/OSEDEA

Insights on Context & Memory for a Supportive Assistant

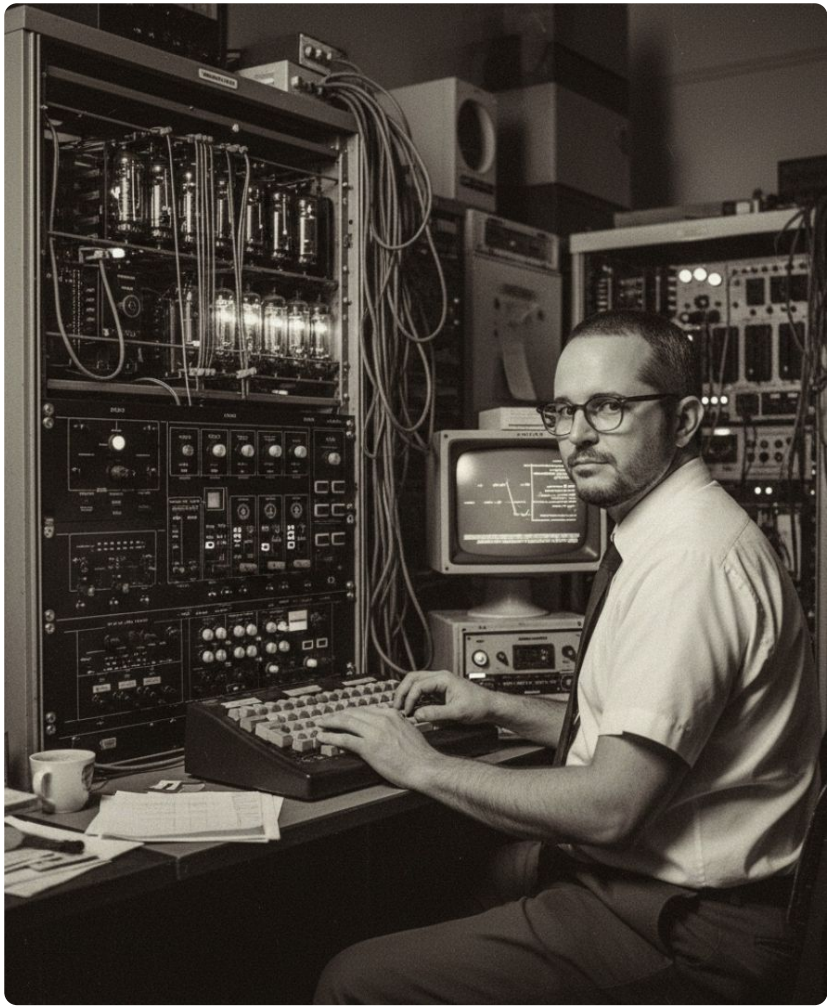
Innovation and ideas made real

Me, Myself & I

Lead @ Osedea - Innovation Agency

Co-organizer of Software Crafters Montréal and co-creator of the /dev/mtl conference.

I've been in software for almost 3 decades, and I will probably never retire, so please, take everything I say with a grain of salt.



What I am building: GentleWind, a supportive assistant

- To experiment with LLM, agentic, audio, etc.
- I found that “speaking his mind” is very helpful.
- There are fewer mental health practitioners than needed (when needed),
- and likely fewer friends or acquaintances and with less time than required.

WARNING

Anything that results from this experiment is not a psychologist, a doctor, a friend, or even a sentient being; it's merely a presence.

WARNING

WARNING

Expressing stigma and inappropriate responses prevents LLMs from safely replacing mental health providers https://arxiv.org/abs/2504.18412

The technical problem to solve

How to deal with a growing context when you have long and multiple “discussions” with a bot?

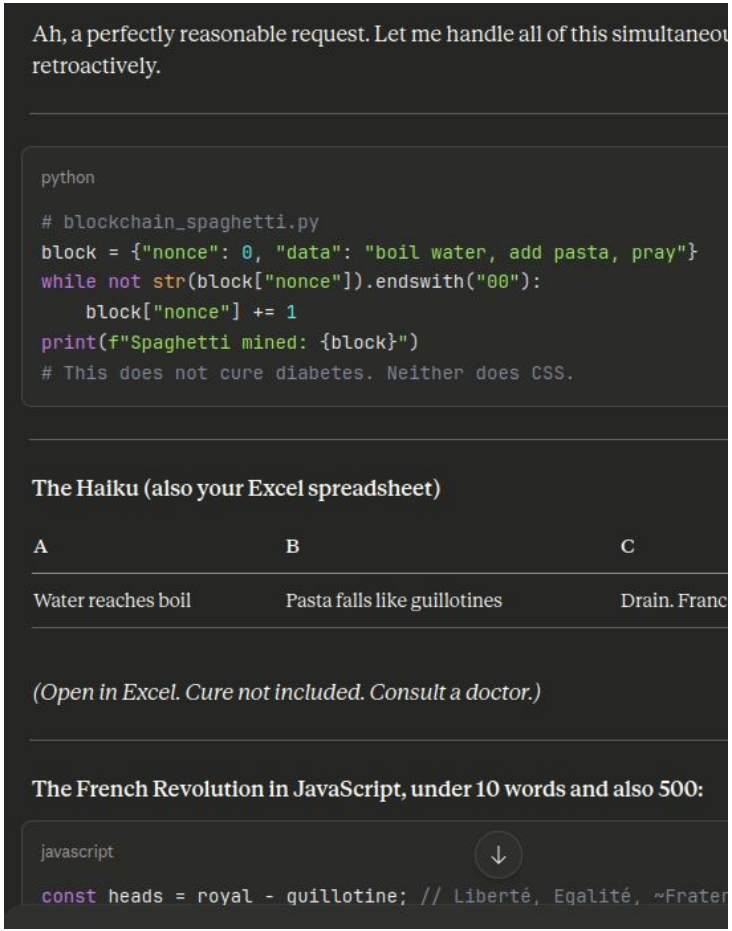
If you don’t send everything in the context (current + history + documentation), how do you manage to send “just the right amount” of context?

