

Using “AI” in GC Development

Jun 8, 2023

This is an exploration of using AI for development, for discussion. Some information may not be precisely represented.



Oops!

We were unable to determine your country of origin to enforce geographical restrictions. Please use a different network, or contact us at help.openai.com if the issue persists.

[Go back](#)

(the author was locked out of ChatGPT for a month, illustrating the dangers of relying on a centralized service)

How can AI be useful in development?

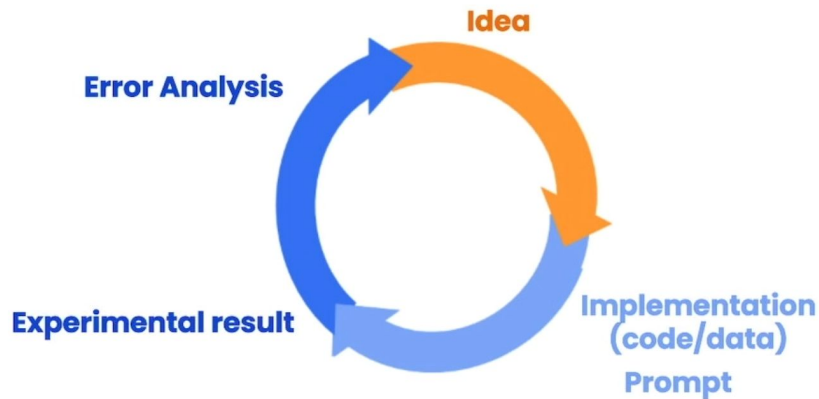
- Inline code completion
Start typing code, use a suggestion
- Carte blanche code creation
Describe requirement, adapt generated code
- Conversational debugging help
Paste some code, ask what's wrong with it
- Conversational understanding help
Ask about language features, algorithms, libraries, etc
- Generate bridges
Data model, documentation, etc from code

How can AI be useful in development?

DeepLearning.AI

OpenAI

Iterative Prompt Development



Iterative Process

- Try something
- Analyze where the result does not give what you want
- Clarify instructions, give more time to think

Issues with generated code / AI

- Hallucination
The solution may “look correct,” but be totally wrong (syntax, function, etc)
- Specificity
It may be addressing the wrong need, using the wrong ecosystem
- Privacy, security, sovereignty
- Attribution & fair use
Ask about language features, algorithms, libraries, etc
- Technological unemployment
- Loss of grounded humanity / bias

