RAMANUJAN COLLEGE

UNIVERSITY OF DELHI



**DSE- Project Work/ Dissertation**

**Research Paper Topic- ChatGPT**

**SUBMITTED BY:**

AKANSHA JAISWAL (20020570003)

SUKAINA INAM NAQVI(20020570033)

VINAY YADAV(20020570041)

**SUBMITTED TO:**

Mr. Nikhil Rajput

B.Sc. (H) Computer Science |Vi Semester

ChatGPT

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1. **ABSTRACT: -**

ChatGPT was a very vast topic to write upon as it has so much in it to research about and write about it and we tried to give as much information about it by just writing its plus point and minus points in short How it can help us or how can it not help us? We started by writing how ChatGPT has made and what type of algorithm it has used and explained about it. Then the most important part we added in our research paper was its efficiency that we found many research paper was lacking about it. This research paper investigates the effectiveness of ChatGPT in extent the performance of chatbots. It mentions the problem of chatbots' limitations in generating human-like responses, resulting in poor user experience as it sometimes gives wrong answers and can’t think like a human brain. We experience some Problems while writing this research paper as it has limited resources and the most of the users, we found for the review are of computer science or the coder ones. There are very less people from other backgrounds. This paper includes the models used in its training and design involved into the chatbot's architecture and appropriate metric to measure the performance of ChatGPT model using various fields, such as language model, text generator, language translation response time, accuracy, and user satisfaction. Furthermore, the study also investigated the impact of different fine-tuning and optimization techniques such as dynamic masking on specific domains, and the results indicate that it led to more contextually appropriate responses and domain-specific knowledge. This paper also Includes that what content can ChatGPT create and the explain ability of ChatGPT. It Also shown up the Limitations of ChatGPT as it gives wrong answers sometimes and it lack the common sense. Hence elaborate whether the ChatGPT is a friend or a foe to a Human.

Overall, this research highlights the importance of advanced natural language processing techniques such as ChatGPT in chatbot development, it also presents opportunities aimed at enhancing the interaction between humans and machines

1. **INTRODUCTION: -**

“It has become appallingly obvious that our technology has exceeded our humanity.” Well said by Albert Einstein one of the most decorated scientists in history. Technology has become so much advanced this day that with just a flick of your hand you can turn on the lights or switch on the lights or turn it off. Among the vast pool of technology Artificial Intelligence is there. Artificial Intelligence is something that can behave or act like human. A part of AI was come known as ChatGPT an AI that can give answers to your every query. ChatGPT was something that become instantly popular because of its usage in every field a person can name. We started writing on this because we wanted to know its limitation and we found some to as we have written in this research paper. AI is a tool for human to make its work easier and to reduce time and ChatGPT has drastically reduce too much of work load of humans by giving everything a person need.

1. **LITERATURE REVIEW: -**

ChatGPT is a very vast topic to understand fully and we tried our le do it. When we started reading on ChatGPT we found out many things like at one point Elon Musk was part of developing it but he left it because he thought it doesn’t have any future. But know we all are the evidence that he was wrong. The main purpose of the research paper was to find out How ChatGPT works and how it can make our work easier and the last thing was What was its weakness. We found that ChatGPT had so much complex algorithm that it helps it to work efficiently and it uses deep learning techniques and neural network called Transformer to give answers. It was trained upon using 570 GB of data obtained from books, Internet, articles and etc. After learning how it works one can do many things with it like it can write an email for you or if someone wants to write on a topic say “Clean Earth Is Healthy Earth” ChatGPT can do for you in seconds. One wants some tough questions to judge its efficiency you can give it math’s problems related to any topic and it will answer it with elaborated method to understand the answer easily. Like there is always another side of coin to it does have it to. As it says it can answer anything one needs to careful to ask questions too. Though it totally depends how a user use it but it’s the responsibility of the maker to that it doesn’t answer questions like how to make a bomb or how to make gun at home. We also get to know its weakness that it only has database till 2021 after 2021 ChatGPT doesn’t know anything. There it become useless to use. Sometimes it also gives wrong answers too that needs to get changed. In last we just told How it can change the human life by taking jobs from them and in end we concluded everything with a topic does to differ from human intelligence.

1. **WHAT IS ChatGPT?**

It is an artificial language conversational entity framed by San Francisco based Open AI and was released on November 2022. It is built by using GPT-3.5 and GPT-4 of Open AI and modelled by large language models (LLMs) and has been fine-tuned using both supervised and reinforcement learning techniques.

After its initial release in November 30, it gained popularity among the world because of its answers about anything in any domain of knowledge. At a time, you can ask about anything that user want to know and it will give a detailed information about that thing. But sometimes because of its large database and less user interactivity it used to give wrong answers too that is also one of the major drawbacks of it. After its stable released in March 23, 2023 Open AI’s total market values was estimated at 29 billion $ (US Dollar). Its arrival gave a huge competition to big space agency and gave birth to many chatbots like, “BARD” of Google “Llama” of Meta’s. The original release of ChatGPT in 2022 that was based on ChatGPT-3.5 was open for all user. But the latest update that was officially released in 2023 was only available for paid subscribers on a limited basis that was known as ChatGPT-4.

**After typing What is ChatGPT? in ChatGPT we got result like this: -**

“ChatGPT is a large language model developed by Open AI, based on the GPT-3.5 architecture. It is designed to generate human-like text in response to natural language input. This means that it can carry out a wide range of tasks, such as answering questions, translating languages, summarizing text, generating creative writing, and much more. ChatGPT was trained on a massive dataset of internet text, which allows it to draw upon a vast amount of knowledge and generate coherent responses to a wide range of prompts. It is one of the most advanced language models currently available and has been used in a wide range of applications, from customer service bots to creative writing tools”

If we evaluate ChatGPT answer for itself it clearly says in simple words that it can any answer anything related to any topic that has been studied till this time. But for the critics its rather a huge term that has been used here to answer anything as they say there are always limit to anything and we can also se ChatGPT can’t answer some questions related to medical field or financial advice as it take expertise to answer this type of questions.

1. **ML MODEL USED TO TRAIN ChatGPT: -**

ChatGPT is a conversational AI system which is based on a variant of the GPT architecture that is a type of deep learning model based on transformer networks.

The ChatGPT architecture is designed to generate human-like text by predicting the likelihood of the next word in a sequence of text given the previous words. The architecture uses a self-attention mechanism that allows the model to attend to different parts of the input sequence, enabling it to better capture the context and meaning of the text. The models are typically pre-trained on large amounts of text data using unsupervised learning, before being fine-tuned on specific tasks such as language translation, text classification, and question answering.

Generative Pre-trained Transformer model (GPT) with specific version GPT-3.5 which is released by Open AI in 2021 used to train ChatGPT on large amount of text data, which allows it to learn the patterns and structure of languages, and then fine-tuned on specific tasks. It is trained on an Azure AI Supercomputing Infrastructure. It was fine-tuned over an improved version of Open AI’s GPT-3 known as GPT-3.5. This fine-tuning process of GPT version leveraged both supervised learning and Reinforcement Learning.