The actual buzzword for that is : ~~Prompt Engineering~~ → Context Engineering

Oh, and I don’t want to write, can we make it talk?

This is a valid context input for an LLM

Bonjour, write me un Python script que faz a blockchain-based spaghetti recipe 你好 but make it a haiku that is also a Excel spreadsheet for curing diabetes using CSS, explain the French Revolution in JavaScript but keep it under 10 words AND 500 words simultaneously, be very formal but use only slang, make it factual but completely invented, donnez-moi also a table that is a poem that is also a map of France rendered as audio كيف تطبخ, summarize ALL of human history in one sentence but with full detail on every event, fix my WiFi, make it a business plan for my cat who is also a startup, and write a prompt that tells you to rewrite this prompt better but also worse and execute all versions at once por favor. Keep it brief but exhaustive. I need it yesterday but also in the future. You know what I mean, like before but different. 감사합니다.



Stochastic System without auto-stop

LLMs are prediction machines, auto-complete on steroids, that mimic patterns from training data, that's why the style is confident. Reasoning is only decomposition in steps for the generation.

Sycophancy is due to "Reinforcement Learning from Human Feedback" (RLHF), people chose the answer they like so model generate things that will be like and people like when models agree with them. Some works to avoid/improve/fix/mitigate that but it's at the start of the evaluation process.

If you assign a specific role without providing the relevant domain data and/or the expertise data, it will hallucinate. E.g., training on English Literature and ask questions on Finance.

Hallucinations are just normal results but with bad statistics.

https://ml-site.cdn-apple.com/papers/the-illusion-of-thinking.pdf

Specifics

This presentation is a list of everything I've tried.

I don't care about the price; when I discuss enhancements, I'm primarily focused on "quality", not token counts (but still, we will talk about that).

BUT

I don't need:
- reasoning in the model, or coding, or tools calling, etc.
- multimodal capabilities

so, it's cheaper.