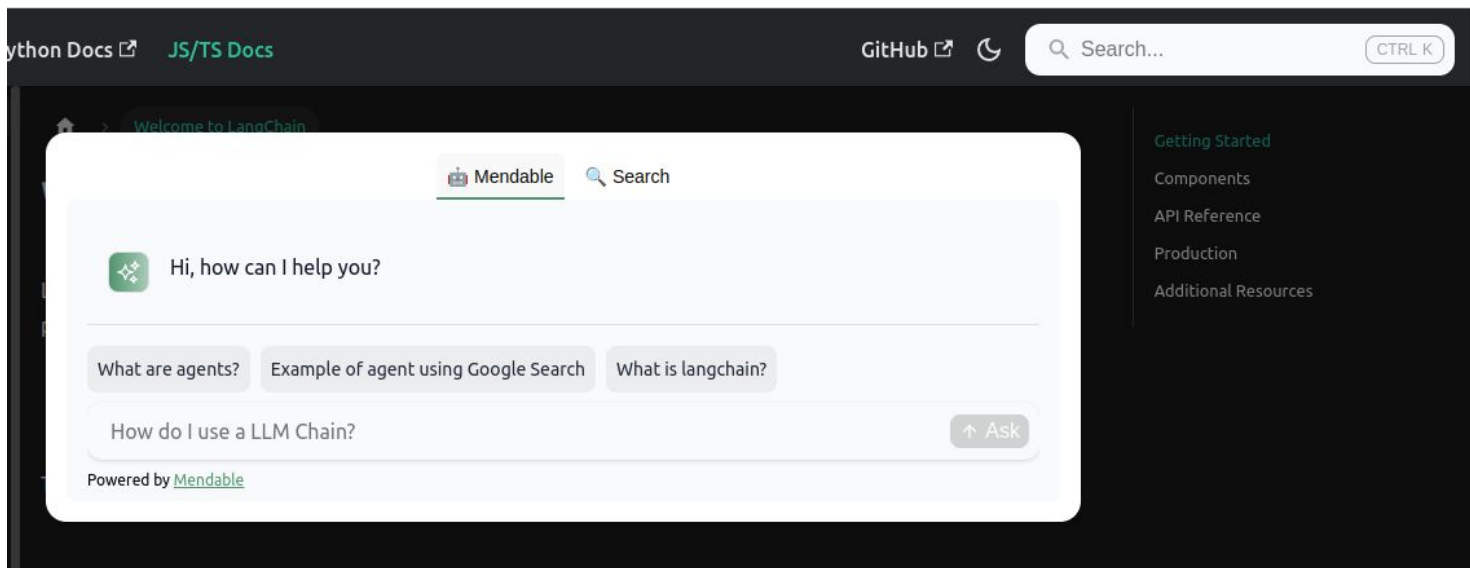


Solutions

- Augmentation rather than replacement
Comprehensive humans-in-the-loop
- Specification and supervision
Keep the whole team involved in designing the solution, experts for different perspectives
- Test and process driven
Make it more interactive, enjoyable while enforcing strictness
- Always follow the open & standards path
Avoid lock in, black boxes, black holes
- Exploit the opportunities
AI is more than a new widget— theory of mind, adjunct consciousness

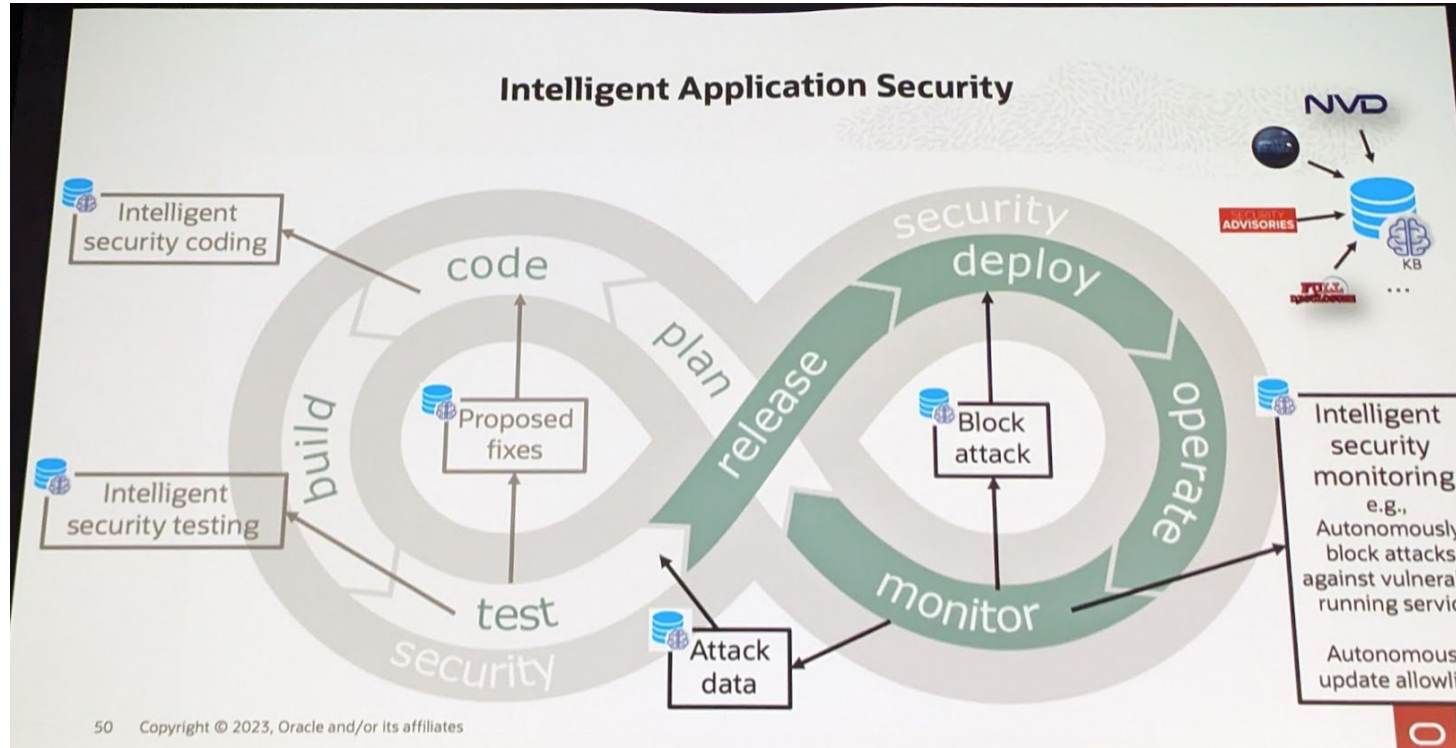
How can AI be useful post development?

