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DesignNews

Creating Your Own AI Software Intern

DAY 1 : Introduction to AI-Powered Software Development

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THE SPEAKER

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Beningo Embedded Group – CEO / Founder

Focus: Software Architecture, Processes, and Dev Skills

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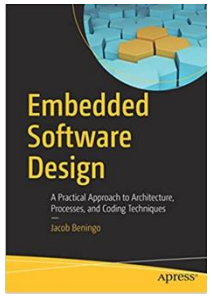

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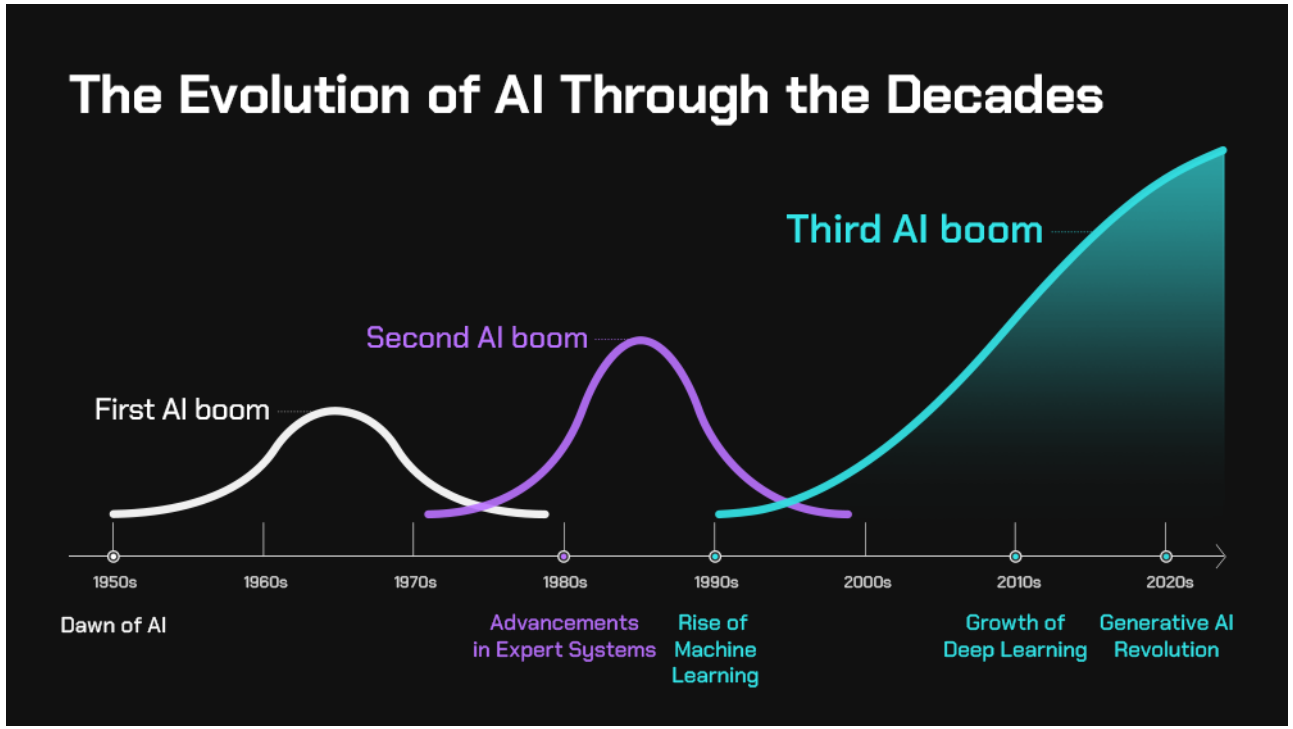
The State of AI

