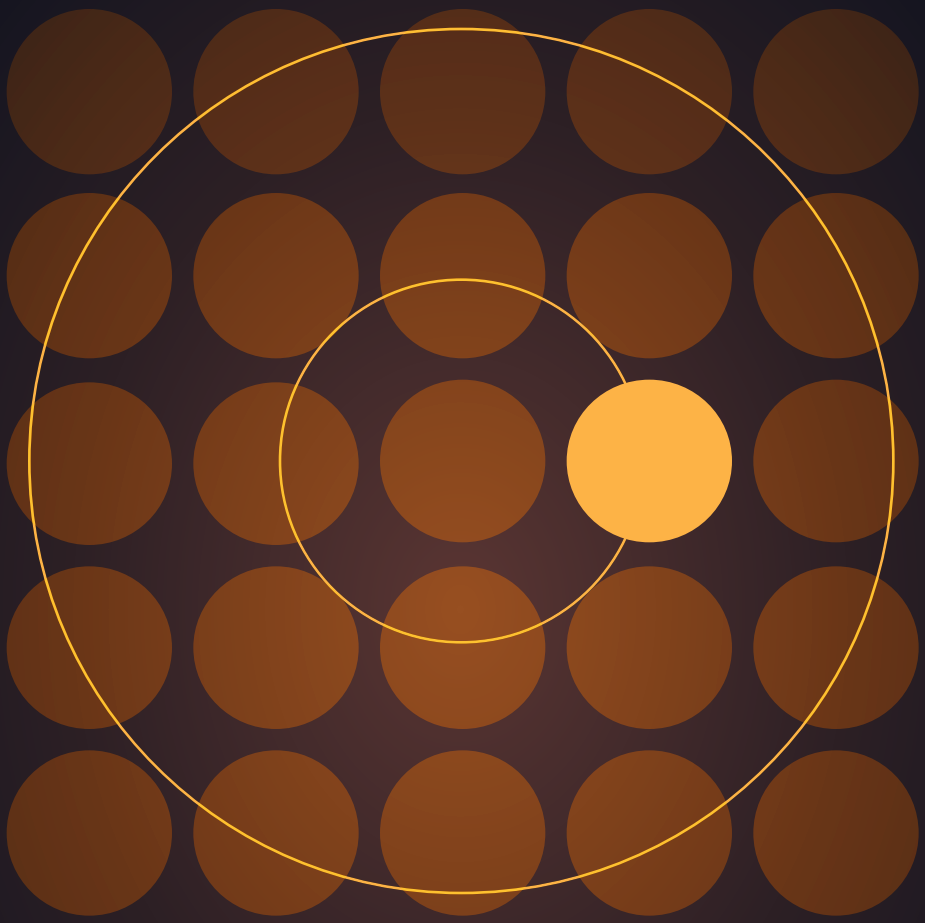
HTEC Momentum



UX of AI

Designing AI-Powered Experiences

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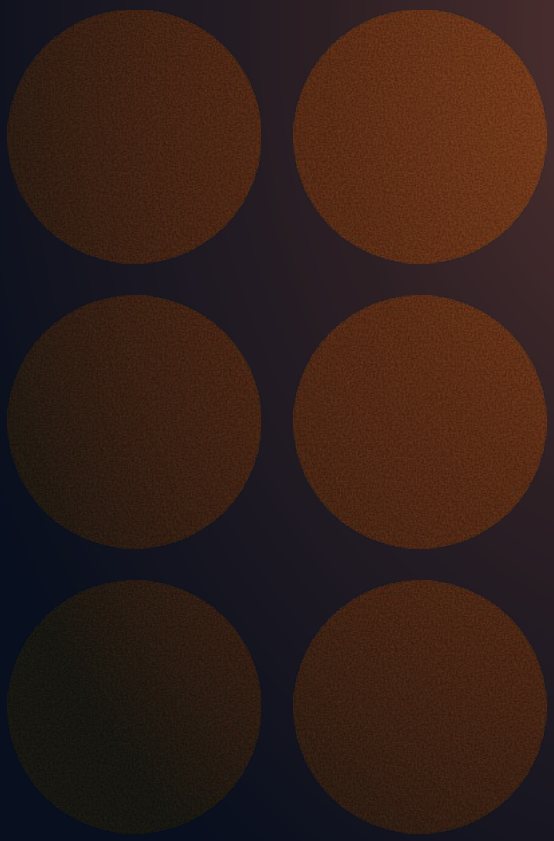


