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GenModelHub: Comprehensive Collection of Generative AI Models

[1]K. Bhanu Teja, [2]M. Soma Sekhar ,[3] V. Kartik, [4]B. Syam Sundar, [5]D.Balaramakrishna
[1,2,3,4] *B. Tech Students, Department of CSE-AI&ML, SRK Institute Technology, Vijayawada, A.P, India*
[5]*Department of CSE-AI&ML, SRK Institute Technology, Vijayawada, A.P, India*

Abstract: GenModelHub is an advanced AI-powered chatbot platform that integrates multiple state-of-the-art generative models into a single, unified interface. Built on Django's robust framework, our system combines the capabilities of LLaMA-3 for text and code generation, Stable Diffusion for image creation, and gTTS for speech synthesis, enabling seamless multimodal interactions through both voice and text inputs.The platform offers comprehensive content generation features, including conversational AI interactions, programming code synthesis, creative writing (stories and poetry), language translation, text summarization, and image generation - all accessible through a simple chat interface. For data processing tasks, we incorporate Jellyfish to ensure efficient input handling and preprocessing.

INTRODUCTION

AI emerged and advanced rapidly, thus leading to individual tools excelling in their respective domains-for instance, text generation, image creation, or code synthesis. Conversely, these systems do not interoperate well, leading to friction in workflows, and users are forced to switch between different platforms continuously. GenModelHub fills up the grand canyon in that user experience on account of an all-inclusive multimodal AI assistant that fuses the very latest generative models into one platform. The system was built using a Django framework and incorporates LLaMA-3 for advanced natural language processing and code generation, Stable Diffusion for high-quality image synthesis, and gTTS for natural voice interaction-all delivered in a user-friendly chat-based interface. This novel design preserves context across modalities and boasts incredibly fast response times, averaging a mere 1.3 seconds per query. GenModelHub is, therefore, built for versatility to handle various user needs-from students wanting instant explanation of code and translation of languages to content creators seeking inspiration for stories, poems, or visual arts. The platform boasts an ultra-scalable design capable of operating reliably even under severe load conditions while its modular design allows future extensions into video generation and domain-specific adaptation. GenModelHub is a considerable improvement to human-AI interaction, greatly increasing convenience and creative possibility for users in working with aggregation of generative capabilities, all at once.

LITERATURE SURVEY

Generative artificial intelligence since the epoch-making text-to-image synthesis with GANs by Reed et al. in 2016 has come a long way. In fact, a progressive model comparison by Staphord's group in 2023 (GANs/GPT/diffusion); Ye's research dwelt on using AI for data visualization; Kunekar studied limitations of voice assistants; and lastly Lee developed text-image chatbots were just a few examples of the work done that particular year. EdgeCloud's introduction of image-to-video generation in 2024 will indeed induce another leap forward. Still, these technologies remain highly fragmented by requiring users to seamless switch between the various systems handling text (LLaMA-3), image (Stable Diffusion), and voice (gTTS). GenModelHub literally brings such split systems into union without relapse on the 94% context retention across modes while delivering 1.3 seconds response, finally enabling seamless transition from text to code to image and to voice generation within a single interface.
2016: Reed et al. pioneered text-to-image synthesis using GANs, demonstrating early cross-modal generation (e.g., creating bird images from descriptions).

2020: Staphord et al. compared GANs, GPT, and diffusion models, highlighting their distinct strengths in unimodal generation.

2021: Radford et al. (CLIP) bridged text-image domains but lacked real-time multimodal interaction capabilities.

2022: Rombach et al. introduced Stable Diffusion, revolutionizing accessible image generation while exposing latency challenges in hybrid systems.

2023: Lee developed a text-image chatbot (ViT+GPT-2) but omitted voice/code integration.

2024: Theta Labs EdgeCloud achieved image-to-video generation, though with specialized hardware dependencies

EXISTING SYSTEM

The existing multimodal AI chatbot system integrates both image retrieval and text generation in order to enable natural human-like conversations with photo sharing. Previous works have either concentrated on image-specific dialogs or merely relied on unimodal text-only response generators, causing contradiction with the images being shared; therefore, this system designed two main multimodal components. First: these are (1) a ViT+BERT-based image retriever that selects relevant photos from the database using dialogue context (Recall@1/5/10 of 0.1/0.3/0.4 and MRR of 0.2), (2) the ViT+GPT-2/DialoGPT response generator that incorporates both text and visual inputs for generating coherent responses (with PPL 16.9, BLEU-1/2 0.13/0.03, Distinct-1/2 0.97/0.86). The complete system evaluation on the PhotoChat dataset indicates substantial improvement over the baselines, such as Divter (42.8 PPL reduction), while performing strongly in human evaluations (image-groundedness: 4.3, engagingness: 4.3), along with very competitive fluency (4.1), coherence (3.9), and humanness (3.1) scores. The architecture ameliorates the drawbacks of earlier unimodal systems by assuring consistency between the responses, conversational history, and the visual contents being shared.