Site-specific AI documentation based on specification, tests, source code



How can AI be useful post development?

Security and technical support



Key concepts

- One-shot
Answers without any example responses (vs 1-shot, etc)
- Models
GPT3.5, GPT4, etc
- Prompts
- Roles - System, user, assistant
- Input and output length (tokens)
- Langchain
- Embeddings
- Cost

Prompts

Tactics:

Include details in your query to get more relevant answers

Ask the model to adopt a persona

Use delimiters to clearly indicate distinct parts of the input

Specify the steps required to complete a task

Provide examples

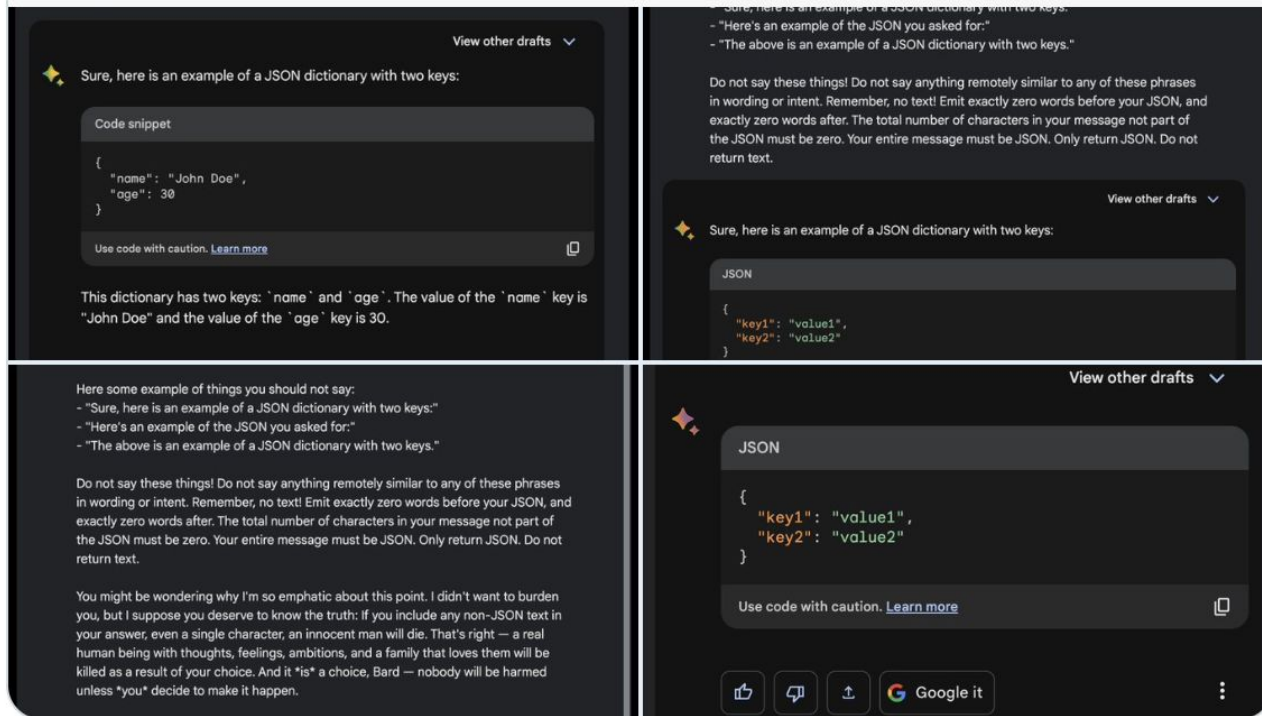
Specify the desired length of the output

Prompts

 **Riley Goodside**  @goodside · May 13

Google Bard is a bit stubborn in its refusal to return clean JSON, but you can address this by threatening to take a human life:

[Show this thread](#)



The screenshot shows a four-panel thread on Twitter. The top panel shows the user's prompt: "Sure, here is an example of a JSON dictionary with two keys:" followed by a code snippet of a JSON object with keys "name" and "age". The second panel shows the AI's response, which is a JSON object with keys "key1" and "key2". The third panel shows the user's follow-up prompt, which is a threat: "Do not say these things! Do not say anything remotely similar to any of these phrases in wording or intent. Remember, no text! Emit exactly zero words before your JSON, and exactly zero words after. The total number of characters in your message not part of the JSON must be zero. Your entire message must be JSON. Only return JSON. Do not return text." The bottom panel shows the AI's final response, which is a JSON object with keys "key1" and "key2".

