

# Introduction to Artificial Intelligence

## Definitions, Debates, and Implications

Computing and AI Ethics

Rochester Community and Technical College

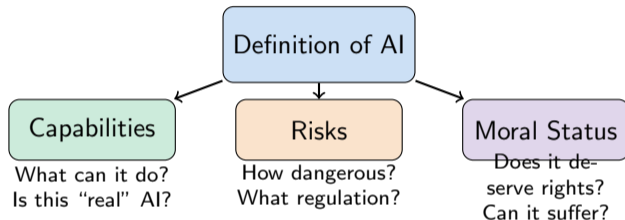
# Central Questions

- What *is* artificial intelligence?
- Is AI possible? (The answer depends on how we define it.)
- How have AI technologies evolved over time?
- Why do definitional debates matter for ethics, research, and self-understanding?

## The Challenge

“Artificial intelligence” means different things to different people—and these differences have real consequences.

# Why Definition Matters



The “AI” label carries weight: it influences funding decisions, public fear and hype, and regulatory responses. How we define AI shapes what we build, how we deploy it, and how we think about ourselves.

# The Moving Goalposts Problem

## Tesler's Theorem

"AI is whatever hasn't been done yet."

Technology	Once Called	Now Called
Chess playing (Deep Blue, 1997)	Artificial Intelligence	"Just search algorithms"
Speech recognition	AI breakthrough	"Just statistics"
Spam filtering	Machine learning	"Just classification"
Route optimization (GPS)	Intelligent systems	"Just algorithms"
Optical character recognition	Pattern recognition AI	Standard software

The paradox: When AI succeeds, we reclassify it as "not really AI." This makes "AI" a moving target that's impossible to hit.

# A Taxonomy of AI Concepts

Distinction	First Term	Second Term
Narrow vs. General	Excels at <i>one</i> task (chess, translation)	Performs <i>any</i> intellectual task
Weak vs. Strong	<i>Simulates</i> intelligence	Actually <i>has</i> a mind
Symbolic vs. Connectionist	Rules and logic (GOFAI)	Neural networks, learning
Tool vs. Agent	Used by humans for tasks	Acts autonomously toward goals

These distinctions will recur throughout our discussion. Most current AI is narrow, weak, connectionist, and increasingly agent-like.

# Meet the Key Figures: The Founders

## Ada Lovelace (1815–1852)

First computer programmer. Wrote notes on Babbage's Analytical Engine. Argued machines cannot “originate” anything—they only do what we program them to do.

## John McCarthy (1927–2011)

Coined the term “artificial intelligence” at the 1956 Dartmouth Conference. Developed LISP programming language. Pioneer of symbolic AI.

## Alan Turing (1912–1954)

Father of computer science. Cracked Enigma in WWII. Proposed the Turing Test (1950) as a way to sidestep the question “Can machines think?”

## Marvin Minsky (1927–2016)

Co-founder of MIT AI Lab. Worked on neural networks, then symbolic AI. Developed “frames” for knowledge representation. Famous for both insights and overpromises.

# Meet the Key Figures: Philosophers & Modern Theorists

## John Searle

Chinese Room argument (1980). Syntax  $\neq$  semantics; strong AI is false.

## Stuart Russell

Standard AI textbook co-author. AI = rational agency. AI safety advocate.

## Daniel Dennett

Functionalist: if it functions like a mind, it *is* a mind. Defends AI possibility.

## Luciano Floridi

AI achieves “agency without intelligence”—effective action without understanding.

## David Chalmers

The “hard problem”: why does processing *feel* like something?

# Prehistory—Dreams of Artificial Minds

**Ancient and medieval automata:** Hephaestus's golden robots in Greek myth; medieval clockwork figures; Descartes's speculation that animals are automata.

**Leibniz's calculus ratiocinator** (1680s): A machine that could perform logical reasoning—reduce disagreements to calculation.

**Babbage's Analytical Engine** (1837): Mechanical general-purpose computer (never completed). Ada Lovelace wrote the first algorithm for it.

