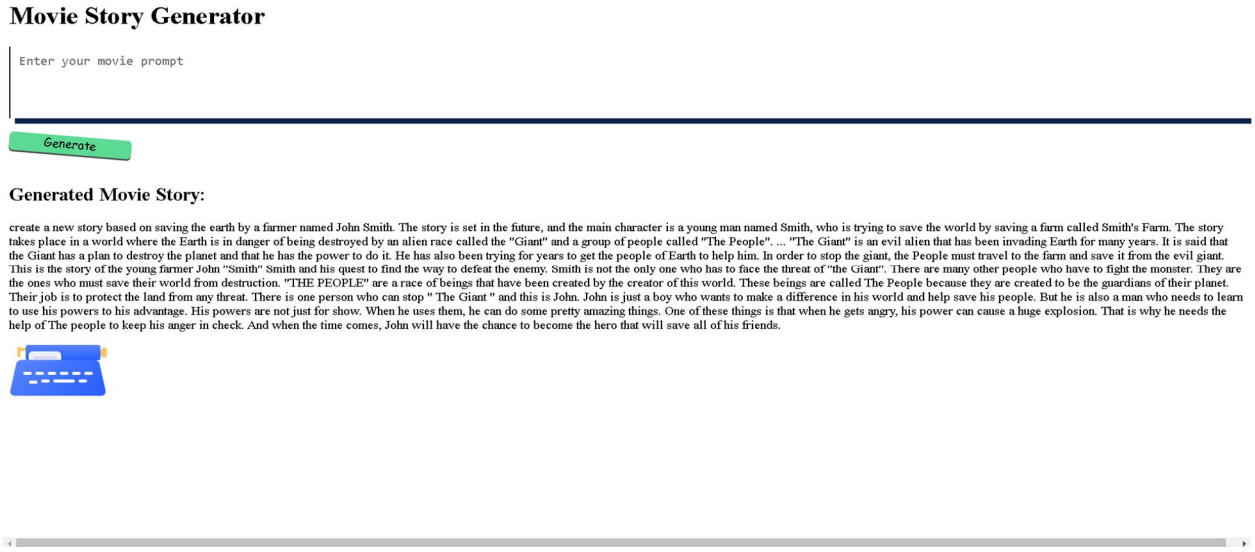
E. Output Screen-5

When the user enters AI-Story Generation platform, user gets the interface consisting of an entry input where user can give the prompt to generate a story.



F. Output Screen-6

After user enters the prompt, based on user prompt the story will be generated.



VI. METHODOLOGY

The implementation demonstrates a robust backend architecture, incorporating transformers, Fastai, and Flask to handle various aspects of the application. The use of external JSON files for storing user reviews and movie ratings ensures data persistence and easy retrieval. The front end, designed with HTML templates, provides an intuitive user interface, enabling users to explore existing movie ratings, receive sentiment predictions, and contribute their own reviews seamlessly.

The project not only serves as an educational resource for understanding the integration of different technologies but also showcases the practical application of natural language processing and sentiment analysis in a real-world scenario. As technology continues to evolve, the possibilities for enhancing user interactions and experiences through intelligent systems like these are vast.

This Flask project exemplifies the synergy between artificial intelligence and web development, offering a glimpse into the future of interactive and intelligent applications. The success of this endeavor lies in its ability to cater to movie enthusiasts, providing them with a platform that goes beyond traditional review systems, creating a dynamic and engaging space for sharing opinions and exploring the world of cinema.

VII. CONCLUSION

In this paper, we presented a comprehensive exploration of a Flask-based web application that seamlessly integrates natural language processing and sentiment analysis for an enhanced movie review and rating system. Leveraging state-of-the-art language models such as GPT-2, the application not only generates contextually relevant movie reviews but also predicts sentiment from user-submitted reviews. This innovative combination of technologies offers users a unique and interactive experience, bridging the gap between artificial intelligence and user-generated content.