Technology is evolving again. Over the past six decades, we have seen major shifts in how people interact with machines. From typing commands on green-and-black screens to the familiar interaction patterns and swiping used with modern apps, each change made technology more accessible. Now, we are stepping into a new phase: Intent-Based Interaction, powered by artificial intelligence.

The idea is straightforward. Instead of operating a computer in a way that is not much different from a factory worker operating a machine, users are simply able to express what they need and their desired outcome, and let technology handle the rest. Imagine planning a trip by just saying, "Book me a flight and hotel for next weekend," and it happens. No forms, no tabs, just results. But with this ease comes complexity. Designing for AI is not just about making it work; it's about making it feel natural and trustworthy.

Nobody understood this better than Steve Jobs. He famously described computers as "bicycles for the mind." Just as a bicycle amplifies physical power, a computer amplifies our mental power. This vision captured the essence of what technology could be: an extension of human capability. Intent-Based Interaction takes this metaphor one step further. Rather than navigating paths or clicking through layers of interface, you simply express your goal – and technology responds.

The key that has been making this possible over time is artificial intelligence, but more recently, LLMs are a breakthrough to a whole new experience. AI is the brain that powers these Intent-Based Interactions (more recently through AI agents). It bridges the gap between human intention and technological execution, interpreting goals and dynamically figuring out the best way to achieve them. Unlike traditional interfaces, where users must understand the steps needed to complete a task, AI handles this complexity behind the scenes.

Three Shifts That Changed Everything

To understand where we are, it helps to look back at where we've been. Over the last 60 years, three major shifts in interaction design have redefined how we engage with technology. Each one moved the computer closer to human intuition, making them more accessible, more interactive, and more capable of understanding our needs.

1. Command-Based Interaction (1960s to 1980s)
   In the earliest days of computing, using a computer meant speaking its language. Users typed precise commands into monochrome terminals, line by line, to perform even the simplest tasks. This method was powerful but exclusive. Only those with technical expertise could navigate its rigid structure. While efficient, it kept technology out of reach for many, limiting its potential to specialized environments like labs and corporate data centers.

2. Graphic User Interfaces (GUIs) (1980s to Present)
   The arrival of GUIs changed everything. Icons, windows, and visual navigation replaced text-based commands, opening the door for broader use. Computing no longer required deep technical knowledge. You could point, click, and explore. This shift democratized technology, making it part of everyday life. For many, this was the beginning of digital fluency. Interacting with technology became less about memorizing commands and more about discovery and exploration.

3. Intent-Based Interaction (The New Era)
   Today, we are stepping into a new paradigm: Intent-Based Interaction. Unlike GUIs that rely on manual navigation, Intent-Based Interaction focuses on goals instead of steps. Users express their needs, and AI handles the rest. It is a shift from clicking through screens to simply stating intent. No more sifting through menus or toggling between tabs. You express your need, and technology responds. This approach marks a fundamental change in design, moving away from static screens to adaptive systems that respond in real time.

The Technology Behind It

At the heart of Intent-Based Interaction are agentic systems powered by LLMs. AI agents do not just respond; they interpret, adapt, and optimize based on the user intents. This allows for more natural interactions where technology understands what needs to be done and handles it accordingly.
There are two primary types of Gen AI systems that make this possible:

Traditional (Non-Agentic)
These systems operate in a one-shot manner. You make a request, the AI provides a single response, and the interaction ends. For simple tasks like checking the weather or answering a trivia question, this works well. But there is no learning, no refinement, and no real back-and-forth.