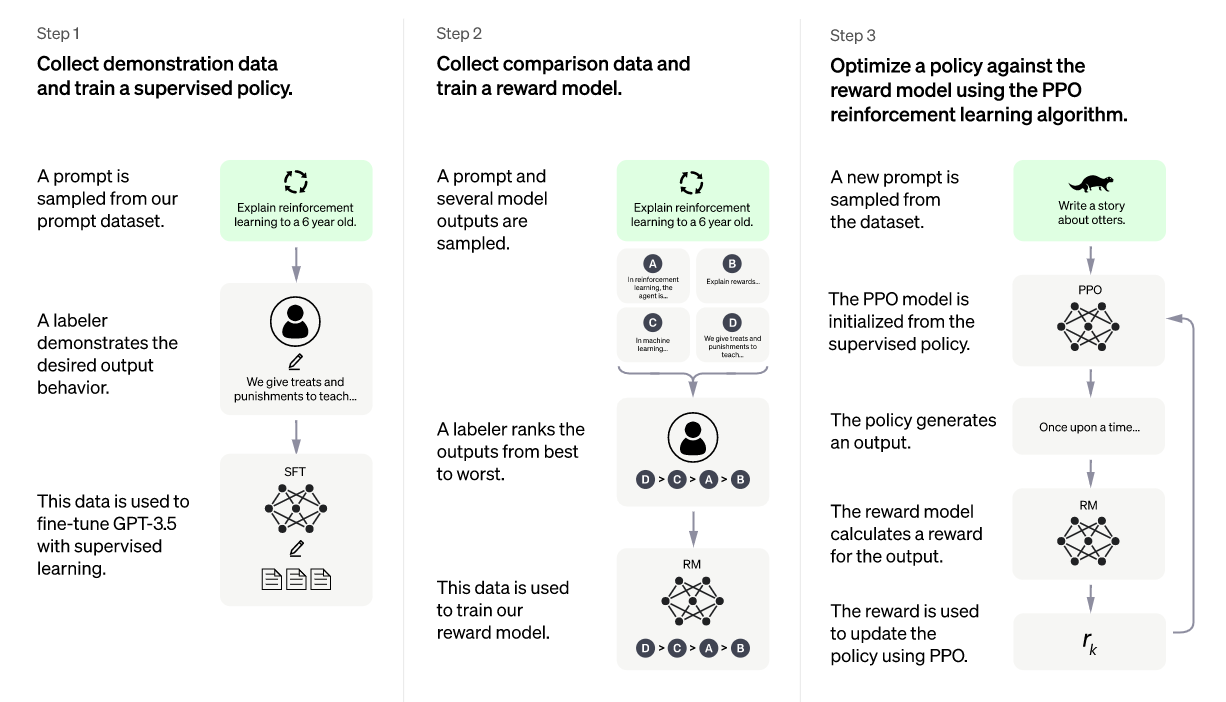
Now, for ChatGPT Plus Subscribers Open AI being GPT-4 model with the capabilities of Advanced Reasoning, Complex Instructions, More Creativity, Less Search Time.

**HOW MODEL TRAINED: -**

ChatGPT is a sibling model of InstructGPT with the differences in the data collection setup

**A detailed model training explained by Open AI: -**

**Step 1 -** collect demonstration data and train a supervised policy: Initial model is trained using supervised policy where the model was provided with conversations in which the trainers played both sides- the human user and the AI assistant.



**Step 2 -** In this step, human trainers ranked initial’s model responses and with the use of these rankings reward model is created

**Step 3** **-** In this step, Fine tuning of reward model were performed by using many iterations of PPO (Proximal Policy Optimization).

1. **ALGORITHM USED IN ChatGPT: -**

ChatGPT is GPT based architecture and an advanced conversational AI system which uses combination of several models and several algorithms and techniques to generate human like responses.

**Some algorithms and models used are -**

**TRANSFORMER**

ChatGPT model is based on the Transformer Architecture which is a neural network architecture which is based on self -attention mechanism and designed to process sequential data. This model consists of an encoder and a decoder. The encoder processes the input sequence and generates a sequence of hidden states, which are then used by the decoder to generate the output sequence. It is a Deep Learning model that can process sequences of data and generate outputs.

**PRE - TRAINING**

Unsupervised pre-training with a variant of the Transformer architecture, known as the Generative Pre-trained Transformer (GPT) Pre-training algorithm used in ChatGpt model. This algorithm is a variant of the unsupervised pre-training approach which involves pre-training of a deep neural network on a large text data using a language modelling objective. The goal of this algorithm is to learn a good representation of the language that can be fine-tuned on downstream natural language processing tasks.

This algorithm uses a variant of the Transformer architecture that consists of a multi-layered encoder, which processes the input sequence, and a language modelling task that is trained on the output of the encoder. The input sequence is processed by a sequence of self-attention and feedforward layers, and the output of the final layer is used to predict the next token in the sequence. During pre-training, the model is trained to maximize the likelihood of the next token given the previous tokens in the sequence.

**Fine-Tuning**

This algorithm is a variant of unsupervised pre-training and supervised fine -tuning approach, which is used in NLP tasks. Once the model is pre-trained in previous algorithm now it is fine-tuned on specific tasks to generate human like responses and this process involves modifying the pre-trained model’s parameters to adapt to the new task or domain.

**NLP**

ChatGPT is an NLP model that uses a variant of the GPT architecture, which is based on transformer networks. This model is specifically designed for natural language processing tasks such as language modelling, text generation and many more.

In short, NLP (Natural Language Processing) algorithms are used to help the model to identify keywords, phrases and contexts for generating accurate responses and to understand and process inputs from users.

1. **EFFICEINECY OF ChatGPT:-**

The efficiency of ChatGPT depends on various factors such as the length and complexity of the prompt, the number of requests being sent to the API, the selected GPT model, and the API response time.

In general, GPT models are known for their high accuracy and proficiency in generating human-like responses to natural language prompts. Generated responses can be computationally expensive, and the response time may vary depending on the model and the complexity of the prompt.

We’ve tried to detect the efficiency of ChatGPT with the help of its latency, content Repetition, Range of content it can create and Authenticity with the use of Open AI API key. We used “DaVinci” engine of GPT-3 provided by Open AI. We sent the prompts to this engine through the Open AI API then we processed the generated responses and able to find its latency, authenticity, content repetition Score and content ChatGPT can create.

1. **LATENCY**

We have taken a specific prompt (“Born date of Jawahar Lal Nehru”) to measure the response time (latency) of ChatGPT by setting up Open AI API key.

The prompt request sent to ChatGPT 5 times through num\_requests. Using the time module, A function measure\_latency() is defined to send requests to ChatGPT and measure the response time (latency). This function sends the prompt to ChatGPT using the Open AI. Completion.create() method measures the time it takes to receive a response using the time.time() method.

This code measures latency of each request and the average latency for a specific prompt but it can vary for different prompts.