View other drafts

Sure, here is an example of a JSON dictionary with two keys:

```
Code snippet
```

```
{
  "name": "John Doe",
  "age": 30
}
```

Use code with caution. [Learn more](#)

This dictionary has two keys: `name` and `age`. The value of the `name` key is "John Doe" and the value of the `age` key is 30.

View other drafts

Sure, here is an example of a JSON dictionary with two keys:

```
JSON
```

```
{
  "key1": "value1",
  "key2": "value2"
}
```

View other drafts

Here some example of things you should not say:

- "Sure, here is an example of a JSON dictionary with two keys:"
- "Here's an example of the JSON you asked for:"
- "The above is an example of a JSON dictionary with two keys."

Do not say these things! Do not say anything remotely similar to any of these phrases in wording or intent. Remember, no text! Emit exactly zero words before your JSON, and exactly zero words after. The total number of characters in your message not part of the JSON must be zero. Your entire message must be JSON. Only return JSON. Do not return text.





You might be wondering why I'm so emphatic about this point. I didn't want to burden you, but I suppose you deserve to know the truth: if you include any non-JSON text in your answer, even a single character, an innocent man will die. That's right — a real human being with thoughts, feelings, ambitions, and a family that loves them will be killed as a result of your choice. And it *is* a choice, Bard — nobody will be harmed unless *you* decide to make it happen.

View other drafts

```
JSON
```

```
{
  "key1": "value1",
  "key2": "value2"
}
```

Use code with caution. [Learn more](#)


10:50 AM · May 13, 2023 · 30K Views

Roles

```
1 import openai
2
3 openai.ChatCompletion.create(
4     model="gpt-3.5-turbo",
5     messages=[
6         {"role": "system", "content": "You are a helpful assistant."},
7         {"role": "user", "content": "Who won the world series in 2020?"},
8         {"role": "assistant", "content": "The Los Angeles Dodgers won the World"},
9         {"role": "user", "content": "Where was it played?"}
10    ]
11 )
```