The Technology Behind It

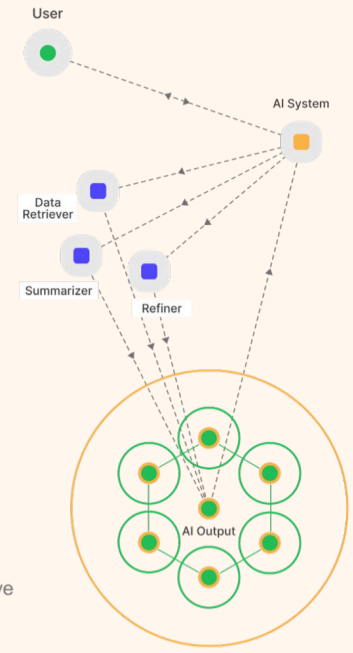
Agentic

This is where the real innovation begins. Agentic systems are designed to handle complex, multi-step tasks through a network of specialized digital agents. Each agent focuses on a specific part of the problem: one gathers data, another analyzes it, and yet another drafts the final response. If adjustments are needed, the agents communicate and optimize the output before it reaches the user.

This structure allows for real-time feedback, learning, and adaptation. Unlike traditional methods where users have to navigate every step, agentic AI takes on the complexity, coordinating tasks dynamically to achieve the desired outcome.

Agentic
Multi-Agent System

- Step-by-Step Process
- Uses feedback loops for refinement
- Breaks task into smaller stages

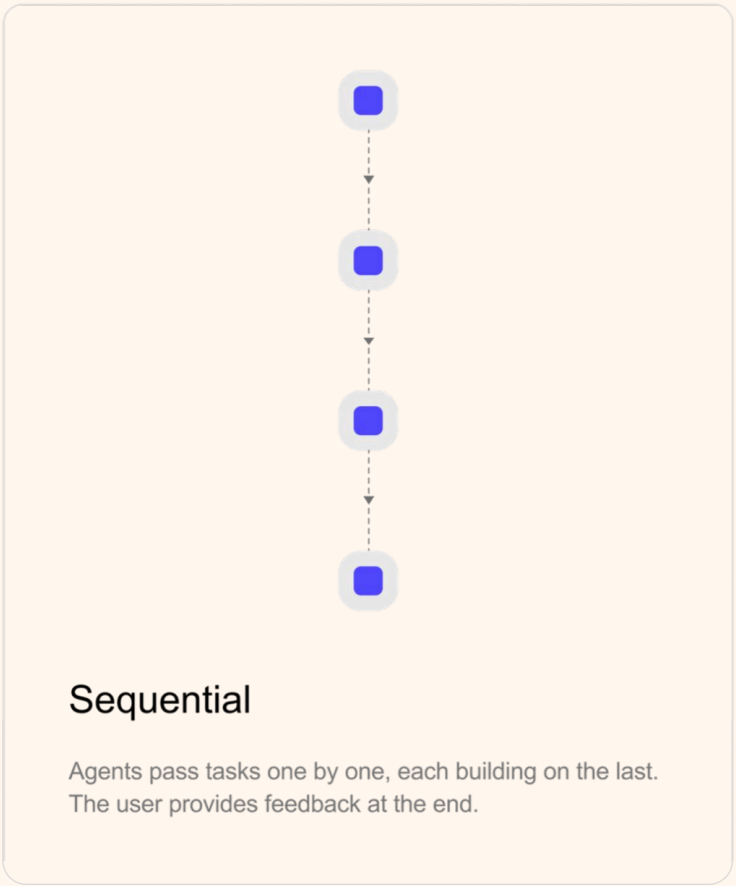


Example: "Summarize this article" → Retrieve sources → Gather data → Summarize → Refine based on user feedback

Basic Agentic Workflows

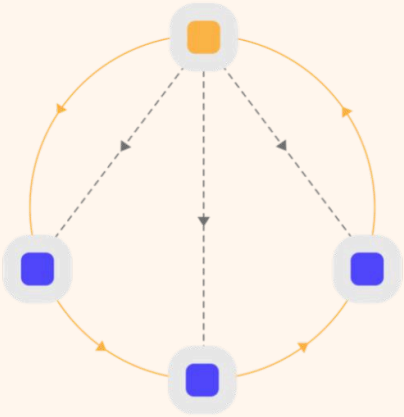
While agentic AI is capable of complex orchestration, there are three foundational workflow types that define its core operations. These are not exhaustive, but they represent the baseline of how agentic interactions are typically structured:

- **Sequential**
  Tasks are passed along step by step, like an assembly line. One agent completes its part and hands it off to the next. The user typically provides feedback at the end, adjusting the outcome if necessary.