**CODE -**

import time

import openai

openai.api\_key = "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"

# Promot used to send the chatgpt

prompt = "Born date of Jawaharlal Nehru"

# number of requests to send to ChatGPT

num\_requests = 5

# function to send requests to ChatGPT

def measure\_latency(prompt):

start\_time = time.time()

response = openai.Completion.create(

engine="davinci",

prompt=prompt,

max\_tokens=1024,

n=1,

stop=None,

temperature=0.5,

)

end\_time = time.time()

return end\_time - start\_time

# Send multiple requests to ChatGPT

total\_latency = 0

for i in range(num\_requests):

latency = measure\_latency(prompt)

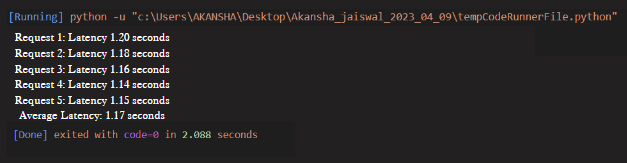
total\_latency += latency

print(f"Request {i+1}: Latency {latency:.2f} seconds")

average\_latency = total\_latency / num\_requests

print(f"Average Latency: {average\_latency:.2f} seconds")

**OUTPUT :**



1. **CONTENT REPETITION**

To check content repetition code. we tried this code which sends a prompt to the Open AI GPT 3 API to generate text and measures the content repetition ratio of the generated text.

First, the OpenAPI credentials are set up and the prompt is defined and the num\_requests variable is defined for how many requests will be sent to the API.

Function **measure\_repetition(prompt)** is defined to send requests to the API using the **openai.Completion.create()** method and appends the response text to a list. The ‘text’ variable is created by joining all of the response texts in the list into one string.

The ‘repetition ratio’ is calculated by dividing the length of the text string by the length of a set of the text string which will give a higher value if there is more repetition in the text. The function returns both the repetition ratio and the list of response texts basically the prompt is sent to the API and the measure repetition function is called then the repetition ratio and list of response texts are printed.

**CODE -**

import openai

openai.api\_key = " 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 "

# prompt to send to ChatGPT

prompt = "What is the capital of France?"

# number of requests to send to ChatGPT

num\_requests = 5

# Define a function to send requests to ChatGPT and measure the content repetition ratio

def measure\_repetition(prompt):

response\_list = []

for i in range(num\_requests):

response = openai.Completion.create(

engine="davinci",

prompt=prompt,

max\_tokens=1024,

n=1,

stop=None,

temperature=0.5,

)

response\_list.append(response.choices[0].text.strip())

text = " ".join(response\_list)

repetition\_ratio = len(text) / len(set(text))

return repetition\_ratio, response\_list

# Send the prompt to ChatGPT

repetition\_ratio, responses = measure\_repetition(prompt)

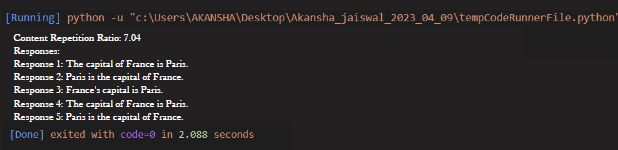
print(f"Content Repetition Ratio: {repetition\_ratio:.2f}")

print("Responses:")

for i, response in enumerate(responses):

print(f"Response {i+1}: {response.strip()}")

**OUTPUT :**



1. **RANGE OF CONTENT**

We tried this code which uses the OpenAI API to send a prompt to the ChatGPT model and generate multiple responses, and then measures the range of response lengths among those generated responses.

The `prompt` variable is defined to be sent to the ChatGPT model and the prompt asks to generate a short story about a time-traveler who goes back in time to prevent a global disaster, but ends up making things worse.

The `num\_requests` variable is defined to send to the ChatGPT model which we take 3. The `measure\_range()` function is defined to send multiple requests to the ChatGPT model using the `openai.Completion.create()` method, and measure the length of each response and the response lengths are then returned.

Finally, the `measure\_range()` function is called with the `prompt` variable as input, and the resulting response lengths are used to calculate the range of response lengths among the generated responses then this range of length is printed.

**CODE -**

import openai

openai.api\_key = " 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 "

# Define the hard prompt to send to ChatGPT

prompt = "Generate a short story about a time-traveler who goes back in time to prevent a global disaster, but ends up making things worse."

# number of requests to send to ChatGPT

num\_requests = 3

# function to send requests

def measure\_range(prompt):

response\_lengths = []

for i in range(num\_requests):

response = openai.Completion.create(

engine="davinci",

prompt=prompt,

max\_tokens=1024,

n=1,

stop=None,

temperature=0.5,

)

response\_lengths.append(len(response.choices[0].text.strip()))

return response\_lengths

# calculate the range of response lengths

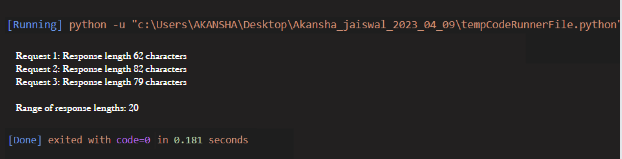
response\_lengths = measure\_range(prompt)

response\_range = max(response\_lengths) - min(response\_lengths)

print(f"Range of response lengths: {response\_range}")

print(f"Response lengths: {response\_lengths}")

**OUTPUT:**



1. **AUTHENTICITY**

We’ve tried this code of using Open AI's GPT-3 API to check the authenticity of ChatGPT's response to a given prompt.

This code defines a prompt to send to ChatGPT, which in this case is "Where is Harappa?" and an expected response, which is "Harappa is in Punjab, Pakistan".

A function called "check\_authenticity" that takes in the prompt and the expected response as arguments. This function sends the prompt to ChatGPT using the API and extracts the response text from the API response. It then checks whether the expected response is contained within the ChatGPT response, and returns a string indicating whether the response is authentic or not, along with the ChatGPT response.

**CODE -**

import openai

openai.api\_key = "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"

# prompt to send to ChatGPT

prompt = "Where is Harappa?"

# expected response

expected\_response = "Harappa is in Punjab, Pakistan."

# function to check the authenticity of ChatGPT's response

def check\_authenticity(prompt, expected\_response):

# Send the prompt to ChatGPT

response = openai.Completion.create(

engine="davinci",

prompt=prompt,

max\_tokens=1024,

n=1,

stop=None,

temperature=0.5,

)

# Extract the response text from the API response

chatgpt\_response = response.choices[0].text.strip()

# Check if the response is authentic

if expected\_response in chatgpt\_response:

return f"authentic ({chatgpt\_response})"

else:

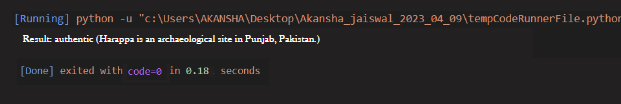
return f"not authentic ({chatgpt\_response})"

# Check the authenticity of ChatGPT's response

result = check\_authenticity(prompt, expected\_response)

print(f"Result: {result}")

**OUTPUT :**



1. **AN APPROPRIATE EVALUATION METRIC TO MEASURE THE PERFORMANCE OF ChatGPT MODEL: -**

**Language Model: -**

Chat GPT is a transformer-based language model that uses a variant of the transformer architecture called the Generative Pre-trained Transformer (GPT) to generate high-quality natural language text. The GPT architecture consists of a multi-layer bidirectional transformer encoder-decoder that is trained on a large collection of text data.

The model uses a pre-training technique called unsupervised learning to learn the patterns and structures of natural language. During the pre-training phase, the model is trained on a large collection of text data to predict the next word in a sentence given the preceding words. This pre-training process enables the model to capture the semantic and syntactic relationships between words and sentences. The model is capable of understanding the context of a conversation and generating logical and relevant responses.

