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1st year

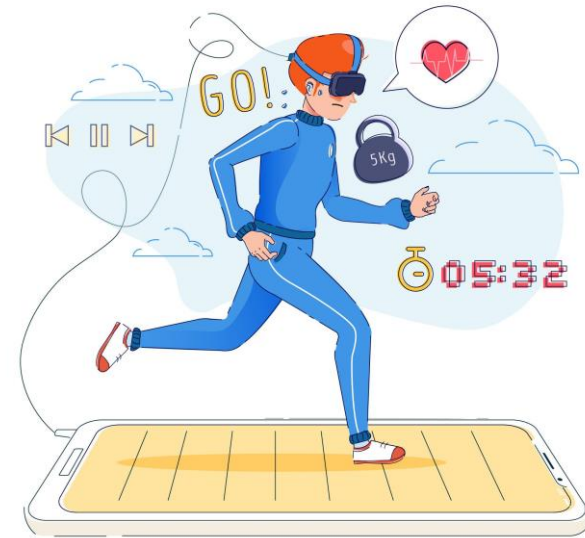
Introduction to Artificial Intelligence

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**AI is already running your
life... and you didn't even
notice !**

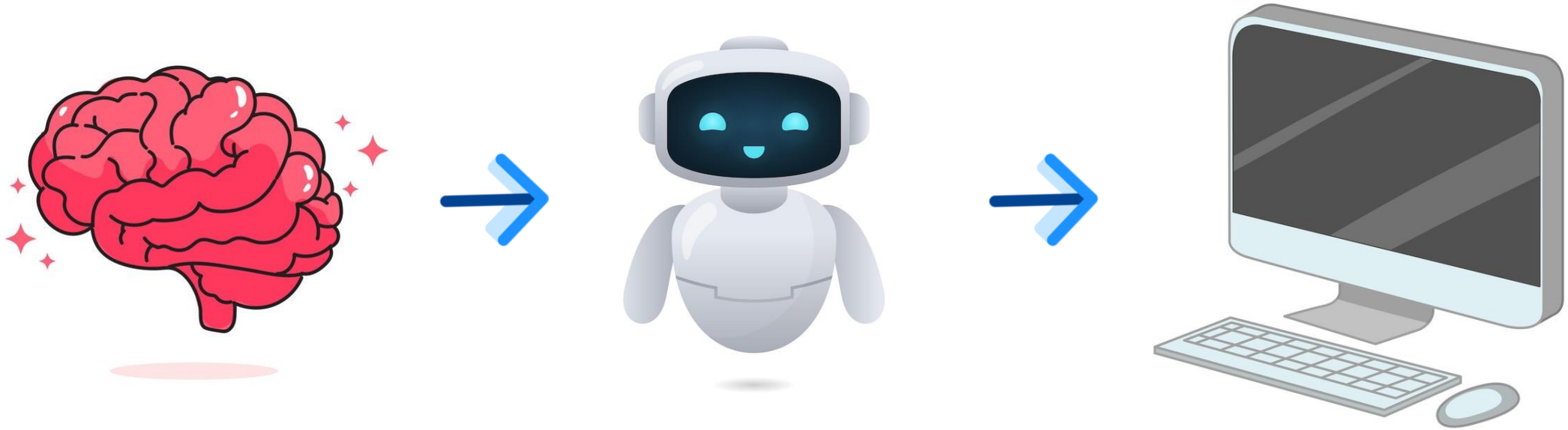


”

AI decides for you



Okay, but what is AI really



Understanding AI: **Words**, **Ideas**, **Definition**

Words

- **Artificial** → made by humans, not natural
- **Intelligence** → ability to **think**, **learn**, **solve problems**

Understanding AI: **Words**, **Ideas**, **Definition**

Idea

- Make the machine **act like a human** 🤖
- Make the machine **think like a human** 🧠
- Machines and programs with **more or less intelligence** ⚡

AI can range from very simple programs that follow rules to complex systems that can learn, reason, and adapt just like humans

Understanding AI: Words, Ideas, Definition

Definition

“

Artificial Intelligence (AI) is the **science and engineering of creating intelligent machines and programs**. It refers to the ability of machines to perform **cognitive tasks** such as **thinking, perceiving, learning, problem-solving, decision-making, reasoning, planning, and understanding language**.

”

Brief History of AI

“How the past built the AI of today”

Ancient & Early History

- **Aristotle (~2000 BCE)** → logic & reasoning systems
The foundation for **rule-based AI / expert systems** (if-then logic like MYCIN for medical diagnosis)
- **Chinese Abacus (~4000 years ago)** → first calculating machine
Inspired **computers performing calculations automatically**
- **Pascal, Napier, Leibniz (1600s–1700s)** → mechanical calculators
Early hardware for computation → eventually led to **digital computers that run AI algorithms**
- **Al-Khwarizmi** → formal logic, algorithms
“Algorithm” comes from his work — AI today **relies on algorithms to solve problems**
- **Descartes** → thinking about mind vs. physical world
Inspired AI questions: *Can machines think like humans?*



Brief History of AI

“How the past built the AI of today”

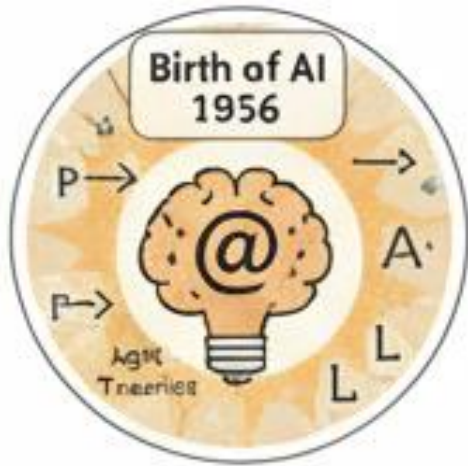


Modern Foundations

- **Babbage & Boolean Algebra (1800s)** → first computer designs & logic gates
Digital circuits in AI chips, the backbone of computers running neural networks
- **Turing (1950)** → Turing machine & Turing test
ChatGPT passes a Turing-like test — can it convince you it's human?
- **McCulloch & Pitts (1943)** → first artificial neural network (ANN)
Modern deep learning for image recognition or voice assistants

Brief History of AI

“How the past built the AI of today”



Birth of AI (1956)

- Dartmouth Conference → term “Artificial Intelligence” coined
- **Logic Theorist** → first AI program (automatically proved theorems)

Math-solving AI today, like WolframAlpha or automated theorem solvers

- McCarthy → LISP language

AI programming languages like Python today still follow these roots

Brief History of AI

“How the past built the AI of today”



Expert Systems & Programming Languages (1967–1980s)

- **MYCIN (medicine)** → AI suggests antibiotics
- **DENDRAL (chemistry)** → AI predicts chemical structures
- **PROSPECTOR (geology)** → AI predicts mineral locations

Early AI applied **real-world decision-making**, similar to modern AI in healthcare or logistics

- **Prolog programming language** → foundation for **logic-based AI**

Brief History of AI

“How the past built the AI of today”



Modern Era (1990s–2000s)

- Internet → search engines like Google → **recommendations powered by AI**
- ALVINN (autonomous car) → **early self-driving vehicle**
- **1997:** Deep Blue beats chess champion → **AI surpassing human experts in games**
- **1999:** NASA AI flies satellite past Mars → **autonomous AI in space exploration**

Brief History of AI

“How the past built the AI of today”

Today



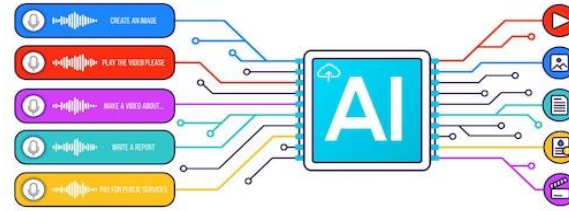
- Deep learning, NLP, computer vision → **apps like ChatGPT, TikTok, Google Lens**
 - ChatGPT → language understanding & generation
 - Face filters → computer vision & deep learning
 - Spotify/Netflix → recommender systems (machine learning)



Every step in AI history wasn't just theory it solved a real problem:

- **Logic and algorithms** → the rules AI uses
- **Calculating machines** → the computers running AI
- **Neural networks** → computers that *learn*
- **Expert systems** → AI making real decisions in medicine, chemistry, and geology
- **Search engines & autonomous cars** → AI in everyday life
- **Today's ChatGPT** → combines decades of this history into something interactive and practical.

