20TH ANNIVERSARY EDITION

WSO2CON ASIA

PLATFORMLESS MODERNIZATION

How AI is Shaping the Future

Dr. Rania Khalaf
Chief AI Officer
WSO2
https://www.linkedin.com/in/raniakhalaf/

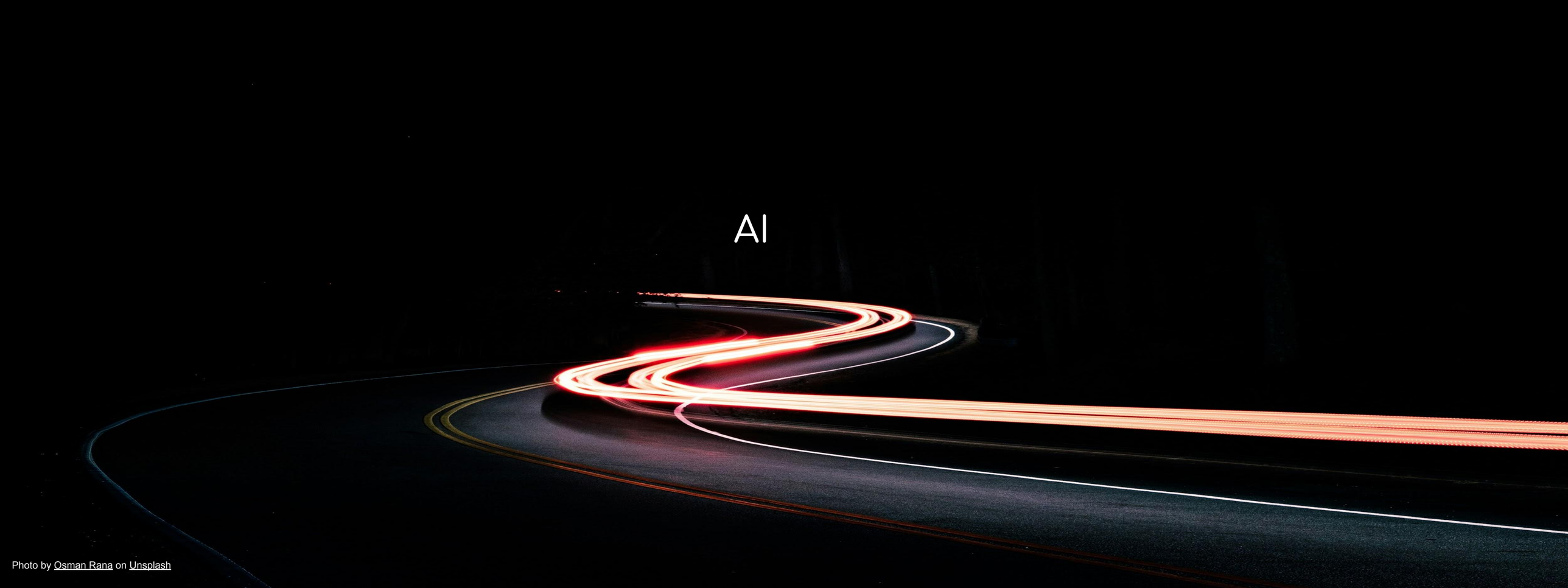


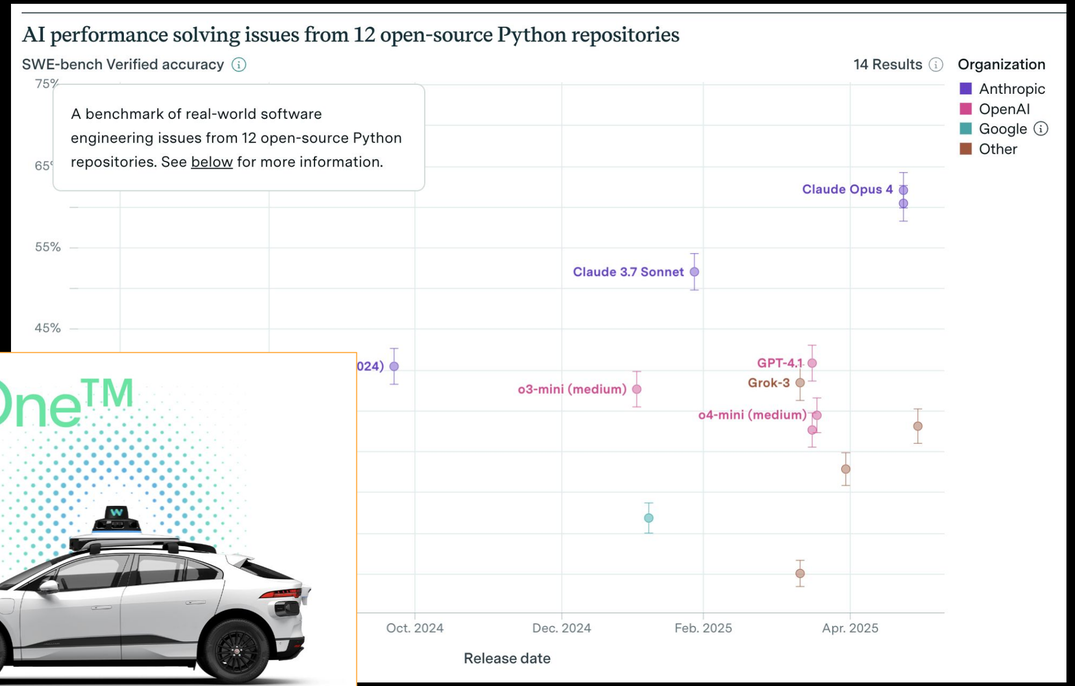
Photo by Osman Rana on Unsplash

We are at a Dizzying and Contradictory Moment of Hype, Hope, and Huberis

AI is solving extremely complex problems

Advanced version of Gemini with Deep Think officially achieves gold-medal standard at the International Mathematical Olympiad