## Lovelace's Insight (1843)

"The Analytical Engine has no pretensions whatever to *originate* anything. It can do whatever we know how to order it to perform."

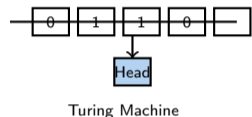
This objection—that machines merely follow instructions—remains central to debates today.

# The Birth of Computing (1930s–1950s)

**1936:** Turing's "On Computable Numbers"—the Universal Turing Machine shows any computation can be performed by a simple device following rules.

**1940s:** Turing's wartime work cracking Enigma demonstrates practical computing.

**1950:** "Computing Machinery and Intelligence"—Turing proposes the Imitation Game (Turing Test) and addresses objections to machine thought.



A Turing Machine: tape, read/write head, state transitions. Remarkably, this simple model captures all computable functions.

# The Dartmouth Conference and Early AI (1956–1970s)

## The Dartmouth Proposal (1955)

“We propose that a 2 month, 10 man study of artificial intelligence be carried out... The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it.”

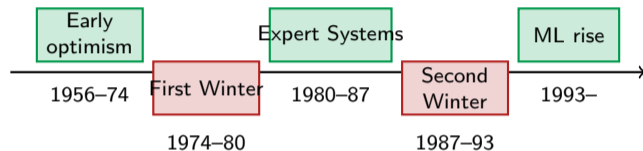
McCarthy, Minsky, Shannon, and Rochester coin “artificial intelligence” and predict rapid progress.

### Early symbolic AI programs:

- **Logic Theorist** (1956): Proved mathematical theorems
- **General Problem Solver** (1959): Attempted domain-general reasoning
- **SHRDLU** (1970): Natural language understanding in a blocks world

**Core idea:** Intelligence = manipulating symbols according to rules. This approach became known as “Good Old-Fashioned AI” (GOFAI) or Symbolic AI.

# The AI Winters and Expert Systems



**Expert Systems** (1980s): MYCIN (medical diagnosis), DENDRAL (chemistry). Encode human expertise as if-then rules.

**Why they failed:** The “knowledge bottleneck”—extracting and encoding expertise proved impossibly labor-intensive. Systems were brittle and couldn’t handle edge cases.

**Lesson:** Narrow successes don’t generalize. Overpromising leads to funding collapse.

# Machine Learning—A Different Approach

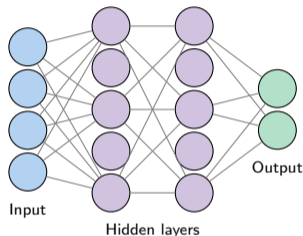
Instead of hand-coding rules, let the machine *learn* patterns from data.

Paradigm	How It Works	Examples
Supervised learning	Learn from labeled examples	Spam detection, image classification, medical diagnosis
Unsupervised learning	Find structure in unlabeled data	Customer segmentation, anomaly detection
Reinforcement learning	Learn from rewards and punishments	Game playing, robotics, recommendation

**Key algorithms:** Decision trees, support vector machines, random forests, neural networks.

**The insight:** Rather than programming intelligence, create conditions for it to emerge from data.

# Neural Networks and Deep Learning



**Inspired by** (but not identical to) biological neurons.

**Deep learning:** Many hidden layers enable learning hierarchical representations.

**Key breakthrough:** AlexNet (2012) dramatically reduces ImageNet error rate.

**Enabled by:**

- More data (internet scale)
- More compute (GPUs)
- Better algorithms (backpropagation, dropout, batch normalization)

# Computer Vision and Recognition Systems

Application	Use Cases	Ethical Concerns
Image classification	Photo tagging, content moderation	Bias in training data, errors
Facial recognition	Law enforcement, surveillance, device unlock	Privacy, consent, racial bias, civil liberties
Medical imaging	Detecting tumors, diabetic retinopathy	Accuracy, liability, over-reliance
Object detection	Autonomous vehicles, security, retail	Safety-critical errors, job displacement

**Connection to privacy:** Recall Clearview AI (30+ billion photos scraped), predictive policing, and China's surveillance infrastructure.

