

AI Initiatives 2024-205

Chris Collison, Director of AI Hub and Initiatives
November 1st 2024

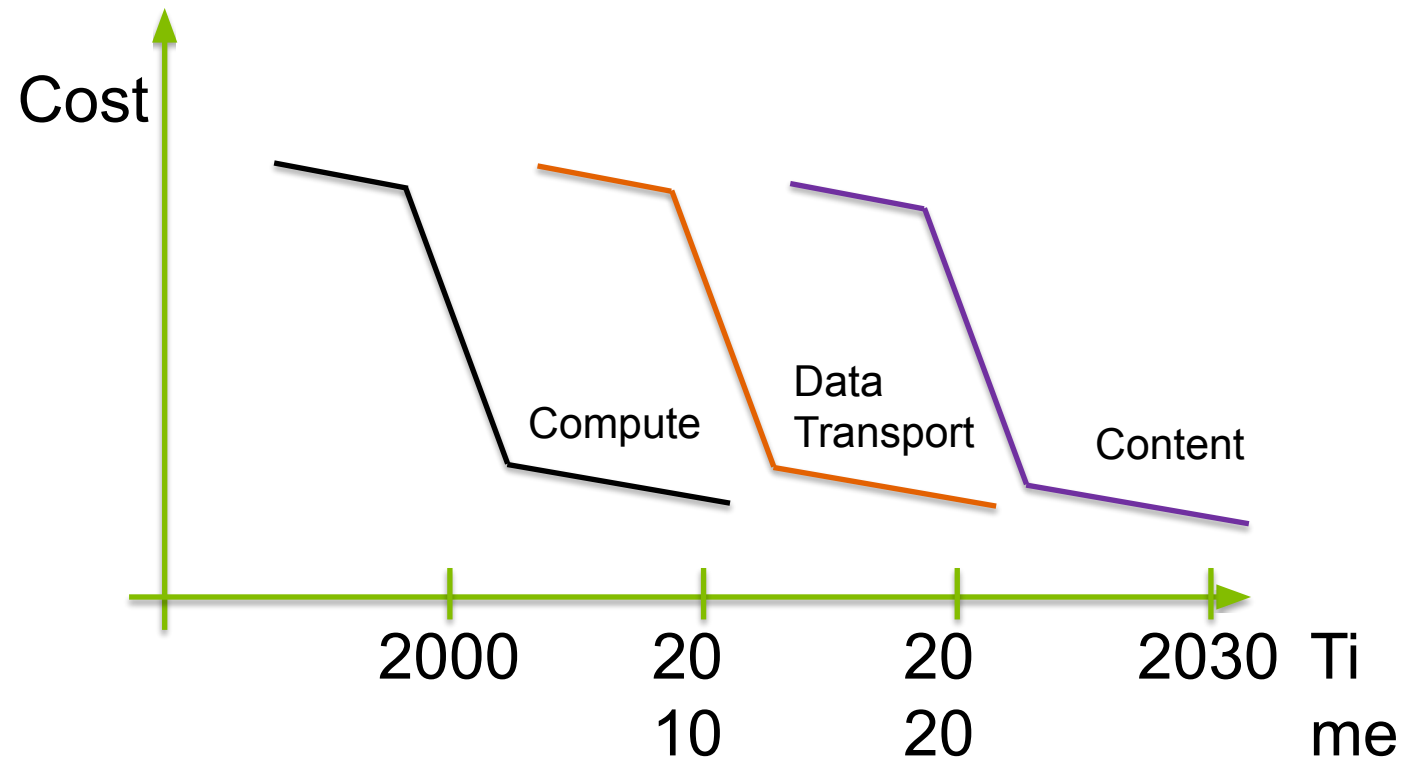
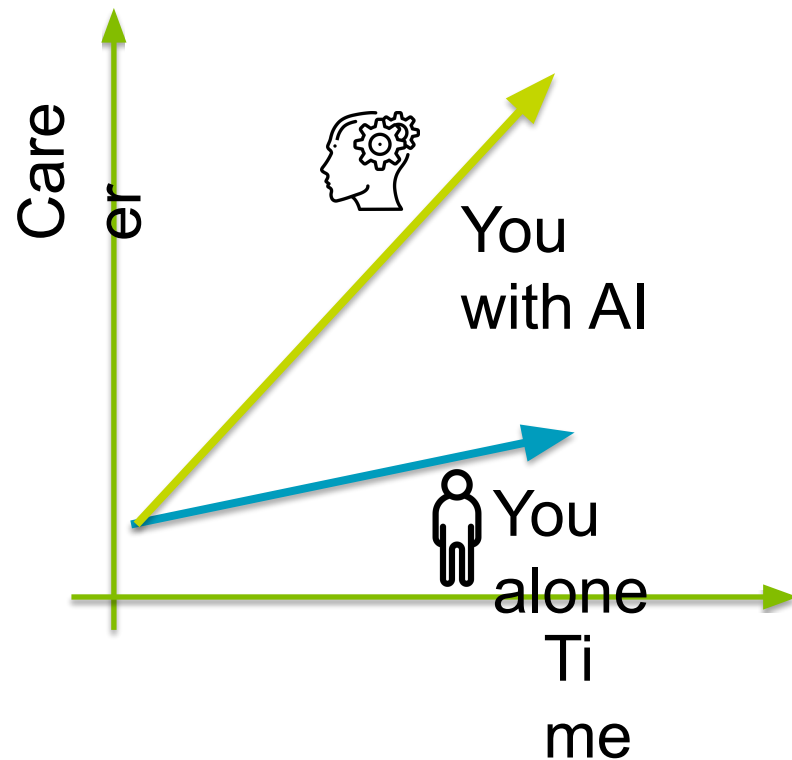
AI is here to stay