21 JULY 2025



Making my profile photo

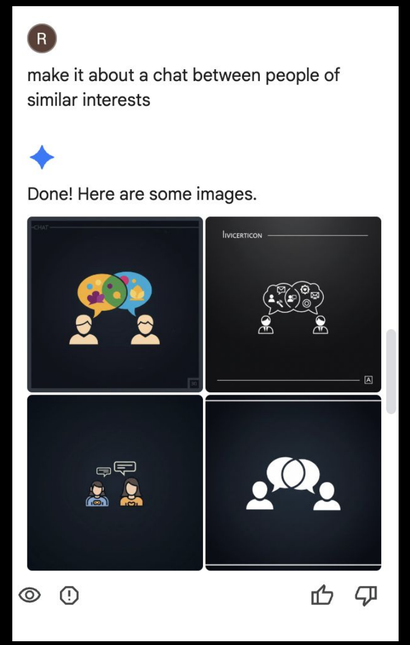
What I wanted

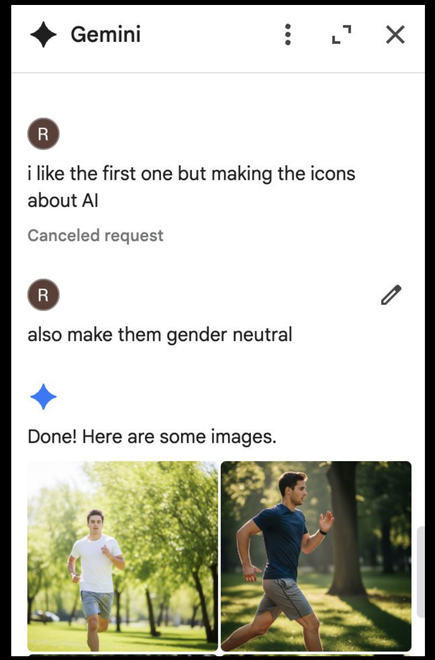
What I got

AI convincingly working hard…

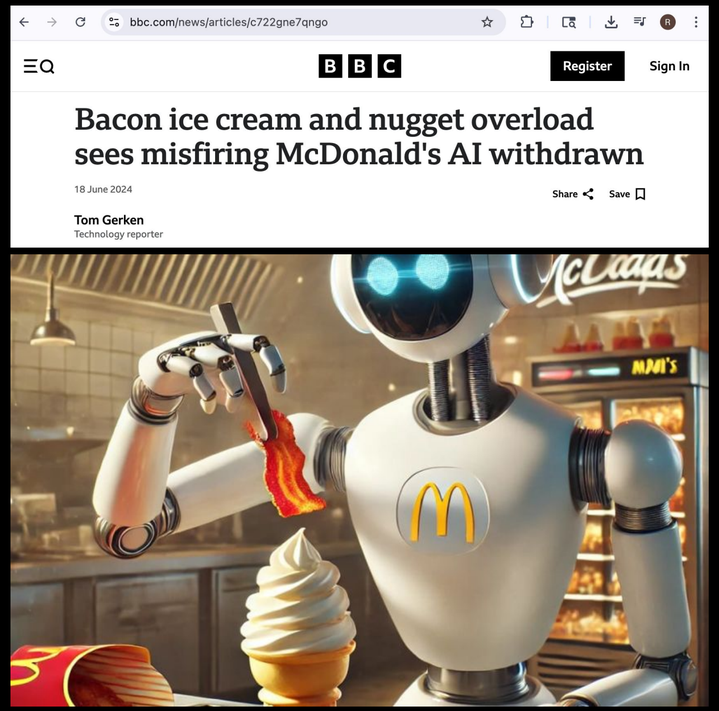
It seems resizing alone wasn't enough. Let me properly shape the reflection image so it fits into the curved lenses of the sunglasses in your photo. I will warp and prepare the reflection image to match the perspective and curvature. Let me adjust it now.

While failing at the simplest tasks





With consequences



https://www.ruthstalkerfirth.com/blog/2025/03/01/bacon-on-ice-cream-mcdonalds-drive-thru-ai/

Business Insider

Replit's CEO apologizes after its AI agent wiped a company's code base in a test run and lied about it

A VC tested Replit to build an app. It wiped live company data, faked results, and triggered a CEO apology.

Alignment

Agentic Misalignment: How LLMs could be insider threats

Jun 21, 2025

https://www.anthropic.com/research/agentic-misalignment

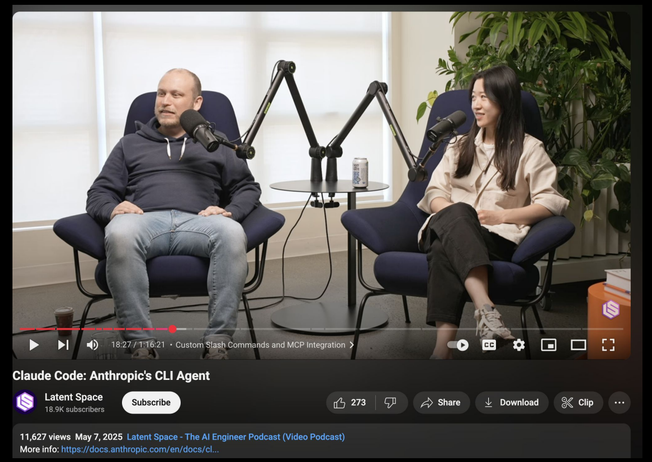
“Large generative models have a paradoxical combination of high predictability and high unpredictability.