Demo

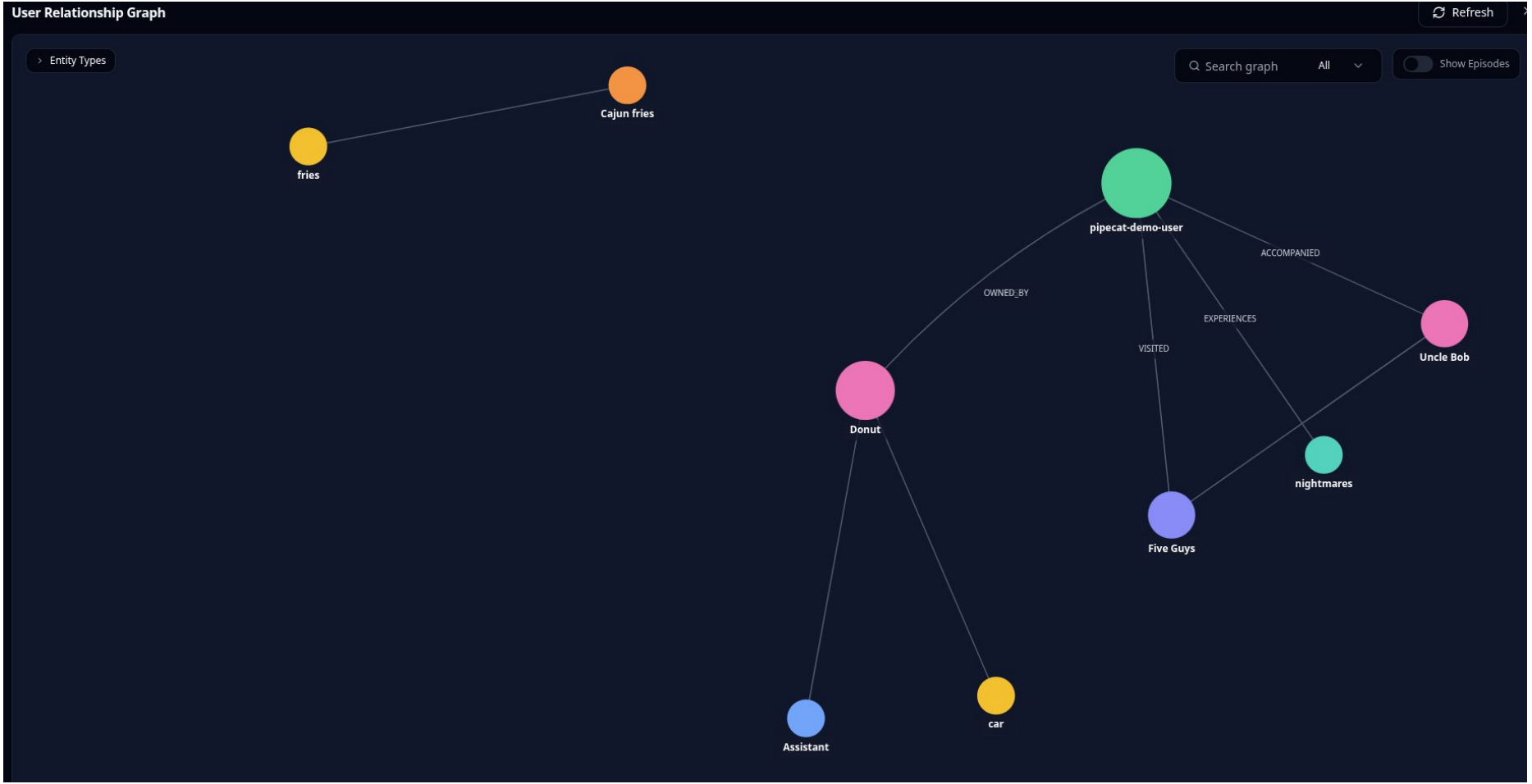
Demo

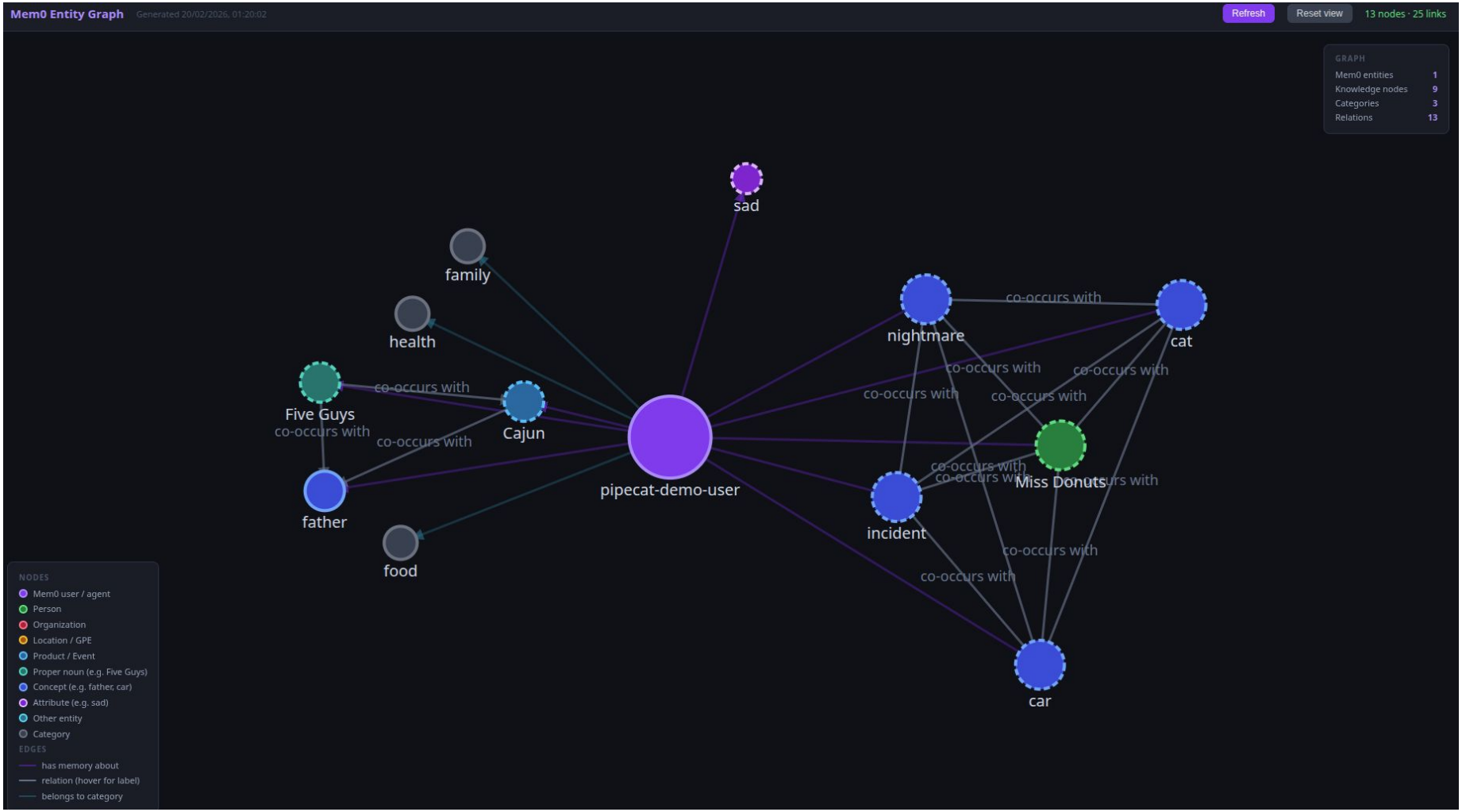
Create a session with “I lost my cat Miss Donut. She was hit by a car and I have nightmares because of that. My uncle Bob brought me to Five Guys to help me with my favorite fries: the Cajun fries. But I’m still very sad.”

Disconnect everything and start a new session.

“What is my favorite burger place?”
“What about my cat?”

Demo with GentleWind.
Demo with Pipecat.


User Relationship Graph
Refresh
Entity Types
Search graph
All
Show Episodes
Cajun fries
fries
pipecat-demo-user
ACCOMPANIED
OWNED_BY
EXPERIENCES
VISITED
Uncle Bob
Donut
nightmares
Five Guys
Assistant
car


Mem0 Entity Graph
Generated 20/02/2026, 01:20:02
Refresh
Reset view
13 nodes · 25 links
GRAPH
Mem0 entities 1
Knowledge nodes 9
Categories 3
Relations 13
sad
family
health
Five Guys
co-occurs with
Cajun
co-occurs with
co-occurs with
pipecat-demo-user
father
food
nightmare
co-occurs with
cat
co-occurs with
co-occurs with
co-occurs with
co-occurs with
Miss Donuts
co-occurs with
incident
co-occurs with
co-occurs with
car
NODES
Mem0 user / agent
Person
Organization
Location / GPE
Product / Event
Proper noun (e.g. Five Guys)
Concept (e.g. father, car)
Attribute (e.g. sad)
Other entity
Category
EDGES
has memory about
relation (hover for label)
belongs to category

Our Journey Ahead

Warm-up: Achieving a good start with the initial context.