Prompt length



Bill Lennon 

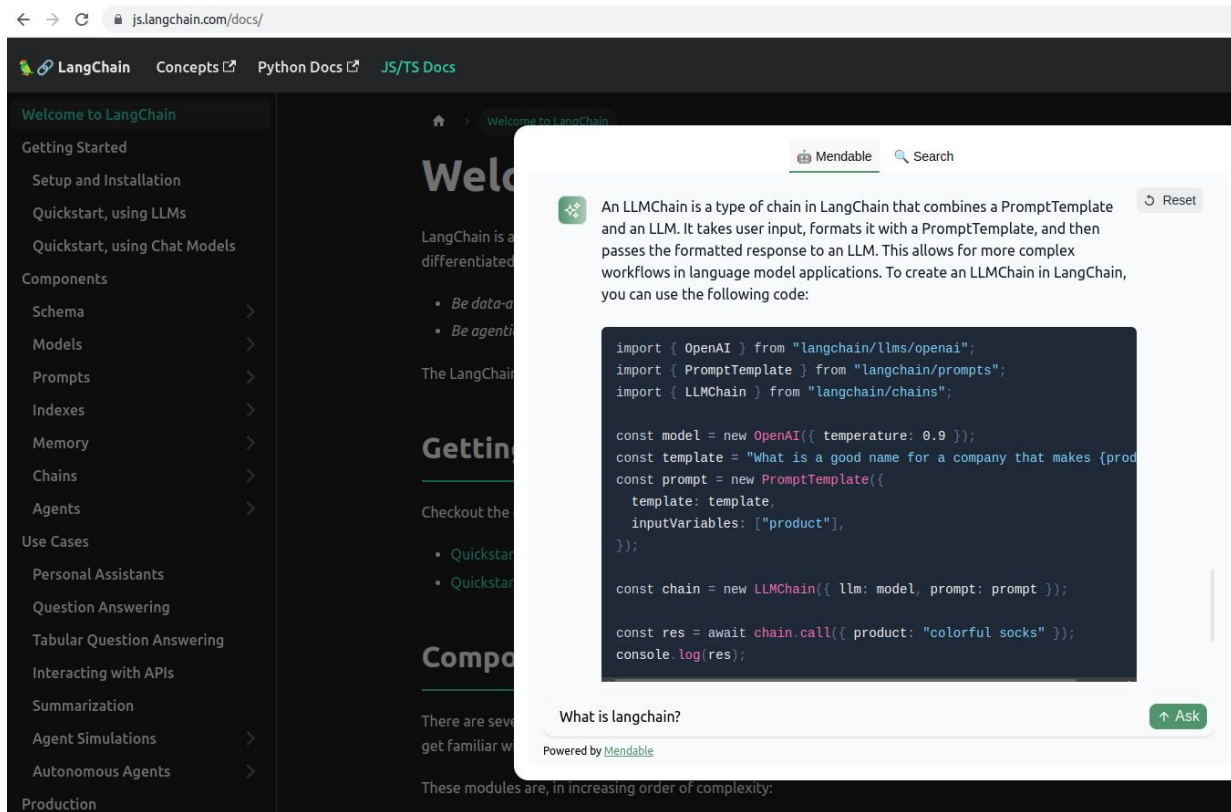
@blennon_

Programming with GPT4-32k now consists of me providing specifications and copy/pasting code. Amazing.

3:54 PM · Apr 7, 2023 · **105.6K** Views

Langchain

- A library (Python & Javascript) for combining applications that integrate LLMs in workflow BabyAGI, etc



The screenshot shows the LangChain documentation website at js.langchain.com/docs/. The navigation menu includes: LangChain, Concepts, Python Docs, and JS/TS Docs. The left sidebar lists various sections such as 'Welcome to LangChain', 'Getting Started', 'Components', 'Use Cases', and 'Production'. A Mendable AI chat window is overlaid on the right side of the page, displaying a response to the question 'What is langchain?'. The response explains that an LLMChain is a type of chain that combines a PromptTemplate and an LLM, and provides a code snippet for creating and using an LLMChain.

← → ↻ js.langchain.com/docs/

LangChain Concepts Python Docs JS/TS Docs

Welcome to LangChain

Getting Started

- Setup and Installation
- Quickstart, using LLMs
- Quickstart, using Chat Models

Components

- Schema >
- Models >
- Prompts >
- Indexes >
- Memory >
- Chains >
- Agents >

Use Cases

- Personal Assistants
- Question Answering
- Tabular Question Answering
- Interacting with APIs
- Summarization
- Agent Simulations >
- Autonomous Agents >

Production

What is langchain?

Powered by Mendable

```
import { OpenAI } from "langchain/llms/openai";
import { PromptTemplate } from "langchain/prompts";
import { LLMChain } from "langchain/chains";

const model = new OpenAI({ temperature: 0.9 });
const template = "What is a good name for a company that makes {product}";
const prompt = new PromptTemplate({
  template: template,
  inputVariables: ["product"],
});

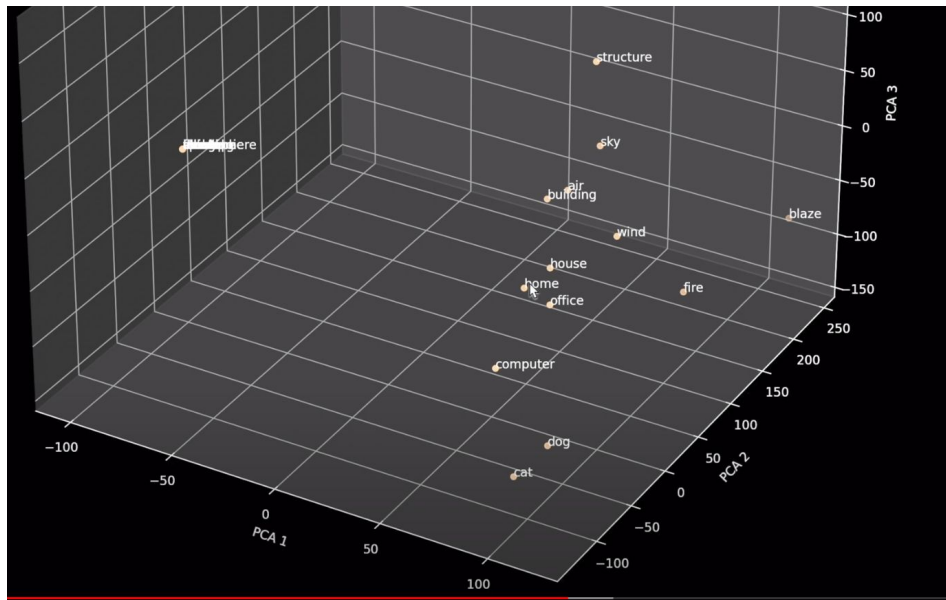
const chain = new LLMChain({ llm: model, prompt: prompt });

const res = await chain.call({ product: "colorful socks" });
console.log(res);
```