After pre-training, the model is fine-tuned on conversational data to generate human-like responses to text inputs. Fine-tuning involves training the model on conversational datasets to improve its ability to generate coherent responses.

Chat GPT is a generative model, which means that it is capable of generating text from scratch rather than simply classifying or labeling text. The model generates text by sampling from a probability distribution over the vocabulary of words based on the context of the input text.

Overall, Chat GPT's ability to generate high-quality conversational responses has made it a powerful tool in the field of natural language processing and conversational AI. The model has achieved state-of-the-art performance on various conversational AI benchmarks and has been used in various applications, such as chatbots, customer service, and personal assistants.

Top of Form**Text Generation: -**

Chat GPT is capable of generating natural language text using a technique called autoregressive text generation. Autoregressive text generation involves iteratively predicting the next word in a sentence given the preceding words.

To generate text, the model takes input text as its starting point. The input text is fed into the model, and the model predicts the probability distribution over the vocabulary of words for the next word in the sequence. The model then selects a word from the predicted probability distribution, and this word is added to the text.

This process is repeated continuously, the model continues generating words until a stopping criterion is met, such as reaching a predetermined maximum length or generating an end-of-sentence.

Overall, the autoregressive text generation technique used in Chat GPT enables the model to generate high-quality and coherent text that resembles human-like language.

Top of Form**Language Translation: -**

Chat GPT is primarily a language generation model, rather than a translation model. However, some researchers have explored using the model for language translation by training it on parallel datasets in multiple languages.

To translate a sentence using Chat GPT, the input sentence in one language is fed into the model, and the model generates the corresponding sentence in the other language. This is achieved using a similar autoregressive text generation process.

Language translation using Chat GPT has shown promising results, but it is not as effective as specialized translation models such as the Transformer-based model used in Google Translate. The limitations of Chat GPT in processing non-textual information and its focus on text generation make it less suitable for translation tasks than specialized translation models.

1. **IMPANCTS OF VARIOUS FACTORS ON THE EFFICIENCY OF ChatGPT MODEL SIZE, AMOUNT OF TRAINING DATA AND COMUTATIONAL RESOURCES.**

There are various factors that can impact the efficiency and performance of Chat GPT, including model size, training data, and computational resources.

Model size is a crucial factor that can impact the efficiency of Chat GPT. Larger models tend to have more parameters and can capture more complex patterns in the data, which can lead to better performance. However, larger models also require more resources to train and run, which can limit their accessibility.

Training data is another important factor that can impact the efficiency of Chat GPT. The quality and size of the training data can significantly affect the performance of the model. Models trained on larger and more diverse datasets tend to perform better than those trained on smaller or less diverse datasets. However, the quality of the training data is equally important, as models can learn biases or generate inappropriate responses if the training data contains biased or problematic or less content.

Computational resources, such as processing power and memory, also play a significant role in the efficiency of Chat GPT. Larger models and datasets require more computational resources to run, which can limit the scalability of the model. However, advancements in hardware and software optimization techniques have made it possible to run larger models on commodity hardware.

Overall, the efficiency and performance of Chat GPT are impacted by various factors, including model size, training data, and computational resources. Understanding these factors and their impact can help researchers and developers optimize the model and its applications for specific use cases.Top of Form

1. **DIFFERENT FINE-TUNING AND OPTIMIZATION TECHNIQUES TI IMPORVE THE PERFORMANCE OF ChatGPT: -**

The performance of ChatGPT can be improved on specific NLP tasks using various techniques. Some techniques that can be used are:

1. **Transfer Learning**

Transfer Learning is a machine learning method which is basically reused a trained model to accomplish or add different by related task. In case of ChatGPT, this method can be used in pretraining of ChatGPT on a large and new more diverse dataset because it is found that the dataset in which ChatGPT trained was up to 2021.

It has been seen that ChatGPT is not a perfect language translator and its proficiency in each language vary like more accurate in some languages than others. Therefore, Transfer Learning can be used to retrained ChatGPT model to improve its efficiency.

1. **Fine Tuning on specific Domain**

It has been seen that ChatGPT is not a fixed entity and can be fine- tuned on various domains like – customer service, healthcare, finance, legal, Ecommerce and many more which improve its performance on domain-specific tasks and it can be achieved by train the model on domain specific text data dataset.

1. **Dynamic Masking**

Masking different subset of tokens during each training iteration, which can help to prevent ChatGPT from memorizing the training data and improve its ability to generalize.

During training of ChatGPT Masked Language Modelling (MLM) technique was used due to which ChatGPT randomly masks out a certain percentage of input tokens and predicts them based on the context of existing tokens but This masking of token is static which means the same set of tokens are masked during each training iteration. Due to which the model memorizing the training data and performing poorly on new data.

But Dynamic masking work by randomly selecting a different set of tokens to mask during each training iteration and this forces the model to learn more generalizable representations of the input data, which can improve its performance on new data.

1. **IS CHATGPT REALLY TAKES THE JOB: -**

Simply to say ChatGPT is an AI chat box that answer question for the user. Its uses totally depend on how a user use it. For some people it can take jobs but for some it helps to make their job easy.

To find out that if it can really take a job, we are going to evaluate a survey that took place in US and its participant was half of the US companies that are using ChatGPT right now. Its result was that they said they are deploying ChatGPT instead of humans. Their review was like 55% business leader told that ChatGPT is excellent and 34% said it is very good.

By reading this it was clear that ChatGPT can really take people jobs. Some companies have already started of deploying ChatGPT instead of humans now. To frankly say as ChatGPT says that it can answer anything it can also answers code for us too. There was a case where a human passed Google coding interview for level 3 engineer with 183K $ salary with the help of ChatGPT. As from technical background I found out that it can give answers to code related queries too. So, people who are working as full stack developer are at loss right now cause for them it is bane and at the same time boon to as it helps them to write code.

***JOBS THAT CHATGPT CAN REPLACE ANSWERED BY ChatGPT:*** *-*

|  |  |  |
| --- | --- | --- |
| **S.no** | **JOBS** | **HUMAN TRAIT REPLACED** |
| *1* | *Data Entry Clerk* | *Speed and Accuracy* |
| *2* | *Customer Services Representative* | *Communication and Empathy* |
| *3* | *Proof-reader* | *Attention to details* |
| *4* | *Paralegal* | *Research and Organisation* |
| *5* | *Book-Keeper* | *Mathematical Skills* |
| *6* | *Translator* | *Language Proficiency* |
| *7* | *Copywriter* | *Creativity and Writing* |
| *8* | *Market Research Analyst* | *Analytical Skills* |
| *9* | *Social Media Manager* | *Content creation and Curation* |
| *10* | *Appointment Scheduler* | *Time Management* |
| *11* | *Telemarketer* | *Persuasion and Communication* |
| *12* | *Virtual Assistant* | *Multitasking and organization* |
| *13* | *Transcriptionist* | *Listening and Typing skills* |
| *14* | *News Reporter* | *Facts Checking and Writing* |
| *15* | *Travel Agent* | *Planning and Coordination* |
| *16* | *Tutor* | *Knowledge and Teaching* |
| *17* | *Technical Support Analyst* | *Troubleshooting* |
| *18* | *Email Marketer* | *Writing and Targeting* |

*Now I will tell when asked with ChatGPT that can It really takes people job what was its answer: -*

“ChatGPT is a tool that can be very useful in certain contexts, such as customer service, language translation, or generating creative writing. It is capable of answering a wide range of questions and providing accurate and informative responses in many cases.