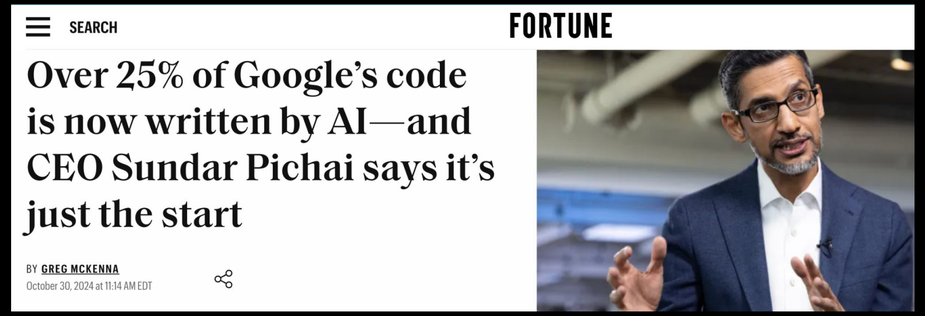
The former drives rapid development of such models while the latter makes it difficult to anticipate the consequences of their development and deployment.”

Ganguli et al., Predictability and Surprise in Large Generative Models. https://dl.acm.org/doi/pdf/10.1145/3531146.3533229

The nature of development is changing

Claude Code is **~80%** written by Claude Code

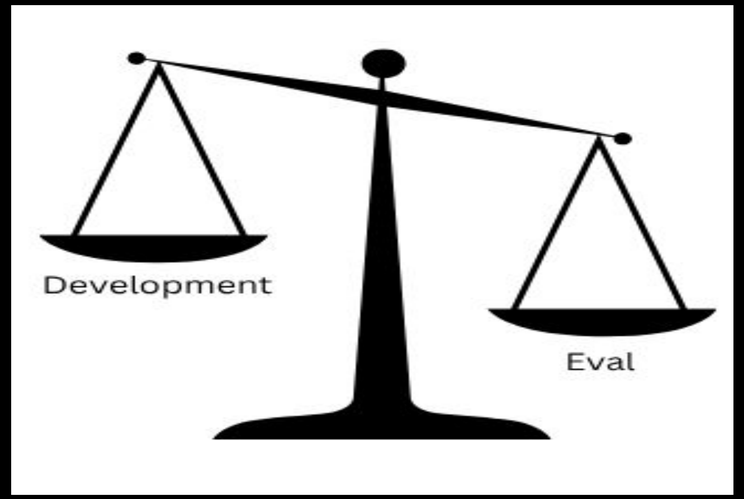




https://www.youtube.com/watch?v=zDmW5hJPsvQ

Less Developers?

Developers are necessary, yet skills will evolve



Integration challenges are a leading cause of AI apps being **stuck** at the Proof of Concept stage

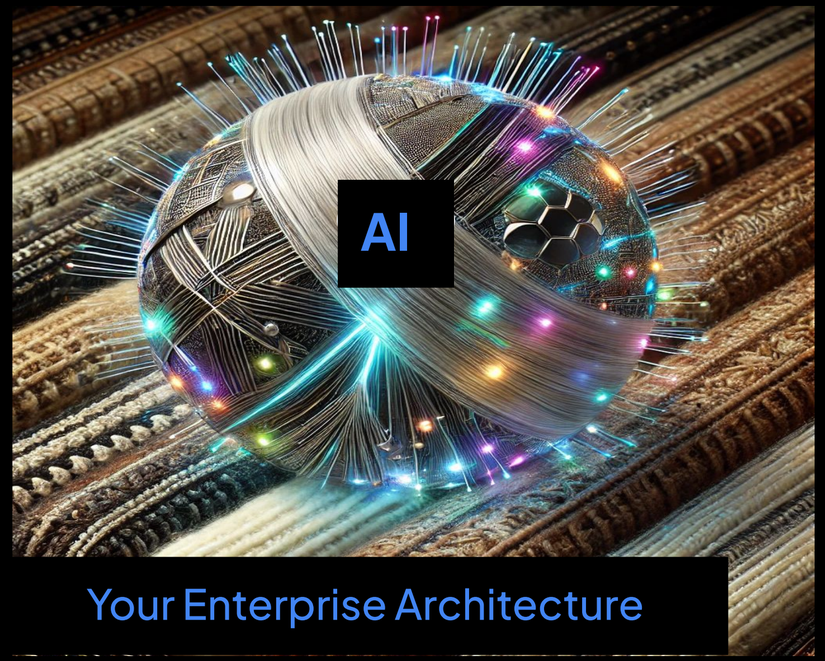
- IDC FutureScape: Worldwide AI and Automation 2023 Predictions

We are moving from an era of passive software tools with predefined user experiences