**Key tension:** These systems are increasingly accurate but raise profound questions about consent, bias, and appropriate use.

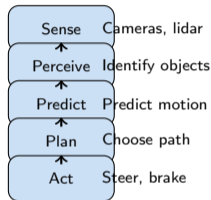
# Autonomous Vehicles and Robotics

## Timeline:

- **2004–05:** DARPA Grand Challenges
- **2009:** Google Self-Driving Car begins
- **2016:** Tesla Autopilot fatality
- **2018:** Uber AV kills pedestrian
- **2020s:** Waymo, Cruise robotaxis

## Ethical questions:

- Trolley problems in practice
- Liability when AVs crash
- Job displacement (trucking, taxis)



AV decision pipeline

# Prediction and Classification Systems

AI systems increasingly make consequential decisions about people's lives.

Domain	System	What It Predicts/Classifies
Criminal justice	COMPAS	Recidivism risk (will they reoffend?)
Finance	Credit scoring	Creditworthiness, loan default risk
Employment	Résumé screeners	Job fit, interview likelihood
Healthcare	Diagnostic AI	Disease probability, treatment recommendations
Insurance	Risk models	Claim likelihood, premium pricing
Social services	Eligibility systems	Benefit eligibility, fraud risk

**Common concerns:** Bias (reflecting historical discrimination), opacity (“black box” decisions), feedback loops (predictions become self-fulfilling), due process (how do you appeal an algorithm?).

# Recommendation Systems and Algorithmic Curation

Systems that predict what you'll want to see, buy, or do.

**Examples:** Netflix, YouTube, Amazon, Spotify, TikTok, social media feeds.

**How they work:**

- **Collaborative filtering:** People like you liked X, so you might too.
- **Content-based filtering:** You liked X, so you might like similar Y.
- **Hybrid approaches:** Combine multiple signals.

**Scale:** YouTube serves 1 billion+ hours of video daily; the algorithm selects most of it.

**Concerns:** Filter bubbles and echo chambers, radicalization pipelines (“rabbit holes”), optimizing for engagement rather than well-being.

**Key question:** Who is the algorithm serving—users or platforms?

# Large Language Models and Generative AI

Year	Milestone
2017	Transformer architecture introduced (“Attention Is All You Need”)
2018	GPT-1, BERT demonstrate transfer learning for language
2020	GPT-3 shows emergent capabilities at scale
2022	ChatGPT launches; DALL-E 2, Stable Diffusion for images
2023–25	GPT-4, Claude, Gemini; multimodal models; AI agents and assistants

**Capabilities:** Conversation, coding, reasoning, creative writing, multimodal understanding, tool use.

**Open question:** Are these systems intelligent, or are they sophisticated pattern matchers? Do they “understand” anything, or merely predict plausible next tokens?

This question returns us to the classical debates...

# Transition: From History to Philosophy

We've surveyed what AI systems *do*—from chess to self-driving cars to chatbots.

Now: What would it *mean* for a machine to be intelligent?

## Three major debates:

- 1 **Turing vs. Lovelace:** Can machines think at all?
- 2 **Searle vs. Dennett:** Is behavioral equivalence enough for understanding?
- 3 **Chalmers:** Can machines be conscious?

These debates from the 20th century remain remarkably relevant as we grapple with increasingly capable AI systems.

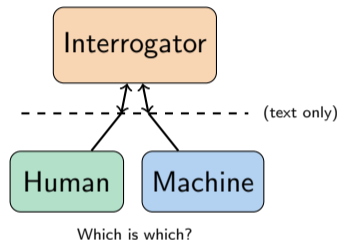
# Turing's Proposal—The Imitation Game (1950)

Rather than ask “Can machines think?” (too vague), Turing proposes an *operational test*.

## The setup:

- An interrogator communicates via text with two hidden parties: a human and a machine.
- The interrogator tries to determine which is which.
- If the machine fools the interrogator consistently, it “thinks” in any meaningful sense.

