

# Applications of Chatbots & AI Image Generators

Gurneesh Singh Banga<sup>1</sup>, Arnav Sadana<sup>2</sup>, Prateek Pandey<sup>3</sup>, Dr. Shruti Gupta<sup>4</sup>

<sup>1</sup> Student, School of Engineering & Technology  
K.R. Mangalam University  
Gurgaon, Haryana, India,  
[gurneeshbanga12@gmail.com](mailto:gurneeshbanga12@gmail.com)

<sup>2</sup> Student, School of Engineering & Technology  
K.R. Mangalam University  
Gurgaon, Haryana, India,  
[arnav.sadana04@gmail.com](mailto:arnav.sadana04@gmail.com)

<sup>3</sup> Student, School of Engineering & Technology  
K.R. Mangalam University  
Gurgaon, Haryana, India,  
[pp3807248@gmail.com](mailto:pp3807248@gmail.com)

<sup>4</sup> Assistant Professor, School of Engineering & Technology  
K.R. Mangalam University  
Gurgaon, Haryana, India,  
[shruti.searching@gmail.com](mailto:shruti.searching@gmail.com)

**Abstract:** This research digs into the domain of testing and evaluating chatbots and in-age-generation AI bots which are wide-ranging applications. While these AI systems hold promise in enhancing user experience and operational efficiency, their deployment necessitates rigorous inspection. Chatbots are integral to customer service and demand precision and reliability. Image-generation AI focuses on output quality. To ensure its responsible use, vigorous testing and evaluation are necessary. The research will evaluate the current state of chat-bots and AI image generators, revealing gaps in outcomes and ethical considerations. This study contributes to the responsible and effective deployment of chatbots and image-generation AI bots, to pave the way for their continued integration into our daily lives and businesses.

**Keywords:** Chatbot, AI Image Generation, Generative Art, Artificial Intelligence

(Article history Received: 20<sup>th</sup> October 2023 and accepted 15<sup>th</sup> July 2024)

## I. INTRODUCTION

In this modern day and age, chatbots and image-generation AI bots represent the advancement and implementation of Artificial Intelligence (AI) in multiple sectors of the market. Although these Artificial Intelligence (AI) technologies provide efficient user experiences [1], they still require rigorous testing and evaluation to enhance the accuracy and speed of outputs and prevent misinformation. Chatbots handle customer interactions where accuracy and reliability are a must [2]. Image-generation AI bots contribute to art and entertainment, where the output image quality and relevance is important [3]. Misinformation and inappropriate content generation must be prevented which can be achieved by ensuring that these technologies function in an ethical manner. As testing and evaluation continue for these technologies, many prominent gaps are visible. This study aims to address the blunders made by these Artificial Intelligence technologies to improve the competence of chatbots and image-generation AI bots deployed in the market.

## II. LITERATURE REVIEW

Artificial intelligence (AI) has been greatly reshaped by two prominent categories of AI systems: chatbots and image-

generation AI bots. These technologies have revolutionized various domains; however, their reliability and effectiveness require regular and systematic testing and evaluation. This section reviews the current state of this field and outlines the key areas of research.

### A. Chatbots

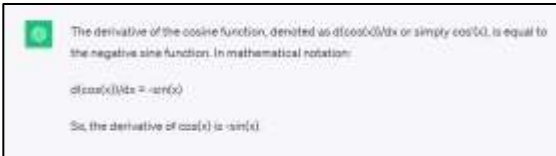
A chatbot is a computer program that simulates and processes human conversation [1], allowing humans to interact with digital devices as if they were communicating with a real person; it is a form of artificial intelligence (AI) used in messaging. This tool helps add convenience to customers and organizations in terms of cost-effectiveness and response times. To test the accuracy and speed of chatbots we have placed questions against two popular chatbots - ChatGPT and Google Bard.

- ChatGPT, which is powered by Open Ai's GPT-3, is known for its natural language understanding and generation capabilities. It can provide responses to a wide range of user queries.
- Google BARD (Bi-directional Autoregressive Transformer Dialog) is a chatbot developed by Google, known for its conversational abilities and information retrieval capabilities. It's designed to provide accurate and contextually relevant responses.

*Investigation on the information provided by Chatbots.*

During our experiments, we observed visible differences in the generated responses provided by ChatGPT and Google Bard.

