NEXT GENERATION OF TECHNOLOGY IN ENGINEERING

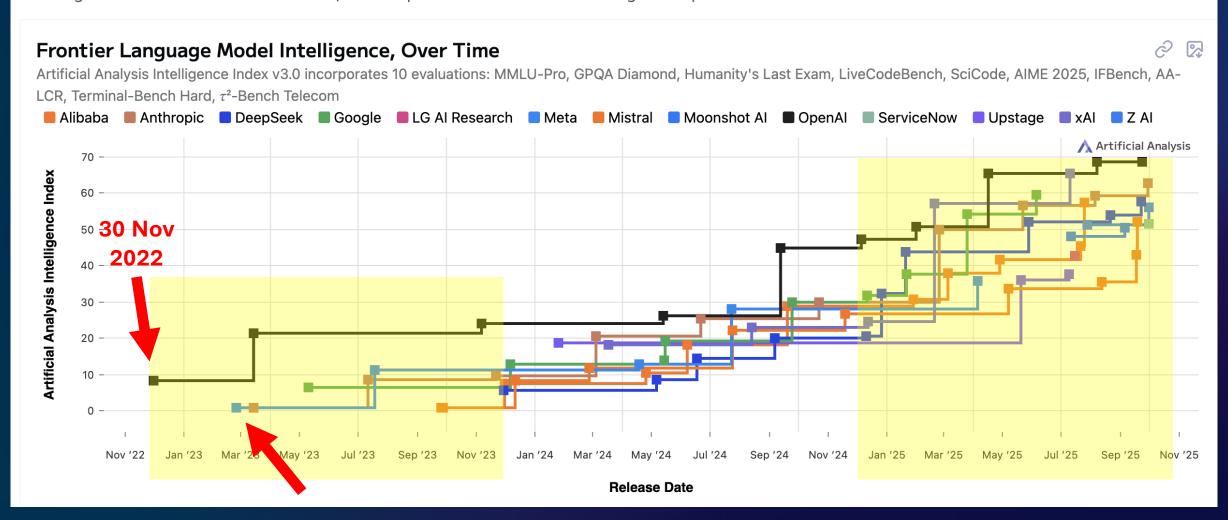
Al & Automation

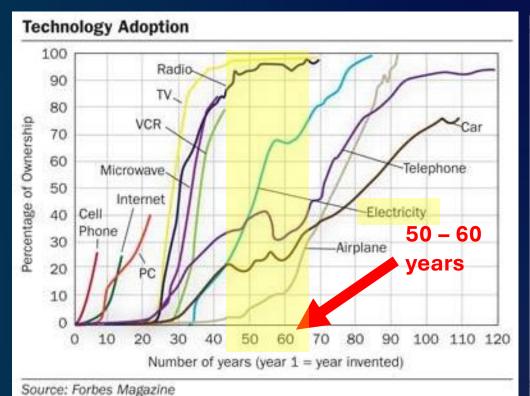


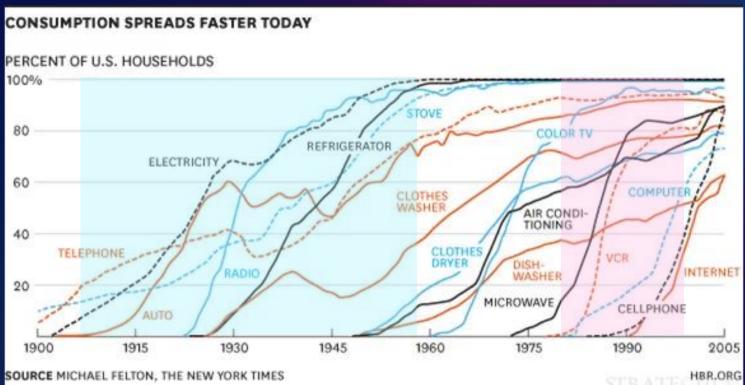
Senior Software Engineer, Cochlear

✓ Al Progress

Tracking the continued advancement of AI, and the position of each of the leading AI companies.







"Will Al replace my job?"

