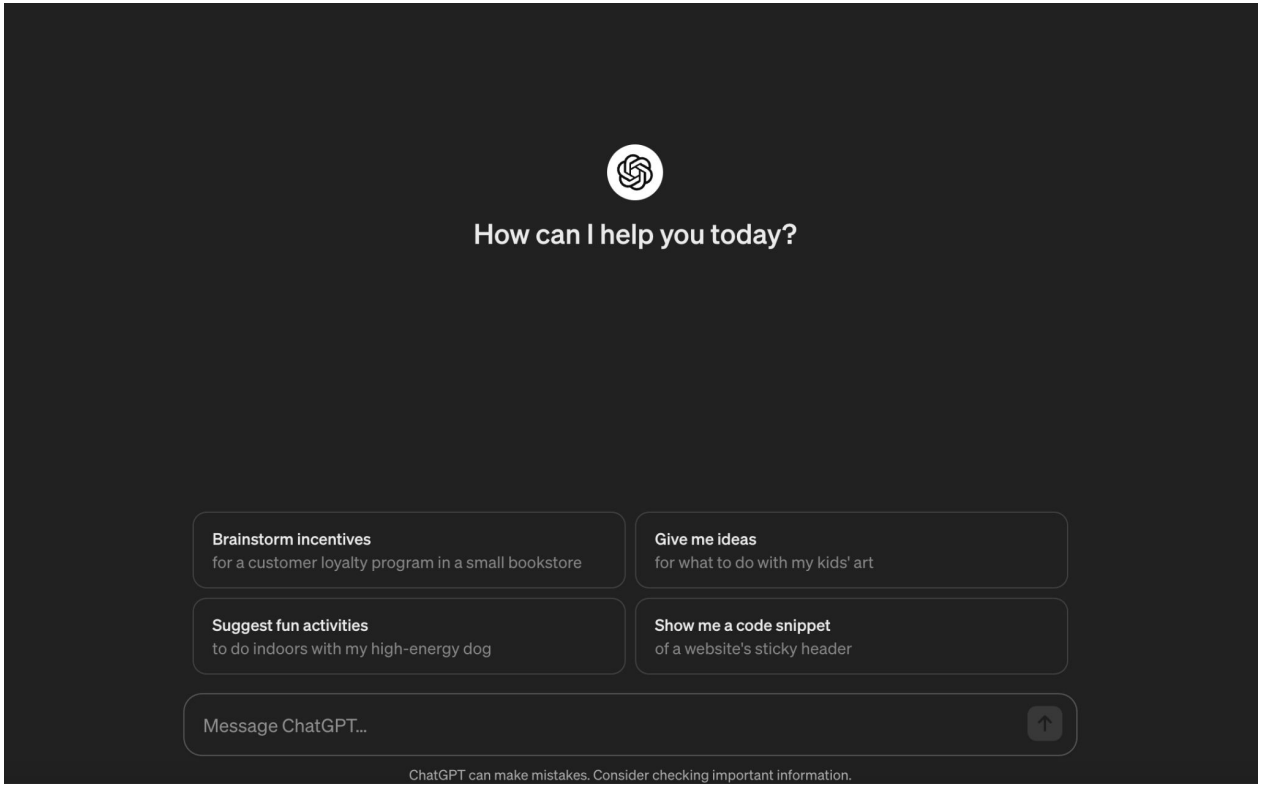
Quarkus meets AI :

Build your own LLM-powered application

Zineb Bendhiba - Blabla conf 2023


How can I help you today?
Brainstorm incentives
for a customer loyalty program in a small bookstore
Give me ideas
for what to do with my kids' art
Suggest fun activities
to do indoors with my high-energy dog
Show me a code snippet
of a website's sticky header
Message ChatGPT...
ChatGPT can make mistakes. Consider checking important information.

Java™

Zineb Bendhiba

- Open Source Engineer at **Red Hat**
- **Apache Camel** PMC
- International Speaker
- 15+ years professional software development experience
- Speak English, French, Moroccan Darija, Arabic
- **University of Cadi Ayyad** Alumni
- https://zinebbendhiba.com
- Twitter: @ZinebBendhiba