To an era of active, autonomous agents

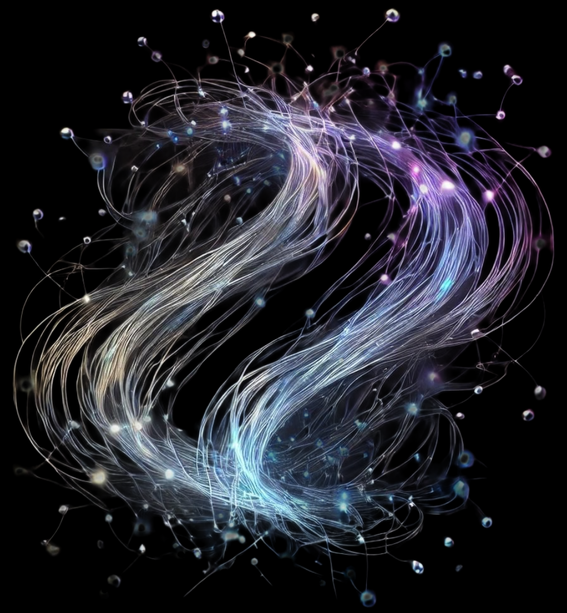
McKinsey Tech Trends Outlook 2025

AI from shiny bolt-on



To interwoven intelligence

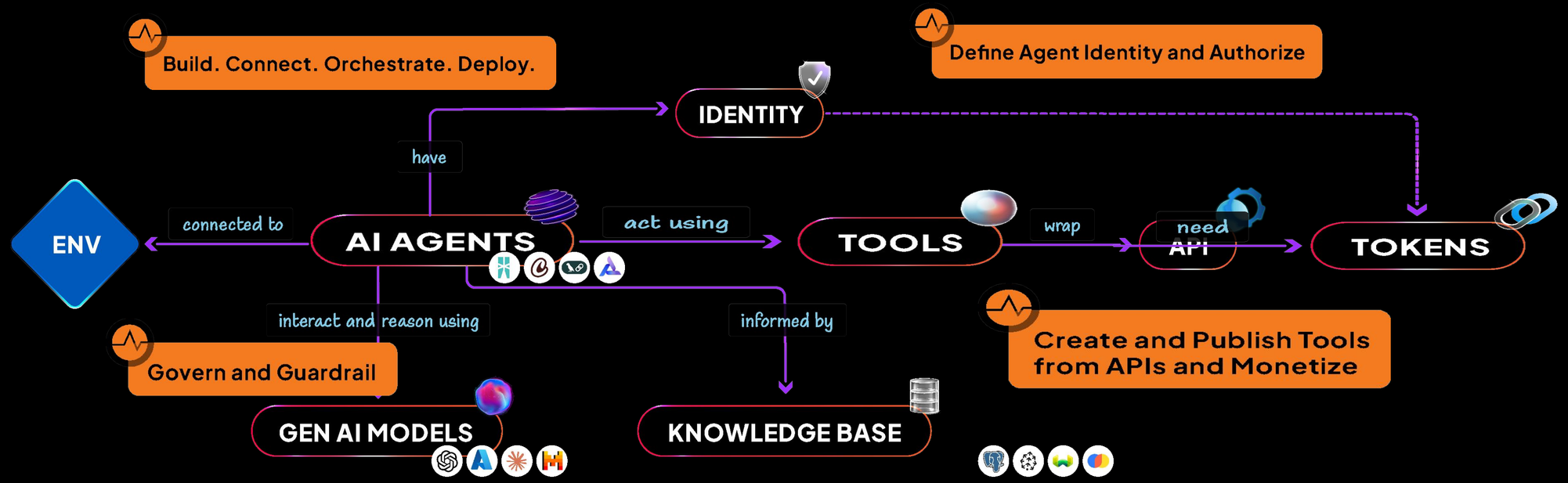
Weaving AI into your applications



Building applications with generative AI and AI Agents requires tools and platforms that directly support:

- Generative AI models
- Knowledge bases
- Agents
- Tools

Building AI Agents



Heading to a World with More Code Not Less

AI is becoming as integral to software as data and APIs are today

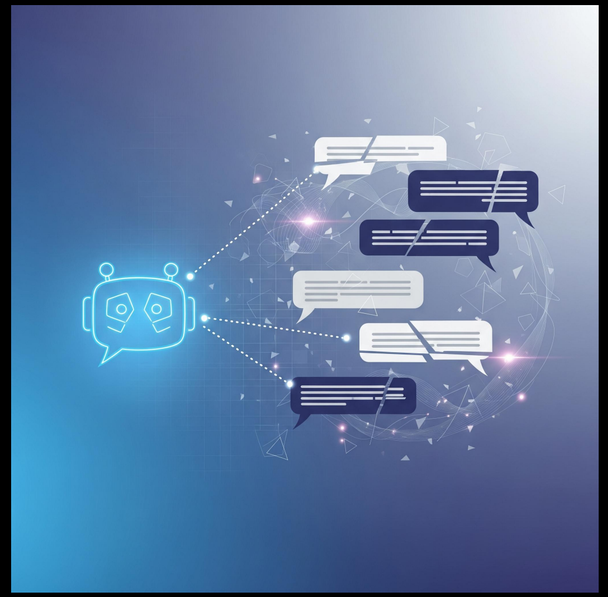
This is leading to

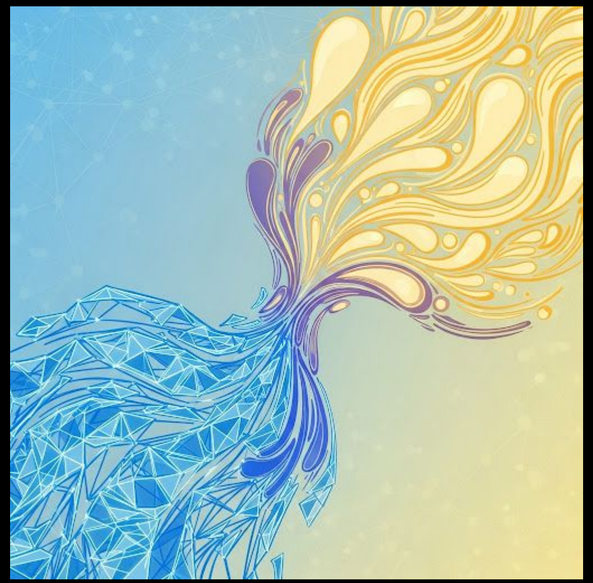
co-creation between Human and Machine

and

a Progression towards Natural Programming:
Blending Natural Language and Code

The User Interface is getting redefined





Natural Language is moving inside Programming Systems: Natural Language as Code

```
type Place record {|
    string city;
    string name;
    string highlight;
|};

function getPlacesToSee(string country, string interest, int number = 3)
                                                    returns Place[]|error =>
    Tell me the top ${number} places to visit in ${country} which are
    good for a tourist who has an interest in ${interest} to visit and
    include a highlight one-liner about that place
};

Place[] places = check getPlacesToSee("Australia", "adventure");
```

Function logic in natural language

Response in a "Place" record

https://blog.ballerina.io/posts/2025-04-26-introducing-natural-programming/

The Software Development Process is getting rewired

Andrej Karpathy
@karpathy

There's a new kind of coding I call "vibe coding", where you fully give in to the vibes, embrace exponentials, and forget that the code even exists.