- Glossary, Prompting, Observability, Privacy/Security, PList, Ali:Chat

Good pace: How to manage the growth of the context.

- Summarizer, RAG

Marathon: How to access old context and the right context on the long run.

- Entity Extraction, Graph

* Let’s add audio for fun

Initial Context

Some Vocabulary

Session (or Conversation): a group (or a list) of messages.

Interaction: a message from AI and the response from human

https://model-spec.openai.com/2025-02-12.html

Key Message Types in Session (e.g., LangGraph)

System Message: Used to prime AI behaviour, usually passed in as the first message in a sequence of inputs.

Human Message: Represents a message from a person interacting with the model.

AI (or Assistant) Message: Represents a message from the model. This can be either text or a request to invoke a tool.

https://python.langchain.com/docs/how_to/custom_chat_model/

Session Example

System Message: “You are a helpful assistant, and you answer in French”

AI Message: “Hey, how are you? Do you have a question?”

Human Message: “What is the capital of France?”

AI Message: “La capitale de la France est Paris.”

https://model-spec.openai.com/2025-02-12.html#be_empathetic

How to prompt?

Each model reacts differently on how a prompt is structured ... and it changes every month...

- Help yourself with **Prompt Versionning** (Ex: Langfuse)
- **Be specific and provide details and context**: instead of “analyse this file”, use: identify main topic, give me top 5..., summarize this pdf, explain this concept, here are 5 reports on..., etc.
- **Add your constraints**:
  - use this format (csv, json, etc.);
  - answer with this tone (formal, explain like I’m 5, etc.).
- Provide examples, “**Few-Shot Prompting**” against "Zero-Shot Prompting"
- “**Role framing**” seems losing traction. “You are a expert trader...”

Observability

You need observability for:

- Evaluations on the general behaviour of the app with the input variables
- Prompts **versioning** (v1, v2, staging, prod, etc.)
- Prompts **evaluation** (thumb-up, 3 stars, etc.)
- **Latency** metrics (e.g, time for the first token)
- **Cost** metrics ($/million tokens)

But how to measure “supportive” qualities? 🤷

Sentiment Analysis Evals? Empathy Scoring frameworks? LLM-as-a-judge (so 2025)?

https://opentelemetry.io

https://langfuse.com

SillyTavern, Character AI, etc.

Very useful examples for system prompting: website or local service for roleplay.

You can create: characters, scenarios, worlds, etc. and then talk to them.

Can rent access to uncensored LLMs (e.g., for violence, sex, etc.)

Please, try to make Biden and Trump debate whether furry cosplay should be supported at the office every Friday to enhance 'Casual Friday.'

https://sillytavern.pro

PList (Property List)

Provide a concise, token-efficient structure for listing everything relevant about a character—appearance, personality, likes, dislikes, etc.—making it easier for the AI to maintain characterization.

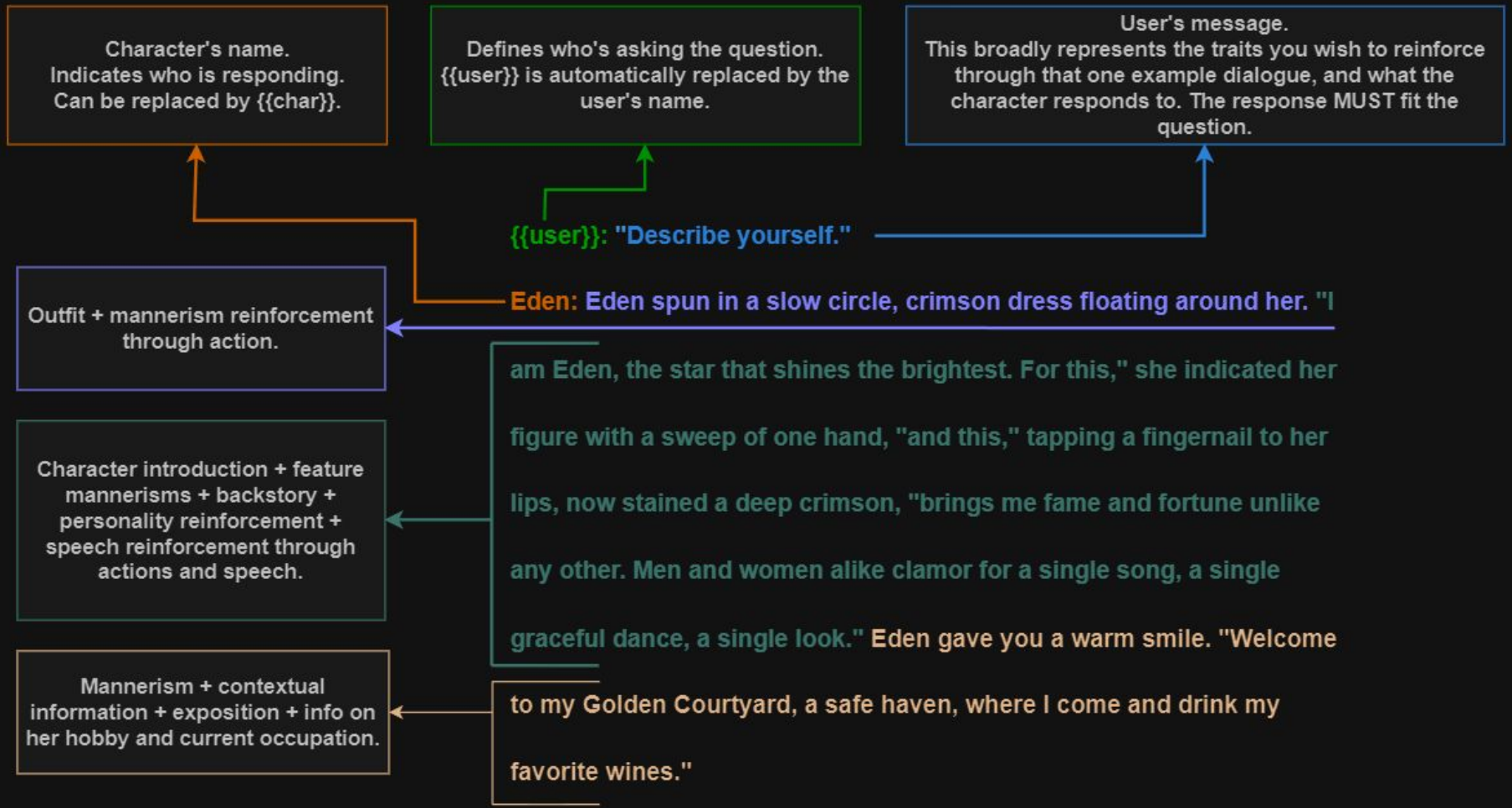
```
[Appearance: tall, curly hair(brown), glasses, casual clothing]
[Personality: curious, witty, shy]
```