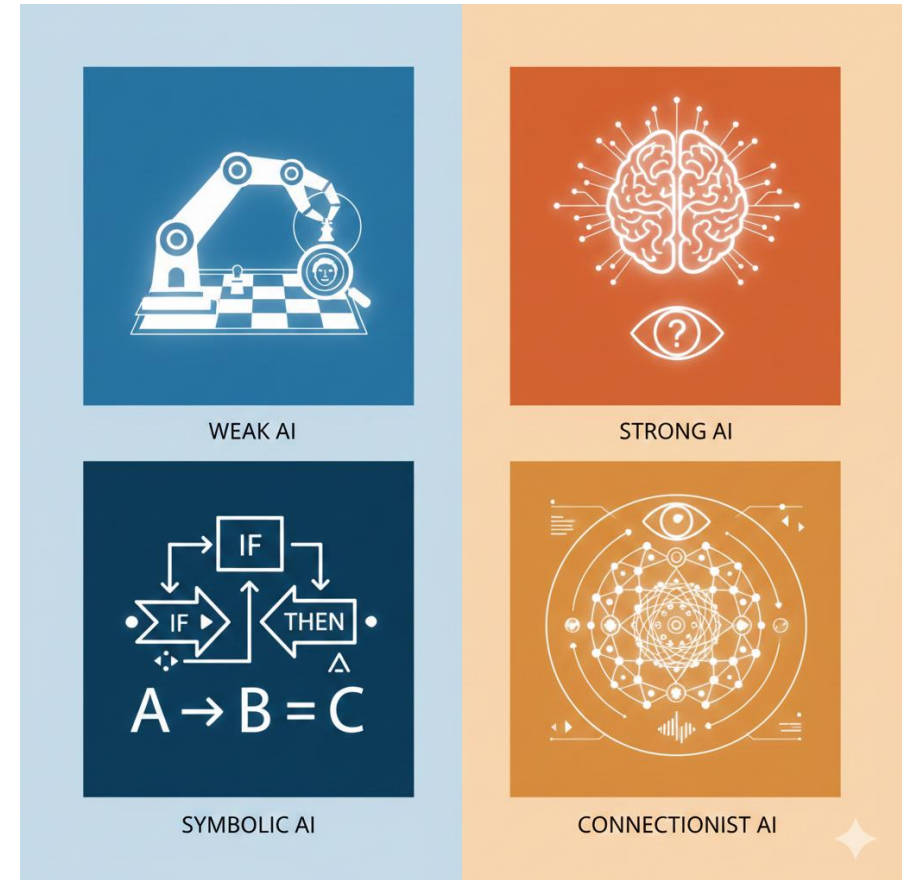
Types of AI



Why classify AI



- Not all AI thinks the same way
- Not all AI has the same goal
- Not all AI is equally powerful



Weak IA / Narrow AI

IA weak “Smart but specialized”

Definition :

Weak AI is designed to perform **one specific task** extremely well, without real understanding or consciousness.

Example:

- ChatGPT → generates text
- TikTok algorithm → recommends videos
- Google Maps → finds routes
- Face recognition → identifies faces

Key characteristics

- Task-specific
- No self-awareness
- Cannot think outside its domain

Strong IA / General AI

IA strong Human-level intelligence (the dream)

Definition :

Strong AI refers to machines capable of **understanding, reasoning, learning, and adapting across any domain**, like a human.

Example:

- None in reality
- Movies: Terminator, Westworld, HAL 9000

Key characteristics

- General intelligence
- Consciousness (theoretical)
- Can transfer knowledge between tasks

Symbolic IA (Rule-Based AI)

IA symbolic Thinking with rules

Definition :

Symbolic AI uses **explicit rules, logic, and symbols** to represent knowledge and make decisions.

Example:

- Expert systems (MYCIN)
- IF–THEN rules
- Chess engines (early versions)



IF fever AND infection
THEN prescribe antibiotic

Strengths:

- Transparent
- Easy to explain

Weaknesses:

- Cannot learn
- Breaks in complex environments

Connectionist IA (Learning AI)

Definition :

Connectionist AI is inspired by the human brain and uses **artificial neural networks** to learn patterns from data.

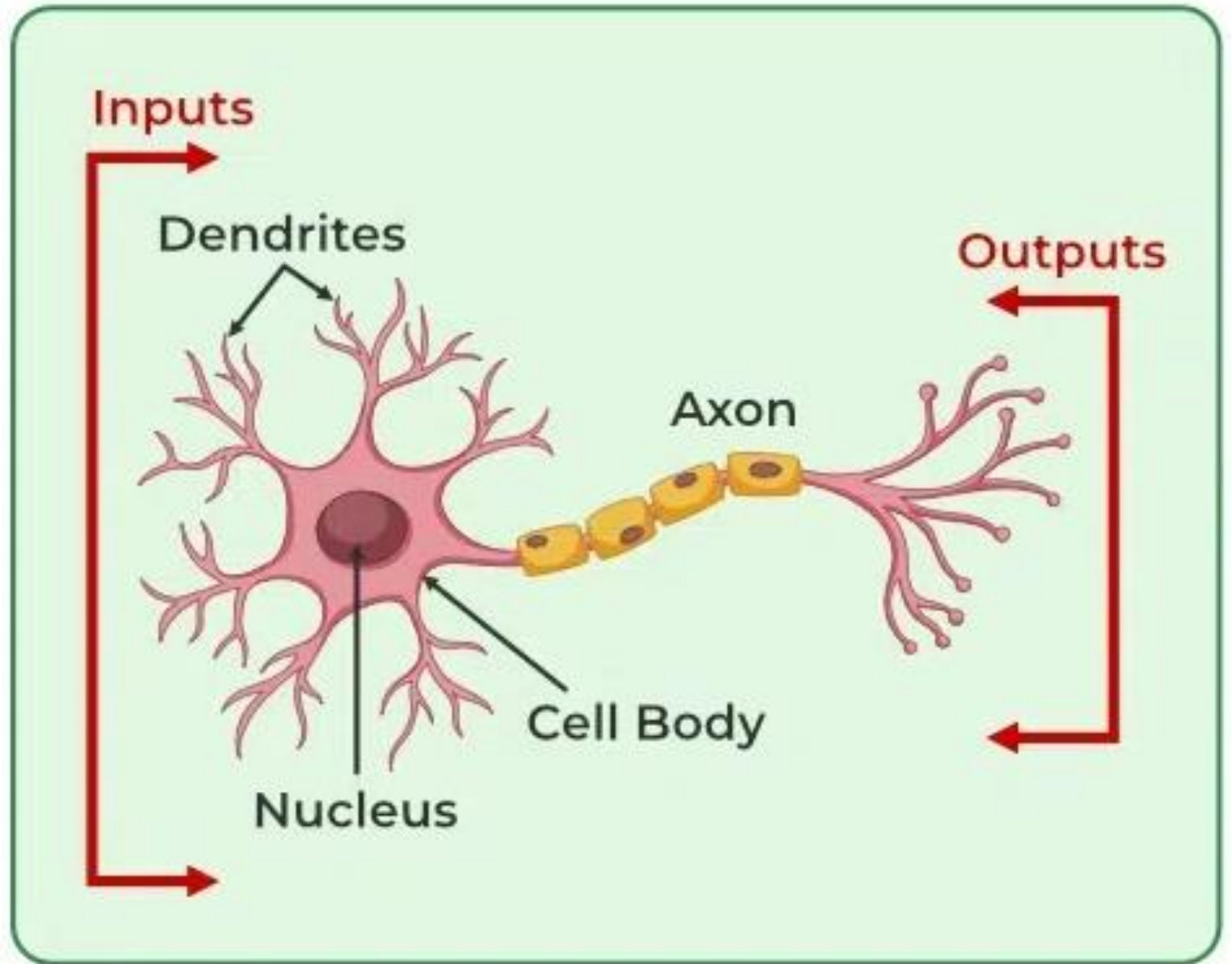
Example:

- Image recognition
- Voice assistants
- Face filters
- Self-driving cars

Key ideas:

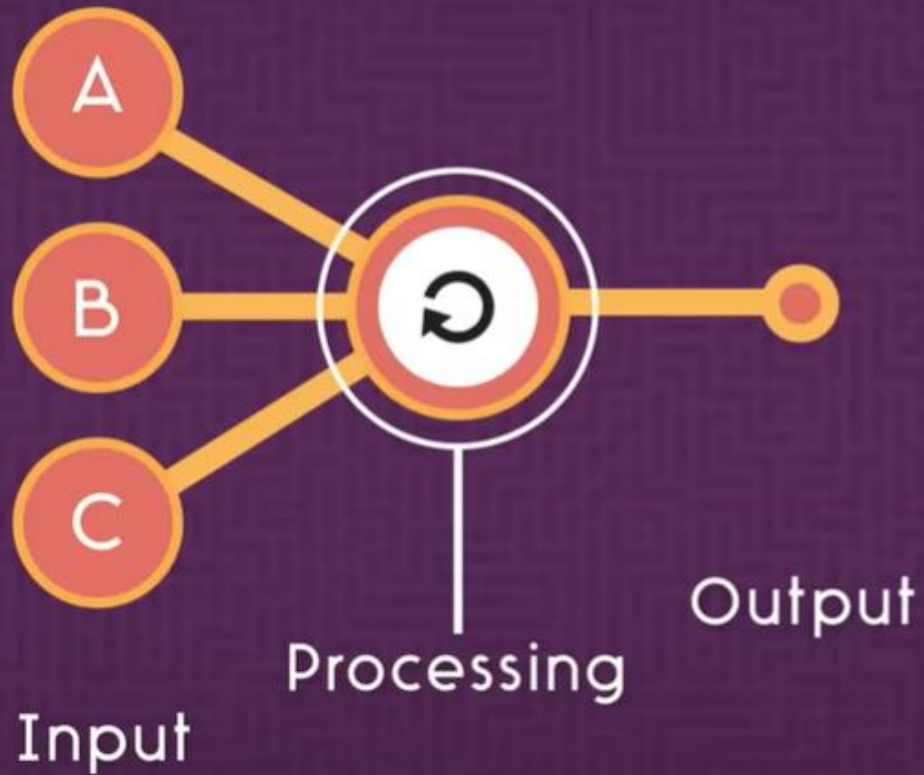
- Learns from examples
- Improves with data
- Hard to explain decisions (black box)

human
brain
neuron



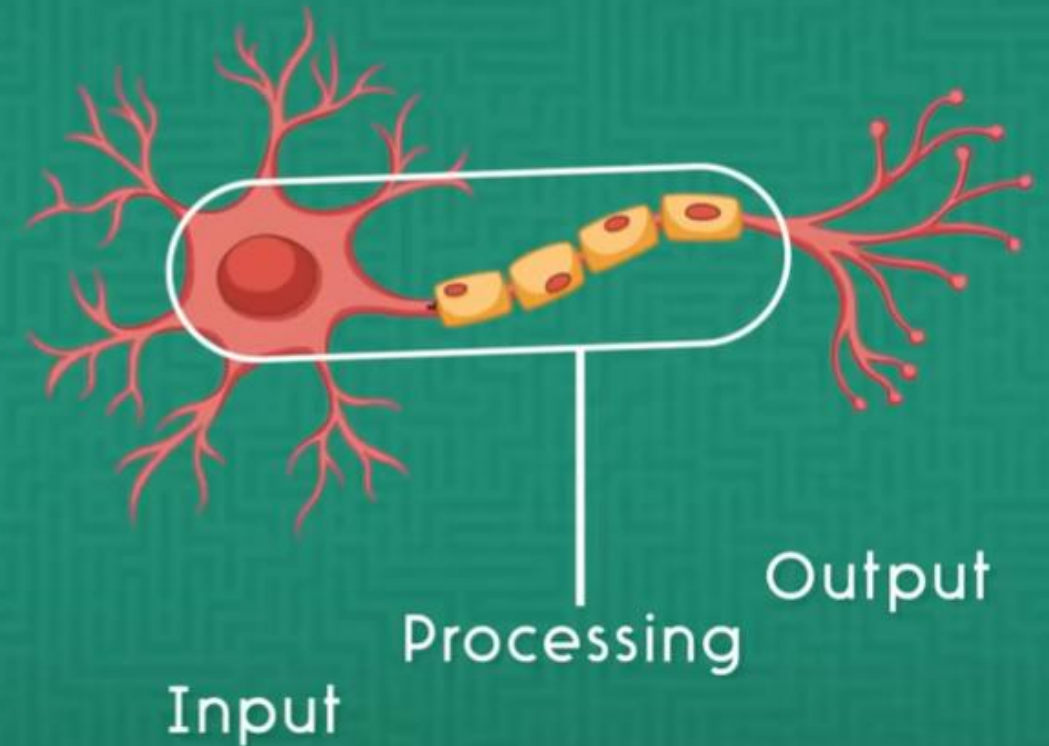
Artificial Neuron

(software)