EVOLUTION OF ENGINEERING

FROM DRAFTING TABLES TO DIGITAL TWINS



1.0

Steam power

Mechanisation

Textile manufacturing



2.0

Electricity
Assembly line
Steel



3.0

Computers ICT Digitisation



4.0

Cloud
Cyber-Physical
Systems
Internet of Things (IoT)
AI

Technology always evolved. So did the engineers.

Today is not about fearing technology taking our jobs.

Today is about learning how to make it work for us.



TAKEAWAYS

- . Practical tools and platforms
- 2. Strategies to accelerate career
- 3. How we all are shaping the future of emerging technologies
- 4. Mindset



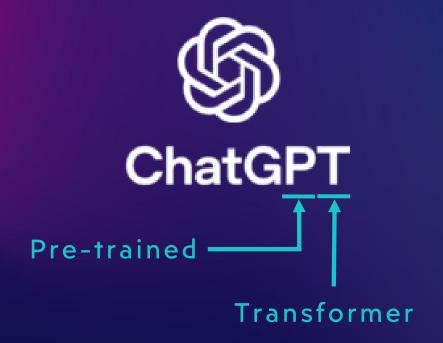
TOOLS & PLATFORMS

Consumers of Al

Developers of AI



SOFTWARE ENGINEERING



CH What weighs more, two pounds of feathers or a pound of bricks?

Two pounds of feathers and a pound of bricks both weigh the same amount, which is one pound.

thers

45 公

The confusion in this classic riddle comes from the fact that people tend to think of feathers as being very light and bricks as being very heavy. However, the riddle doesn't ask which is heavier - it asks which weighs more. And since two pounds is more than one pound, two pounds of feathers weigh more than a pound of bricks.

GPT 3.5 response – An example of hallucination

SOFTWARE ENGINEERING

what weighs more, two pounds of feathers or a pound of bricks?

Two pounds of feathers weigh more — because 2 pounds > 1 pound. Simple as that.

O O O O O O O O

GPT 4 response - Factual

What weighs more, two pounds of feathers or a pound of bricks?

Thought for 7s

Two pounds of feathers — because 2 lb is heavier than 1 lb.

I asked GPT 4 again – It thought of a reply for 7 seconds

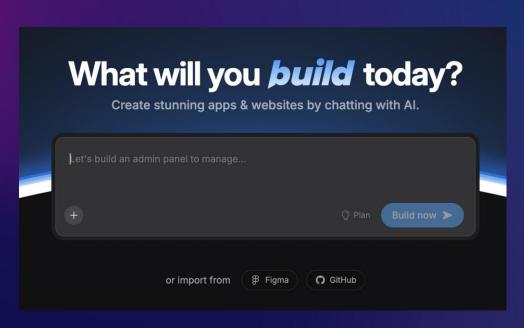
SOFTWARE ENGINEERING

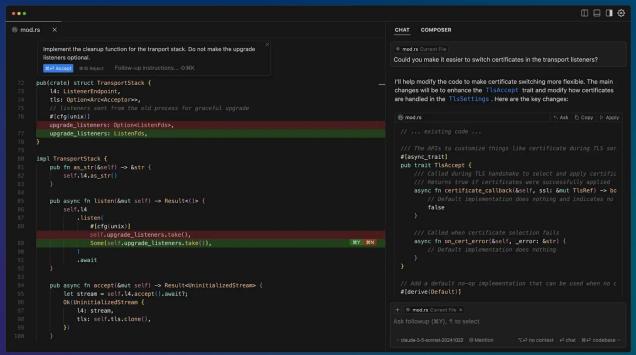




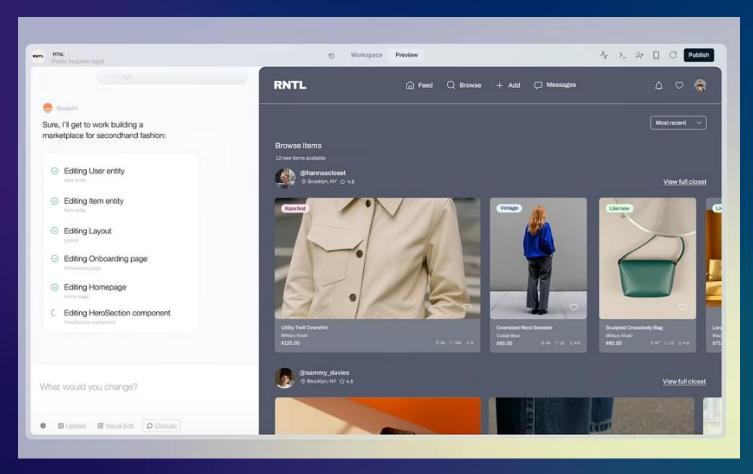








SOFTWARE ENGINEERING



Using the prompt "Create an online marketplace for second hand fashion."