01

The State of AI



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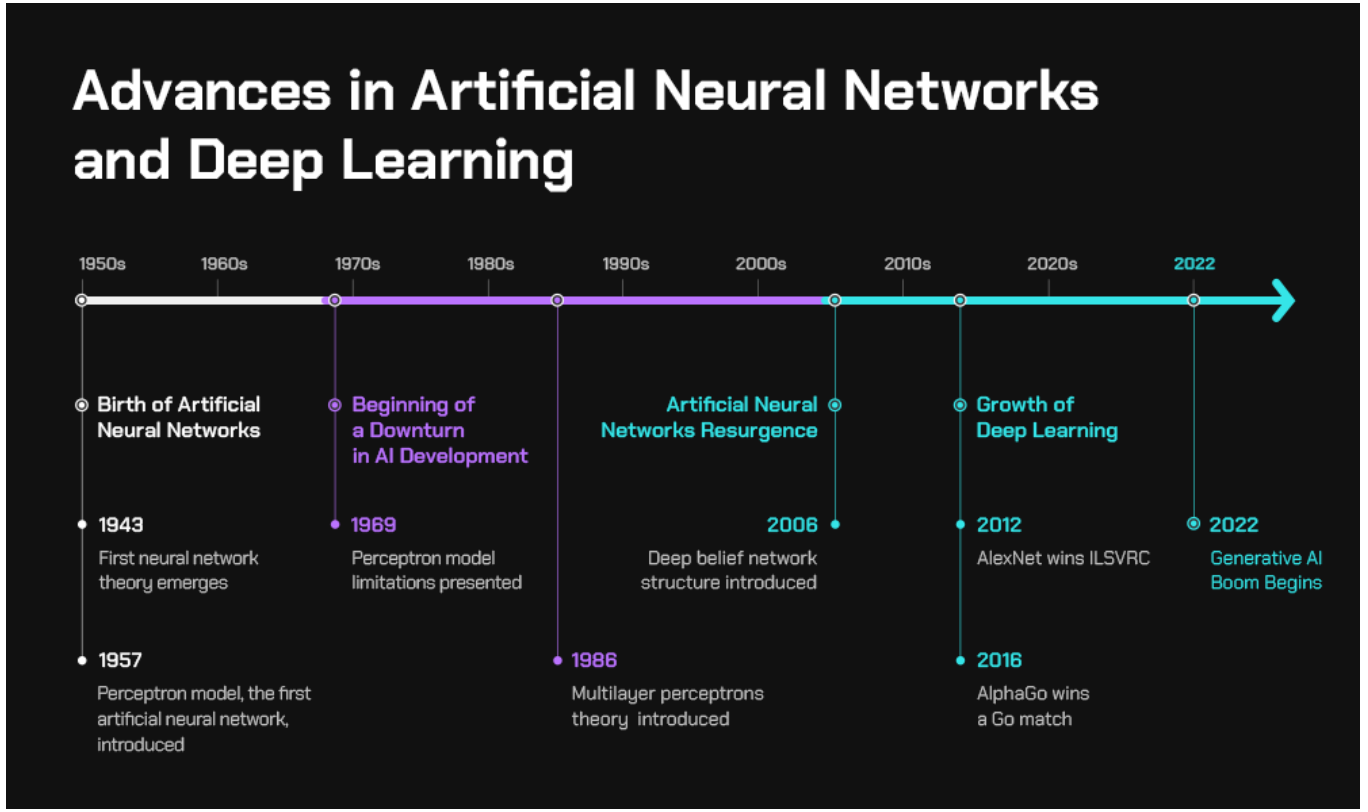
The State of AI



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The State of AI

AI Agents
- Autonomous tools that plan, execute, and adapt.
- Use cases: test automation, code refactoring, CI/CD monitoring.

Retrieval-Augmented Generation (RAG)
- Combines LLMs with external knowledge (docs, code, APIs).
- Use cases: documentation chatbots, internal tools with up-to-date context.

Codebase-Aware AI
- AI copilots trained on your repo for smarter suggestions.
- Tools: Cody, CodeWhisperer, Sourcegraph Agents.

Multimodal AI
- Accepts and reasons across text, code, images, diagrams, and more.
- Use cases: explaining circuit diagrams, analyzing screenshots, reverse-engineering UIs.

Chain-of-Thought and Tool Use
- AI that breaks down reasoning or uses APIs/calculators.
- Use cases: build scripts, simulation pipelines, unit test generators.

Fine-Tuning & Custom Instruction Tuning
- Train models on your firmware/data to improve relevance.
- Use cases: domain-specific language support, project guidance.

Voice/Command Interfaces
- Control development tools via natural language.
- Use cases: “Build with profile X,” “Run test Y,” “Explain function Z.”

Synthetic Data & Simulation Agents
- Use AI to generate sensor data or simulate edge-device behavior.
- Use cases: system testing, machine learning pipelines, fuzzing.