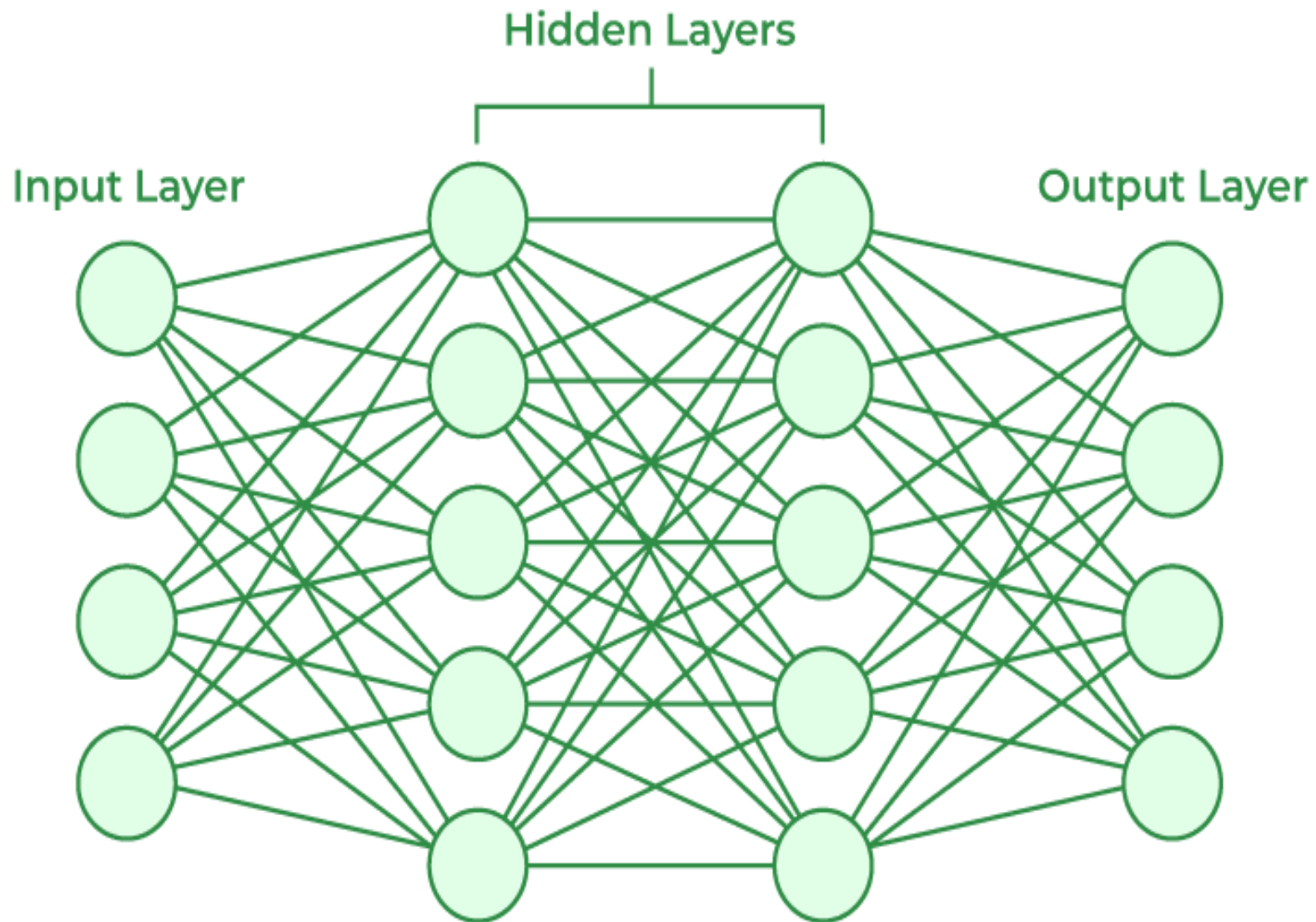


Human Neuron

(hardware)