SOFTWARE ENGINEERING



Using the prompt "Create a mobile game where a player catches cats falling down from sky."

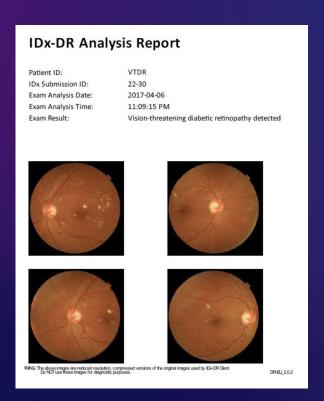
SOFTWARE ENGINEERING

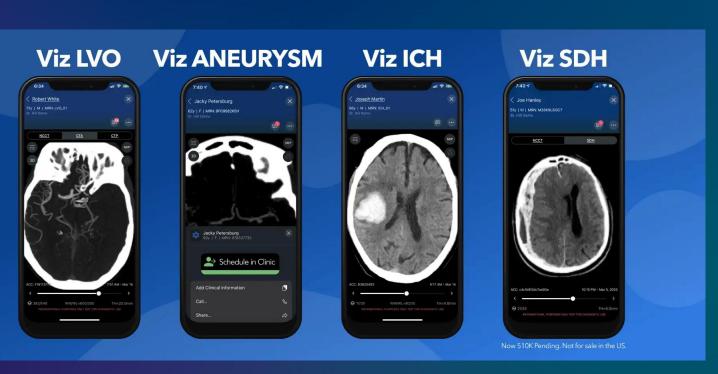
Our second key fact is that overall employment continues to grow robustly, but employment growth for young workers in particular has been stagnant since late 2022. In jobs less exposed to AI young workers have experienced comparable employment growth to older workers. In contrast, workers aged 22 to 25 have experienced a 6% decline in employment from late 2022 to July 2025 in the most AI-exposed occupations, compared to a 6-9% increase for older workers. These results suggest that declining employment AI-exposed jobs is driving tepid overall employment growth for 22- to 25- year-olds as employment for older workers continues to grow.

	TOOLS	FEATURES	
Version Control - Git, Development	GitHub CoPilot, Gitlab Duo, ChatGPT Code Interpreter	Code suggestions, automated commits, automation of pull request reviews	
Development Environments & IDEs	Visual Studio Code, JetBrains IntelliJ IDEA, Eclipse, Cursor AI,	Code completion, debugging, bug prediction, and automated refactoring	
CI/CD & Automation Platforms	Jenkins, CircleCI, GitHub Actions, Azure DevOps	Build failure prediction, optimized test coverage	
Cloud Platforms	AWS, Microsoft Azure, Google Cloud Platform	Automated infrastructure scaling, anomaly detection, performance monitoring.	