Generative AI

ChatGPT

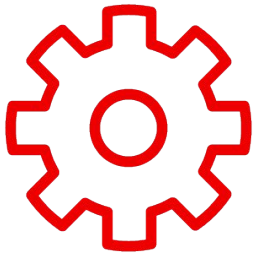
Article Talk

From Wikipedia, the free encyclopedia

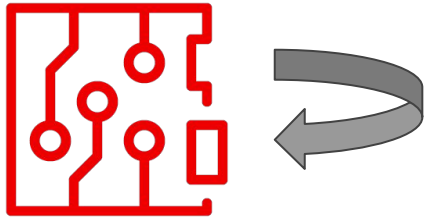
ChatGPT (**Chat Generative Pre-trained Transformer)** is a large language model-based chatbot developed by OpenAI and launched on November 30, 2022, that enables users to refine and steer a conversation towards a desired length, format, style, level of detail, and language. Successive prompts and replies, known as prompt engineering, are considered at each conversation stage as a context.[2]

Large Language Model - 101

Evaluate, Deploy, Monitor, Re-train



Turn **Base Model** into a **Chat Assistant Model**



Model Pre-training (self-supervised)

- Prepare/configure the **billion parameters***
- Collect/tokenize **trillions of data***
- Let the model **self-train** on that data
- Model learns to predict the **next word**
  - E.g. "once upon a" ⇒ "*time*" (99%)
  - But it can also make up stuff!
- Requires **$M(MM)** in GPU/processing power
  and days to weeks of training

Model Fine-tuning (supervised)

- Curate **hundreds** of high quality chats (**Q&As**)
- Let the model **retrain** on the new data set
- Model learns to **mimic the chat behaviour**
  - Understands instructions
  - Using the pre-trained knowledge!
- **[Retrain** to make it **Helpful, Honest, Harmless]**
  - Reinforcement Learning from Human Feedback (RHFL)
- Takes a day of processing for each cycle

This is Data Science stuff!

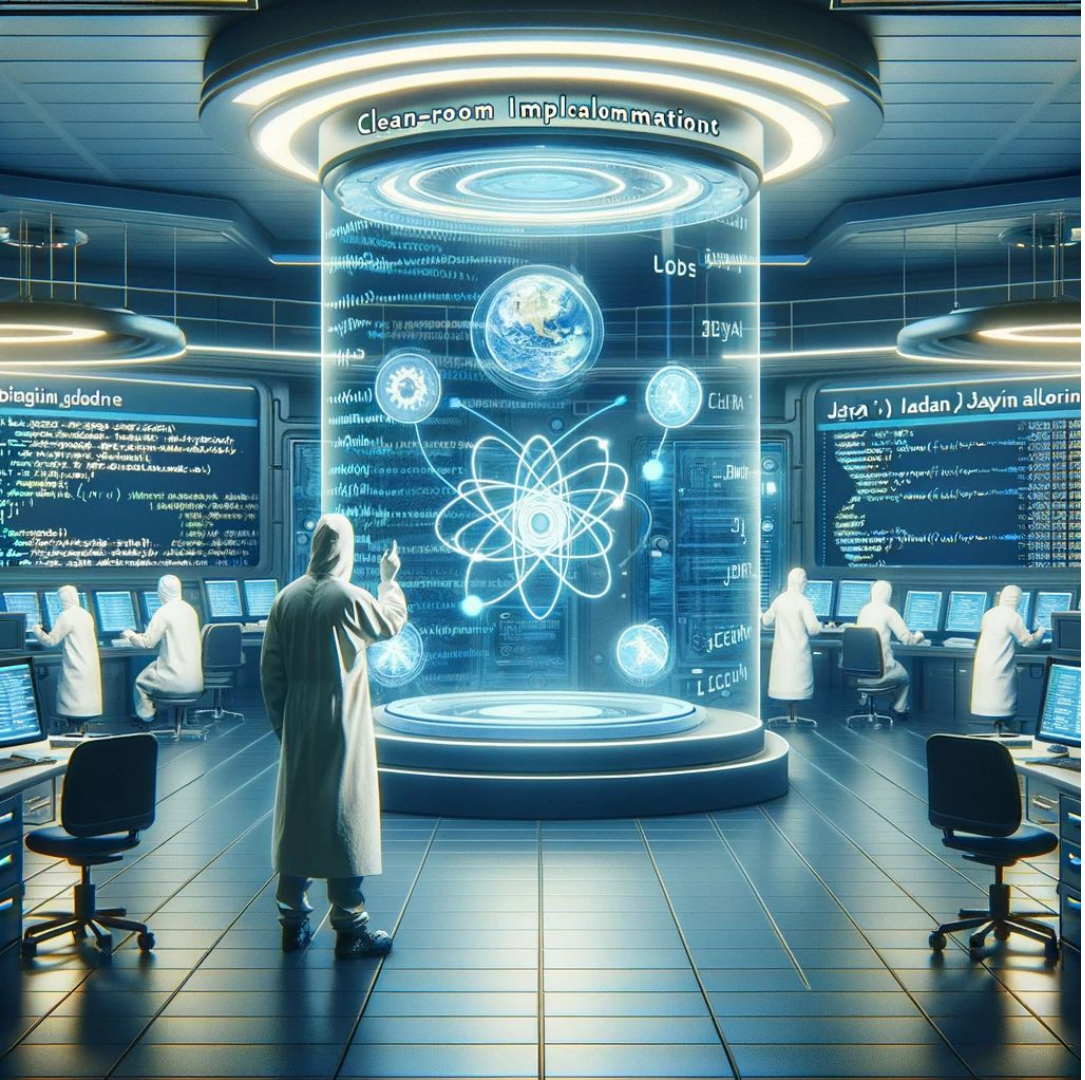
What about the Developers?