*Maths: Derivative of cos(x).*



**Fig. 1.** ChatGPT's Generated response on the Derivative of the Cosine Function



**Fig. 2.** Google Bard's Generated response on the Derivative of the Cosine Function

*Trivia: Who was the first person in space*

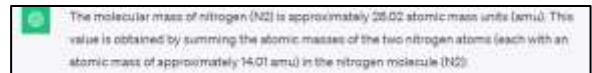


**Fig. 3.** ChatGPT's Generated response explaining who was the first person in space



**Fig. 4.** Google Bard's Generated response explaining who was the first person in space

*Chemistry: Molecular mass of nitrogen*

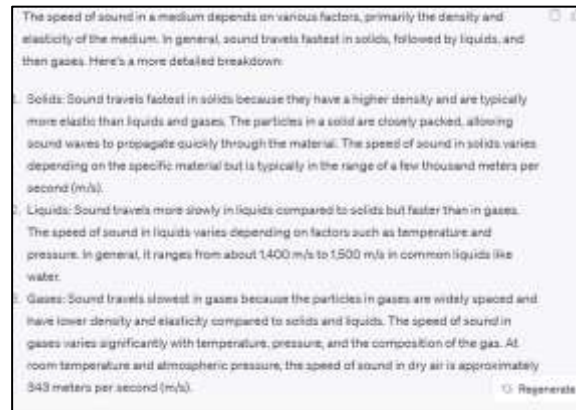


**Fig. 5.** ChatGPT's Generated response explaining the molecular mass of Nitrogen



**Fig. 6.** Google Bard's Generated response explaining the molecular mass of Nitrogen

*Physics: Which medium is the speed of sound is the fastest*



**Fig. 7.** ChatGPT's Generated response explaining in which medium the speed of sound is the fastest



**Fig. 8.** Google Bard's Generated response explaining in which medium the speed of sound is the fastest

*Investigation on the accuracy of Chatbots.*

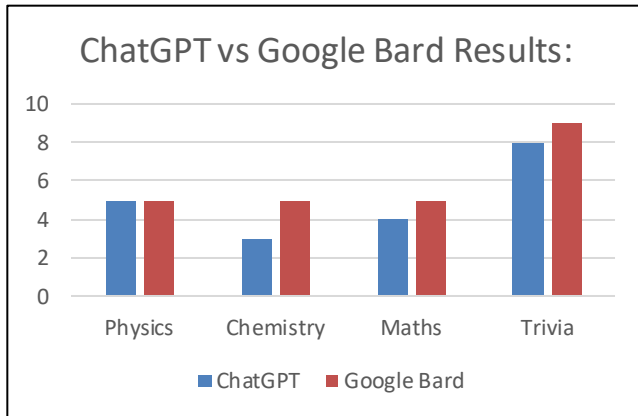
During our experiments, we observed visible differences in the generated responses provided by ChatGPT and Google Bard. The accuracy of a chatbot refers to how well it can correctly and effectively understand and respond to user input [3]. As chatbots evolve and adapt to new user queries

and tasks, ongoing monitoring and improvements are necessary to maintain and enhance their accuracy.

The questions placed against the Chatbots –

- 5 questions of Physics
- 5 questions of Chemistry
- 5 questions of Maths
- 10 questions related to Trivia and General

During this experiment, both ChatGPT and Google BARD demonstrated a high level of accuracy when providing responses related to specific topics.



**Fig. 9.** Level of Accuracy of ChatGPT vs Google Bard depicted in a graphical format

#### Investigation on the speed of Chatbots.

Response time is a critical factor in assessing the chatbot speed. This refers to the time it takes for the chatbot to respond to a user's query or message. It can differ depending on the complexity of the task, number of incoming messages, and efficiency of the chatbot's algorithms.

The questions we've placed against the chatbots ChatGPT and Google Bard show the following results in terms of speed -

- Average response time for ChatGPT - 5.13s
- Average response time for Google Bard - 11.04s

#### B. AI Image Generation Bots

Image generation artificial intelligence (AI) bots have emerged as dominant and hyped-up tools in the market with the creation of realistic and high-quality images. It applies deep learning algorithms to generate high-quality images [4].

They can be applied in numerous industries, revolutionizing the way we create and work with visual content it can be applied in the fields of Graphic Design, Advertisement, Fashion, Film and Animation as well.