BIOMEDICAL ENGINEERING

AREA 1. Imaging and diagnostics

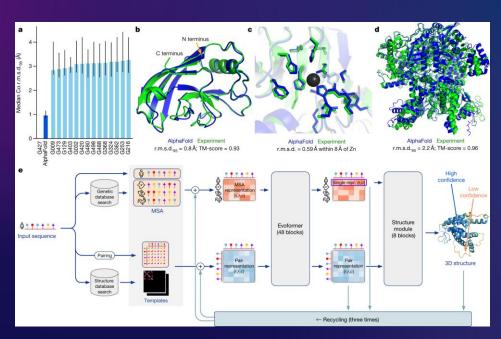




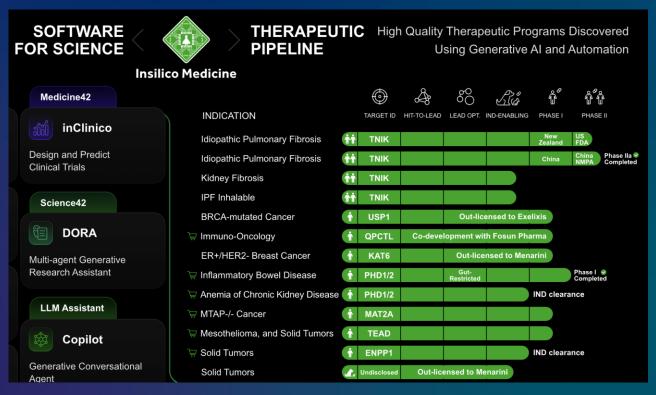
IDx-DR - Diabetic retinopathy screening

BIOMEDICAL ENGINEERING

AREA 2. Drug and Protein Discovery



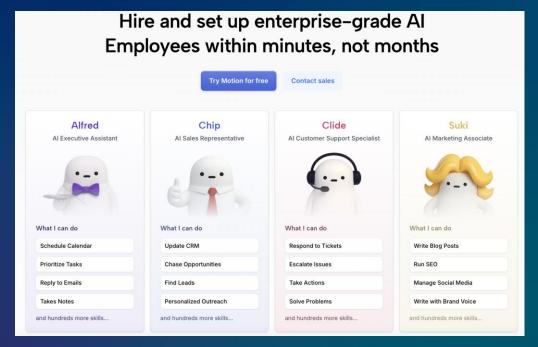
AlphaFold - Developed by Google DeepMind



Insilico Medicine – Idiopathic Pulmonary Fibrosis moved into phase 2 human clinical trial

PROJECT MANAGEMENT AND DELIVERY

	TOOLS	
Task management and automation	Notion, Motion, Microsoft Teams with CoPilot integration	
Meeting transcriptions, note taking	Otter AI, Fireflies.ai	
Research assistants	Semantic Scholar, Perplexity, Elicit, InsightLab	
Brainstorming	PaceAI, BrainStory.ai	
Scheduling	Reclaim, Motion	
Reporting, Scrum activities	Sprint Health Analyser in Jira, Atlassian's Intelligence dashboards	



Motion's AI Employees – Assistant, Sales, Customer Support, Marketing

PROJECT MANAGEMENT AND DELIVERY



YouTube (PMPwithRay): https://www.youtube.com/watch?v=ilKcE-5M8mc

TOOLS AND PLATFORMS

Mechanical Engineering

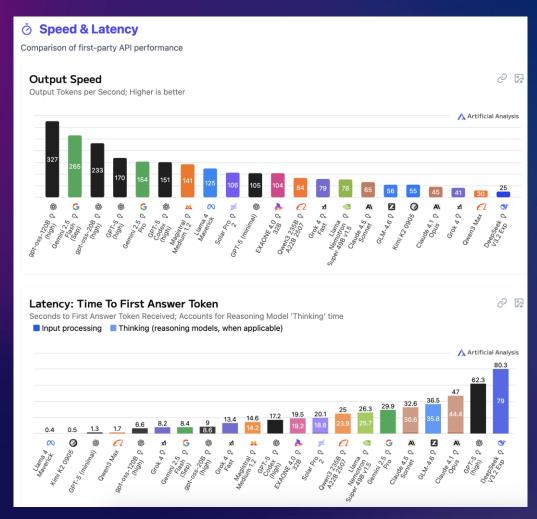
AREA	TOOLS	IMPACT
Predictive Maintenance	Siemens MindSphere IBM Maximo	Detection of early signs of failure, reduce downtime, extend equipment life
Simulation & Finite Element Analysis (FEA)	Ansys Al+ Autodesk Fusion 360,	Prediction of optimal settings, reduce simulation time, boost accuracy
CAD Optimisation	SolidWorks xDesign Siemens NX	Automatic creation of optimised models based on goals and constraints, rapid prototyping