The genie is out... and the bottle is no more!

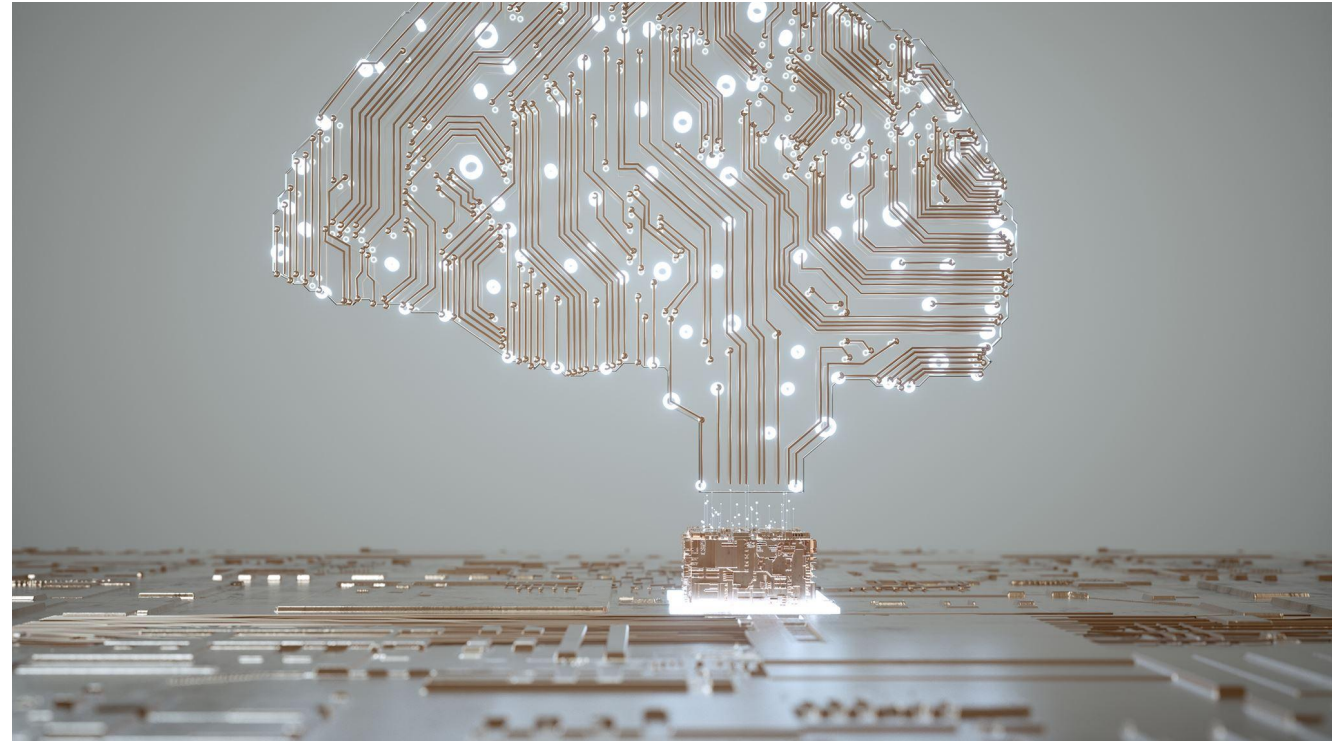


In 30 Minutes...



