



CS 131 Spring 2025 Semester Project

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5/2/25



01

Main Research





LLM Comparisons

This refers to the process of evaluating and contrasting different Large Language Models (LLMs) based on various factors like performance, pricing, and the ability to help users choose the most suitable model for their needs.

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LLM Comparisons

The purpose of LLMS:

- Text Generation: creating responses from the text based input prompt from the user
- Text Completion: predicting and completing the sentences/paragraphs
- Translation: converting the text from one language to another with high accuracy
- Sentiment Analysis: identifying the emotional tone behind a piece of text
- Question Answering: responding

Summary:

It's a artificial intelligence (AI) system that is designed to understand, generate, and manipulate human language. These models are built using deep learning techniques. LLMS are trained on diverse datasets that encompass a wide range of topics, styles, and contexts.

Evolution of LLMs:

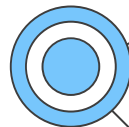
- The beginning of LLMs, it heavily on rule based systems and statistical models that could analyze text but it struggled to understand the context.
- Until the 2017, the introduction of the transformer architecture. This was used for self-attention mechanisms that enabled it to weigh the importance of different words (it paved the way for larger and more capable models)
- During this time of modeling, the development reached a point to use pre-training techniques like BERT (Bidirectional Encoder Representations)
 - Unlabeled data before being fine-tuned for specific tasks, improve performance
- Finally, it reached its final and current state, models like OpenAI's GPT series and Google's PaLM represent the LLM development. These models are trained on diverse datasets, enabling them to generate remarkably human-like text.

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Major Players in the LLM Landscape



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OpenAI

Emerged as a frontrunner in the LLM area with pre-trained transformer

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Google

The transformer architecture, which laid the groundwork for many subsequent models

03

Meta AI

The LLM landscape include the development of models like LLaMA (Large Language Model Meta AI)

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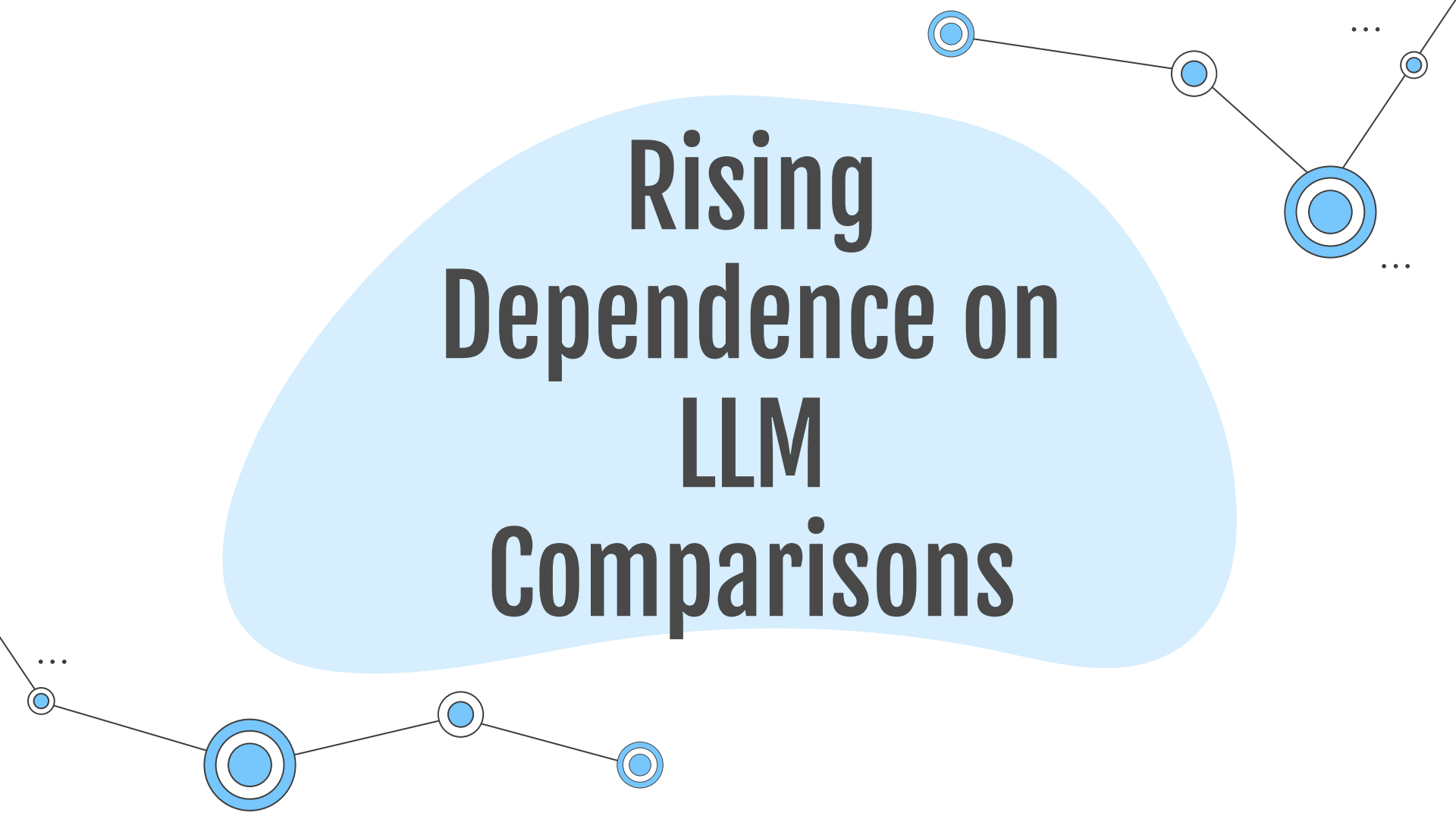
Mistral