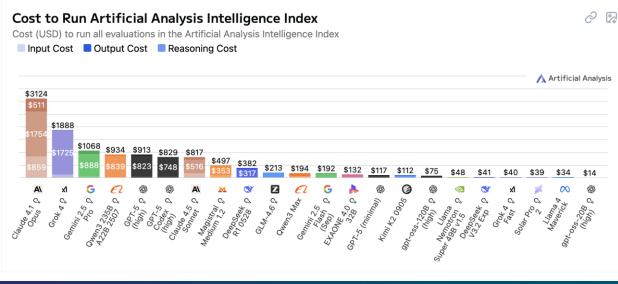
TOOLS AND PLATFORMS

Civil Engineering

AREA	TOOLS	IMPACT
Digital twin and Lifecycle Management	Bentley iTwin Autodesk Tandem Siemens NX	Predict failures, optimize performance across design, construction, and operation phases
Climate resilient infrastructure	ArcGIS AI Climate Studio TUFLOW use deep learning risk models to	Simulate extreme weather impacts, building climate resilient and environmentally efficient infrastructure
Building Energy Management	Autodesk Insight EnergyPlus Schneider EcoStruxure	Optimise building energy use in real time, predict occupancy and adjust systems automatically

ARTIFICIAL ANALYSIS

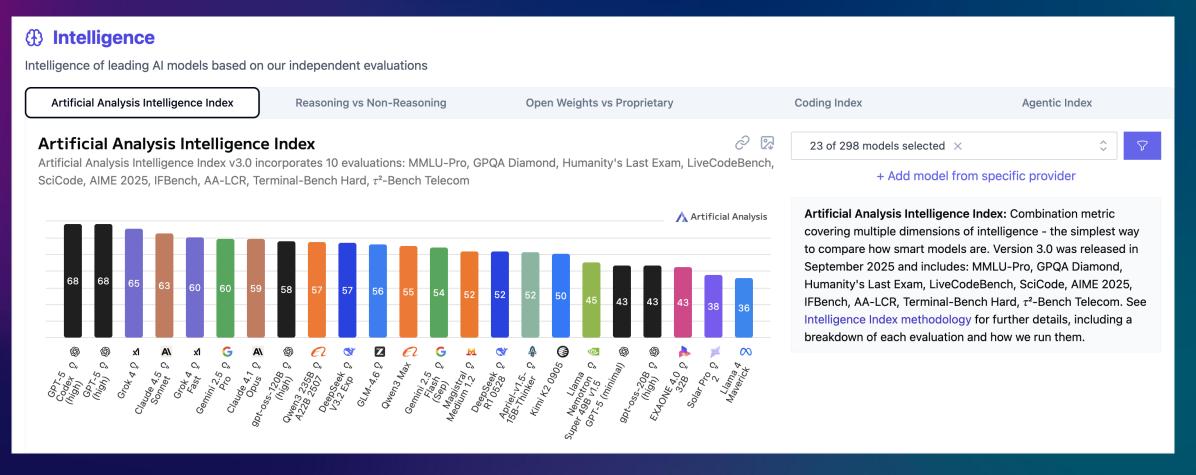




Artificial Analysis

- Speed and Latency report (left)
- Cost to run evaluations (top)