**Artificial
neural
network**



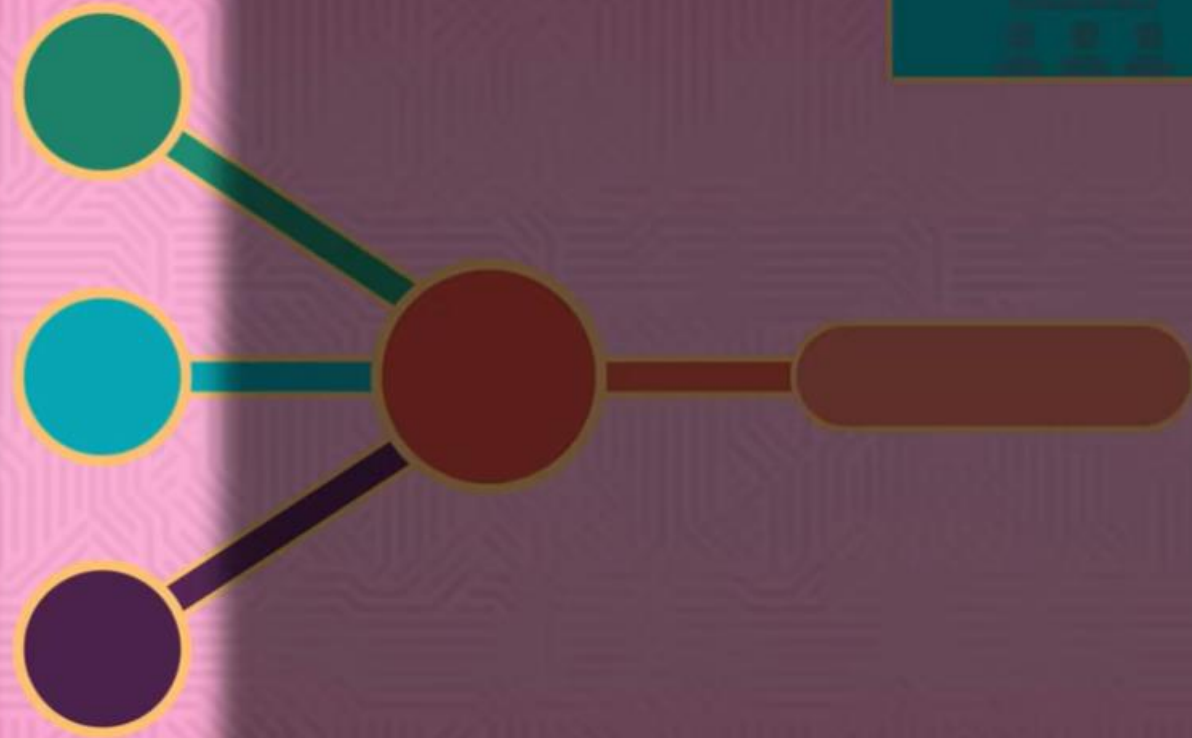




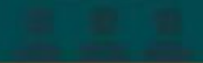




Input



Movie





Input

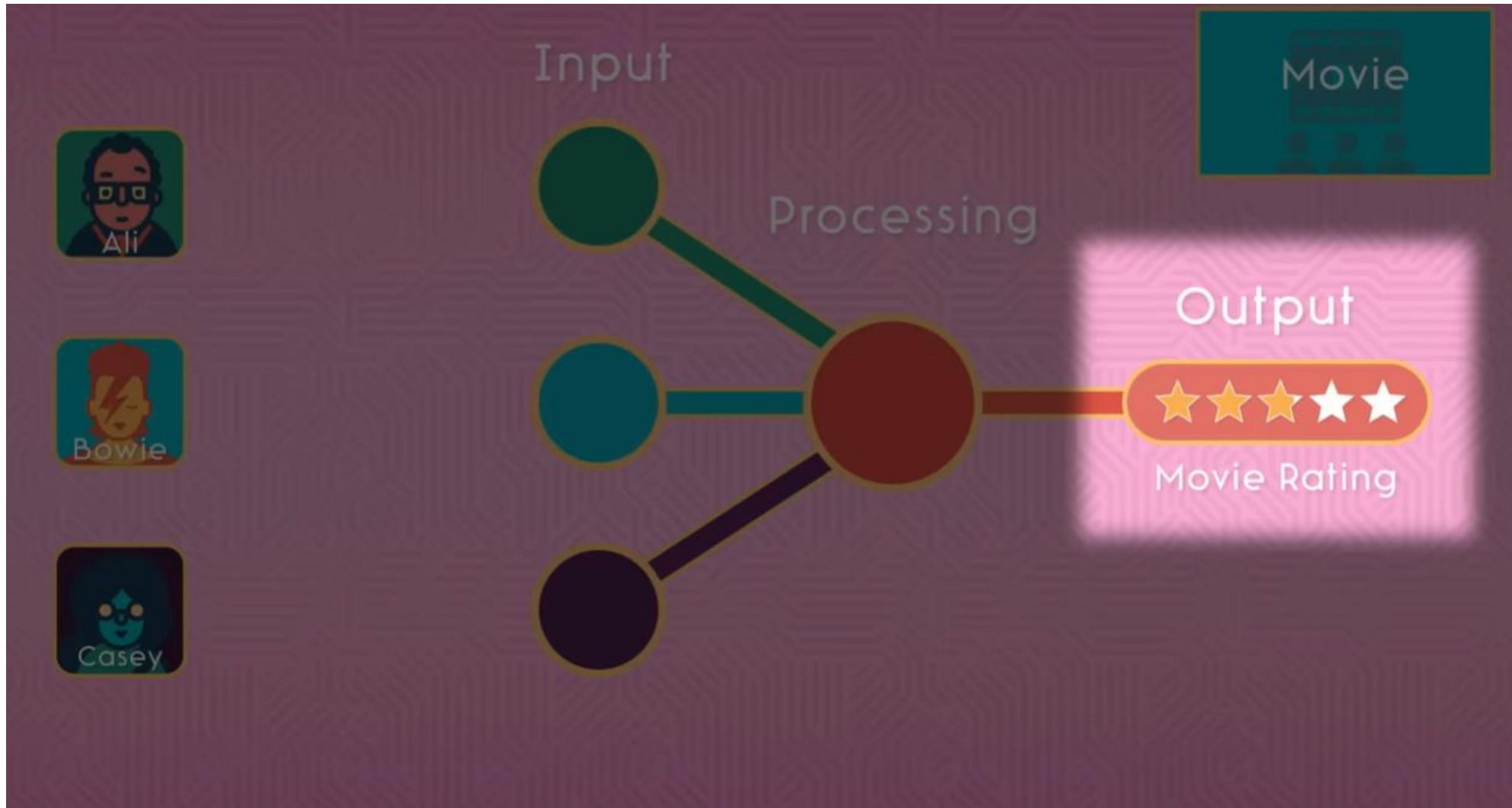


Processing



Movie