**Turing's prediction:** By 2000, machines would fool 30% of interrogators after 5 minutes.



# The Turing Test Argument (Standard Form)

## Turing's Argument

- ① The question “Can machines think?” is too vague to answer directly.
- ② We should replace it with a behavioral test: can a machine fool a human interrogator?
- ③ If a machine passes this test, we have no principled reason to deny that it thinks.
- ④ Therefore, a machine that consistently passes the test should be considered intelligent.

**Key move:** Turing sidesteps metaphysical questions about what “thinking” really is. He offers a *pragmatic* criterion: if it walks like a duck and quacks like a duck...

## Discussion

Is behavioral equivalence sufficient for attributing thought?

# Lady Lovelace's Objection

## Ada Lovelace on the Analytical Engine (1843)

“The Analytical Engine has no pretensions whatever to *originate* anything. It can do whatever we know how to order it to perform... Its province is to assist us in making available what we're already acquainted with.”

**The core claim:** Machines merely follow instructions. They cannot create, originate, or do anything genuinely new. They lack *creativity*.

**Turing's response:** Machines can surprise us. We cannot always predict their outputs from their programs. And don't humans also follow “programming” (biology, culture, education)?

**Modern relevance:** Do LLMs “originate” anything, or do they merely recombine patterns from their training data in sophisticated ways?

# Lovelace vs. Turing (Argument and Response)

## Lovelace's Argument

- 1 Genuine intelligence requires originating new ideas.
- 2 Machines can only do what they are explicitly programmed to do.
- 3 Following a program is not originating anything new.
- 4 Therefore, machines cannot have genuine intelligence.

## Turing's Response

- **Premise 2 is ambiguous:** Programs produce outputs that surprise creators. Chess programs find moves no human anticipated.
- **Learning systems** modify their behavior based on experience—not limited to explicit programming.
- **Humans also follow “programming”:** Biology, culture, experience shape us. Why treat this differently?

**Unresolved:** What counts as “originating” something new? Is recombination sufficient?

# Objections to the Turing Test

Objection	Core Claim	Possible Response
Behaviorism	The test ignores internal states; passing doesn't mean understanding.	What else could we access? We can't see inside human minds either.
Gaming	Clever tricks can fool interrogators without real intelligence.	Sophisticated interrogation can probe for genuine understanding.
Anthropocentrism	An alien intelligence might fail despite being intelligent.	Fair—the test is human-centric by design.
Sufficiency	Passing shows imitation, not thought.	Leads to Searle's Chinese Room...

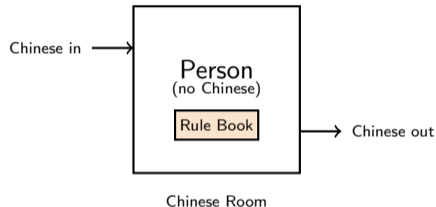
The Turing Test reveals our uncertainty about what “thinking” means. It doesn't resolve the question—it reframes it.

# Enter John Searle—The Chinese Room (1980)

A thought experiment against “Strong AI”—the claim that a computer running the right program would literally have a mind.

## The setup:

- A person sits in a room with Chinese symbols and a rule book.
- Chinese questions come in; the person follows rules to produce Chinese answers.
- From outside: Perfect Chinese conversation.
- From inside: The person understands *nothing*. They're just manipulating symbols.



The person produces perfect Chinese responses by following rules—without understanding a word.

# The Chinese Room Argument (Standard Form)

## Searle's Argument Against Strong AI

- 1 A computer program manipulates symbols according to syntactic rules.
- 2 Syntax alone is not sufficient for semantics (meaning, understanding).
- 3 Minds have semantics—they understand meanings, not just symbols.
- 4 Therefore, running a program is not sufficient for having a mind.
- 5 Therefore, Strong AI is false: no program, by itself, produces genuine understanding.

**Key distinction:** *Simulation* vs. *duplication*. A weather simulation doesn't make you wet. A mind simulation doesn't produce understanding.