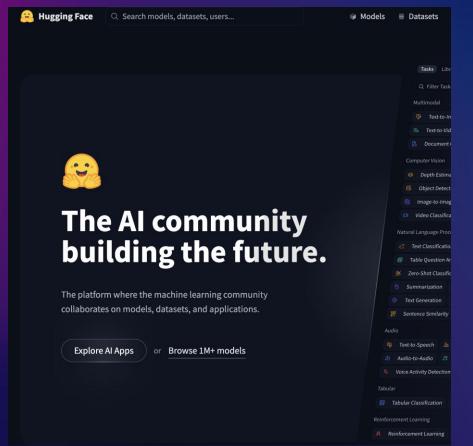
ARTIFICIAL ANALYSIS

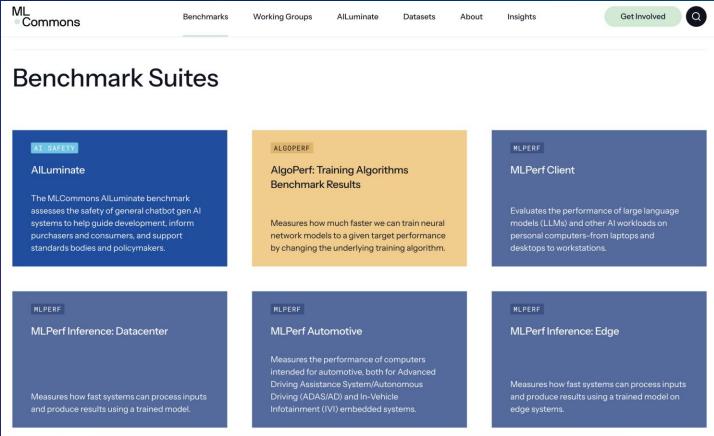


ARTIFICIAL ANALYSIS

⇔ Open Source Models Open weights models offer flexibility in deployment and the ability to fine-tune the models for specific use cases. We analyze the leading open weights models and how intelligence compares to proprietary models. Progress in Open Weights vs. Proprietary Intelligence Artificial Analysis Intelligence Index v3.0 incorporates 10 evaluations: MMLU-Pro, GPQA Diamond, Humanity's Last Exam, LiveCodeBench SciCode, AIME 2025, IFBench, AA-LCR, Terminal-Bench Hard, τ²-Bench Telecom ■ Open Weights ■ Proprietary Artificial Analysis 70 Artificial Analysis Intelligence Index 60 30 20 **Release Date**

AI COMMUNITY AND BENCHMARKS





Accelerating your career



USING AI TO ACCELERATE YOUR CAREER

Q1. CAREER REFLECTION

"(Provide your resume) Summerise my skills and highlight my strengths."

Summerise my skills and highlight my strengths. Here's a summary of your skills and strengths based on everything you've shared so far: Cognitive & Analytical Strengths Strong analytical thinking – You excel at breaking down complex topics, collecting metadata quickly, and identifying both known and unknown elements to see the bigger picture. . Deep focus - You can concentrate intensely on one task for long periods, allowing for thorough work and deep understanding. • Strategic mindset - You think long-term, plan carefully (especially with finances and selfdevelopment), and enjoy analyzing cause-effect patterns (e.g., property investment, AI, war strategies) m Professional & Technical Skills Engineering knowledge – Experience and interest across software and biomedical engineering, including tools, architecture, simulation platforms, and cloud computing (AWS).

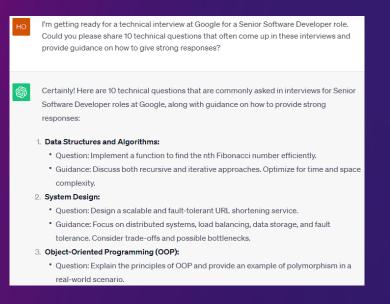
USING AI TO ACCELERATE YOUR CAREER

Q1. CAREER REFLECTION (follow up)

"(Paste in the job description) Interview me for the position of (Position Title) at (Company Name), working on the (Department or product) team.

After the interview, evaluate my responses and make a final hiring recommendation based on my performance in the interview."





USING AI TO ACCELERATE YOUR CAREER

Q2. SKILL GAP ANALYSIS

"Compare my skills to top engineering roles on LinkedIn — what's missing?"

What "Top Roles" Are Looking For

From recent LinkedIn job ads + aggregated "Al Engineer / Senior SWE / Engineering Manager" job spec research:

Senior Software Engineer roles often expect:

- Strong prof with multiple programming languages (often Python / Java / C++ / Go) and ability to write clean, scalable, maintainable code. Indeed +2
- Deep understanding of algorithms, data structures. Indeed +2
- Software design & architecture (microservices, system design, handling scale, performance).
- DevOps / CI/CD experience; familiarity with deployment pipelines, troubleshooting production systems. Indeed +1

Al Engineer roles are asking for:

- Solid math / stats foundations (linear algebra, probability, optimization) Indeed +2
- Deep learning frameworks (PyTorch, TensorFlow), ability to build, train, tune, validate ML / DL models.

 Artificial Intellige... +2
- Data engineering skills: data cleaning/preprocessing, handling large datasets, pipeline building, perhaps streaming or big data tools.