Ali



Bowie



Casey



TIME
LORD

Weight



$A \times 1.0$



$B \times 1.0$



$C \times 1.0$





Weight

A x 1.0

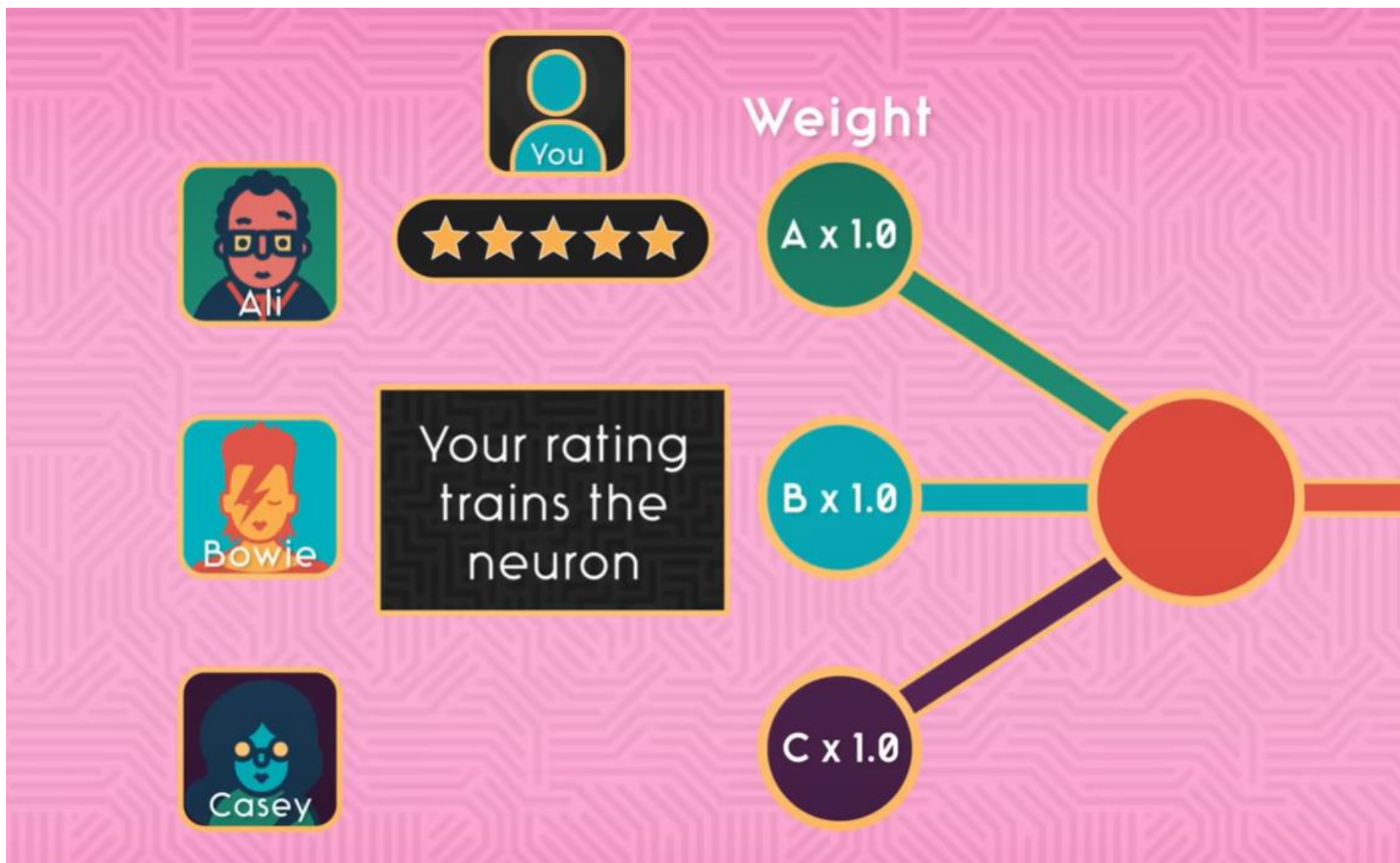
B x 1.0

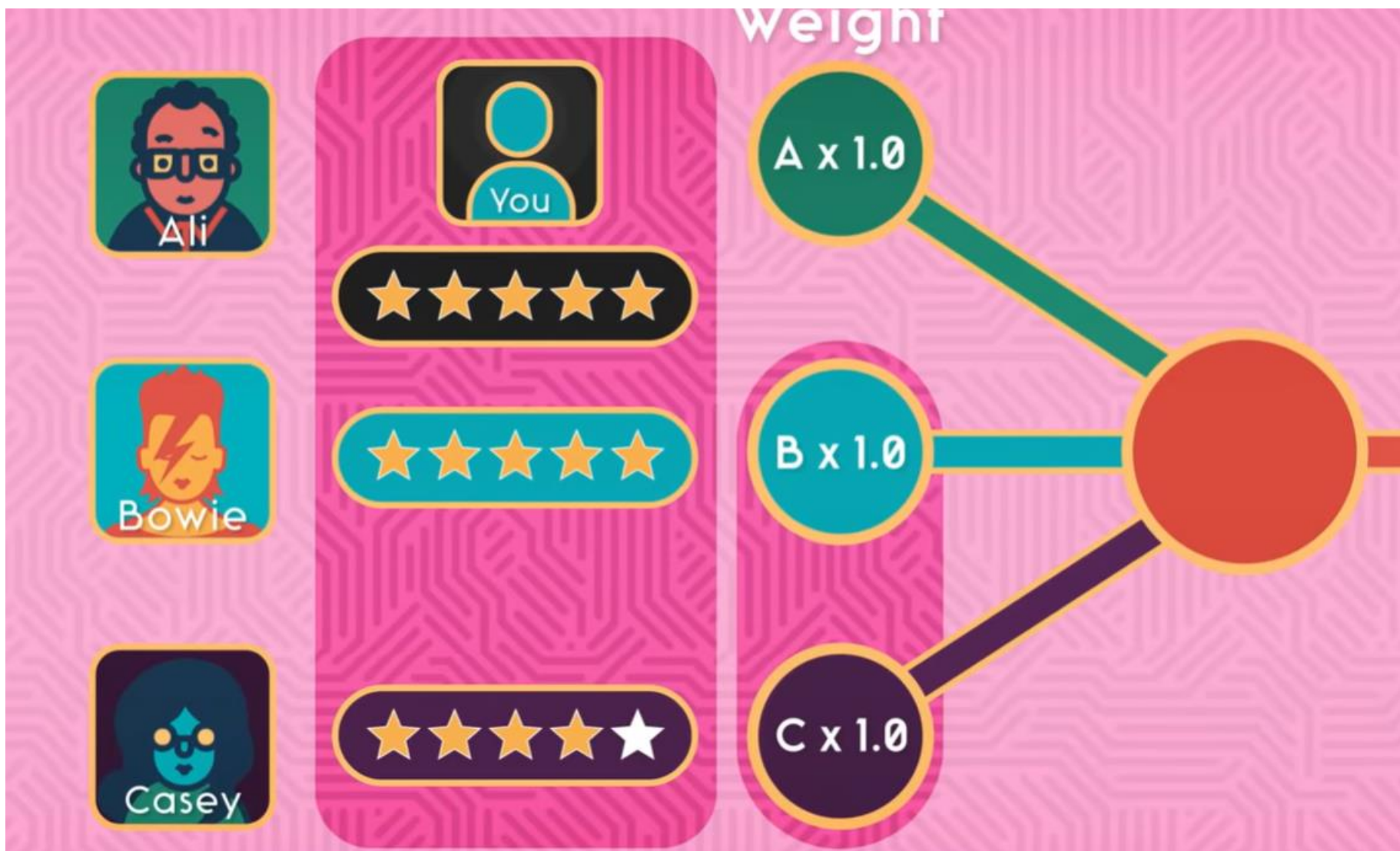
C x 1.0