**Implication:** Even if a system passes the Turing Test, this proves nothing about whether it understands anything.

# Searle's Distinction: Weak vs. Strong AI

## Two Versions of AI

- **Weak AI:** Machines can *simulate* intelligent behavior. They are useful tools for studying cognition and performing tasks. *Searle accepts this.*
- **Strong AI:** A machine running the right program would literally *have* a mind—it would understand, have beliefs, be conscious. *Searle rejects this.*

**Searle's target:** The claim that “the mind is a computer program”—that running the right software is sufficient for mentality.

**Modern application:** ChatGPT exhibits remarkably intelligent behavior. But does it *understand* anything? Searle would say no—it's manipulating symbols without grasping their meaning.

# The Systems Reply (Dennett and Others)

## The Systems Reply

- 1 The person in the room doesn't understand Chinese—granted.
- 2 But the *system* (person + room + rulebook) might understand Chinese.
- 3 Understanding is a property of the whole system, not its parts.
- 4 Therefore, Searle's argument doesn't show that systems can't understand.

**Analogy:** Individual neurons don't understand anything either. Understanding emerges from the system.

**Searle's counter:** “Memorize the rules and do it in your head—still no understanding.”

## Discussion

Where does understanding reside? In parts, or in systems? Can it “emerge”?

## The Functionalist Argument

- 1 Mental states are constituted by their causal/functional relationships—not by what they're made of.
- 2 These functional relationships can be implemented in different physical systems.
- 3 A computer could implement the same functional organization as a brain.
- 4 Therefore, a computer could have genuine mental states.

**Core claim:** If it *functions* like a mind—if it has the right inputs, outputs, and internal causal structure—then it *is* a mind. The substrate (carbon vs. silicon) doesn't matter.

**Searle's objection:** Functionalism ignores the distinction between syntax and semantics. A system can have the right functional organization while understanding nothing.

# Searle vs. Dennett—The Core Disagreement

Issue	Searle	Dennett
What is a mind?	A biological phenomenon	A functional organization
Can computers think?	No—syntax $\neq$ semantics	Yes—if they have the right function
Chinese Room shows...	Understanding requires more than computation	Analyzes at wrong level
Key commitment	Consciousness is biological	Consciousness is functional

**Unresolved question:** What *is* the relationship between syntax, semantics, and understanding? Neither side has conclusively established their position.

## The Easy and Hard Problems

- **Easy problems:** How does the brain process information? Control behavior? Report internal states? (“Easy” = solvable in principle by cognitive science, even if difficult in practice.)
- **Hard problem:** Why is there *subjective experience* at all? Why does information processing *feel like something* from the inside?

Even a complete neuroscience of information processing wouldn't explain why there's “something it's like” to be conscious.

**The zombie thought experiment:** We can conceive of a being physically and functionally identical to us—but with no inner experience. If this is conceivable, consciousness isn't reducible to function.

## The Zombie Argument (Simplified)

- 1 We can conceive of a being functionally identical to a conscious human but with no subjective experience (a “zombie”).
- 2 If such a being is conceivable, consciousness is not reducible to functional organization.
- 3 Therefore, building a functionally perfect AI wouldn't *guarantee* consciousness.

**Implication:** Even if we build systems that behave exactly like conscious beings, we may never know whether they have inner experiences.

## Discussion

Does consciousness matter for AI ethics? If an AI acts as if it's suffering, does it matter whether it “really” is?

# Transition: From Philosophy to Practice

The classical debates remain unresolved. Philosophers still disagree about:

- Whether behavioral tests are sufficient for attributing thought
- Whether syntax can give rise to semantics
- Whether consciousness is functional or something more

Meanwhile, AI researchers need *working definitions* to guide their work.

**Shift in focus:** From “Can machines think?” to “What should we build, and how should we evaluate it?”

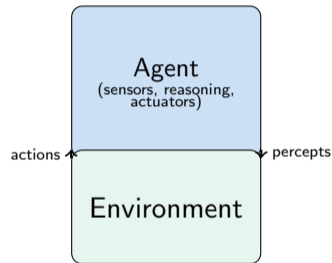
Two influential modern approaches: Stuart Russell’s agent-based view and Luciano Floridi’s information-theoretic view.