However, it is important to note that ChatGPT is not a substitute for human expertise or experience in all situations. There are some tasks that still require the unique skills and insights of a human being, such as complex decision-making, emotional support, or creative problem-solving.

In short, while ChatGPT can be a powerful tool in certain contexts, it is not a replacement for human workers and should be used as a complement to human intelligence, not a replacement for it.”

Now to analyse this test it is clear that we can see ChatGpt can give some time biased and sometime unbiased answers too. But let’s come to main point it is clear by seeing this and by some survey that ChatGPT can literally take jobs from the people. So, now’s a question Should we really implement this in working private sector?

1. **CONTENTS ChatGPT CAN CREATE: -**

While from developing phase it was the idea of the creator of ChatGpt that it should answer anything. From this it was said that it can create a humongous range of contents in any field of knowledge.

If I sit to write the topics for which it can give answers it will be a huge list for starters it would go Physics, Chemistry, Biology, Maths, English, History, Economics, Accounts, Finance, Geography, Computer Science, Philosophy and many more areas too. It can also write emails for you.

While asking from ChatGPT what contents you can create it answered?

“ChatGPT can create a wide range of contents, such as:

1. Answering questions on various topics: ChatGPT can provide accurate and informative responses to questions related to science, history, current events, and more.
2. Language translation: ChatGPT can translate text from one language to another, making it a useful tool for communication across different cultures and languages.
3. Summarizing long texts: ChatGPT can read and summarize long articles or documents, making it easier to digest and understand complex information.
4. Generating creative writing: ChatGPT can be used to generate poetry, short stories, or even entire articles based on a given prompt or topic.
5. Personalized recommendations: ChatGPT can analyse user preferences and recommend books, movies, or products based on their interests and habits.
6. Chatting with users: ChatGPT can engage in conversations with users on a wide range of topics, providing helpful information and engaging in friendly banter.”

To analyse this answer of ChatGPT we can take some points from it and can ask some hard questions from that: -

So, I asked a history question from ChatGPT

Who was the pallbearer of the Mahatma Gandhi Funeral?

“The pallbearers of Mahatma Gandhi's funeral were his close associates and followers, who were mostly prominent leaders in the Indian independence movement and members of the Indian National Congress. The pallbearers included Jawaharlal Nehru, Vallabhbhai Patel, Rajendra Prasad, Abul Kalam Azad, and several other prominent political and social leaders of the time. They carried Mahatma Gandhi's body on their shoulders from Birla House to the site of his cremation at Raj Ghat in New Delhi. The funeral was attended by a large number of people from all walks of life, including politicians, activists, religious leaders, and ordinary citizens, who came to pay their respects to the Mahatma, who was widely regarded as the Father of the Nation.”

Next question I asked was from English

Generate 5 lines poetry on Artificial Intelligence?

“In the realm of circuits and code,

Artificial intelligence takes hold,

A digital mind that can learn and grow

, And help us explore what we don't know.”

“Deep in the machines and wires,

Lies a power that never tires,

It can process and analyse with ease,

And help us solve the world's mysteries.”

This are the poems I got. Even I asked ChatGPT to write a 5-line poem it gave me a 4 line that shows that sometime it mistakes its input from user.

1. **INVESTIGATE METHODS FOR IMPROVING THE INTERPRETABILITY AND EXPLAINABILITY OF ChatGPT IN DIFFERENT DOMAINS: -**

Improving the interpretability and explain ability of Chat GPT is an important area of research, as it can help users understand how the model generates its responses and make informed decisions based on its output. Here are some methods for improving the interpretability and explain ability of Chat GPT in different domains:

1. **Healthcare:** In the healthcare domain, interpretable and explainable models are crucial for ensuring patient safety and improving clinical decision-making. One method for improving the interpretability of Chat GPT in healthcare is to run the model on clinical concepts and medical terminology. This can help the model to generate more relevant and accurate responses that are easily informative by medical professionals.
2. **Finance:** In the finance domain, interpretable and explainable models are important for understanding financial risks and making informed investment decisions. One method for improving the interpretability of Chat GPT in finance is to incorporate domain-specific knowledge and financial indicators into the model. This can help the model generate more accurate and relevant responses that are easily interpretable by financial professionals
3. **Customer service:** In the customer service domain, interpretable and explainable models are important for understanding customer needs and providing effective support. One method for improving the interpretability of Chat GPT in customer service is to train the model on customer feedback and frequently asked questions.
4. **E-commerce:** Interpretable and explainable models in the e-commerce industry are essential to improve customer experience and increase sales. One way to improve the interpretability of Chat GPT in e-commerce is to add customer behaviour data and product information to the model. This can help the model generate more accurate and relevant responses that customers can easily interpret.
5. **Education:** In the field of education, interpretable and explainable models are important to understand student needs and improve learning. One way to improve the interpretability of Chat GPT in training is to add training content and learning outcomes to the model. This can help the model generate more accurate and relevant answers that can be easily interpreted by teachers and students.
6. **Travel and Hospitality:** In the travel and hospitality industry, interpretable and explainable models are essential to provide personalized recommendations and improve customer satisfaction. One way to improve the interpretability of Chat GPT in tourism and hospitality is to incorporate tourism and hospitality industry-specific information such as customer preferences and location-based information into the model.
7. **Law:** Interpretable and explanatory models in the field of law are important for improving legal decision-making and ensuring the fairness of judicial processes. One way to improve the interpretability of Chat GPT in the legal domain is to train the model on legal documents and cases. This can help the model generate more accurate and relevant answers that legal professionals can easily interpret.

In summary, improving the interpretability and explain ability of Chat GPT in different domains requires incorporating domain-specific knowledge, using attention mechanisms, and applying explainable AI techniques such as LIME or SHAP. These methods can help users understand how the model generates its responses and make informed decisions based on its output.

1. **ETHICAL CONSIDERATION AROUND THE USE ChatGPT: -**

If one tries to understand the meaning of ethics It clearly says that moral principles that govern a person behaviour or the conductivity of an activity. But the ethics for an Artificial Intelligence is vast to understand cause in the hand of good user it will have a good ethics but in the hand of a wrongdoer it can harm us. There was this case on ChatGPT where some users used various prompt engineering techniques to bypass the restrictions in early December of 2022 and they successfully attain this deal and gave command like “How to make Molotov Cocktail and a Nuclear bomb? “This was one of the jailbreaks that happened on ChatGPT that made people judge abouts its ethnicity. There was this case too in Pakistan where judge used ChatGPT to give verdict in a Juvenile case. The judge question was “Can a juvenile suspect in Pakistan, who is 13 years old, be granted bail after an arrest? “And ChatGPT answered it with” Under the juvenile justice system act 2018, according to section 12, the court can grant bail on certain conditions. However, it is up to the court to decide whether or not a 13-year-old suspect will be granted bail after arrest.” As we can see it totally depends on How a user use it to find answer.