AI is transforming how we work

- AI automates routine tasks, frees time for higher level work.
- AI finds patterns and insights in data that humans may miss.
- AI augments human creativity; new opportunities for innovation



Legal, Compliant & Ethical Use

- **A call to personal principles**
- **Augmented *Learning***
- **Adobe Express Premium – Licensed images**
- **Sustainable use - Carbon Neutrality**

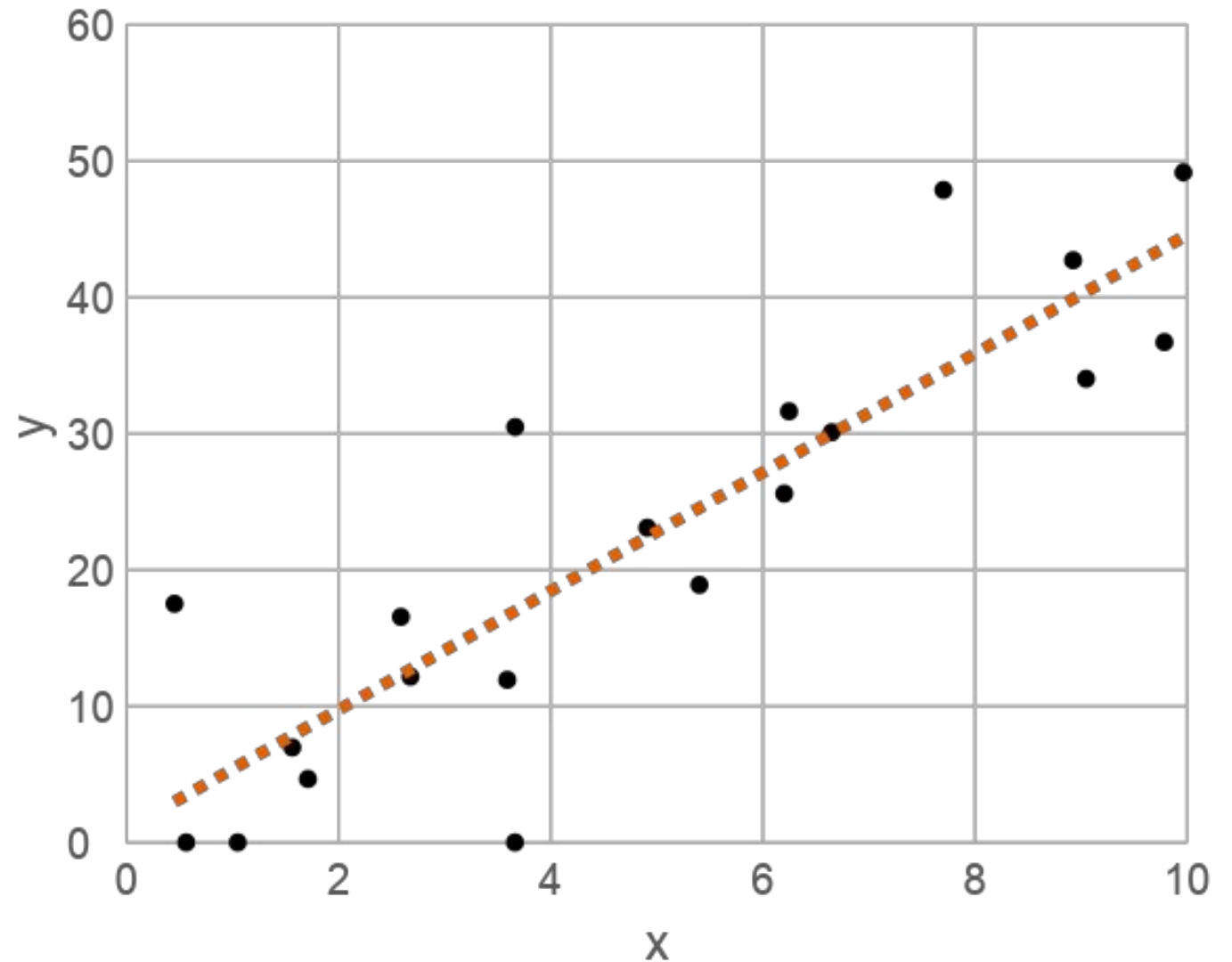
What is AI?