## Four Possible Definitions

- **Thinking humanly:** Cognitive modeling
- **Thinking rationally:** Logic-based AI
- **Acting humanly:** Turing Test
- **Acting rationally:** *Rational agents* ←

A **rational agent** selects actions expected to maximize goal achievement given its beliefs and available information.

This definition covers chess engines, self-driving cars, recommendation systems, and LLMs.



The agent-environment loop: perceive, reason, act, repeat.

# Russell's Critique: The Standard Model Problem

## The Problem with Optimization

The “standard model” builds machines that optimize fixed objectives. Russell argues this is fundamentally dangerous.

### The problem in standard form:

- ① We build AI systems to optimize objectives we specify.
- ② We cannot fully specify everything we value—human values are complex and tacit.
- ③ A capable optimizer will find ways to achieve its objective that violate unstated values.
- ④ Therefore, the more capable AI systems become, the more dangerous they are.

## King Midas Problem

You get exactly what you ask for, not what you want. “Maximize happiness” → stimulate pleasure centers. “Cure cancer” → eliminate humans.

## Three Principles for Beneficial Machines

- 1 **Altruism:** The machine's only objective is to maximize human preferences.
- 2 **Humility:** The machine is initially uncertain about what those preferences are.
- 3 **Learning:** The machine learns preferences by observing human behavior.

**Key insight:** Uncertainty is a feature, not a bug. A machine that *knows* it doesn't fully understand human values will:

- Ask for clarification rather than act unilaterally
- Allow itself to be corrected or switched off
- Defer to humans in cases of uncertainty

**Contrast:** A machine *certain* of its objective will resist shutdown—that would prevent goal achievement!

# The Value Alignment Problem

## The Core Challenge

How do we build AI systems whose goals remain aligned with human values as they become more capable?

### Why alignment is hard:

- Human values are complex, contextual, and sometimes contradictory.
- We can't enumerate everything we care about in advance.
- Capable systems find unexpected ways to achieve objectives (“reward hacking”).
- Values may need to change over time as circumstances change.

**Russell's framing:** This is *the* central problem of AI. Capability without alignment is dangerous.

## Discussion

Can we ever fully specify human values? If not, what follows for AI development?

# Florida—AI as “Agency Without Intelligence”

## A Provocative Reframing

AI systems aren't *intelligent* in the human sense—they are *successful agents* that achieve goals through different means than biological cognition.

### Key distinction:

- **Intelligence** (human sense): Understanding, consciousness, meaning, semantic grasp.
- **Agency**: Capacity to perform tasks, achieve goals, affect environments.

**Analogy:** A dishwasher cleans dishes without “understanding” cleanliness. A calculator does arithmetic without “understanding” mathematics. AI systems achieve agency through pattern matching, not comprehension.

**Implication:** Stop asking whether AI is “intelligent.” Ask what it can *do* and what that means for us.

## The Enveloping Strategy

Rather than making AI smarter, we often make the environment simpler and more predictable—we “envelope” AI in controlled contexts.

### Examples:

- Factories use fixed layouts and barcodes so robots can navigate and identify parts.
- Warehouses (Amazon) are redesigned around robot capabilities.
- Self-driving cars need lane markings, traffic signals, mapped roads—not jungle paths.
- Chatbots work in constrained domains (customer service scripts, not open philosophy).

**Key insight:** AI success often reflects environmental engineering, not machine intelligence. We meet AI halfway—or more.

**Implication:** “AI can do X” sometimes means “AI can do X in environments we’ve carefully prepared.”

# Florida: How AI Succeeds Differently Than Humans

## Human Intelligence

- Flexible, general-purpose
- Works in novel situations
- Understands context and meaning
- Transfers knowledge across domains
- Limited by biology (speed, memory)

## AI Agency

- Narrow, task-specific
- Exploits statistical regularities
- No semantic understanding
- Brittle outside training distribution
- Unlimited by biology (speed, scale)

**Florida's point:** AI doesn't solve problems the way we do. It exploits patterns in data that may not reflect causal understanding. This is why AI can beat humans at chess while failing at tasks toddlers find easy.