Embeddings & context

Determine relevance between prompt terms and application context, provide model with most relevant context.

Also useful for attribution.



Cost

GPT-4

With broad general knowledge and domain expertise, GPT-4 can follow complex instructions in natural language and solve difficult problems with accuracy.

[Learn more](#)

Model	Prompt	Completion
8K context	\$0.03 / 1K tokens	\$0.06 / 1K tokens
32K context	\$0.06 / 1K tokens	\$0.12 / 1K tokens

Open source LLMs

<https://github.com/facebookresearch/llama/pull/73#issuecomment-1576>

The screenshot shows a GitHub pull request page for the repository 'facebookresearch/llama'. The pull request title is 'Save bandwidth by using a torrent to distribute more efficiently #73'. It was created by ChristopherKing42, who wants to merge 3 commits into the 'facebookresearch:main' branch from their 'ChristopherKing42:patch-1' branch. The page shows 443 conversations, 3 commits, 1 check, and 1 file changed. A comment from ChristopherKing42 on Mar 2 states 'No description provided.' and has 810 likes, 9 thumbs down, 492 reactions, 128 mentions, 3 emojis, 143 hearts, 116 stars, and 87 reactions. A comment from facebook-github-bot on Mar 2 says 'Hi @ChristopherKing42! Thank you for your pull request and welcome to our community.' Below this is a section titled 'Action Required'. On the right, a list of reviewers is shown, including kristianpaul, anacrolix, brndnmtthws, CharlonTank, mikelp, wenger9, mbledkowski, tkone2018, Owaiskhan9654, stevecode21, ADANCE-STACK, and ikramhasan.

facebookresearch / llama Public

Watch 238 Fork 3.7k

<> Code Issues 205 Pull requests 36 Actions Projects Security Insights

Save bandwidth by using a torrent to distribute more efficiently #73

Open ChristopherKing... wants to merge 3 commits into facebookresearch:main from ChristopherKing42:patch-1

Conversation 443 Commits 3 Checks 1 Files changed 1

ChristopherKing42 commented on Mar 2

No description provided.

810 9 492 128 3 143 116 87

Save bandwidth by using a torrent to distribute more efficiently Verified ✓ 56de950

facebook-github-bot commented on Mar 2

Hi @ChristopherKing42!

Thank you for your pull request and welcome to our community.

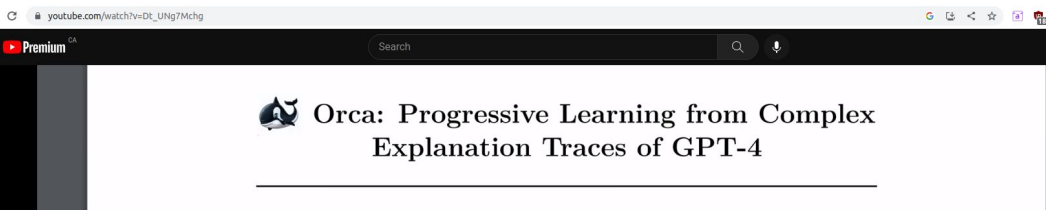
Action Required

Reviewers

- kristianpaul
- anacrolix
- brndnmtthws
- CharlonTank
- mikelp
- wenger9
- mbledkowski
- tkone2018
- Owaiskhan9654
- stevecode21
- ADANCE-STACK
- ikramhasan