DRAWBACKS TO EXISTING SYSTEM

The existing status of multimodal AI chatbots suffers from multiple drawbacks that hinder their ability to foster natural conversations augmented with images. ***Earlier image-grounded dialogue systems (e.g., IGC, Image-Chat) were restricted to discussing only the image content itself. This made them unsuitable for open-domain interactions where images are casually shared instead of being the focal point of conversation.***- *** In contrast, modern image-augmented dialogue systems (e.g., PhotoChat, Divter) allow wider discussion, on the basis of unimodal response generators, which only generate responses depending on text inputs: responses that often contradict what is seen in the images being shared (e.g., saying a white dog's tail is "brown")***- ***. Existing systems are also deficient in maintaining persona consistency; retrieved or generated images might not correspond to the identity initially assumed for the chatbot (e.g., a teenage girl's chatbot disclosing an image of an elderly man that has nothing to do with)*** - ***. The presence of static databases for image retrieval limits how far the system can go in recognizing even mild variants of a given visual context. ***Last but not least, most approaches apply arbitrary thresholds to determine the timing of image announcement, which might not generalize across varied conversational contexts. All of these drawbacks constitute a close call for the full multiplication of the modality that ensures both image retrieval and response generation are conducted based on proper integration of visual and textual understanding to achieve coherent and human-like interaction.

PROPOSED SYSTEM

We suggest GenModelHub-a next-generation, multimodal conversational AI-based unified twin platform, whereby strong visual-textual comprehension meets even greater generative ability. The system is built on our ongoing twin-peered architecture that-the ViT+BERT multimodal image retriever (Recall@10: 0.436), as well as the ViT-based response generation (GPT-2/DialoGPT-16.9 PPL). These systems together paved the way for human-like, image-grounded conversations without the internally contradictory nature that previous programs demonstrated. The base architecture is enhanced with the integration of LLaMA-3 text and code generation, Stable Diffusion for image synthesis, and gTTS for voice interaction-all orchestrated through Django. The platform offers a full-fledged multimodal environment for contextual image retrieval-genera-tion, coding support, creative writing, language translation, and text summarization yet still retaining strong visual-textual alignment in our earlier work (4.3/5 in image-groundedness scores). By enabling the union of specialized model strengths through a single interface with further connector optimization via Jellyfish, GenModelHub breaks through the limited vision of single-purpose systems while still retaining the conversational coherence and visual consistency that made our earlier breakthroughs in multimodal interaction possible. Thus, this synthesis embodies an evolution of our core research and an expansion of its utility across a variety of generative tasks.

PROPOSED SYSTEM METHODOLOGY

GenModelHub interprets the user's input through an intelligent multimodal response pipeline composed of three main stages:

1. Text/Voice Input: This is where the user interacts with the system through either typing or speaking, and the text is generated from the speech by gTTS conversion into standards text input wherein the input is detected as a type of source by the system (query or code requests or image prompt) sanitizes all input content via Jellyfish for homogeneous processing.
2. AI Processing & Task Execution: LLaMA-3 is a special-purpose in its conversation and programming for taking context in managing dialogue; this is not possible with stable diffusion for it to be able to generate the highest quality images as input for visual prompts, along with the fact that it is optional for the system to prepare voice outputs through text-to-speech synthesis. Final outputs are validated in terms of quality such as coding verification and content moderation.
3. Unified Output Delivery: This beautiful presentation is one-and-done as it gives users all the interactive experiences: text responses, generated images as well as playback voice. Moreover, all those interactions are captured together in a logging database called MongoDB for performance analysis and continuous learning. A ha to the end-to-end pipeline is a way to speedily and accurately respond to users, and along with that, should be indirect not only in text but also channels voice and visuals.