Making significant strides in the LLM landscape with its focus on efficiency and speed

Architecture

- LLMs are built on the transformer architecture, which uses self-attention mechanisms to process and generate text
- **Google Gemini** - It based on the transformer model, it integrates multimodal capabilities, allowing it to process both text and visual data. It is designed for complex reasoning tasks and capable of handling large documents
- **OpenAI** - Transformer-based autoregressive model and it's great at generating congruent text and handling complex prompts due to its deep learning capabilities
- **Meta AI LLaMA** - Transformer-based with a focus on efficiency and performance and it offers competitive performance across various benchmarks while being open-source and allowing others in the community to improve
- **Mistral** - It uses a transformer architecture with unique enhancements and designed for efficiency and speed, it also excels in real-time applications. Its architecture allows it to handle long sequence effectively

Rising Dependence on LLM Comparisons



Dependence on LLM Comparisons

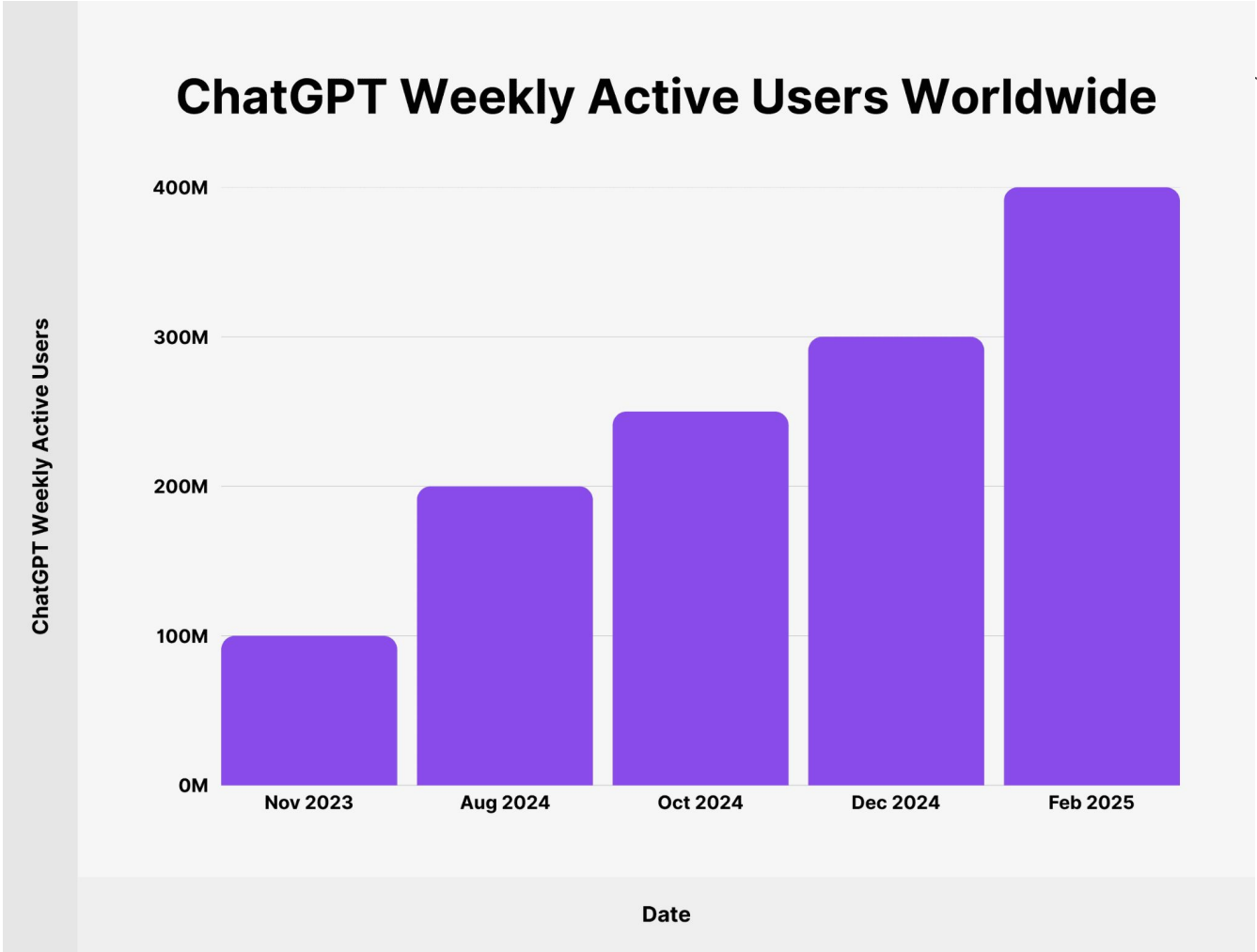
- Throughout the years, everyone can notice that people are starting to rely on these artificial intelligence large language models (e.g. ChatGPT, Gemini, Copilot, etc.)
- Survey done by Elon University, the growth and spread of these AI systems are across many dimensions of the US population
 - LLM users say they have human-like encounters with these tools and the sense of some users that the models have personality traits that are both pleasing and dismaying
- In their survey they stated that Lee Rainie, director of the Imagining the Digital Future Center, "LLMs are used, our survey shows that the share of those who use the models for personal purposes significantly outnumber those who use them for work-related activities."