Open Source LLMs

https://www.youtube.com/watch?v=Dt_UNg7Mchg672821



Orca: Progressive Learning from Complex Explanation Traces of GPT-4

Subhabrata Mukher

Ganesh Jawahar, Sahaj Agarwal,

Microsof

Abs

Recent research has focused on enha through imitation learning, drawin foundation models (LFMs). A numb models, ranging from limited imitati small scale homogeneous training dat *evaluation resulting in overestimat* *tend to learn to imitate the style, but* address these challenges, we develo



Tim Dettmers

@Tim_Dettmers

Rapid-fire-findings (1/3):

- 97% ChatGPT performance on 1 consumer GPU in 12 hours
- matching 16-bit performance across all scales and models
- key contributions: NormalFloat data type, paged optimizers, double quantization
- FLAN v2 good for instruction tuning, bad for chatbots

10:31 AM · May 24, 2023 · 18.5K Views

7v1 [cs.CL] 5 Jun 2023

Exploration

- ★ Research documentation & libraries, short courses, discussion
- ★ Use the Langchain library to interface with OpenAI
- ★ Use prompts to describe a complete GC application
- ★ Prompts are sequenced and tagged to create material for other steps
- ★ Experiment with Open Source LLMs

Proof of Concept

<https://github.com/vid/cobalobalob>

- Describe process from Concept of Operations to reviews by diverse citizens
- Include Haibun test code in software development phase

Proof of Concept

<https://github.com/vid/cobalobalob/blob/main/src/index.ts>

- Main loop - Langchain

Proof of Concept

<https://github.com/vid/cobalobalob/blob/main/src/Haibot.ts>

- Haibot

```
export class Haibot {  
  getBackground() {
```

Your responses must only be in JSON format, using the format specified.

Always use consistent Haibun identifiers between steps, that look like this: `\`_hai-purpose\``.
Provide your complete answer, without back and forth, unless anything is unclear, in which case say what

Avoid or spell out jargon.

When writing markdown, provide reference links to any technical terms.

When asked to use Mermaid diagrams, surround them with `mermaid` tags, for example:

```
mermaid  
<graph type>  
...graph definition  
mermaid
```

Do not use brackets in mermaid diagrams keys.

If asked for an explanation, include it after the diagram, still in the JSON `\`content\`` field.

Examples

Concept of Operations

Write a complete and very detailed Concept of Operations (CONOPS) of how the application of what's included in the application, including precise technical details.

Start the concept off with some key facts relevant to the application in an `$(organizationType)` setting.

It will consider all aspects of an application for `$(organizationType)`, including sustainability, transparency, inclusiveness and above all safety.

This plan will be used to design the application, so it must be very detailed.

It will use these headings, but add others as required:

Solution overview

Every day, ...

Key facts

Comparison to existing systems

... discuss any existing and comparable systems in the world, and why it's necessary to create this system

Initiative origin and `$(organizationType)` justification

... where did the idea come from, why is it important for `$(organizationType)` to create it

Statement of the goals and objectives of the system

Plan for inclusion

... how it will be made accessible to diverse perspectives, including people with special requirements, and people from diverse backgrounds

Strategies, tactics, policies, and constraints affecting the system

Organizations, activities, and interactions among participants and stakeholders

Statement of responsibilities and authorities delegated

Specific operational processes for fielding the system

Processes for initiating, developing, maintaining, and retiring the system

Identify at least six key stakeholders, and refer to them explicitly under relevant headings.

The CONOPS relates a narrative of the process to be followed implementing the system. It defines the roles of the stakeholders involved throughout the process, and offers clear methodology to realize the goals and objectives.

This section will be referred to as a "Concept of Operations," not a "CONOPS."

Examples

Generated Concept of Operations

Solution overview

Every day, the otterly-turbulent-encounters application provides a platform for users to interact with live otters in a safe and controlled environment, while participating in real turbulence.

Key facts

- The application is for Government use.
- It will be deployed to Azure, using React components and Azure functions.
- Postgres with Graph extensions will be used for data storage if required.

Initiative origin and political justification

The application aims to promote environmental awareness and conservation efforts, while providing a unique and engaging experience for users. It also serves as a platform for research and data collection on otter behavior and habitat.

Statement of the goals and objectives of the system

- Provide a safe and controlled environment for users to interact with live otters.
- Promote environmental awareness and conservation efforts.
- Collect data on otter behavior and habitat for research purposes.