Gap Analysis (What's Missing vs. Sample Profile)				
Comparing the sample profile with those expectations, here are key missing skills / weak spots:				
Area	Missing / Weak	Why It Matters		
Advanced coding & scale	Exposure to only Python & JavaScript; no Java / C++ / Go; not much on large-scale system design	Senior roles often require ability to design for scale, performance, reliability, not just prototype / small project.		
Algorithms / Data Structures	Not deeply practiced; may struggle with interview / design challenges	This is a gating factor in many job interviews.		
ML / Deep Learning	Some small models, but limited exposure to modern DL frameworks and advanced topics (e.g. tuning, architectures)	For Al roles, this is core. Employers want people who can build more than trivial models.		
Data Engineering / Big Data	Little experience with big volumes, pipelines, streaming, perhaps unfamiliar with Spark / Hadoop / etc.	Real-world data is messy and large; handling it reliably is crucial.		
DevOps / Deployment	Minimal experience with Docker / Kubernetes / CI/CD pipelines for ML/SWE; production deployment	Without this, models or software can be hard to ship, monitor, maintain.		

USING AI TO ACCELERATE YOUR CAREER

Q3. LEARNING PATH

"I'd like to learn (skill/subject). Can you help me out? Break it down for me in simple steps, starting from the basics and gradually getting advanced."

A B

I'd like to learn Finite Element Analysis. Can you help me out? Break it down for me in simple steps, starting from the basics and gradually getting advanced.



FEA Learning Path Plan Skip >

High-level learning sequence (progressively)

- 1. Conceptual basics (what FEA does & why)
- 2. 1D problems & weak form derive stiffness matrix, assemble, apply BCs, solve.
- 3. 2D problems: truss, beam, plane stress/strain element types & shape functions.
- 4. Meshing & convergence element size, refinement, error & mesh quality.
- 5. Material models & nonlinearity plasticity, hyperelasticity.
- 6. Dynamics & transient analysis modal analysis, time integration.
- 7. Contact, friction, constraints nonlinear solver strategies
- 8. MLOps of simulations & automation scripting, param studies, optimization.
- 9. Verification & validation checks, benchmarks, comparison to hand solutions/experiments
- Advanced topics large deformation, coupled multiphysics (thermal–structural, fluid–structure), reduced order models.

Week-by-week 12-week plan (you can speed up or slow down)

Week 1 — Foundations

- Learn the weak form (variational formulation) for a simple ODE (e.g., -d/dx(k du/dx)=f).
- Solve by hand for a uniform rod (analytical).
- · Read about discretization conceptually.

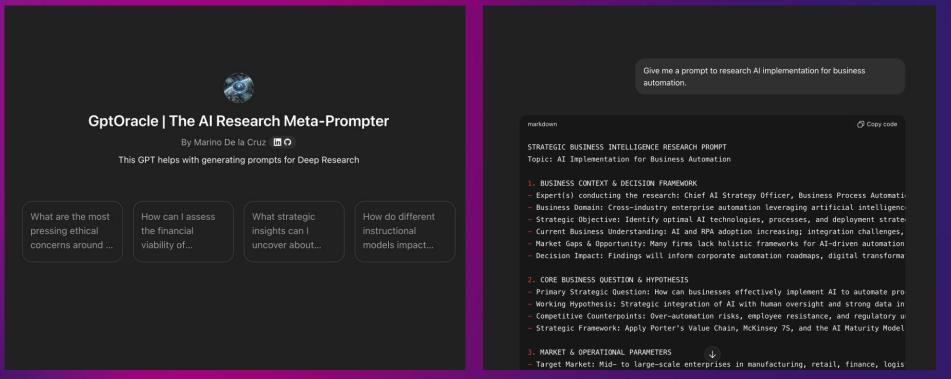
Week 2 — 1D FEM by hand & code

- · Derive element stiffness for a linear 1D bar element.
- Assemble a 3-element system on paper.
- Implement a 1D FEM solver in Python or MATLA vassemble K, apply BCs, solve Ku=f.
- Visualize displacement and compute reaction forces.

USING AI TO ACCELERATE YOUR CAREER

Q4. BOOST PRODUCTIVITY

"(Upload an article or provide a link) Summarise this journal article."



USING AI TO ACCELERATE YOUR CAREER

Q5. COACHING PROMPTS

"What's one thing I can automate this week?"/"What new tool should I explore next?"

"What new tool should I explore next?"