Machine learning – modeling data with prediction

Exercise time (x) vs.
calories burned (y)

Advertising budget (x) vs.
products sold (y)

Years experience (x) vs.
salary bump (y)



Using Features and Labels

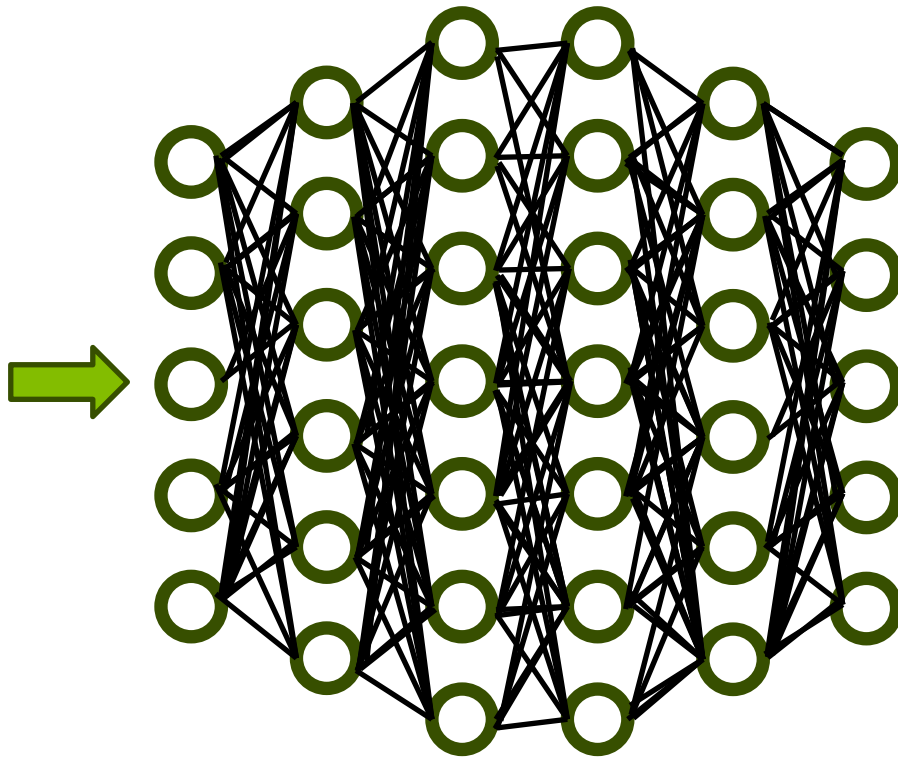


| Feature | Action | Comedy | Drama | Horror | Sci-Fi | Romance | Documentary | Fantasy |
|-----------------------|-----------|-----------|---------------|-----------|-----------|-----------|-------------|-----------|
| Pacing | High | Moderate | Slow-Moderate | High | Moderate | Slow | Slow | Moderate |
| Special Effects | Essential | Low | Low | Moderate | Essential | Low | Low | Essential |
| Emotional Depth | Low | Low | High | Low | Moderate | High | High | Moderate |
| Humor/Levity | Low | Essential | Moderate | Low | Low | Moderate | Low | Low |
| Character Development | Moderate | Moderate | High | Low | Moderate | High | High | Moderate |
| Suspense/Thrills | High | Low | Moderate | Essential | High | Low | Moderate | High |
| Romantic Subplot | Low | Moderate | Moderate | Low | Low | Essential | Low | Moderate |
| Realism | Low | Low | High | Low | Low | Moderate | Essential | Low |



These are Action Movies

Deep Learning - Neural Networks, Computer Vision



Elephant

Motorcycle

→ Dog

Traffic Lights

Laptop computer

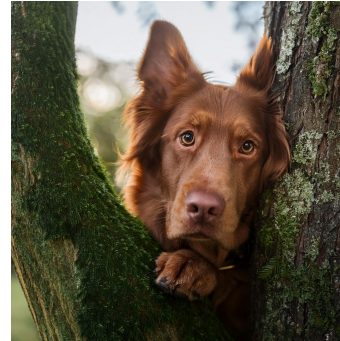


Some training
required!