- Hierarchical

  In this model, a Manager Agent oversees several Worker Agents. The manager assigns tasks, monitors progress, and handles quality checks. If something is not quite right, tasks are looped back for adjustments before the user even sees the result. This internal quality control reduces friction and improves accuracy.

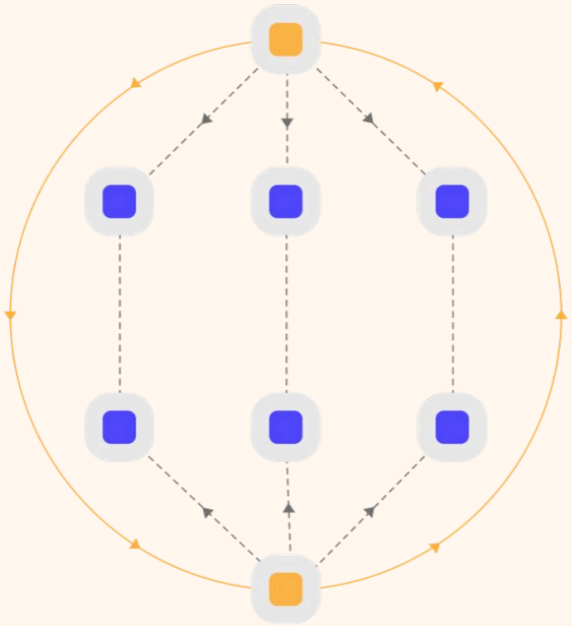


Hierarchal

A Manager Agent oversees Worker Agents, coordinating tasks and reviewing outputs. Feedback loops happen between the Manager and Workers before results reach the user.

- Hybrid

  The most complex of the three, hybrid workflows combine elements of both sequential and hierarchical structures. Multiple processes run in parallel, with a manager orchestrating the interactions. Feedback loops happen continuously, ensuring that results are fine-tuned as they are being created.



Hybrid

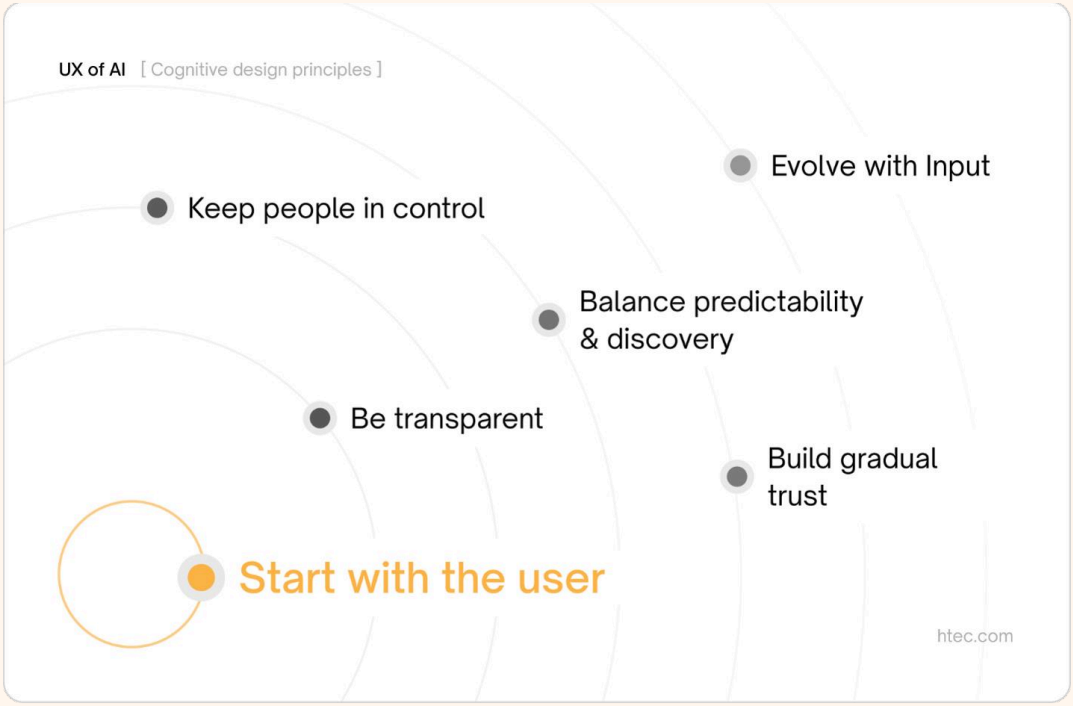
Combines both—multiple sequential flows managed by a central system. Feedback can occur at multiple points across flows.