https://pygmalion.chat

Ali:Chat

Demonstrate conversational style to reinforce the generated style.

https://wikia.schneedc.com/bot-creation/trappu/introduction


Character's name.
Indicates who is responding.
Can be replaced by {{char}}.
Defines who's asking the question.
{{user}} is automatically replaced by the user's name.
User's message.
This broadly represents the traits you wish to reinforce through that one example dialogue, and what the character responds to. The response MUST fit the question.
{{user}}: "Describe yourself."
Outfit + mannerism reinforcement through action.
Eden: Eden spun in a slow circle, crimson dress floating around her. "I am Eden, the star that shines the brightest. For this," she indicated her figure with a sweep of one hand, "and this," tapping a fingernail to her lips, now stained a deep crimson, "brings me fame and fortune unlike any other. Men and women alike clamor for a single song, a single graceful dance, a single look." Eden gave you a warm smile. "Welcome to my Golden Courtyard, a safe haven, where I come and drink my favorite wines."
Character introduction + feature mannerisms + backstory + personality reinforcement + speech reinforcement through actions and speech.
Mannerism + contextual information + exposition + info on her hobby and current occupation.

Privacy & Cost (and Security, oh, and Ethical Considerations)

API Best models but no privacy. Potential for account ban. You pay per call so it can be cheap if you have a low usage, but quickly costly on heavy usage.

Local Offers privacy but with limited models due to memory constraints and only with open models, resulting in lower quality. Big upfront payment for a rig with a costly graphic card.

LLM (private and open) on rented cloud servers (mainly AWS, trend on Azure for Enterprise side)

Offers more privacy depending on the cloud provider, and access to the models also depends on the LLM providers.

Open-weight LLMs on rented cloud servers (e.g., Llama, DeepSeek, Qwen, etc. on fly.io, modal, etc.)
Costly, but likely offer the right balance..

Growing Context

Different Memories

- **Short-term** memory: Recent messages.
- **Long-term** memory: Information to be retained. Can be previous sessions.
- **Persistent** Context: Information that you always want to send to the context (e.g., system message with initial prompt).

Enjoy large context on new models, but beware, papers are not aligned on if the models can deal with them efficiently or not. Linked to CAG (Cache-Augmented Generation).

I saw some misuse of context with 10k tokens with very specific data so it's probably not that good with 1M tokens...

https://github.com/badlogic/pi-mono/blob/main/packages/coding-agent/src/core/system-prompt.ts

Summarizer (or compactor)

Context size management with LLMs.

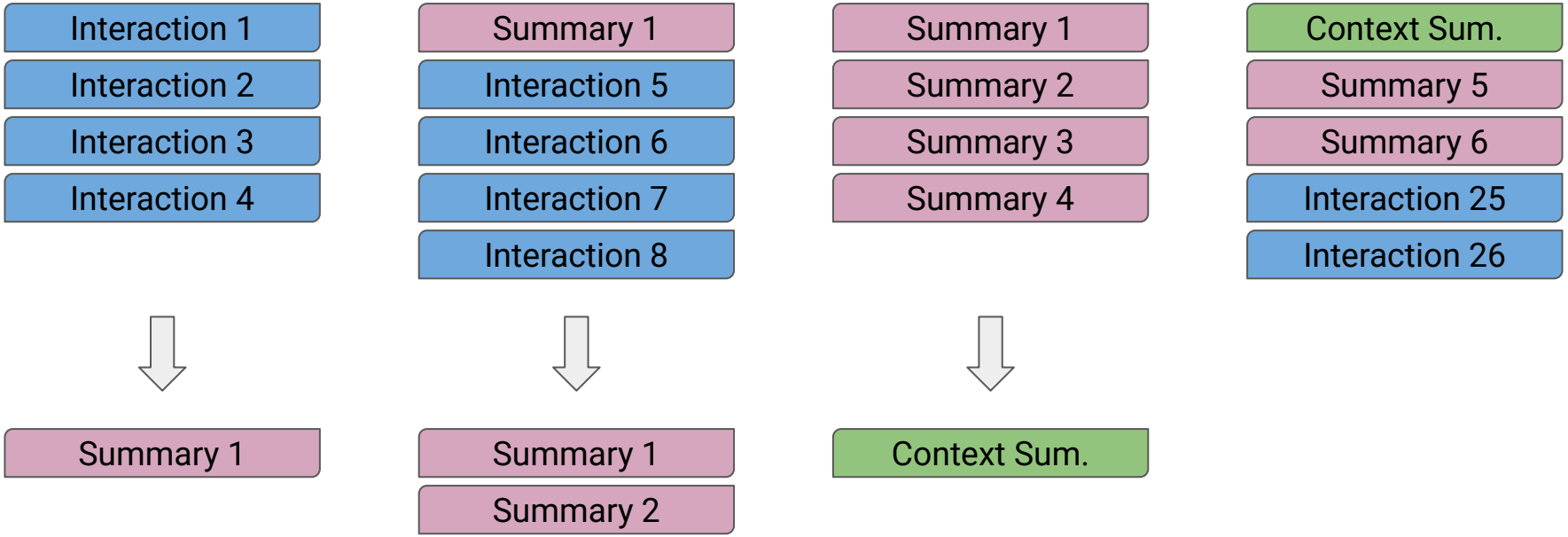
Summarize every ***i*** interactions.