In conclusion, this Flask project exemplifies the synergy between artificial intelligence and web development, offering a glimpse into the future of interactive and intelligent applications. The success of this endeavour lies in its ability to cater to movie enthusiasts, providing them with a platform that goes beyond traditional review.

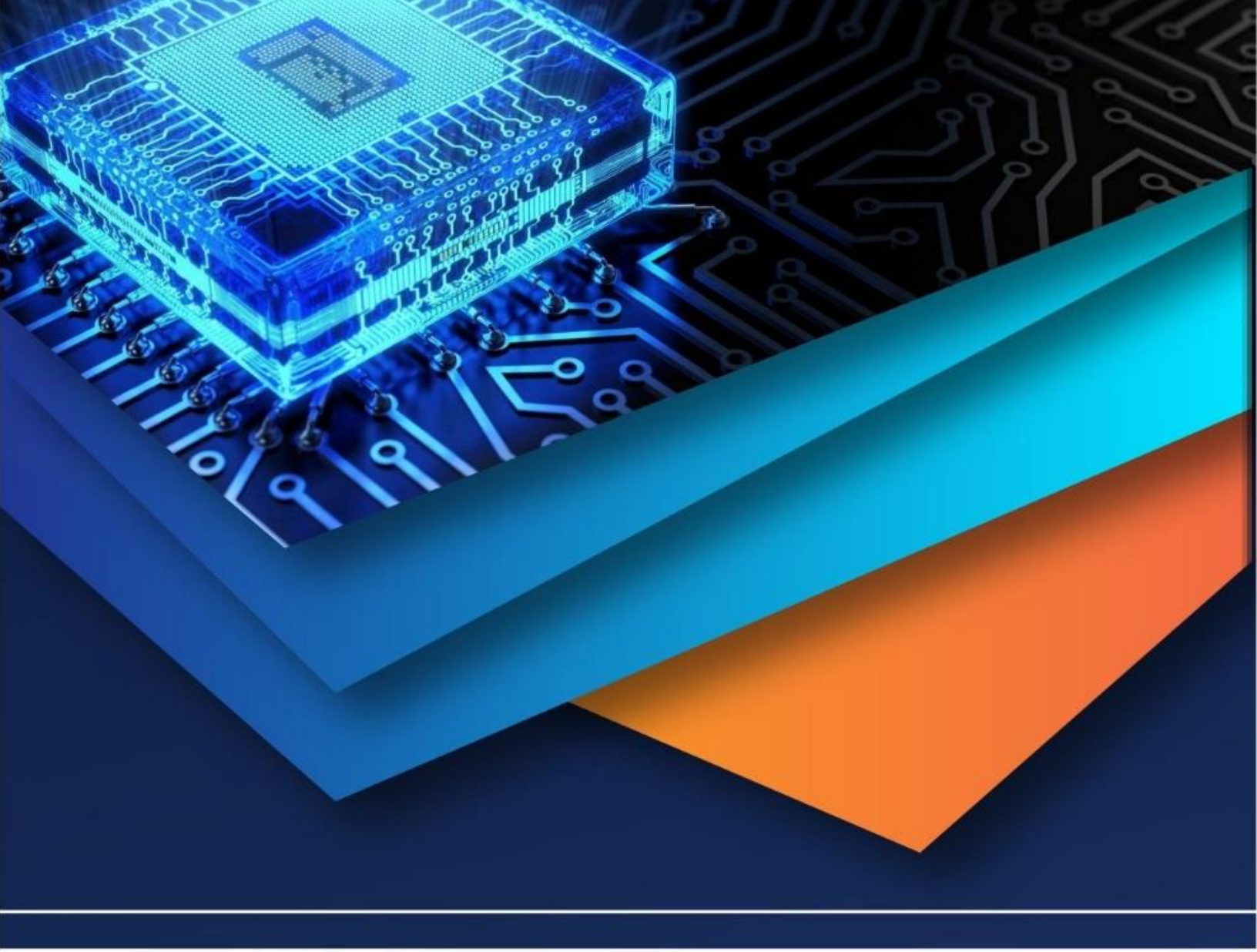
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