These basic workflows represent the starting point for agentic AI interactions. However, as technology evolves, more complex and layered workflows are emerging, expanding the possibilities of what AI can orchestrate.

Cognitive Design Principles for AI-Powered Experiences

The transition to Intent-Based Interaction is not just a technical shift; it is a design challenge. As AI takes on more of the decision-making process, the need for clear, human-centered design principles becomes essential. For users to trust and embrace AI-driven systems, interactions must feel natural, transparent, and empowering.

Below are the core Cognitive Design Principles that guide the development of AI-powered experiences:



Cognitive Design Principles for AI-Powered Experiences

1. Start with the User

Not every problem needs AI. Designing for Intent-Based Interaction starts with understanding real user needs. It is not about forcing technology into a solution but building around the user's intent. Begin with what people want to achieve, then let AI handle the complexity.

2. Be Transparent

AI should not feel like magic. Users need to understand how decisions are made, especially when outcomes are impactful. Transparent explanations build trust, particularly in agentic systems where multiple steps happen behind the scenes. If users understand the logic, they are more likely to trust the results.

3. Keep Users in Control

AI should assist, not take over. Users should have the ability to adjust, refine, and influence outcomes. This sense of control is critical for building confidence, especially as AI handles more complex, multi-step tasks. Even in agentic workflows, the user remains the final decision-maker.

4. Balance Predictability and Discovery

AI-driven experiences should feel both intuitive and explorative. Predictability is important for user confidence, but it should not limit discovery. Interfaces should encourage users to explore while still providing reliable outcomes. Intent-Based Interaction is about enabling users to state their goals without limiting how those goals are achieved.

5. Build Gradual Trust

Trust is earned over time. Starting with simple tasks allows users to build confidence in AI's capabilities before moving on to more complex interactions. Layering in features gradually helps users feel more in control and less overwhelmed. This is especially important for agentic systems that automate multiple steps in the background.

6. Evolve with Input

AI is not static; it learns and adapts. Effective design allows users to provide feedback, enabling the system to improve over time. This continuous learning process keeps the AI responsive to user needs and evolving expectations. It reflects the idea that technology should not just respond to users but also grow with them.

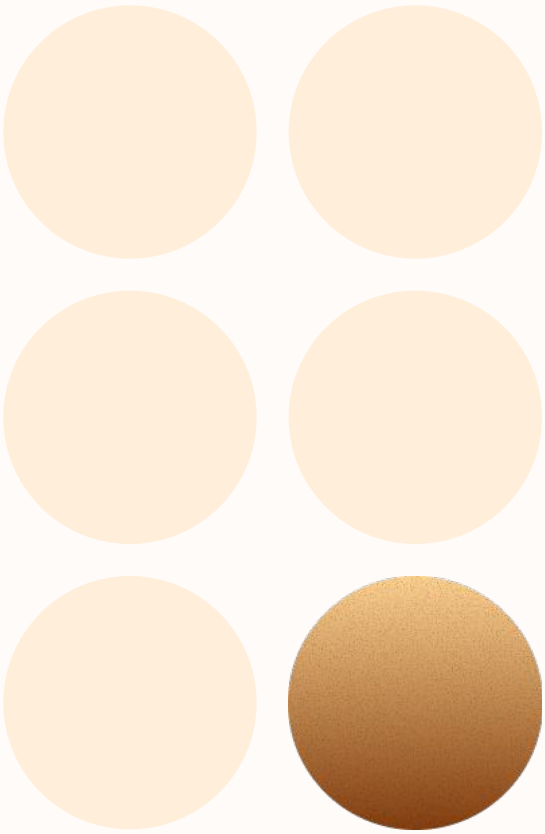
These Cognitive Design Principles are not just guidelines; they are the foundation for Intent-Based Interaction to feel intuitive, trustworthy, and human-centered. By focusing on user empowerment, transparency, and adaptability, we create AI experiences that are not only effective but meaningful.