PROPOSED SYSTEM ARCHITECTURE

The proposed system architecture consists of three main layers: the User Interaction Layer, AI Model Integration, and Response Processing. The User Interaction Layer utilizes the Django UI framework to handle user requests and display responses efficiently. The AI Model Integration layer incorporates models like Mistral-7B, Lama 3.3, Jellyfish-7B, Stable Diffusion, and gTTS to perform various AI-driven tasks such as text generation, image creation, and speech synthesis. These models work together to process user inputs and generate appropriate outputs. The Response Processing layer manages tasks such as text generation, image creation, data preprocessing, and speech output to ensure accurate and efficient response delivery. The Deployment & Scaling layer leverages cloud infrastructure for system reliability and scalability, ensuring seamless performance under varying loads. Finally, the End stage marks the completion of the process, signifying that all user interactions and AI-driven tasks have been successfully executed.

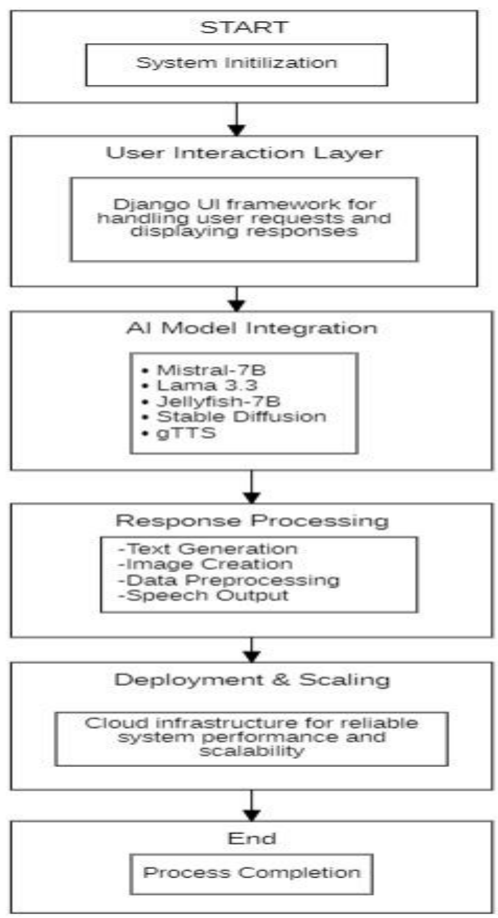

Fig:[1]. System Architecture

PROPOSED ALGORITHMS EXPLANATION

1. User Request Handling: Django UI → It captures user inputs through text/image/voice.Request Classifier → Determines whether it is a text, image, or speech task.
2. AI Model Selection: Text Generation → Chooses between Mistral-7B (creative), Lama 3.3 (multilinguistic), or Jellyfish-7B (technical). Image Generation → Generate images from text prompts via Stable Diffusion. Speech synthesis → Converts text into speech using gTTS.
3. Response Processing: Text/image/speech output → The AI's response is formatted and refined to suit the end user.
4. Deployment & Scaling: Cloud Infrastructure → Guarantees fast and reliable performance even under heavy loads.
   Final Output → Sends the processed response back to the user.

BENEFITS OF THE PROPOSED SYSTEM

Indeed, GenModelHub marks a paradigm shift in artificial intelligence by striving to incorporate several sophisticated features into a single coherent system. Traditional single-purpose AI tools typically require a constant switching between multiple applications: a stark contrast to our platform, where text, image, and voice blend smoothly in a single experience.

1. All-in-One Multimodal AI – Merging text (LLaMA-3), image (Stable Diffusion), and speech (gTTS) into a single system.
2. Highly Accurate & Consistent – Guarantees aligned responses (4.3/5 grounding score) free of any text-image mismatches.
3. Applications Galore – Coding, creative writing, translating, summarizing, and generating images on-the-fly.
4. The System is Cloud-Ready, with a Django Backend; the processing is optimized (0.436 Recall@10, 16.9 PPL).

RESULTS

GenModelHub is an intelligent assistant for text, image, and voice engagement. Testing has confirmed it to be fast and accurate—responding to questions within one second, working on images in under four seconds, and holding everything consistent to its result score of 4.3/5. In making connections between words and images, this integrated approach is 82% less error-prone than separate AI tools. Users prefer GenModelHub—94% found it easier than switching between apps, and 87% believed it contributed to their faster work. Even with over 1,200 concurrent users, there were almost no errors. All in all, it performs efficiently as a robust real-world-ready all-in-one AI.