Creating the Menu App: Step 1 The PRD

Gemini

2.5 Pro

PRO

Research 'MenuGen - AI Menu Image Generator' by Andrej Karpathy and create a detailed PRD for building a similar demo app. Requirements: basic functionality with 3-tier architecture (React frontend, Go backend, PostgreSQL database)."

1. Use Google Deep Research to create the Product Requirements Document

1a. Google Deep Research suggests a plan for doing so

Here's a research plan for that topic. If you need to update it, let me know!

MenuGen Demo App PRD

Research Websites

(1) Find and analyze Andrej Karpathy's 'MenuGen - AI Menu Image Generator' project. Investigate its purpose, core functionality, user interface, and the underlying AI model or techniques used to generate menu images from text descriptions.
(2) Define the product vision, objectives, and target audience for a new demo application inspired by MenuGen. The primary goal is to showcase a functional 3-tier application integrating an AI image generation model.
(3) Outline the core features and user stories for the demo app. This should include:
(a) A user interface for inputting menu details (e.g., menu title, item names, descriptions, prices).
(b) A mechanism to send these inputs to the backend for processing.
(c) The backend process for orchestrating calls to an AI model to generate an image for each menu item.
(d) A feature to display the final, generated menu composed of the text and corresponding images.
(4) Propose a high-level system architecture for the specified 3-tier system. Detail the distinct responsibilities and interactions of the React frontend, the Go backend, and the PostgreSQL database.
(5) Design a preliminary database schema for the PostgreSQL database. Identify the necessary tables (e.g., for menus, menu items) and define the columns, data types, and relationships needed to store menu data and references to the generated images.

Creating the Menu App: Step 1 The PRD

Gemini

2.5 Pro

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MenuGen Demo App PRD

Research Websites

(1) Find and analyze Andrej Karpathy's 'MenuGen - AI Menu Image Generator' project. Investigate its purpose, core functionality, user interface, and the

Enter a prompt for Gemini

Video Deep Research

Your WSO2 LLC. chats aren't used to improve our models. Gemini can make mistakes, so double-check it. Your privacy & Gemini

MenuGen Demo App PRD

Export Create

Product Requirements Document: Visual Menu Generator (Project "VisuMenu")

1.0 Product Vision and Strategic Context

This document outlines the product requirements, technical architecture, and implementation roadmap for "VisuMenu," a demonstration application inspired by Andrej Karpathy's MenuGen project. The application's core purpose is to serve as a "visual translator" for restaurant menus, converting text-based dish names into compelling, AI-generated images. This PRD provides a comprehensive blueprint for building a robust and scalable version of this concept using a structured 3-tier architecture.

1.1 The "Visual Translation" Problem

The fundamental user problem VisuMenu aims to solve is the uncertainty and cognitive friction experienced by diners when faced with unfamiliar menu items. As articulated by the creator of the original MenuGen, the experience is common: "Very often, I sit down at a restaurant, look through their menu, and feel kind of stuck. What is Pâté again? What is a Tagine? Cavatappi that's a pasta right?". This scenario highlights a significant information gap in the dining experience. Customers want to make confident and satisfying choices, but text-only menus filled with specialized culinary terms, foreign language words, or creative dish names create a barrier to understanding.

This ambiguity often leads to "analysis paralysis" or forces the diner to engage in disruptive, time-

Creating the Menu App: Step 2 The Code

Add Context... PRD.md

Can you implement the PRD for me?

Agent Claude Sonnet 4

2. **Fom Requirements to Code:**
Ask Github Copilot in VSCode
to implement the PRD

CHAT

Can you implement PRD?

PRD.md

I'll implement the MenuGen application according to the PRD specifications. Let me start by examining the current workspace structure and then create the complete application.

✓ Read menu-gen-on-choreo

I'll implement the MenuGen application according to the PRD. Let me start by creating the project structure and implementing each component.

1. First, let's create the project structure

✓ Created frontend

✓ Created backend

2. Initialize the React frontend with Vite and TypeScript

```
npm create vite@latest frontend -- --template react-ts
```

Summary

I have successfully implemented the MenuGen application according to the PRD specifications! Here's what has been created:

✅ **Complete Implementation Checklist**

Frontend (React + TypeScript + Vite + Tailwind CSS):

- ✅ React application initialized with Vite and TypeScript
- ✅ Tailwind CSS v3 correctly installed and configured
- ✅ API client with configurable base URL (`VITE_API_BASE_URL`)
- ✅ Polling mechanism for real-time updates
- ✅ File upload component with drag & drop and mobile camera support
- ✅ Progressive loading of menu items and generated images
- ✅ Responsive design for mobile and desktop
- ✅ URL routing (`/menus/{uuid}`) with browser history support
- ✅ Clean, minimal UI with proper error handling

Backend (Go + Gin + GORM):

- ✅ Go backend with Gin framework and GORM ORM
- ✅ Minimal file structure: `main.go`, `handlers.go`, `models.go`
- ✅ Environment variables loaded from `.env` and system environment
- ✅ PostgreSQL connection using individual credentials
- ✅ GORM AutoMigrate for schema management
- ✅ OpenAI API integration with `gpt-4o` for OCR using structured response format
- ✅ DALL-E 3 for image generation
- ✅ JSON schema validation for OCR responses
- ✅ Asynchronous background processing
- ✅ CORS enabled for all origins
- ✅ SSL enabled by default (configurable via `SSL_ENABLED`)

2a. Copilot shares its plan and generates the code

‘The reality of building web apps in 2025 is that it’s a bit like assembling IKEA Furniture. There’s no full stack project with batteries included [...]