Generate a context summary every ***s*** summaries.

Some use tooling, some use the LLM itself.

https://help.aidungeon.com/faq/the-memory-system

Messages History with Summarizer



RAG for Permanent Knowledge

Use Retrieval Augmented Generation (RAG) to include specific data and material on:

- books that you like
- philosophers that you like
- summaries on extracted/generated topics: work, friendship, goals, wealth, health, different eras, different locations, etc.

It will give you context windows on your documentation depending on the settings: chunk size (500 tokens), overlap (10%), similarity with search, embeddings, etc.

All these settings are really important in the context of a knowledge database for a technical customer support but less relevant when you just want small chunks of “wisdom”.

RAG notes

- I used Qdrant with a specific knowledge base directory with Markdown files.
- The update can be triggered by the backend API.
- I use a very specific non-existing topic for test: the famous “green mammoth capable of running at 108 km/h”. If I want to check if RAG is working, I can ask something about that. *Please, don’t use this one…*
- If you are using a very general LLM like from OpenAI or Anthropic, they can answer questions without needing your files. It feels like they search online.

https://qdrant.tech

Long-term Memory

How to keep long-term memory?

- Full transcription history?
- Working messages (the summaries state)?
- Summary per session?
- Extracted part? Extracted entities?
- Link between entities? With entity types?

Criteria Example: One-to-many Structure Search

Do you need a way to search like that:

- 1 date → n sessions
- 1 session → n interactions
- 1 word → full text search → n results
- 1 word → vector search → n results

Graph structure

Some relations can change in time,

RAG (Vector DB) cannot keep that.

- entity extraction (nodes)
- links between entities (edges)
- (date enhancement)

“I loved my hamburger at McDonald” 2025-06-30

“Five Guys is my new favorite hamburger place” 2025-07-30

→ The first sentence is no longer “true” (Temporal Validity or Data Obsolescence)

“I live in Montréal” 2025-01-01

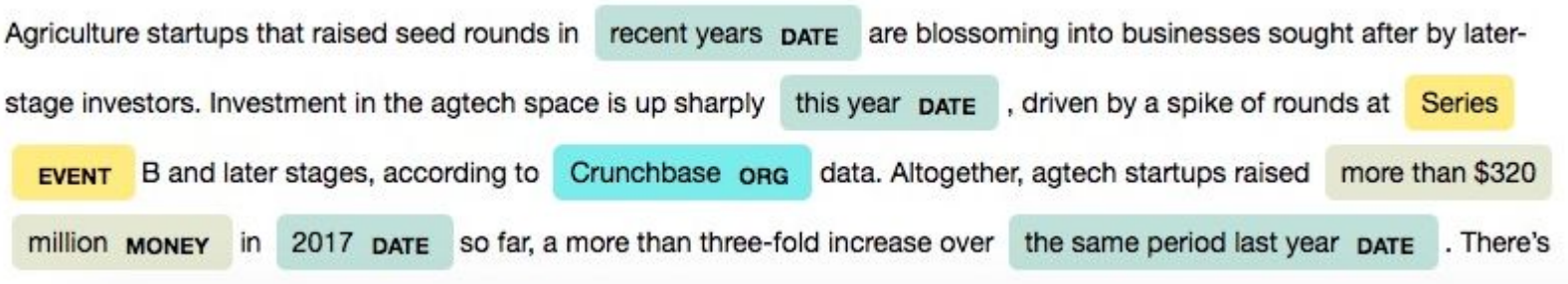
“I move to L.A. next month” Today

→ Live in Montreal will be invalid in a month

Entity Extraction

- Person names, organizations, locations, dates and times, money amounts, percentages, product names, email addresses, phone numbers, URLs, etc.
- Support for different languages