Where We Are Headed

We are only beginning to see what Intent-Based Interaction can do. AI is moving from a passive tool to an active partner, learning from interactions and anticipating needs. This shift is already visible in areas like:

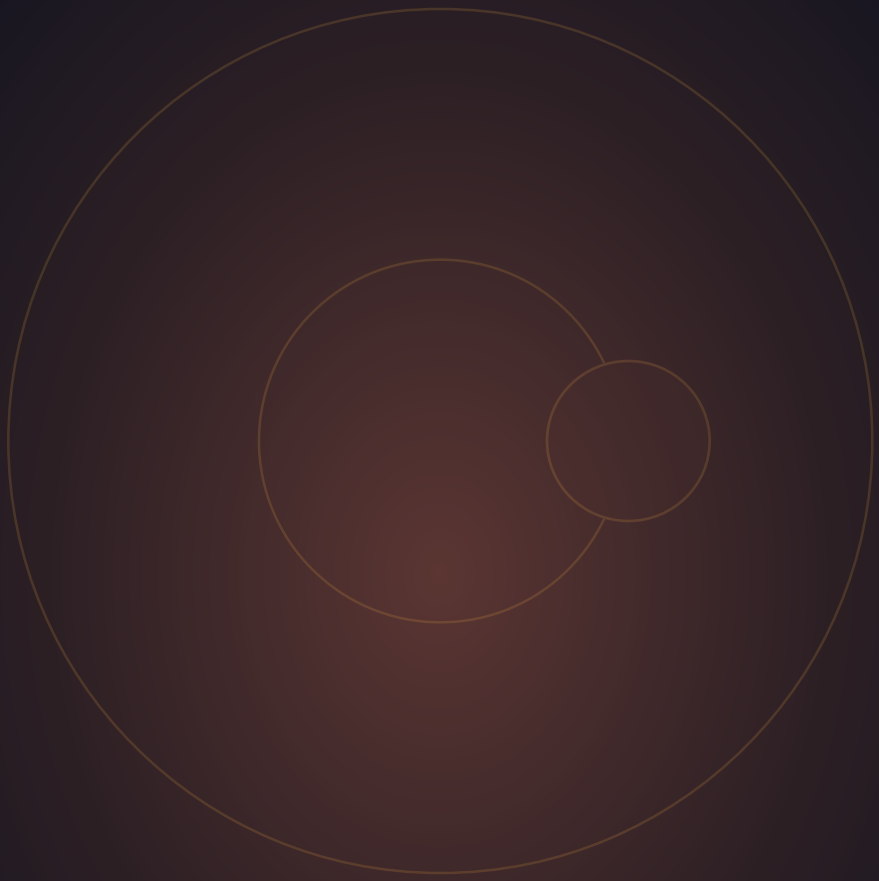
- AI Health Co-Pilots: Smarter, more personalized healthcare.
- Green AI: More efficient computing to support sustainability.
- Emotionally Intelligent AI: Technology that understands tone and context to make interactions feel more natural.
- LLM models such as OpenAI's ChatGPT: ChatGPT now has a memory; it learns from its human operator, enhancing and personalizing the experience over time.

The possibilities are wide-ranging, but they require thoughtful design. It is not just about making things easier; it is about focusing on the right problems to solve and ultimately making things better for all.



And never forget

It starts with the user. Understanding their needs, setting clear expectations, and ensuring transparency so they feel in control, not overwhelmed. HTEC's AI-first approach helps turn these insights into impactful, human-centric products. Let's connect to explore how we can build better products, together.



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