Audience POLL Question

What Role Will AI Play in Your Firmware Work?

a) Daily assistant for wirting/debugging code
b) Occasional helper for research or brainstorming
c) I'm skeptical, it's not ready for firmware yet
d) I don't plan to use AI in development

02 Creating Your Own AI Software Intern

Creating Your Own AI Software Intern

A software engineering intern contributes to real-world development tasks while learning professional practices in a hands-on environment.

Key responsibilities may include:

- Writing, testing, and debugging software features
- Supporting development tools, scripts, or automation
- Participating in code reviews and team meetings
- Documenting functionality, APIs, or workflows
- Learning and applying engineering best practices
- Collaborating with engineers to solve technical problems

Creating Your Own AI Software Intern

Building a software intern, AI is like onboarding a junior developer but with automation in mind.

1) Identify the Intern's Responsibilities:
   - Define the narrow, repeatable tasks the agent will handle.
2) Choose the Right AI Foundation
   - Select an LLM or framework based on your needs
3) Provide Context and Boundaries
   - Feed it source files, repo structure, coding guidelines, or internal docs
4) Set Up a Feedback Loop
5) Wrap in a Simple Interface or Workflow

Creating Your Own AI Software Intern

Option	Major Advantage	Major Disadvantage
OpenAI GPT-4	Best-in-class reasoning and natural language ability	Requires careful prompt design and has API costs
Anthropic Claude	Handles long context windows (100K+ tokens) well	May be slower and less code-focused than GPT-4
Mistral (open-source)	Lightweight and fast for local or private use	Weaker at reasoning and coding unless fine-tuned
Code Llama (Meta)	Open-source and trained for coding tasks	Requires more setup; not as smart as GPT-4 for tasks
Google Gemini	Strong at multimodal input (images + code)	Limited tooling for agent frameworks currently
GitHub Copilot (Codex)	Seamlessly integrated into IDEs, great for code suggestions	Limited outside IDEs; not designed for autonomous tasks
LangChain + OpenAI	Agent architecture with memory, tools, and reasoning	Can be over-engineered for simple tasks
AutoGen by Microsoft	Multi-agent conversations and tool orchestration	More complex setup and coordination overhead

Audience POLL Question

What foundation are you most interested in working with?

a) OpenAI GPT-4
b) Anthropic Claude
c) Code Llama (Meta)
d) Google Gemini
e) GitHub Copilot (Codex)
f) LangChain + OpenAI

What is an Agent?

03

What is an Agent?

What is an Agent?

An AI agent is a system that can autonomously perceive, reason, and act to complete a task or set of tasks—often using tools, memory, and decision-making processes.

Unlike basic AI assistants that respond passively to prompts, agents take initiative, break problems into steps, and adapt their behavior based on goals and feedback.

- Autonomous: Takes action without step-by-step user input
- Goal-Oriented: Works toward completing a defined objective
- Reasoning & Planning: Can chain thoughts, use tools, and explore options
- Tool Use: Invokes APIs, scripts, or external data as needed
- Memory: Retains relevant information across steps or sessions

What is an Agent?

Where can you use AI Agents?

- Development Workflows
  - Run unit tests, format code, and manage CI/CD pipelines
  - Suggest or enforce coding standards during PRs
- Knowledge + Documentation
  - Generate and maintain documentation automatically
  - Answer “how does this work?” using your actual codebase
- Firmware Engineering
  - Simulate sensor inputs or fault conditions
  - Assist with board bring-up (peripheral init, pin configs)
  - Monitor hardware test benches or data logs

Audience POLL Question

How ready are you to trust an AI software intern to help with your engineering tasks?

a) I already use one
b) I'm experimenting
c) I'm curious
d) I don't trust AI for software development at all

Next Steps

04

Going Further

Download the Agent Sourcecode:

- https://beningo.short.gy/l6ykgr

- Attend my EOC workshop
- Review ChatGPT Documentation
- Agent Documentation
- AI Cookbooks

Additional Resources

Please consider the resources below:

- Jacob's Blogs
- Jacob's CEC courses
- Embedded Software Academy

- Embedded Bytes Newsletter
  - http://bit.ly/1BAHYXm

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Next Steps

- ✓ Introduction to AI-Powered Software Development
- Customizing Your AI Intern with GPTs
- Integrating AI Agents into Your Workflow Part 1
- Integrating AI Agents into Your Workflow Part 2
- Deploying and Optimizing Your AI Intern

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