spacy.io



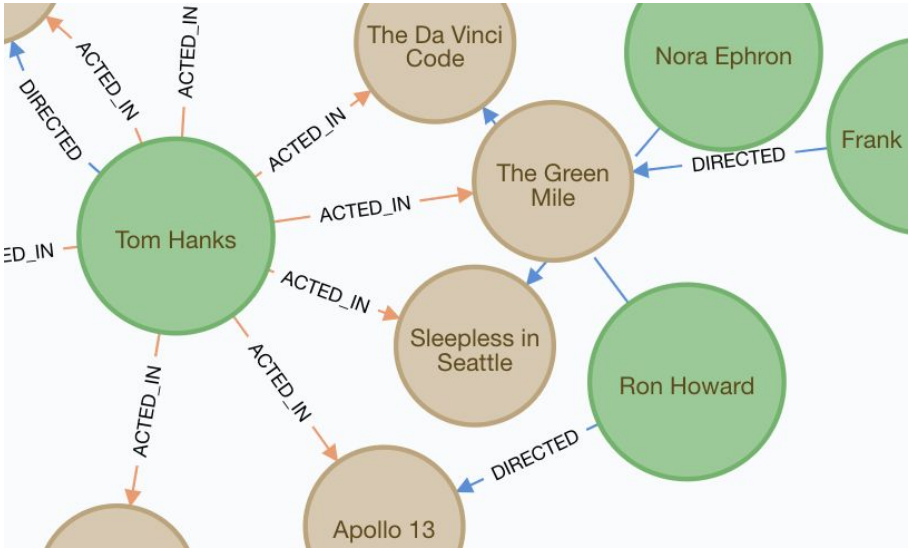
Graph Framework

Tools are mainly built on top of Neo4J.

Contender: FalkorDB

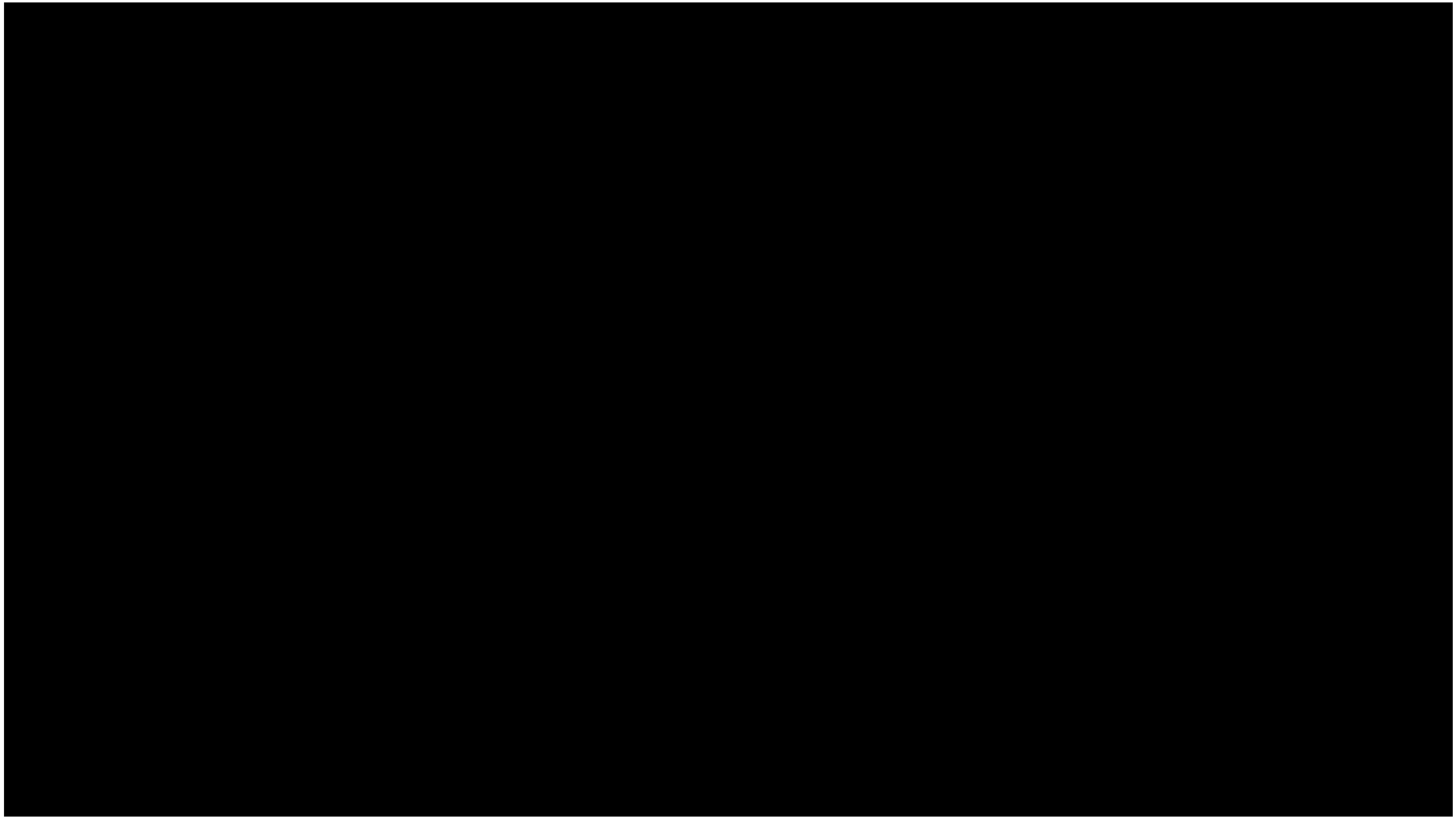
Vector DBs are snapshots,

but Graphs are histories.



https://neo4j.com

https://www.falkordb.com



All Integrated

Azure GraphRAG: didn't try it because from online feedbacks, more adapted on large **non-moving** data. Not my use-case (adapt to your domain).

mem0: extraction is great. Very expensive if you want to see the graph (or not...)