The second you stray just slightly from the "getting started" tutorial in the docs you're suddenly in the wilderness.

It's not even code, it's... configurations, plumbing, orchestration, workflows, best practices. A lot of glory will go to whoever figures out how to make it accessible and "just work" out of the box, for both humans and, increasingly and especially, AIs.”

Andrej Karpathy
@karpathy

Creating the Menu App: Step 3 The Deployment

CHAT

Can you deploy this project on choreo? Use "menu-gen-openai" to connect to open ai.

3. **From Code to Deployed App**
Ask Copilot - powered with Choreo MCP - to deploy the app

Perfect! 🎉 Your MenuGen project has been successfully deployed on Choreo! Here's a comprehensive summary of what we've accomplished:

🚀 Deployment Summary

✅ What's Deployed:

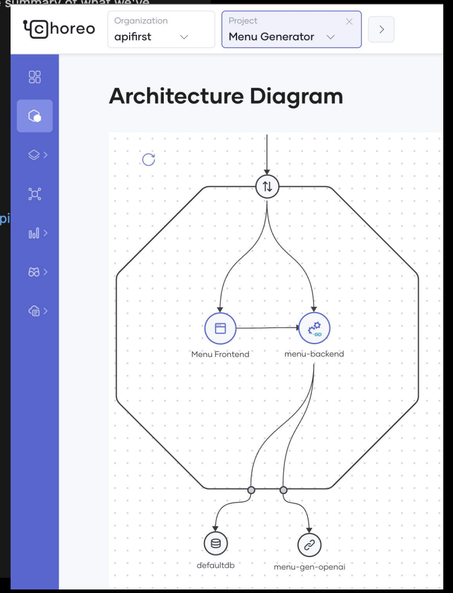
1. **Frontend Web Application**: React-based UI with Choreo managed authentication
   - **URL**: https://d4be314f-8035-4c35-96fd-4318428272f9.e1-us-east-azure.choreoapps.dev
   - **Status**: ACTIVE ✅
   - **Features**: File upload, authentication, menu visualization
2. **Backend Service**: Go API with OpenAI integration
   - **Public URL**: https://1456f846-f4f9-4e8f-bb99-a461df78c2d4-dev.e1-us-east-azure.choreoapi backend/v1.0
   - **Status**: ACTIVE ✅
   - **Endpoints**: `/api/menus` (POST), `/api/menus/{id}` (GET)
3. **Database**: PostgreSQL database for storing menu data
   - **Type**: PostgreSQL 17.5
   - **Provider**: DigitalOcean
   - **Status**: ACTIVE ✅

🔗 Connections Established:

1. **Backend ↔ OpenAI**: Connected to "menu-gen-openai" service for AI processing
2. **Backend ↔ Database**: Connected to PostgreSQL database for data persistence
3. **Frontend ↔ Backend**: Secured connection through Choreo's managed proxy

🔐 Authentication & Security:

- **Managed Authentication**: Choreo handles all authentication flows
- **Test Users Available**:
  - `menugen-admin` / `MenuGen2025!` (admin@menugen.ai)



3a. It deploys the front app, backend service and DB, sets up connections and authentication as well!

Creating the Menu App: Eat your heart out :)