AI bots can generate high-quality images rapidly, significantly reducing the time required for manual design.

While image generation AI bots offer numerous benefits, there are many ethical, lack of originality concerns and many times the output of the image itself is undesirable, sometimes completely distorted or completely unrelated to the prompt [5], [6], [7].

#### Investigation of the Accuracy on the Outputs produced by Image Generation AI Bots.

To test the accuracy of Image Generation AI Bots we have placed multiple prompts against the Image Generation AI Bot of the well-known graphic design application “Canva”

We have categorized the resulting output images into 4 categories –

- Bad
- Average
- Good
- Perfect

These are based on the quality and the accuracy of the output images in reference to the user prompts.

#### Few examples of the categories generated –



**Fig. 10.** Output Image produced by the AI Image Generator of “Bad” Category



**Fig. 11.** Output Image produced by the AI Image Generator of “Average” Category

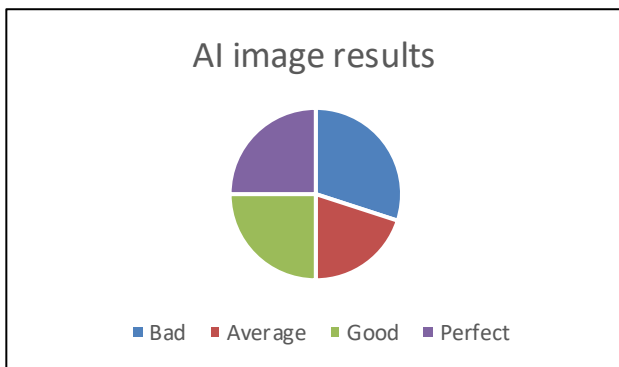


**Fig. 12.** Output Image produced by the AI Image Generator of “Good” Category



**Fig. 13.** Output Image produced by the AI Image Generator of “Perfect” Category

*Collecting and Graphing Multiple Image Outputs.*



**Fig. 14.** Collection of AI Generated Images Categories represented on a pie chart

In our collected results of Image Outputs, we were able to classify –

- 6 results into “Bad” Category
- 4 results into “Average” Category
- 5 results into “Good” Category
- 5 results into “Perfect” Category

It was found that as the prompts got more complicated, the Art Generator AI Bot was not able to keep up with the accuracy and clarity of the image output results.

III. CONCLUSION

In our research and experiments on Chatbots – ChatGPT showed better results when general knowledge questions and facts were asked as it relayed accurate information in less time

For topics on current knowledge, science, and math, Google Bard performed better, as it was much more accurate on the mentioned topics than ChatGPT, and the results it generated were much easier to understand with its detailed explanations.

Although both the Chatbots were able to answer the questions placed against them with high accuracy and relevance to the prompts. They are rule-based and won’t be able to generate actual creative or abstract solutions.

Since chatbots are heavily dependent on training data, they won’t perform well when faced with questions outside their predefined scope.

During our experiments with an Image Generation AI Bot, we were able to get a wide range of image outputs with different prompts placed against it. The images were then classified into different categories depending on their image output quality and relevance to the prompts placed against it. Even though a few Images produced were of perfect quality and completely relevant to the prompts placed against them, many of the output images were not great as the images produced were a bit distorted, non-sensical or not relevant to the prompt [5].

Usually, bad outputs are produced when the prompt placed against the Image Generator are related to intricate environment details [6]. This leads to the critical point of ethical concerns where the image output can be offensive or inappropriate. Like chatbots, AI Image Generators heavily rely on large datasets for image generation. This can lead to the limited understanding of context of certain prompts [7], [8].

AUTHOR PROFILE

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**Gurneesh Banga**

Student, BCA, School of Engineering and Technology, K.R. Mangalam University.  
Area of Interest - Artificial Intelligence.



**Arnav Sadana**

Student, BCA, School of Engineering and Technology, K.R. Mangalam University.  
Area of Interest – Programming & Game Development.



**Prateek Pandey**

Student, BCA, School of Engineering and Technology, K.R. Mangalam University.  
Area of Interest - Artificial Intelligence.



**Dr. Shruti Gupta**

Assistant Professor, School of Engineering and Technology, K.R. Mangalam University. 4.5 Years of Experience and Specialization in Computational Neurosciences