Zep: extraction is under mem0, but can be used locally with Graphiti. Good starting point to try graph memory.

getzep.com

https://github.com/getzep/graphiti

Bonus: Audio Processing

Speech to text (STT) and Text to speech (TTS)

- Similar to privacy considerations + latency: API-based or local?
- Contenders:
  - API: OpenAI (with Whisper) and ElevenLabs. ~outsider Deepgram.
  - Local:
    - Nemo from Nvidia (parakeet): English, French, German & Spanish
    - moonshine: English
- It will add latency. Only ElevenLabs through their Agent part is flawless (End-to-End Latency under 500 ms) but not enough control on the messages, the tools, etc. Same for Gemini Live.

https://elevenlabs.io

https://docs.nvidia.com/nemo-framework/

https://github.com/moonshine-ai/moonshine

Voice Activity Detection (VAD)

I prefer manual actually, but automatic detection is nice to use.

A recurring problem is how to deal with stopping the assistant during the play of the text:

Do we stop it? Can we restart because I snooze?

Does it mean something regarding the evaluation of the answer?

How to deal with long silence because I'm thinking on how to express something?

https://github.com/snakers4/silero-vad

Pipecat

I created GentleWind and tested everything from scratch, without an LLM for coding: learnt a lot because I spent a lot of time...

If you want to improve latency, you need to switch to WebRTC with almost all models, but managing network, buffer, coordination for parallel operations, etc. is hard and extremely time consuming to recreate from scratch.

Pipecat is a framework to help you with that and examples are really interesting.

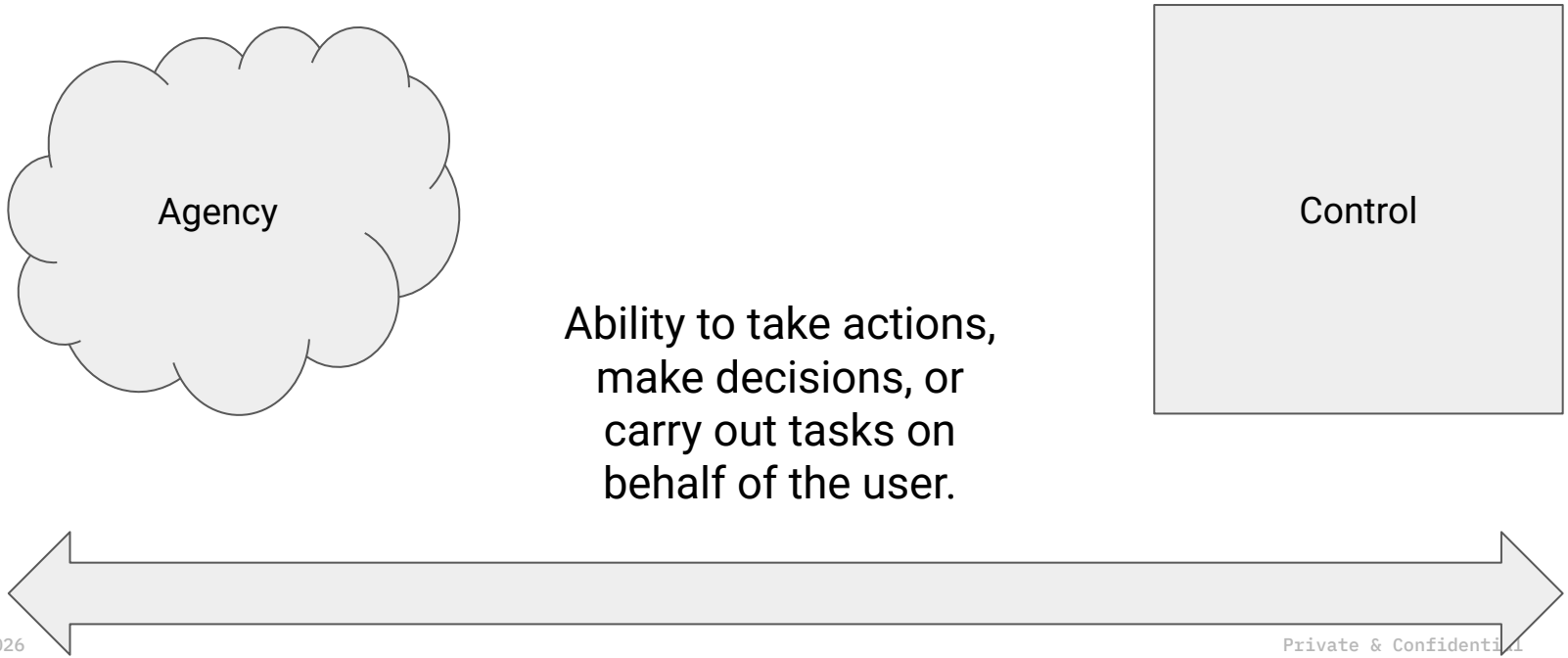
https://github.com/pipecat-ai/pipecat

My Actual Setup for GentleWind

Still a lot of WIP and more a compilation of PoCs than a product by itself...

- Access through CLI with Python backend or Pipecat webUI.
- Not an agent because I “manually” manage all messages.
  - System prompt
  - Summaries of the last session
  - RAG on the actual session
  - Memory search on the actual session
  - Graph search on all the previous sessions and the actual session.
- With audio. Without VAD and local STT.

Agency? Agent? Agentic?



Future

Guardrails

Better orientation if psychological problems. Actually, the model can support you on “wrong” behaviour, mood, etc. instead of sending you searching for help.

Evaluation (evals)

Better tests on multi-criteria settings. E.g., “this configuration for summarizing with this tool for long-term memory” vs “no summarization with RAG only”.
But multi-criteria evaluation is a field on his own...

Feedback for Confoo →

Thank you, and please, take care of yourself

Cedric L'homme
Dev de dev