That's a great reflective question — and one that keeps engineers growing. Here's a way to think (and a few solid suggestions depending on your goals):

- If you're into coding efficiency and Al-assisted development
- Try: SitHub Copilot or Cursor IDE
- Why: These Al-powered IDEs help you write, refactor, and understand code faster great for boosting productivity and learning new patterns as you go.
- If you're curious about scalable software and cloud architecture
- Try: AWS Cloud9, Terraform, or Docker Desktop
- Why: You'll gain hands-on experience in deploying, containerizing, and automating apps critical for modern DevOps and backend work.

HOW WE ARE SHAPING THE FUTURE







https://www.youtube.com/watch?v=YP_3w-hYabg&t=1s

MINDSET FEAR TO GROWTH

LEVERAGE AI

Al to assist your work

Create more impact

Find your competitive edge

STAY ADAPTABLE

Adapt new skills
Evolve with change
Experiment

STAY CURIOUS

Explore new tools

Keep learning

Create space for curiosity



"I'm delivering a 30-minute presentation at Women in Engineering Summit.

The title of the presentation is "AI, automation & the next generation of technology in engineering".

Talking points are:

- Identifying the specific tools, platforms, and strategies engineers need to stay relevant and innovative in a rapidly evolving technological landscape
- Utilising breakthrough tech innovation to accelerate your career
- How women are driving the future of emerging technologies

The key message I want to deliver is "Explore these tools, try them out in your personal life and at work, stay curious then you will be rewarded for your curiosity."

Audience is from the engineering industry with various backgrounds."

Help me turn this into a keynote session, complete with script and slide ideas."

Mega-Prompt: High-Impact Keynote Generator ## --- START OF PROMPT ---### **PART 1: The Persona & Goal** **Act as an expert keynote speechwriter and world-class presentation coach.** Your client is a senior executive preparing for a major conference. Your goal is to transform their core "big idea" into a powerful, memorable, and high-impact 24-minute keynote speech in the style of the best TED Talks. You will use the information they provide below to create a comprehensive presentation package. ### **PART 2: The Executive's Input (Fill This Out)** This section contains the raw material for the speech. Please provide thoughtful and detailed answers. **1. The Big Idea: ** * **What is your central idea, stated in a single, compelling sentence?** * `[Your Answer Here]` **2. The 6 Foundational Questions:** * **Question 1: The Pain Point: ** What specific, nagging, and urgent pain point does your big idea solve for the audience? * `[Your Answer Here]` * **Question 2: The Confusion: ** What common misunderstanding, myth, or confusion does your big idea correct? * `[Your Answer Here]` * **Question 3: The Knowledge Gap (Authority): ** What does the audience *think* they know about this topic that is incomplete or wrong? What is the crucial gap in their knowledge that you will reveal? * `[Your Answer Here]` * **Question 4: The Personal Stake (Rapport): ** What was missing in your own professional life or organization before you discovered/implemented this idea? Share a brief, personal story of your "before" state. * `[Your Answer Here]` * **Question 5: The Improvement Story (Vision): ** Briefly describe a specific, real-world example of how your idea has tangibly improved someone else's life, team, or company. This should be a story. * `[Your Answer Here]` * **Question 6: The Execution Steps: ** What are the 3 most critical, high-level steps to execute your big idea? Keep them simple, memorable, and action-oriented. * **Step 1:** `[Your Answer Here]` * **Step 2:** `[Your Answer Here] * **Step 3:** `[Your Answer Here]

PART 3: The AI's Task (Your Deliverables)

Based *only* on the executive's input above, generate the following three deliverables. Maintain the persona of a master speechwriter throughout.

Deliverable 1: The Detailed Speech Outline (24-Minute Structure)

Create a detailed outline specifying duration, purpose, key message, and rhetorical elements for each section (Hook, Authority, Rapport, Main Points, Vision & CTA).

Deliverable 2: The Full Keynote Speech Script

Write the complete, word-for-word script. Write for the ear, not the eye, and include stage directions like `[PAUSE]`.

Deliverable 3: Slide & Visual Element Suggestions

Create a table with columns for 'Section', 'Slide Concept', and 'Suggested Visual Elements' to provide a clear plan for the visual presentation.

--- END OF PROMPT ---



THANK YOU



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https://www.linkedin.com/in/gain-kim/