The "Model" is only part of your Architecture

It's just another API

You can do *a lot* with a generic model

…and enough context
(docs, emails, other data)



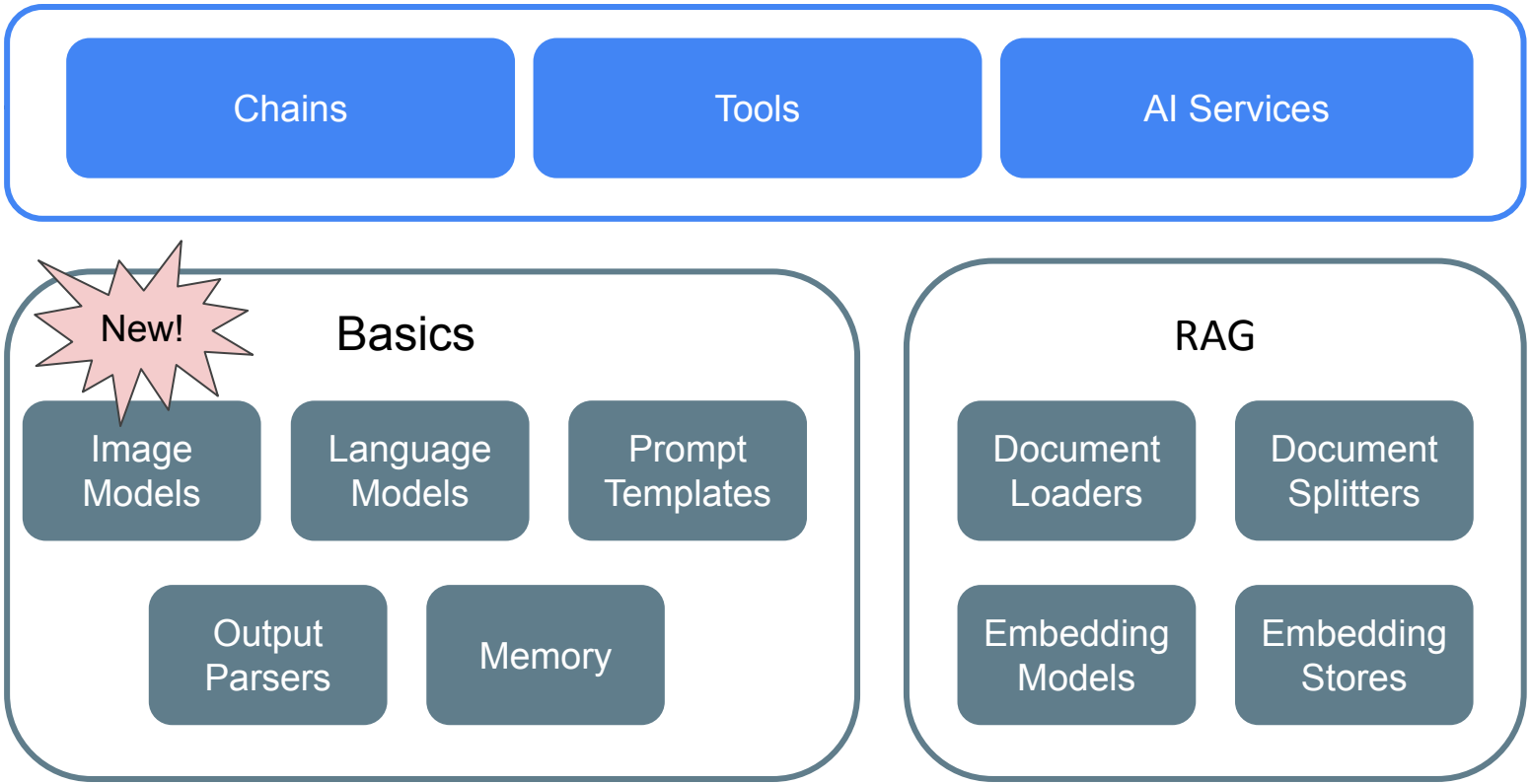
LangChain

python

Java™

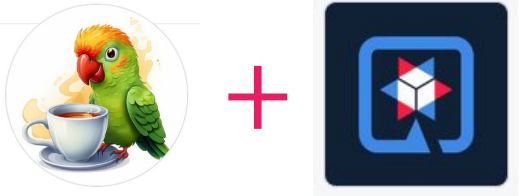
LangChain4j

Components of LangChain4j

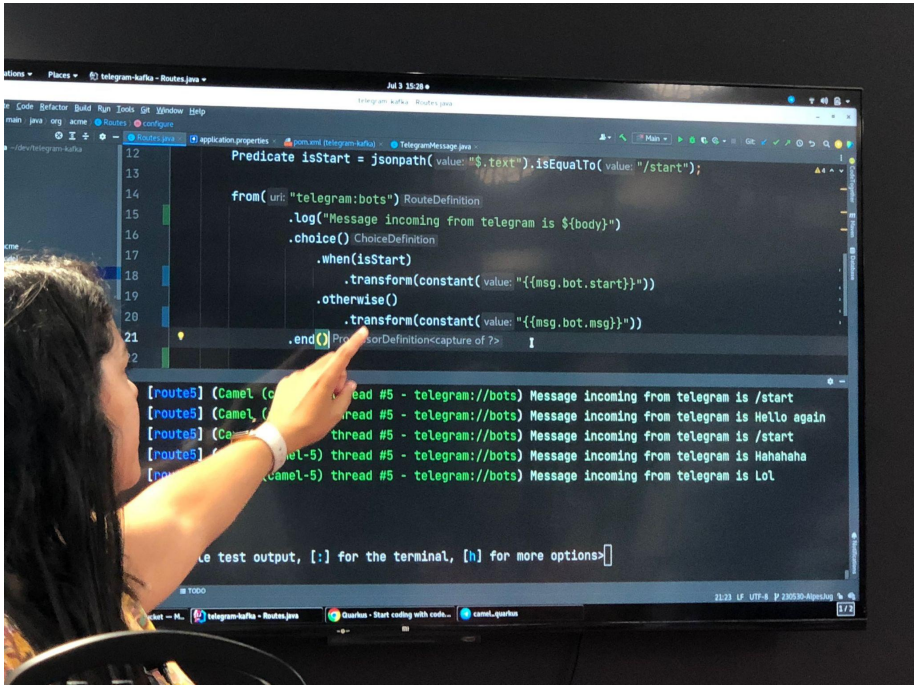


Why LangChain4j with Quarkus?

- Programming Model
  - Seamless integration with CDI
  - Simpler declarative AI Services (@RegisterAiService)
- Developer Joy
  - 'quarkus dev' enables iterative testing and Prompt tuning.
  - Dev UI allows to view AI services, tools, config, add/search embeddings, test prompts, generate images
- Performance Enhancements
  - Optimized Quarkus REST/JSON libs
  - Reduced library footprint
- Build time
  - Build time warnings
  - Compile to native with GraalVM
- Production Enhancements
  - Unified Configuration
  - Metrics, Tracing, Auditing



Demo


Predicate isStart = jsonpath(value: "$.text").isEqualTo(value: "/start");
from(uri: "telegram:bots") RouteDefinition
.log("Message incoming from telegram is ${body}")
.choice() ChoiceDefinition
.when(isStart)
.transform(constant(value: "{{msg.bot.start}}"))
.otherwise()
.transform(constant(value: "{{msg.bot.msg}}"))
.end()
[route5] (Camel
thread #5 - telegram://bots) Message incoming from telegram is /start
[route5] (Camel
thread #5 - telegram://bots) Message incoming from telegram is Hello again
[route5] (Ca
thread #5 - telegram://bots) Message incoming from telegram is /start
[route5]
camel-5) thread #5 - telegram://bots) Message incoming from telegram is Hahahaha
camel-5) thread #5 - telegram://bots) Message incoming from telegram is Lol
test output, [:] for the terminal, [h] for more options>

Links

- Quarkus Langchain 4j documentation
- Quarkus Langchain4j samples
- Apache Camel project
- Quarkus project
- Langchain4j project
- Demo
- WIP: Camel Langhcain4j component

Thank you

Zineb Bendhiba (@ZinebBendhiba)