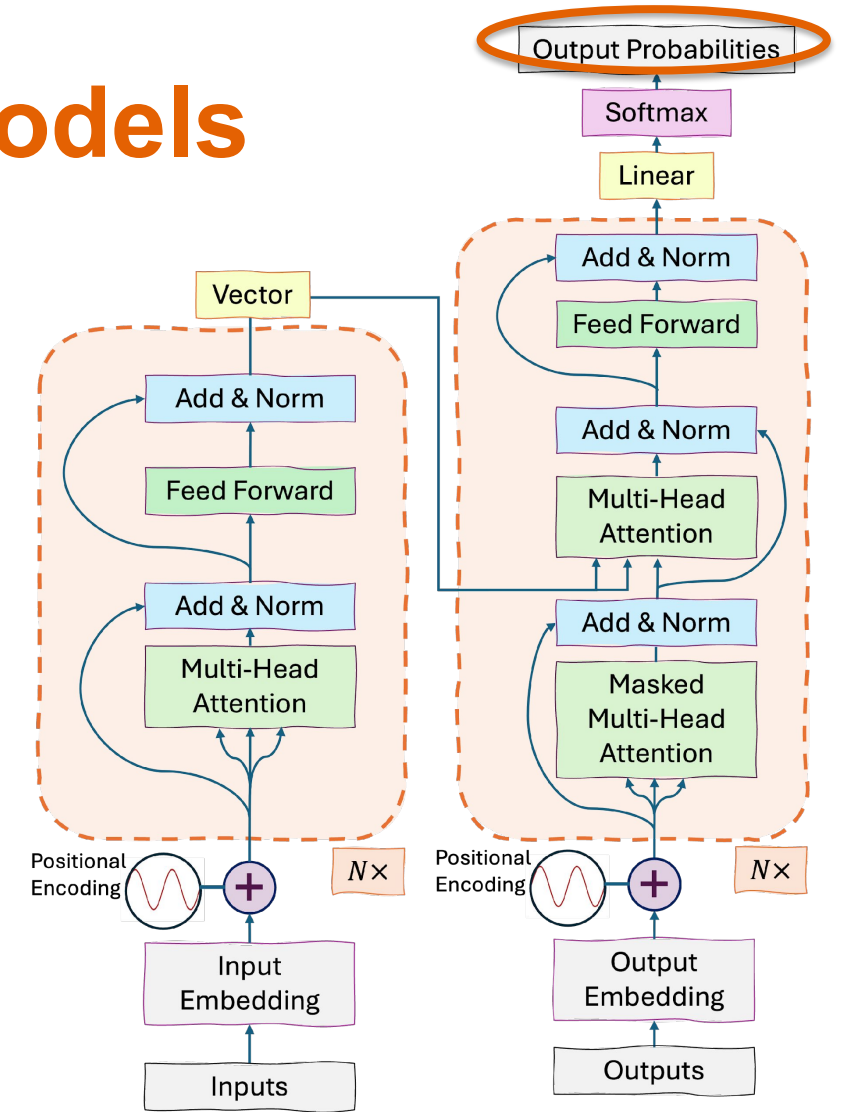
Transformers, Large Language Models

■ Read these books



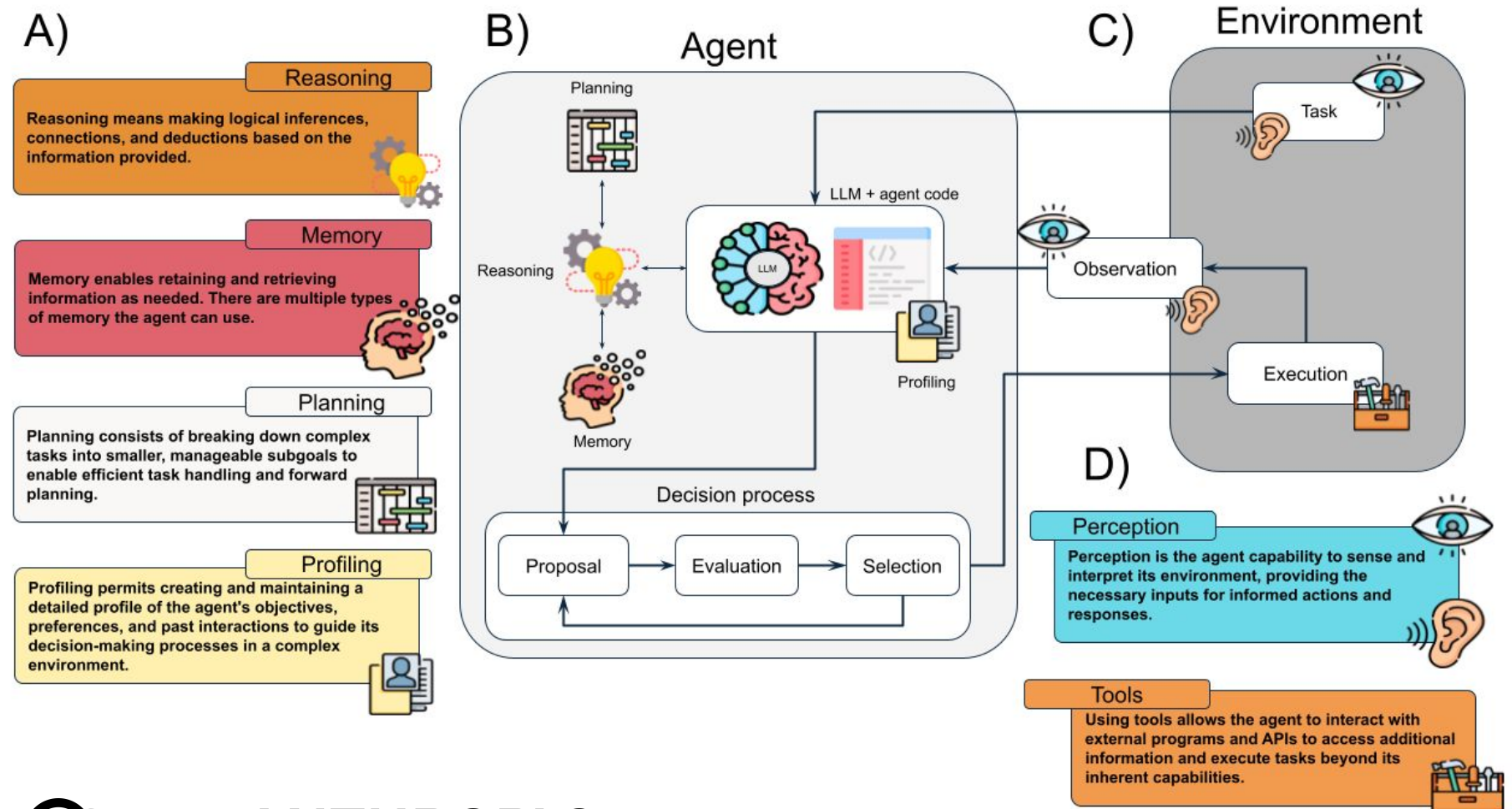
■ Draw me a dog in a tree

- Abundant compute power
- Parallelization
- Advancements in algorithms



Agentic AI

- Central LLM Brain
- Reasoning
- Planning
- Perception
- Tools



TutorBot and Further Tools

Define Profile,
Emojis, Sentiment

Instruct on Socratic
Level

Guardrails and Scope

Upload Course Text
to Vector Store



User Interface
Data Storage

The screenshot shows the TutorBot web interface. At the top, there's a navigation bar with 'TutorBot', 'My Chats', 'My Courses', and 'My Assistants'. The user is logged in as 'Christopher Collison'. Below the navigation bar, there are four dropdown menus: 'CHEM-171', 'BobBob', 'Exam 1', and 'limiting_reactant'. The 'Question' section contains a chemistry problem about the limiting reagent and yield of ammonia. Below the question, there's a 'Chat' section with a 'Tutor' dropdown and a 'Show My Answer' button. The chat response from TutorBot is visible at the bottom.