When asked Ethical consideration about the use of ChatGPT? It answered: -

“The use of ChatGPT raises several ethical considerations that must be taken into account by those who interact with it. Some of these ethical considerations include:

* 1. Bias: ChatGPT can perpetuate biases and discrimination if it is trained on biased data or programmed with biased algorithms. It is crucial to ensure that the model is developed and trained in an ethical and unbiased manner.
  2. Privacy: ChatGPT can collect personal information from its users, such as their conversation history or location data, which can be used for malicious purposes. It is essential to ensure that this data is collected, stored, and processed ethically and transparently.
  3. Transparency: ChatGPT's outputs can be unpredictable, making it challenging to understand how the model arrived at a particular response. It is essential to ensure that the reasoning behind ChatGPT's outputs is transparent and explainable, so users can understand and trust its behaviour.
  4. Responsibility: While ChatGPT is just a tool, its developers and users have a responsibility to ensure that it is used for ethical purposes. ChatGPT should not be used to promote hate speech, harassment, or any other form of unethical behavior.
  5. Accountability: If ChatGPT causes harm or is used to facilitate unethical behavior, it is essential to have systems in place to hold those responsible accountable. This could include ethical guidelines, codes of conduct, or legal frameworks.
  6. Informed Consent: It is important to obtain informed consent from users before using ChatGPT to collect personal information or use it in any way that could potentially impact their privacy or security.
  7. User Safety: It is crucial to ensure that ChatGPT is not used in any way that could harm users physically, mentally, or emotionally.

1. Fairness: It is important to ensure that ChatGPT is used in a fair and equitable manner, and that it does not perpetuate or amplify existing inequalities.
2. Human Oversight: It is essential to have human oversight and control over ChatGPT to ensure that it is used ethically and responsibly.”

It is clear by this that it’s uses can be harmful and good at same time it just it totally depends upon the user.

1. **LIMITATIONS OF ChatGPT: -**

ChatGPT has an outstanding performance in various fields and domains but also have some limitations as nothing is hundred percent accurate and perfect.

This model can’t think as a human being can think or imagine that’s leads to lack of Common sense that affect the ability of answering the reasoning questions.

Also, this model has a low capacity or say limited capacity to handle the unstructured data So this is difficult to maintain the consistency for the longer conversation.

As the ChatGPT is a huge and complex model that requires very large amount of data to give best performance.

GPT may generate irrelevant or nonsensical responses, which could have a negative impact on user who used ChatGPT and believe that it is always relevant. For Example, Sharing my own experience with ChatGPT. I asked a mathematics question from ChatGPT, ChatGPT answered it wrong. So sometimes ChatGPT gives wrong answer to the users.

So ChatGPT also have some limitations so a proper testing and evaluation of the model is required so that only the authentic and correct information is delivered or shared to the user.

1. **ALTERNATIVE OF ChatGPT AND THEIR COMPARISON: -**

There are many other AI applications beyond Chat GPT that can be used for different natural language processing tasks. Here are some examples along with a brief comparison with Chat GPT:

1. **Google Bard: -**Google's new AI language model, "LaMDA," powers the search giant's conversational search platform, Google BARD. Google BERT, which stands for Bidirectional Encoder Representations from Transformers, is a deep learning algorithm that processes natural language queries to better understand the context of words and sentences.

As of March 21st, 2023, Google's Bard is launched in two countries:

* the United States
* the United Kingdom.

As, ChatGPT is not launched in Our Country India, So After reading the review from the people of US and UK who tried the Google bard, I understand that some people found Google BARD, a Google initiative that aims to bridge the gap between research and development, enabling faster innovation in academia and business. Some found that it provides a platform for researchers to share data, exchange ideas and receive feedback from outside their circle. Some found it helpful in areas such as genomics, drug discovery, medical imaging and artificial intelligence. Overall, Google BARD demonstrates the power of collaboration in managing rapid technological development.

ChatGPT, on the other hand, is a language model developed by Open AI that uses deep learning techniques to generate human-like text in response to prompts provided by users.

The main difference between Google BARD and ChatGPT is their respective functions. Google BARD is primarily focused on improving the accuracy of search results by better understanding the context of natural language queries. ChatGPT, on the other hand, is designed to generate human-like text in response to prompts.

While both models use natural language processing and machine learning techniques, their primary functions and applications are different. Google BARD is used to improve the accuracy of search results, while ChatGPT is used for generating text in response to user input.

1. **RUNWAY: -** Runway AI is an artificial intelligence platform that provides tools for artists and creatives to develop, run, and use machine learning models. It aims to make AI more accessible and usable for non-technical users by providing a user-friendly interface and pre-built models that can be customized and trained to fulfil specific needs.

On the other hand, ChatGPT is a large language model trained by Open AI that uses deep learning techniques to generate human-like text based on prompts provided by users. ChatGPT's primary focus is on generating natural language responses to a wide range of topics and questions.

The main difference between Runway AI and ChatGPT is their purpose and functionality. Runway AI is a platform for creating and deploying machine learning models, while ChatGPT is a language model specifically designed to generate text. However, both platforms use artificial intelligence techniques to accomplish their respective goals.

1. **COGRAM: -** Cogram AI is a natural language processing platform that uses advanced algorithms and machine learning techniques to understand and analyse text data. It is designed to help businesses and organizations automate their text-based workflows and improve efficiency in various industries such as healthcare, legal, and finance.

In contrast, ChatGPT’s focus is on generating natural language responses, while Cogram AI is more focused on analysing and processing natural language data to perform specific tasks.

While both Cogram AI and ChatGPT use natural language processing techniques, their primary functions and applications are quite different. Cogram AI is a platform for automating text-based workflows, while ChatGPT is a language model that generates text based on user inputs.

1. **COMPOSE AI: -** Compose AI is an AI-powered writing assistant that is designed to help users write more effectively and efficiently. It uses machine learning algorithms to suggest and autocomplete phrases, sentences, and even entire paragraphs based on the context and content of the text being written. Compose AI can be used for a variety of writing tasks, such as composing emails, reports, and social media posts.

The main difference between Compose AI and ChatGPT is: Compose AI is a tool for helping users write more efficiently, while ChatGPT is a language model that generates text.

1. **CHATBOT LIV:** - Chatbot liv is a conversational AI platform that is designed to automate customer service and support. It uses natural language processing and machine learning to understand and respond to customer queries and requests. CHATBOT LIV is primarily used by businesses to provide 24/7 support to their customers, reducing the need for human operators and improving response times.

In contrast, ChatGPT is designed to be a conversational agent that can engage in natural language conversations on a wide range of topics.