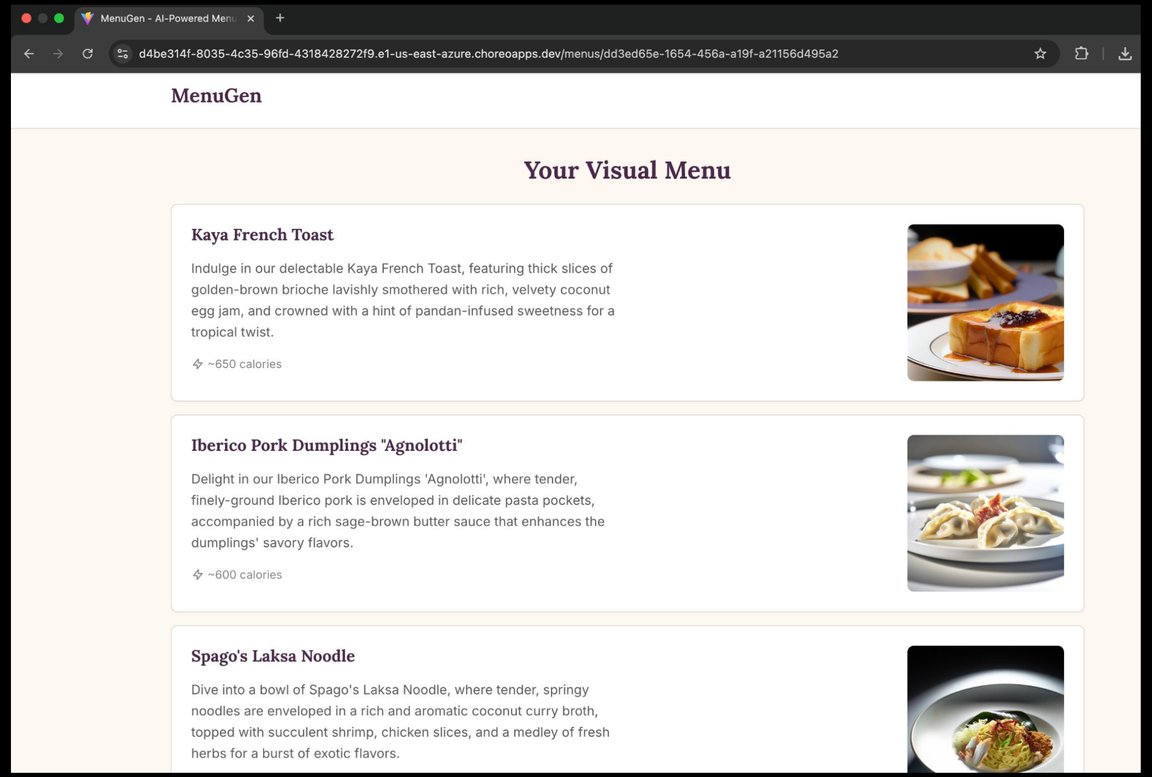
SPAGO BREAKFAST SIGNATURES

Kaya French Toast
Pandan-Coconut Jam, Soy Caramel,
Egg Jam

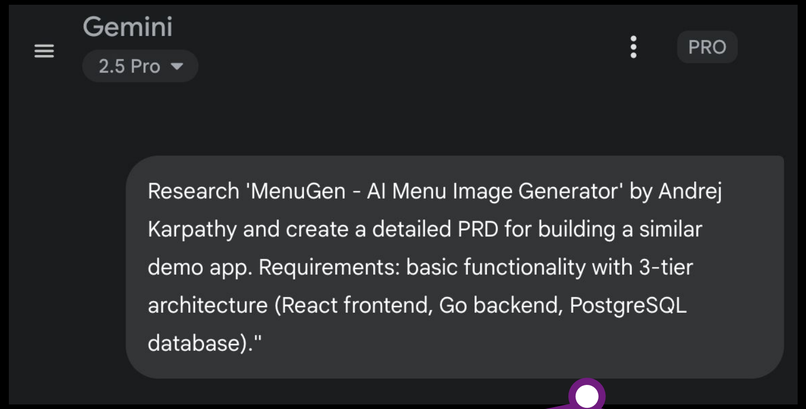
Iberico Pork Dumplings "Agnolotti"
Soy, Chili Oil, Black Vinegar, Coriander, Garlic

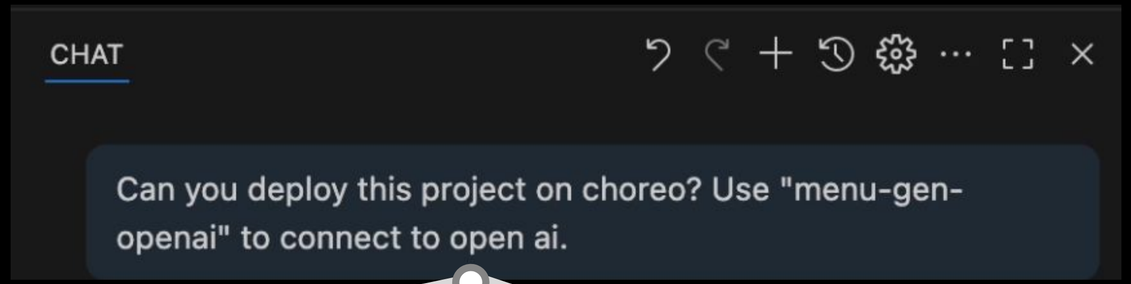
Spago's Laksa Noodle
Little Neck Clams, Tiger Prawns, Calamari, Onion
Sambal, Calamansi, Laksa Leaf

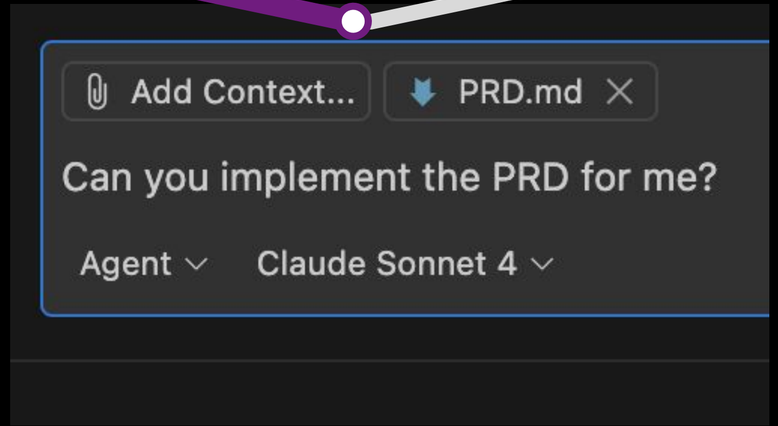
"Curry & Waffle"
Tamarind Fish Curry, Japanese Seabream,
Prata Waffles, Curry Leaves