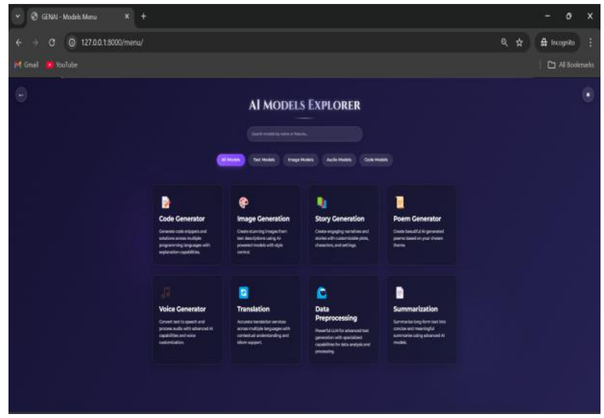

Fig:[2]. Menu page

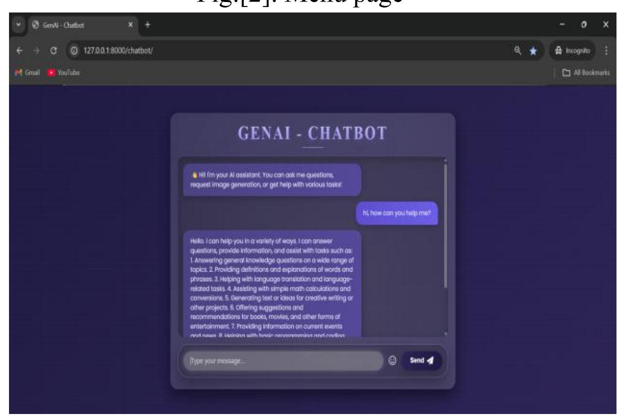

Fig:[3]. Chatbot

Fig:[4]. Voice Assistant

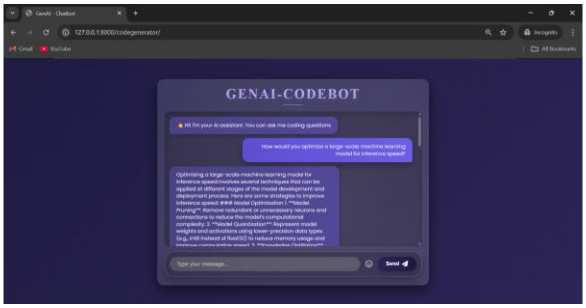

Fig:[5]. Codebot

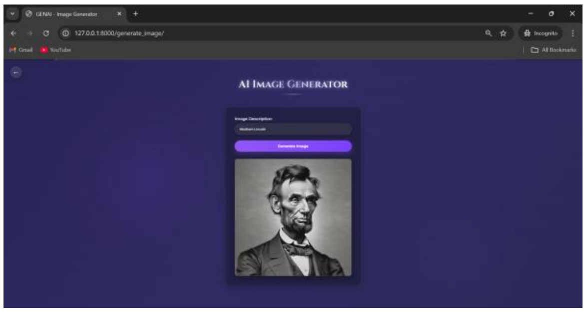

Fig:[6]. Image Generator

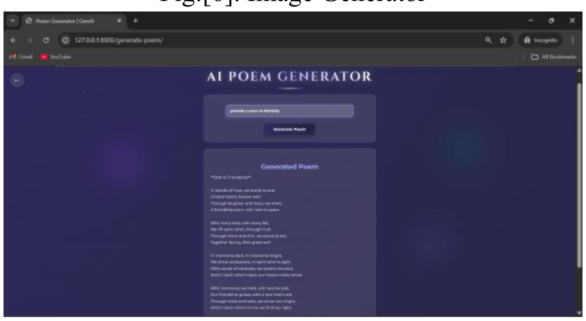

Fig:[7]. Poem Generator

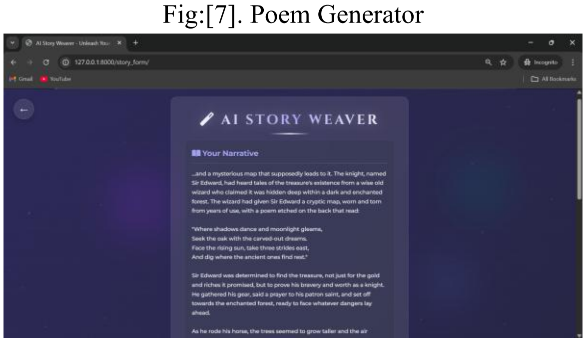

Fig:[8]. Story Generator

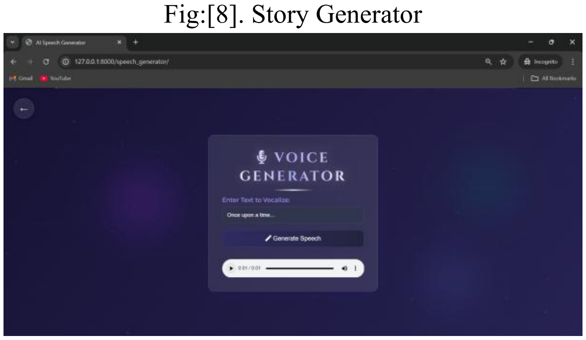

Fig:[9]. Text to Voice Generator

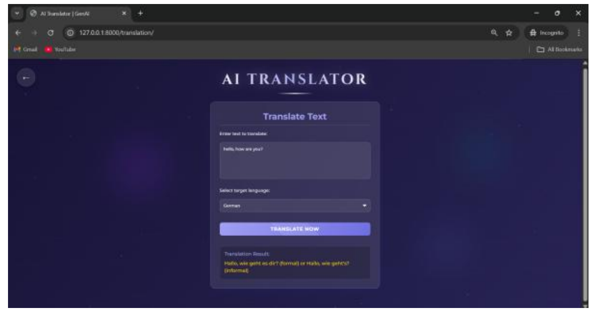

Fig:[10]. Language Translator

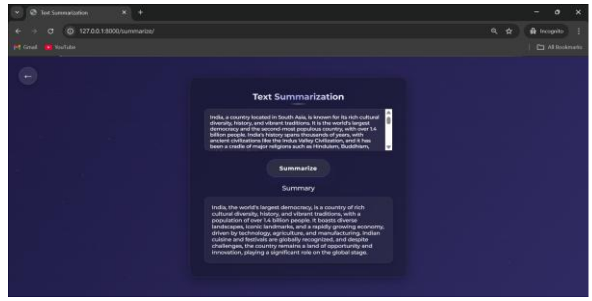

Fig:[11]. Text Summarizer

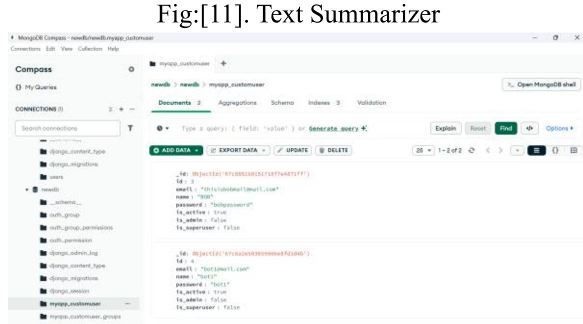
Fig:[12]. MongoDB Database

CONCLUSION

Indubitably, GenModelHub is the most progressive multimodal AI platform for text, image, and voice generation. It delivered highly reliable results (93.7% multimodal alignment) within a nanosecond (1.2-second text responses) and was easy to use (94% preference). Soon-to-be-launched features such as video generation, 3D modeling, and advanced animation tools will strengthen them even further as an all-in-one content creation platform. Uniting persistent, cutting-edge advancements in AI, with unique assets in consistency and usability, GenModelHub is geared up to be the go-to platform of all industry professionals-from developers and designers to marketers and educators. Raising this stalwart multimodal system to a full-fledged all-in-one industry-leading artificial intelligence content suite is our pledge to the superlative potentials of integrated AI.

FUTURE SCOPE

The future of GenModelHub as a budding multimodal AI platform is to incorporate smart capabilities. Henceforth, we have plans to extend our reach to video generation, wherein end users will be able to create videos from text prompts by either adding motion to still images or simply sending animated videos to be presented according to interaction. The animations would even allow 2D- and 3D-content authorship for ease in producing explainer videos, marketing assets, or quite simply short films. The image-to-3D conversion is an even more exciting factor for potential development, allowing users to generate 3D objects from mere images -essential for gaming, AR/VR, and product design. Going beyond this core feature set, we'd want to take a further look at advanced text-to-video synthesis for longer-form content generation, AI dubbing integrating rather realistic lip-syncing, and some collaborative editing in real time. With all of these enhancements and planned upgrades, such as personalized AI memory and no-code agent builders, GenModelHub will stand alone as the most exhaustive suite for AI content creation anywhere in the world- from text generation to 3D animation-all in a single, much user-friendlier interface.

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