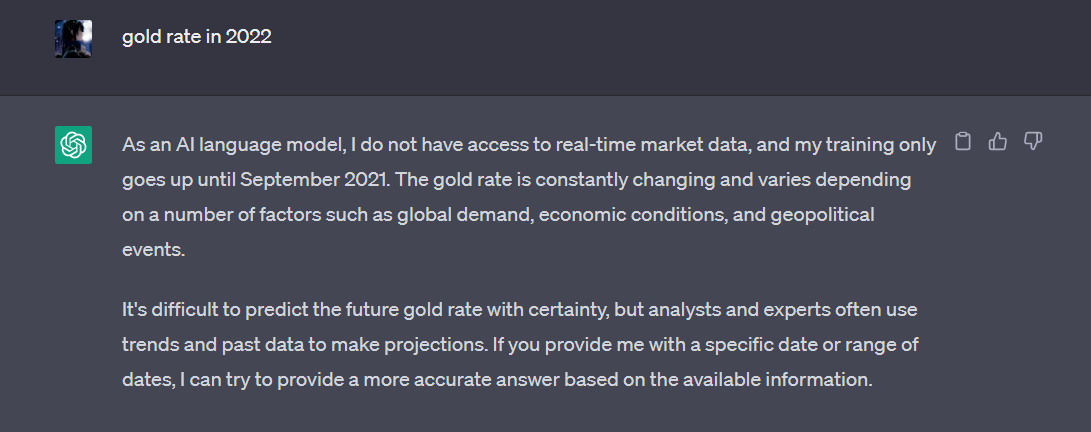
The main difference between CHATBOT LIV and ChatGPT is: CHATBOT LIV is designed to automate customer service and support, while ChatGPT is designed to generate human-like text responses. While both platforms use natural language processing and machine learning techniques, their functionalities are different.

In summary, there are many AI applications beyond ChatGPT that can be used for different natural language processing tasks. Each model has its own strengths and weaknesses, and the choice of model depends on the specific task requirements and available resources.

1. **USER REVIEW AND FEEDBACK: -**

**ChatGPT** is an AI-powered writing tool that can write both text and code. While it is still in its infancy, it is generally considered to be quite accurate in understanding and responding to conversational prompts. Its accuracy may vary from user to user, and it is still somewhat imperfect. Many users have had positive experiences with **ChatGPT** and give it a high rating. **ChatGPT** can be a useful tool for writers looking to boost their productivity, but it still requires human oversight.

As the ChatGPT’s training only goes up to until September 2021 just because many users have had negative experiences with ChatGPT, which is its biggest negative point and many users face problems due to this.



We conducted a survey for user’s reviews and feedbacks of ChatGPT we found many conclusions about ChatGPT.

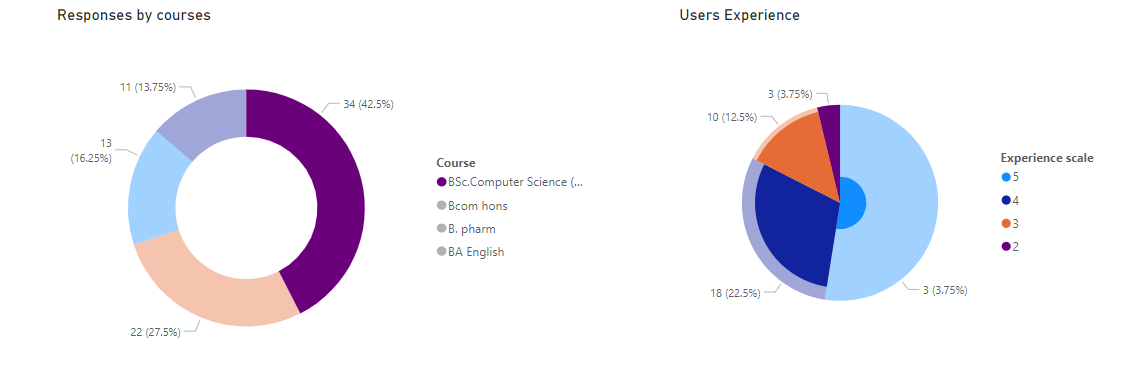
Mostly users limited to only ChatGPT and not go with ChatGPT plus extension due to its price the reason of this maybe they all are currently students. And we also found Not just because of the limitation of training data we found many users face many different types of issues like one user said ChatGPT can't process very big tasks and also can't deal with files while the other users said Lack of emotional intelligence. limited ability to handle complex tasks. limited ability to generate original ideas. limited understanding of context, sometimes lagging, Biased level of information response, Sometime error facing, it can't answer something tricky or out of the box questions, to be very specific and niche to the topic to get the correct outcome otherwise it'll give some other things that you don't need and many more.

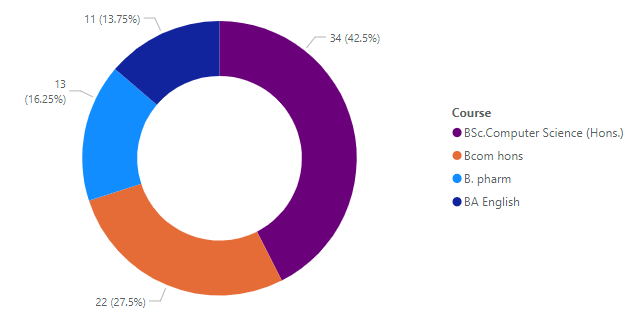
We’ve found that mostly users use ChatGPT for code generation , finding bugs, remove errors, text generation and too many things which totally depend on user’s work and domain but they also want some extensions in the model to enhance the performance of ChatGPT and many users suggest some functions which can be embedded in chatbot like Don’t add any kind of subscription plan in it, Image generation, Trained model for data after 2021, add features like future prediction, updated data results, If many people search at a particular time it doesn't work so this may improve for people so that they can smoothly use ChatGPT, Voice Search Feature, Photo Generation, Share link also, It can also have a connector to different applications.

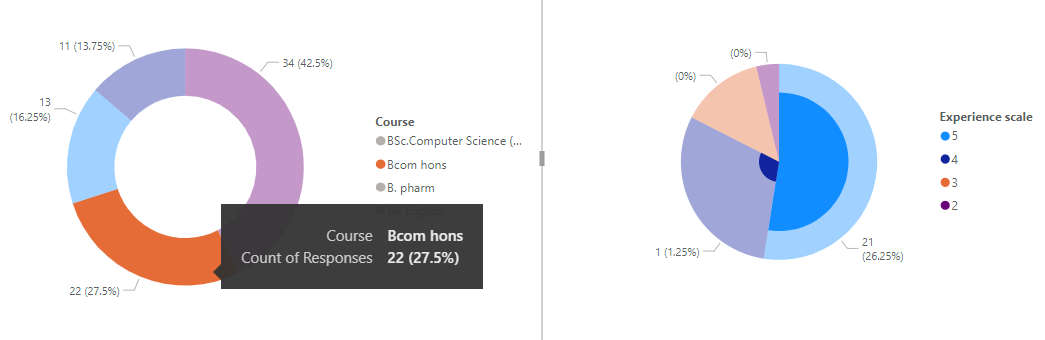
We collected data from different courses and we got the responses from 4 courses and these are computer science, BCom, B. pharma, BA English. In our analysis, we found mostly CS students use ChatGPT for code, bugs, and documentation. BCom students mainly use it for their assignments, B. Pharma students use it for solving tricky problems and BA students use it for literature and essay generation.

The whole survey is based on 42.5% responses from CS(H), 27.5% from BCom, 16.25% from B. Pharma and 13.75% from BA students.