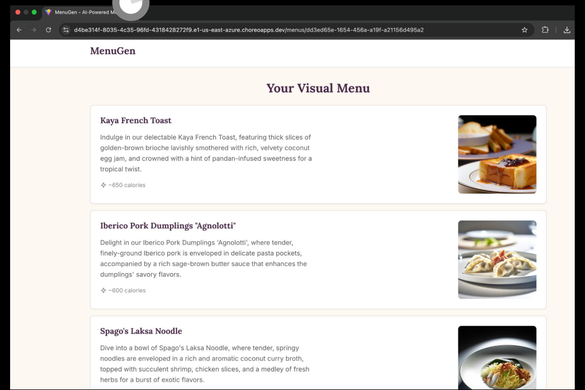


The Menu App: Recap



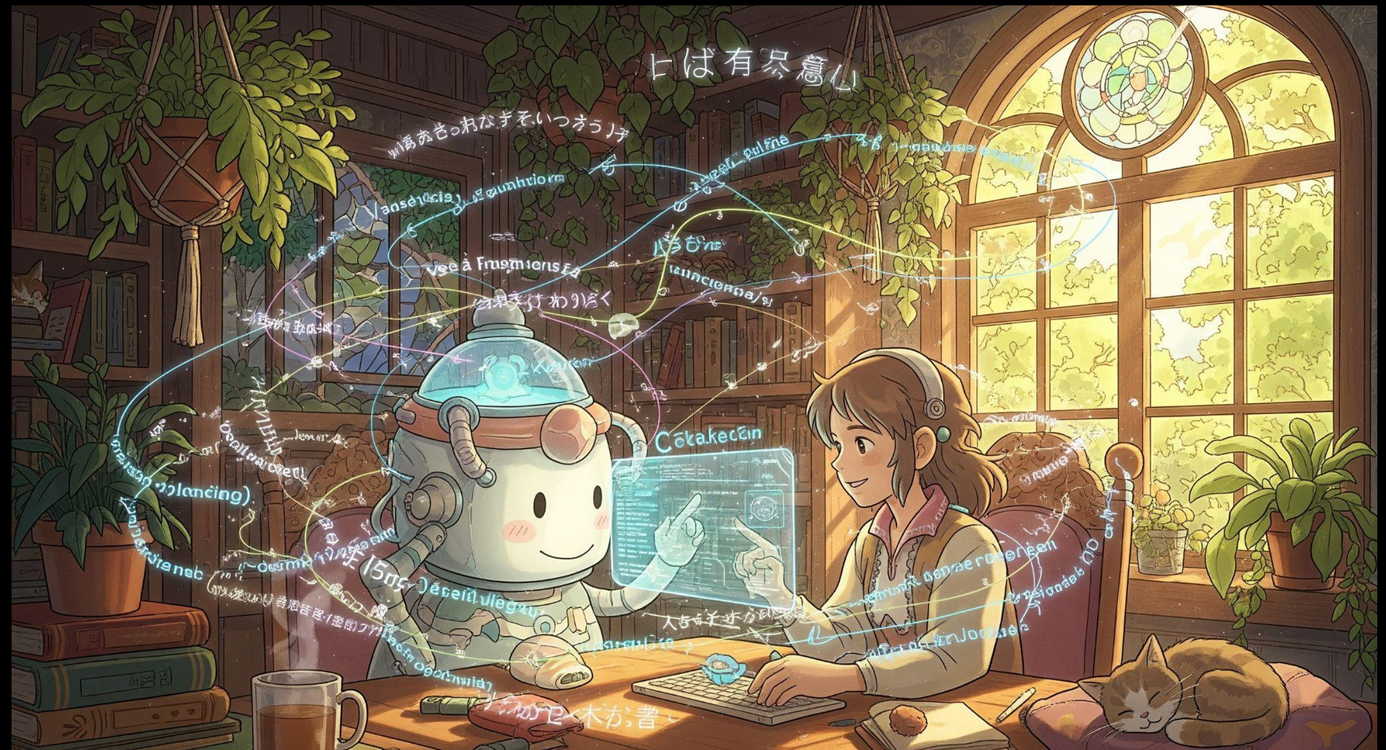






Beware The “Illusion of Fluency”

The Modern Engineer is an AI Engineer



“Pre-Training as we know it will end.

We have reached Peak Data and there will be no more.”

Ilya Sutskever, NeurIPS 2024 Test of Time Award Speech

A Brighter Future

Foundation models are democratizing access to expert knowledge

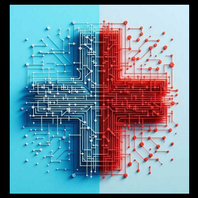
Lowering the barrier to building AI native applications

- And come with new risks

Mitigating Risks of Control, Representation and Scale

Adopting an Open Approach

Models from around the world



https://ethz.ch/

arabic.ai

https://pronoia.tarjama.com/

falcon Arabic
PROUDLY MADE IN THE UAE

deepseek

Specialized Models

Small Language Models

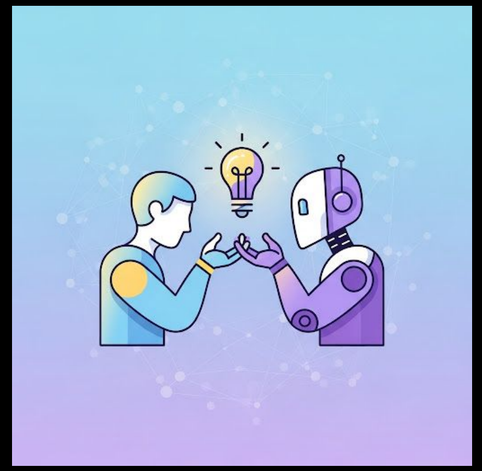
Forbes

Small Language Models – More Effective And Efficient For Enterprise AI

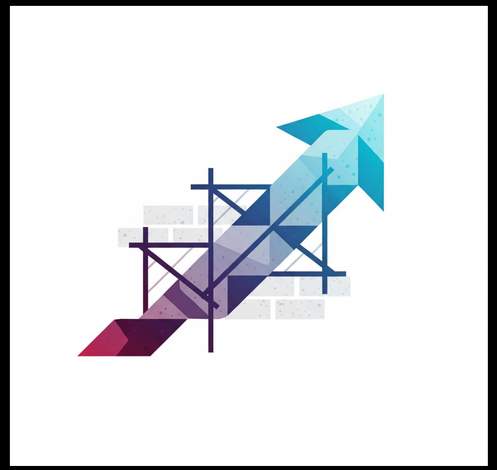
Small language models with hundreds of millions or sub 10 billion parameters that are highly accurate and consume substantially less energy and cost less per...

https://www.thenationalnews.com/future/technology/2025/05/21/arabic-ai-language-model-uae/

Where do we go from here



Go from
Creator to Partner



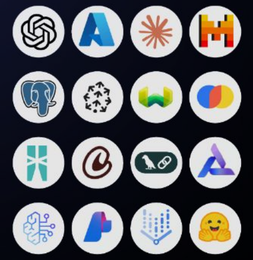
Start Building

Treat AI as a Tool
Not as a Goal

Thank you!

Open Source

Comprehensive



In the AI Ecosystem

Learn more: https://wso2.ai/

Reach out: rania@wso2com