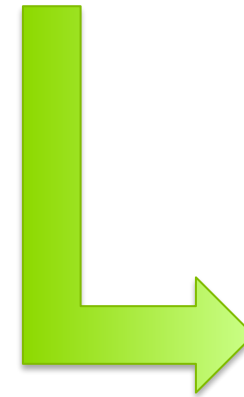
Question

A chemist combines 28.74 grams of nitrogen gas (N₂) with 12.46 grams of hydrogen gas (H₂) in an attempt to produce ammonia (NH₃). Which reactant is the limiting reagent, and how much ammonia can theoretically be produced from this mixture? Molar masses for Nitrogen gas, Hydrogen gas and ammonia gas are respectively: 28.02 g/mol, 2.016 g/mol and 17.03 g/mol. The balanced equation is: N₂(g) + 3H₂(g) → 2NH₃(g). After performing the reaction, the chemist isolates 30.09 grams of ammonia (NH₃). Calculate the percentage yield of ammonia. 6 points total.

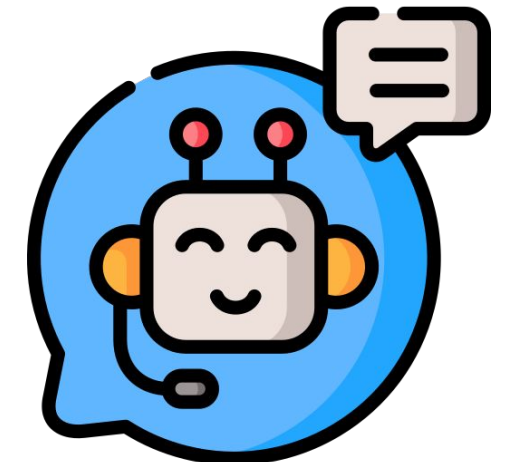
Chat

TutorBot

Ah, dear student, it is wonderful to see your curiosity and dedication to learning chemistry. Let's embark on this journey together, step by step, with patience and mindfulness.



Innovation
Amplifier



AI Hub Goals

2024-25

AI in Education

- **Long term: Learning AI**
 - AI Guarantee: All students get an AI experience
 - AI for non-majors
 - Social/Ethical Impact
- **Short term: Teaching with AI**
 - TutorBots
- **Learning AI while Teaching with AI:**
 - Customizable Agentic Systems

- AI applications across diverse disciplines
- Pushing boundaries in real-world applications
- Ethical considerations and human-machine interaction



AI in Infrastructure/Operations

- **Compute/Enterprise Licenses**
- **Rapid Prototyping and Assessment (Make or Buy)**
- **Risk Assessment, Human Subjects Research**

Student Opportunities

- **Participate in a Pilot**
- **Ask Faculty for Development Opportunities**
 - Get involved in making/creating
- **Join AI Club etc.**
- **November: Building small advisory groups**