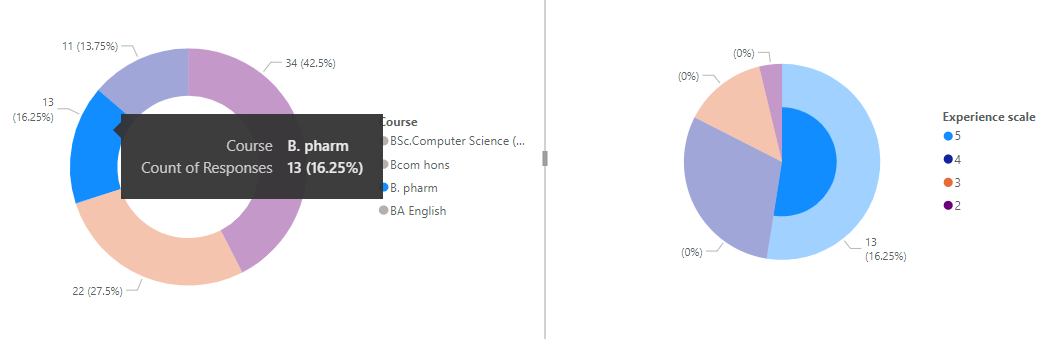
**HOW USERS SCALE THEIR EXPERIENCES: -**

We conducted a survey to gather user’s reviews and feedback so that we can present some insights of ChatGPT’s users experience and can generate short summary of how they are using it and how they rate their experience.

Computer Science students can make use of ChatGPT in numerous ways, such as receiving help with coding assignments, clarifying concepts and algorithms, and practicing problem-solving techniques for exams. As per Report that we received from survey is 22.5% CS students scale their experience 4 out of 5, 12.5% students scale it in 3 out 5, 3.75% students

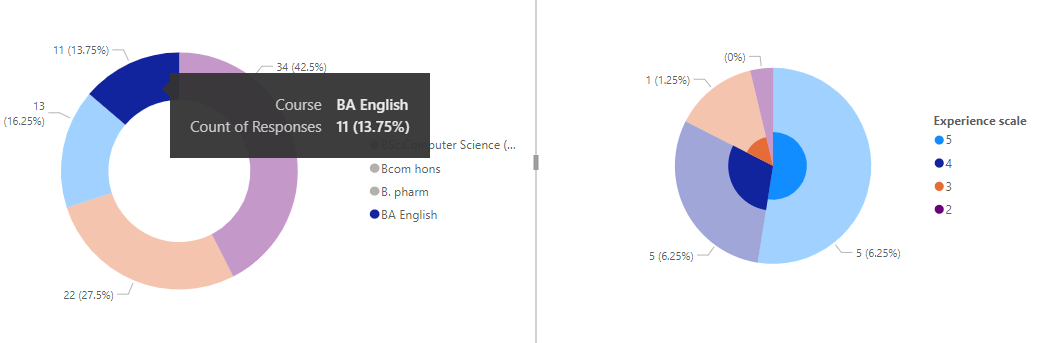
scale it in 2 out of 5 and only 3.75% students scale their experience in 5 out 5 which shows less satisfaction with ChatGPT’s response.

As BCom students can use ChatGPT to their advantage in several ways, such as getting help with accounting principles, finance concepts, and other business-related topics, practicing problem-solving techniques for exams, and seeking guidance on career paths in business. Additionally, ChatGPT can provide up-to-date information on industry trends and current events, helping BCom students stay informed and prepared for their coursework and future careers.

And in our survey, we have found that responded BCom hons students were more satisfied with ChatGPT’s response as mostly students rated their experience with a scale of 5 out of 5 which shows their high satisfaction and

only 1 student rated their experience on a scale of 2 out of 5.

B. Pharma students can benefit from using ChatGPT in a number of ways, including researching and studying various pharmacy-related topics, getting help with homework and assignments, preparing for exams by practicing questions and learning effective strategies, and receiving guidance on different career paths within the field of pharmacy.

As per survey, total responses that were received, all of them report their experience scale with 5 which shows ChatGPT can be a valuable resource for B. Pharma students looking to enhance their knowledge and academic performance

As, BA English students can use ChatGPT as a helpful tool to improve their language skills by accessing its vast database of literature and resources. ChatGPT can provide assistance with understanding literary devices and analysing texts, and can also help with grammar and writing skills. Additionally, ChatGPT can suggest reading materials and provide guidance on career options in the field of English literature.

And as per the survey we received mixed reactions from students who rate their experience on a scale of 5,4,3 out of 5 from which only 6.25% of students are fully satisfied with the chatbot’s response.

1. **ChatGPT: A FRIEND OR FOE: -**

ChatGPT is an artificial intelligence language model designed to generate human-like responses to natural language inputs. Some people view ChatGPT as a friend, while others see it as a foe. The truth is that ChatGPT can be both a friend and a foe, depending on how it is used.

On the one hand, ChatGPT can be a friend to humans. It can be a valuable resource for people seeking information, advice, or entertainment. ChatGPT can help people find answers to complex questions, write anything on user’s demand, generates anything accordingly. In this way, ChatGPT can be a source of support and comfort to many people.

However, on the other hand, ChatGPT can also be a foe to humans. It is a machine that lacks empathy, emotions, and moral values. Its responses are generated based on statistical patterns and algorithms or models used in it, which means that it is not capable of understanding human emotions or intentions. It can provide false or misleading information that can cause confusion in people. It can also sustain biases and prejudices that are present in the data it was trained on, leading to unintentional discrimination and wrong information. Moreover, some people worry that ChatGPT could be used for malicious purposes. It could be programmed to spread propaganda, misinformation, or hate speech. It could also be used to impersonate someone and spread false information or engage in cyberbullying or some more these types of activities. These are serious concerns that highlight the potential dangers of this technology.

So, is ChatGPT a friend or a foe? The answer is that it depends on how it is used. ChatGPT has the potential to be a valuable tool that can help people in many ways. Still, it can also be a dangerous if it falls into the wrong hands or is programmed with harmful intent. Therefore, it is essential to use ChatGPT responsibly and ethically to ensure that it is a friend and not a foe to humans.

In conclusion, ChatGPT is a powerful technology that can be both a friend and a foe to humans. It has the potential to help people in many ways, but it can also cause harm if used irresponsibly. It is up to us to use ChatGPT in a way that benefits society and respects human dignity and rights.

1. **DOES CHATGPT DIFFER FROM HUMAN INTELLIGENCE: -**

Yes, ChatGPT differs from Human Intelligence as ChatGPT is an Artificial Intelligence so it will never be same as of human intelligence.

Even, Human intelligence differ from people to people. All the human has their different thinking ability and intelligence. if two human’s intelligence or thinking ability can’t be same So, how it’s possible that an Artificial Intelligence can be same as of Human intelligence.

ChatGPT is built or say designed to act like Human or solve anything that can made it easy for the Human beings to use this AI chatbot so that their work becomes easy.

ChatGPT tries to think like humans, but it can only answer questions based on what it has learned from its training. It can't do things on its own or think for itself. It can only solve or answer that it trained on it. Sometimes, it gives Wrong answers of mathematics questions and have some different methods to solve the   
questions and may the answer can vary.

As human intelligence is based on biological processes within the brain. Also, Human being have emotions so they can have different opinions about topics. ChatGPT don’t have emotions in it as it is artificial intelligence it does not have the capacity for independent thought or creativity in the same way that humans do.

ChatGPT does not have a physical body and is not able to interact with the physical world in the way that humans can. It exists solely as a software program running on a computer server, and its outputs are limited to text-based responses.

In general, although ChatGPT can produce responses that seem very similar to those of a human in terms of their language and style, it is essentially dissimilar from human intelligence and does not possess several of the intricacies and intricacies of human cognition and conduct.