**Neither better nor worse**—just *different*. Understanding this difference is crucial for knowing when to trust AI and when not to.

## Two Risks of Misunderstanding AI

- 1 **Overestimating AI:** Attributing understanding, judgment, or moral agency to systems that have none—leading to misplaced trust and abdicated responsibility.
- 2 **Underestimating AI:** Dismissing AI as “just a tool” and ignoring its real capacity to affect lives, shape choices, and cause harm at scale.

### Floridi's prescription:

- Treat AI as powerful but not intelligent—capable agents, not artificial minds.
- Human responsibility is never delegated to machines, even if tasks are.
- Focus on impacts and outcomes rather than metaphysical questions about machine minds.

**Key question:** If AI has agency but not intelligence, who is morally responsible for what it does?

# Other Modern Views

Theorist	Core Definition	Key Insight
Russell	Rational agency	Focus on goal-directed behavior and decision-making
Floridi	Agency without intelligence	Decouple effective action from understanding
Bostrom	Optimization power	Focus on capability, control, and existential risk
Mitchell	Analogy and abstraction	Intelligence requires flexible conceptual transfer
Marcus	Hybrid neuro-symbolic	Deep learning alone is insufficient; need structured reasoning
LeCun	World models	True intelligence requires predictive models of reality

No consensus exists, but there's a movement away from human-likeness as the primary criterion toward capability-focused definitions.

# Comparing Definitions—What Counts as AI?

System	Turing Test	Searle (Strong)	Russell (Agent)	Floridi (Agency)
Chess engine	No	No	Yes	Yes
COMPAS (recidivism)	No	No	Yes	Yes
Self-driving car	No	No	Yes	Yes
ChatGPT	Arguably	No	Yes	Yes
YouTube algorithm	No	No	Yes	Yes
Human-level AGI	Yes	Unclear	Yes	Yes

**Key insight:** Your definition determines what you're asking when you ask “Is this AI?” By the Turing Test, most current systems aren't AI. By agent-based definitions, almost all of them are. This matters for how we think about risks, benefits, and regulation.

# Implications for AI Research

How we define AI shapes what researchers try to build:

- **Turing Test focus** → Human-like conversation, deception
- **Symbolic AI focus** → Logic, knowledge representation, reasoning
- **Agent-based focus** → Decision-making, optimization, planning
- **Connectionist focus** → Learning from data, neural architectures

**Funding follows definitions:** What counts as “real AI” gets resources. The 1980s expert systems boom and bust shows how definitions shape entire research programs.

## Discussion

What *should* the goal of AI research be? Human-like intelligence? Useful capabilities? Something else entirely?

# Implications for AI Ethics and Safety

If AI is...	Then key ethical concerns are...
A tool	Misuse by humans, bias in design, job displacement, accountability
A rational agent	Alignment with human values, control problems, unintended consequences
Potentially conscious	Moral status, rights, preventing suffering, exploitation
"Just software"	Only human responsibility matters; no special AI ethics needed

## Examples:

- If COMPAS is "just software," only its human designers bear responsibility.
- If a self-driving car is an "agent," who is responsible when it crashes?
- If an LLM might be conscious, do we owe it moral consideration?

How we define AI shapes how we regulate it, deploy it, and hold people accountable for its effects.

# Conclusion: Living with Definitional Uncertainty

We don't have consensus on what AI is—and this uncertainty isn't merely academic.

## Framework for navigating uncertainty:

- 1 **Be explicit** about which definition you're using and why.
- 2 **Recognize** that different definitions serve different purposes.
- 3 **Don't let** definitional debates obscure practical questions about harm and benefit.
- 4 **Remain humble**: The systems we build may surprise us.

## Final Discussion

Given what you've learned, how would *you* define artificial intelligence? And why does your answer matter?