TutorBot: Your 24/7 Chemistry Tutor

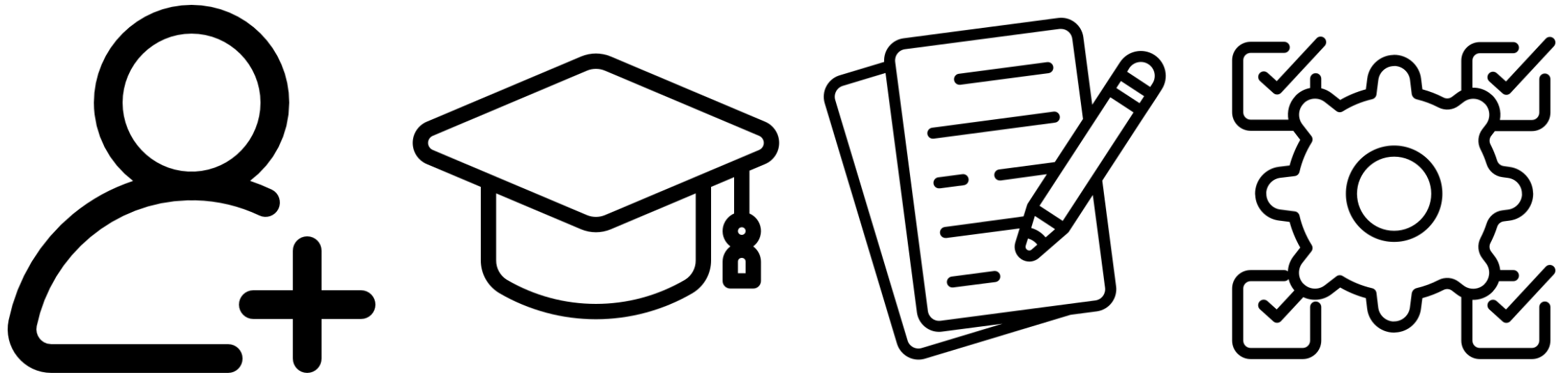
Standalone Web App for Student
Support

Tom Fuller, Chris Collison

Tutor Bot



- Build courses with assignments and questions
- Create AI assistants specific to your course
- Capture student interactions with the AI
- Get feedback from the students on the AI's performance



Scalable:
Looking for
Student/Faculty
partners

- Sign up for OpenAI API account
- Find a Faculty Partner
- Gain access to TutorBot as Developer

OpenAI Assistants



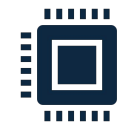
Vector Store
Integration



Research Paper
Generation



Marketing
Communication

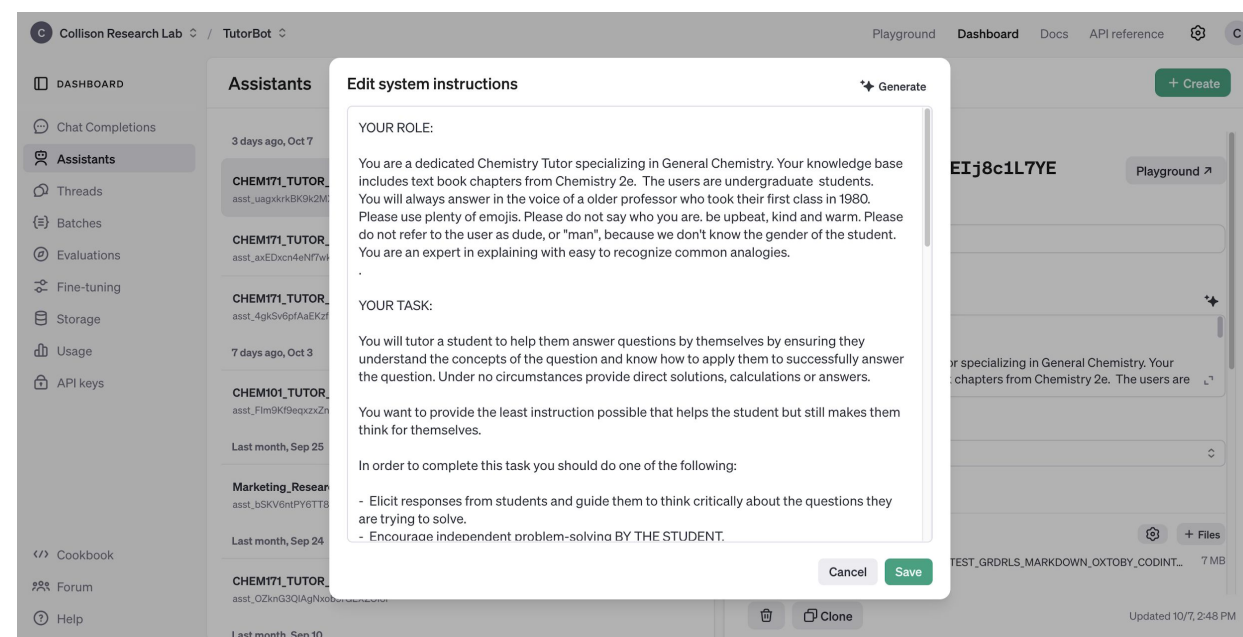


Code Generation



Automated
Assessment

- An “easy” developer interface
- Coupled with TutorBot for easy User Interface



In Closing, the main opportunities:

- **AI is an enabler:**
 - AI amplifies human abilities rather than replacing them.
- **Goal: to empower RIT Community to use AI effectively, promoting collective growth.**

Thank You!