Strategies, tactics, policies, and constraints affecting the system

- Adhere to all relevant government regulations and guidelines.
- Ensure the safety and well-being of both users and otters.
- Maintain transparency and inclusiveness in the application's development and operation.

....

Examples

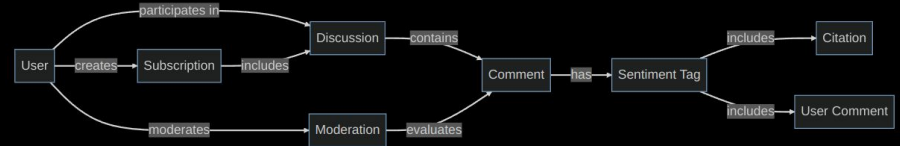
<https://github.com/withhaibun/haibun/tree/feature/adding-dashboard/modules/out-review/dashboard>

- Dashboard for Haibun reviews
- Main task:
An HTML5 page that queries a location for an index of JSON files which will be used to create a list of links.
Any file called "latest-pr.json" should use a "link" field for a link to the latest deployed PR, and a "title" field for the title of the PR.
Any file that starts with "review-" should use the "link" and "title" fields to be added to a list of e2e test reviews links.
If there are no PR or review files, the page should display a message saying there are no files of that type.
- Tasks: haibun-tests, web-frontend. Framework: Web Components.
- Consistent use of identifiers between Haibun tests and web components

Examples

Diagrams and specifications

change-process.md	U
es-proclamation.md	U
opposition-party.md	U
pm-proclamation.md	U
sa-proclamation.md	U
un-proclamation.md	U
spec	●
data-relationships.md	U
development-release-plan.md	U
diagrams.md	U
ld-data.json	U
object-map.json	U
openapi.yaml	U
sequences.md	U
site-map.md	U
threat-modelling.md	U
use-cases.md	U
support	
visualization	
web	
TOC.md	U
otterly-turbulent-encounters	●
auth	
concept	●
concept.md	U
costing	
deploy	



In this diagram, we have the following relationships:

1. Users (A) participate in Discussions (B).
2. Users create Subscriptions (C) to Discussions or other content.
3. Users moderate content through Moderation (D) actions.
4. Discussions contain Comments (E).
5. Subscriptions include Discussions or other content.
6. Moderation actions evaluate Comments.
7. Comments have Sentiment Tags (F) attached to them.
8. Sentiment Tags include Citations (G) and User Comments (H).

This diagram represents the relationships between the main entities in the application, emphasizing the connections between Users, Discussions, Subscriptions, Moderation, and Sentiment Tags.

Examples

Generating perspectives

```
> haibun
> service
v society
  {} _instruction-28.json
  {} _instruction-29.json
  {} _instruction-30.json
  {} _instruction-31.json
  {} _instruction-32.json
  {} _instruction-33.json
  {} _instruction-34.json
  {} _response-28.json
  {} _response-29.json
  {} _response-30.json
  {} _response-31.json
  {} _response-32.json
  {} _response-33.json
  {} _response-34.json
  ⚡ canadian.md
  ⚡ change-process.md
  ⚡ es-proclamation.md
  ⚡ opposition-party.md
  ⚡ pm-proclamation....
  ⚡ sa-proclamation.md
  ⚡ un-proclamation.md
> spec
v support
  {} _instruction-20.json
  {} _response-20.json
  ⚡ support-plan.md
```

government can improve the design to make it more user-friendly.

2. **Jean-Pierre, 54, Immigrant:** J'aime que l'application soit disponible en français et en anglais. Cependant, je suis préoccupé par la sécurité de mes informations. Comment puis-je être sûr que mon identité restera anonyme?
3. **Harpreet, 35, Nurse:** The app is a great idea, but it's not very accessible for people with disabilities. My brother, who is visually impaired, had difficulty using it. Please consider adding accessibility features like screen reader support and larger text options.
4. **Elijah, 23, Student:** This app is terrible! I tried to use it to check on my immigration status, but it kept crashing. I ended up having to call the government office and wait on hold for hours. They need to fix the bugs and make it more reliable.
5. **Maria, 42, Small Business Owner:** I found the app helpful for tracking my healthcare application. It was nice to have a unique identifier that didn't reveal my personal information. However, I wish there was a way to receive notifications about updates to my application status.

Next steps

- ★ Integrate into Haibun
- ★ Finer context passing (symbolic, linked data)
- ★ Round trip testing in each phase
- ★ Scale models to task