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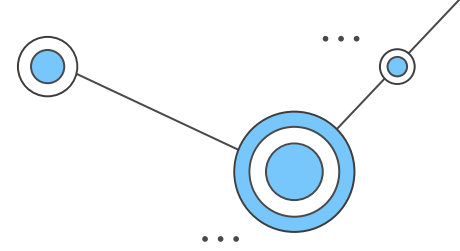


ChatGPT Statistics

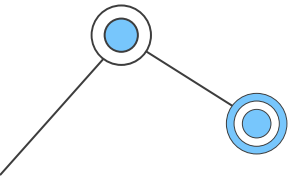
Graph #1



Graph #2



Age Group	ChatGPT Adoption Rate
18 - 29	43%
30 - 49	27%
50 - 64	17%
65+	6%



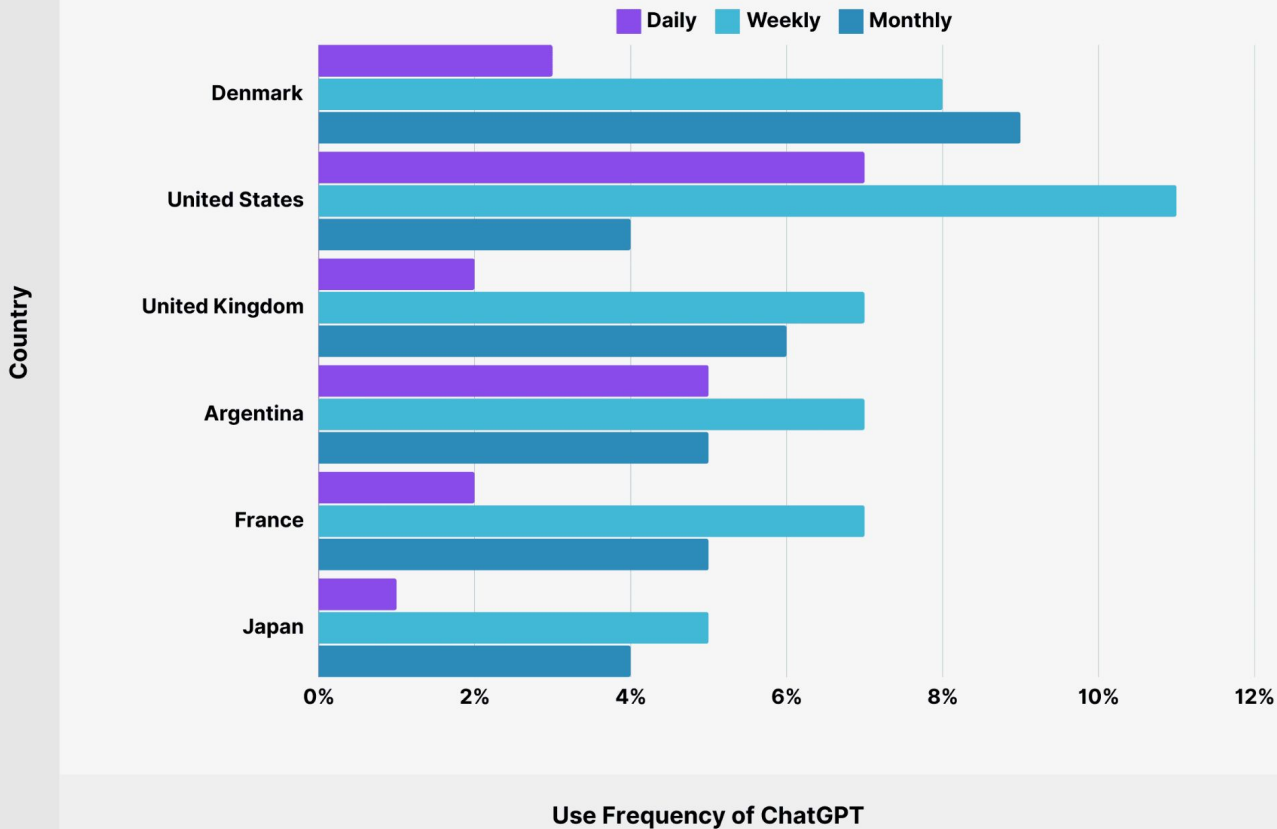
ChatGPT Stats

- ChatGPT has been started to become more popular within people throughout the years
- In graph #1, you can see the weekly usage of ChatGPT worldwide and how it increased over the years especially Nov 2023 between Feb 2025
- It can be seen in the table (graph #2) it shows a breakdown of the age groups that use ChatGPT, the young adults are using this feature to help them with their task for work (31%)
- Other group of young adults who are getting their bachelor's degree (25%) and others working to get their high school diploma (8%)

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Graph #3

Use Frequency of ChatGPT by Country



ChatGPT Stats WorldWide

- In the graph #3, you can the breakdown by Country by percentage on how much they use ChatGPT, the graph also breaks down the usage of daily, weekly, and monthly
- The highest usage for each section is the United States, Denmark and the UK, Argentina, and France have similar usage for weekly and Japan has the lowest percentage for each section
- People all over the world has started to rely on these new features on the internet to make their life easier by

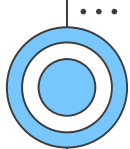
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Examples

Examples:

- I've heard and seen many people use ChatGPT, some of my fellow classmates from highschool to complete their homework and other assignments
- Now, Professors are noticing that students have began to use ChatGPT or any AI systems to help them write their code:
 - When completing coding assignments, many people rely on these applications (e.g. ChatGPT, OpenAI, Gemini, etc.)



```
...  
#include<iostream>  
#include<ctime>  
#include<cstdlib>
```

```
using namespace std;
```

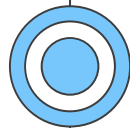
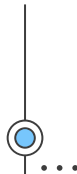
```
//this will hold the computer choose which would be randomly chosen
```

```
string GatherCompChoice(){  
    string choices[ ]={ "rock", "paper", "scissors" };  
    return choices[rand() % 3];          //this will return the random choice of the computer  
}
```

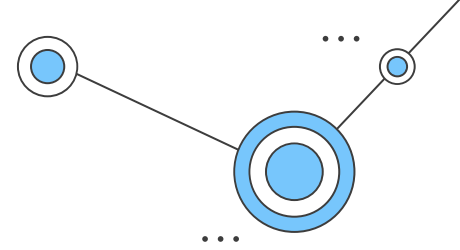
```
string Winner(string UserChoice,string CompChoice){  
    if (UserChoice == CompChoice){  
        return "It's a tie!";  
    }  
    else if ((UserChoice == "rock" && CompChoice == "scissors") || (UserChoice == "paper" && CompChoice == "rock") || (UserChoice == "scissors" &&  
CompChoice == "paper")) {  
        return "Congratulations! You win!";  
    }  
    else {  
        return "The Computer wins!";  
    }  
}
```

```
int main(){  
    string UserChoice;          ...  
    char PlayAgain;  
    srand(time(0));             //seed a random number generator
```

```
    cout << " Welcome! Let's play Rock, Paper, Scissors! " << endl;
```



Reference Page



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