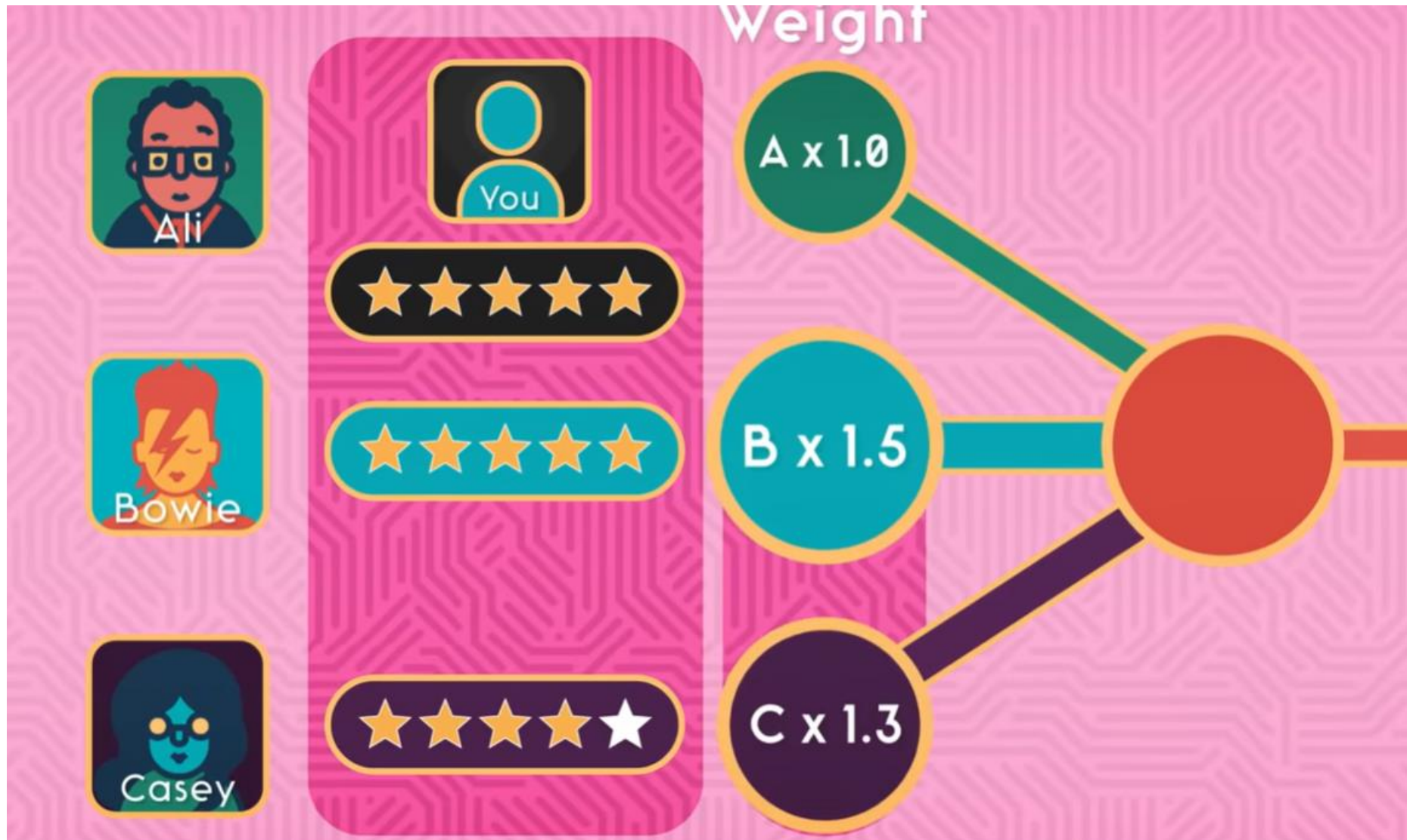


3.3





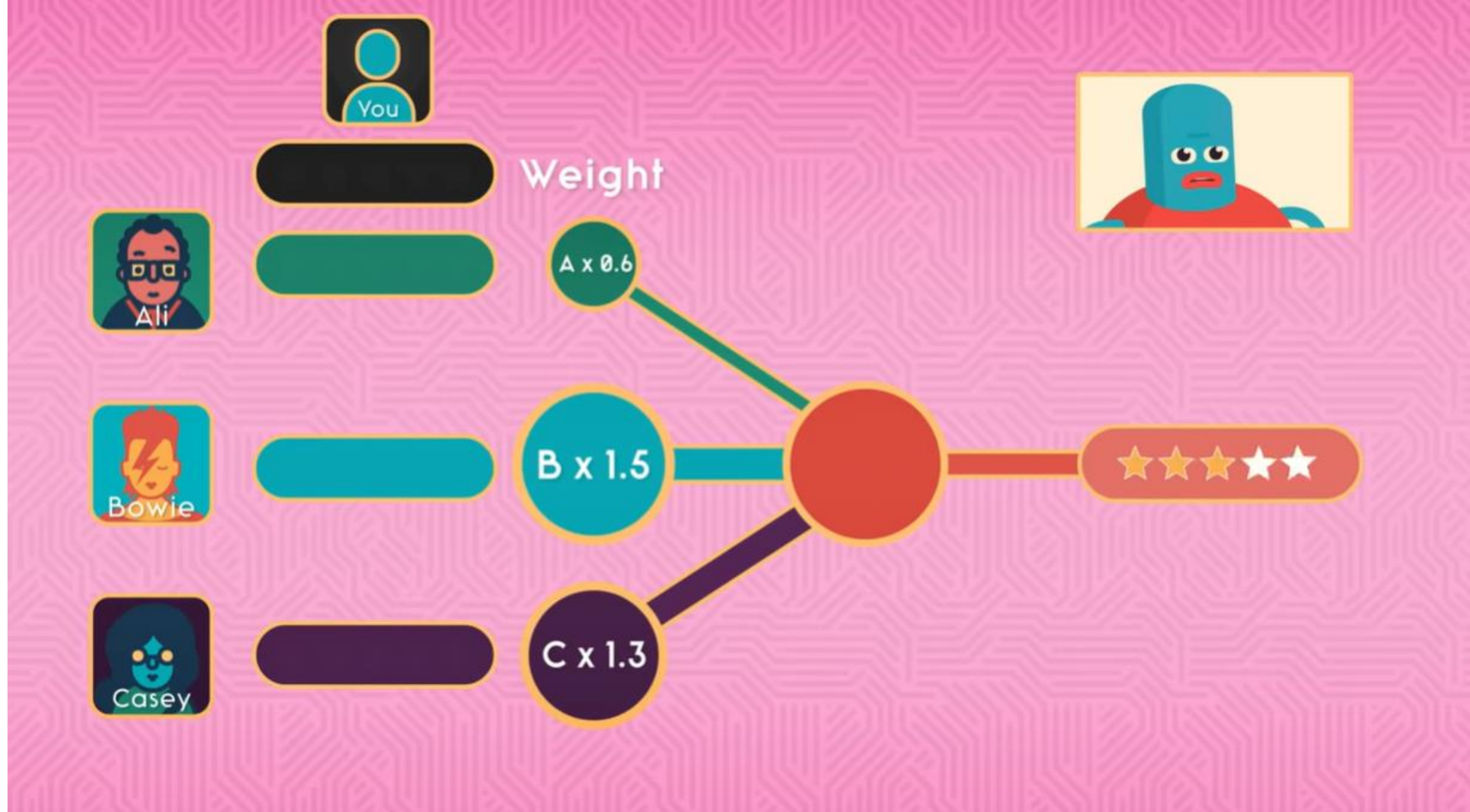




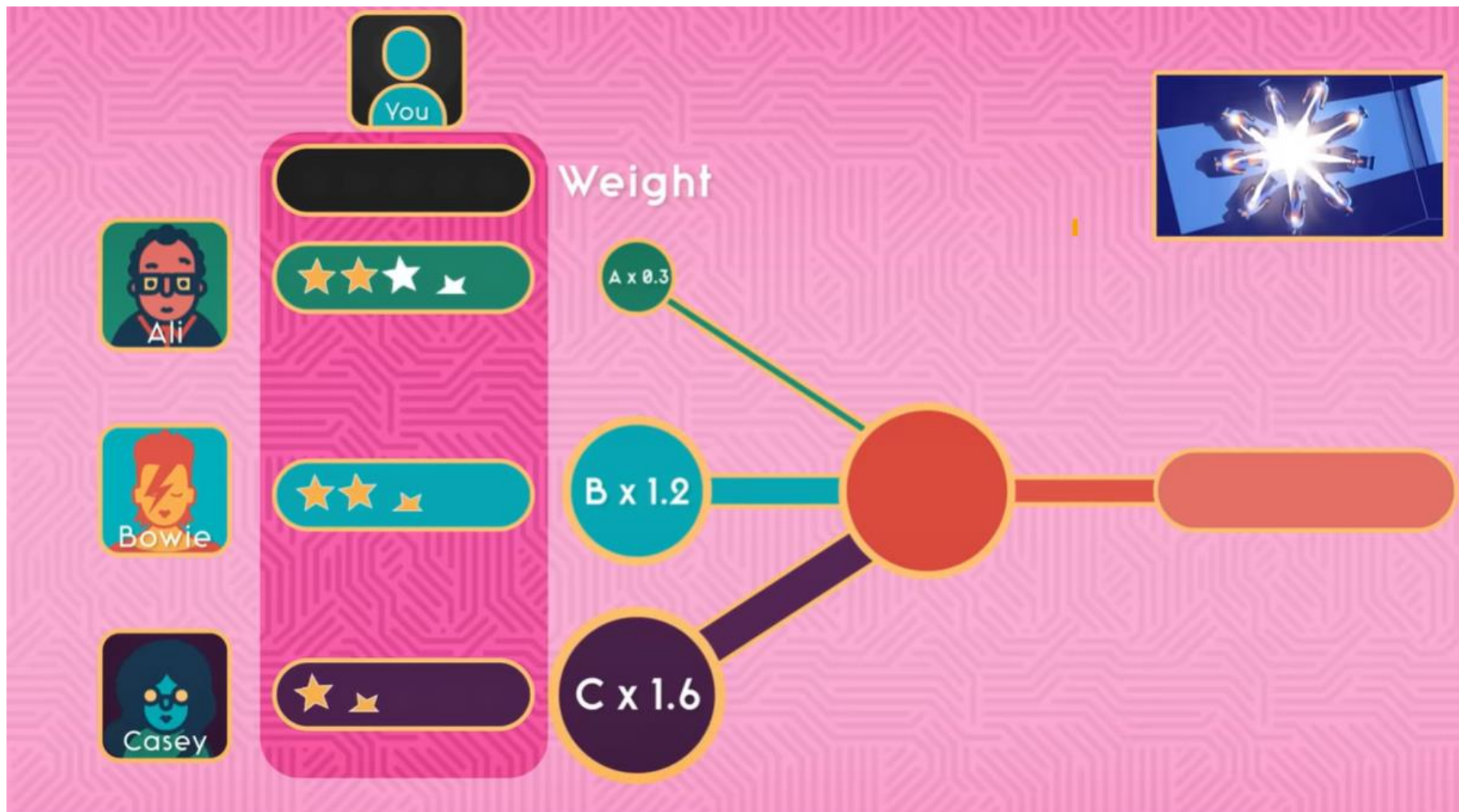


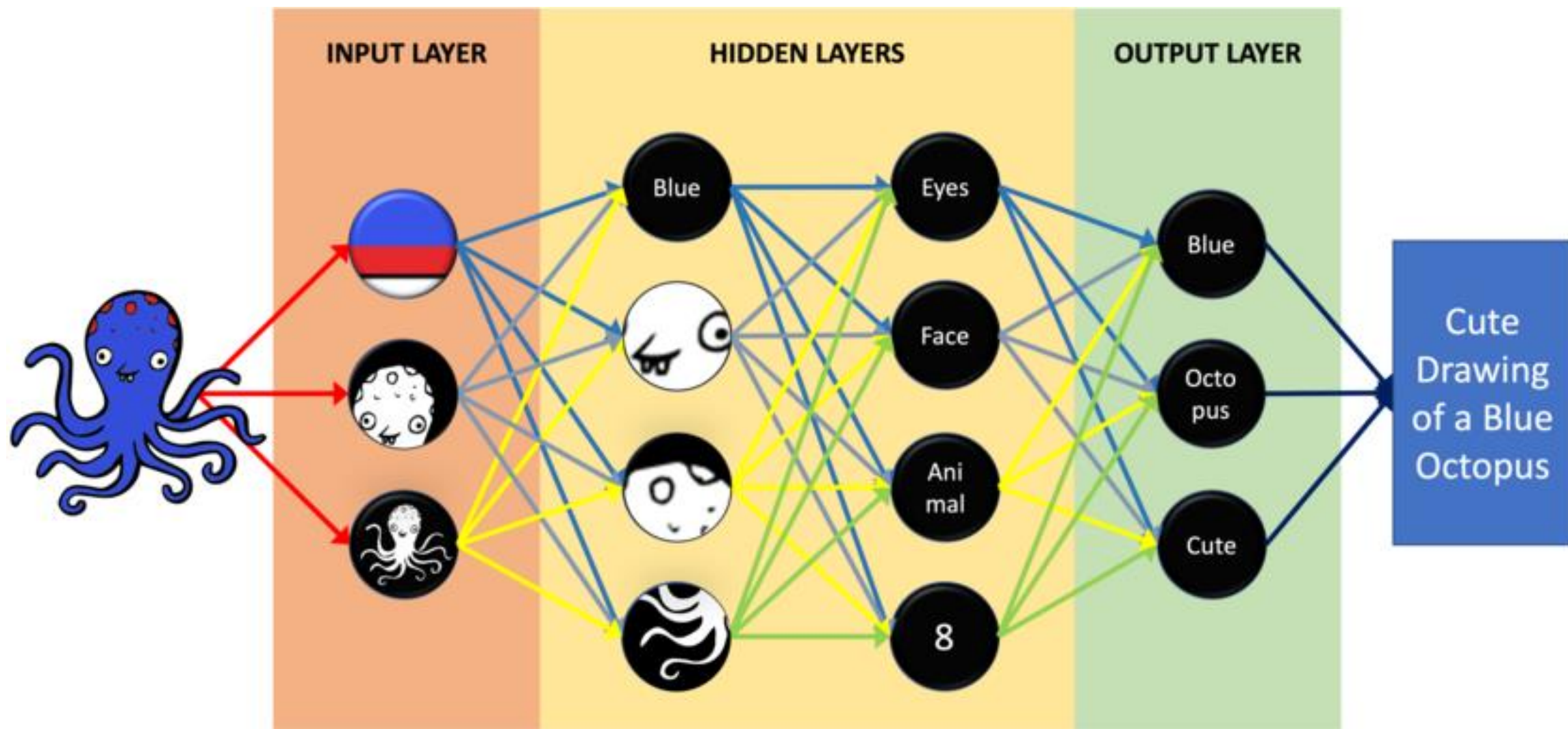
Weight

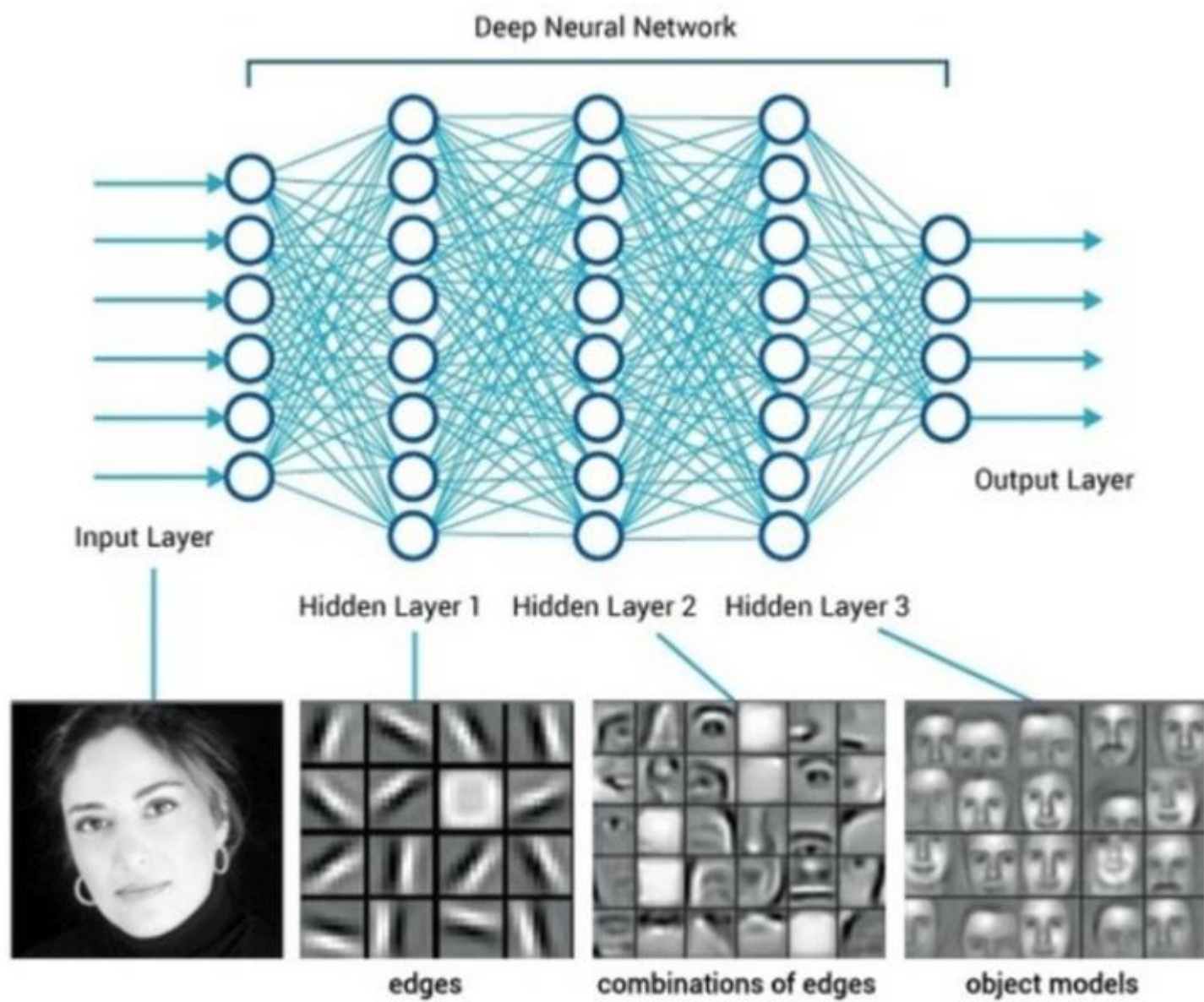
$$A \times 0.6$$



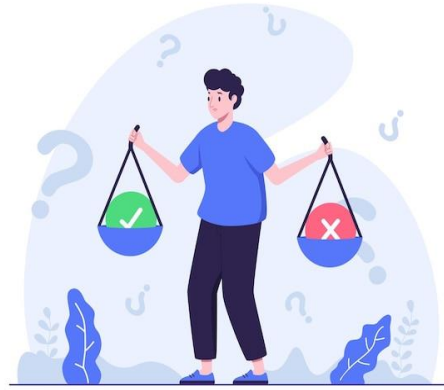








Comparison



Aspect	Weak AI	Strong AI	Symbolic AI	Connectionist AI
Exists today?	Yes	No	Yes	Yes
Learns from data	Sometimes	Yes	No	Yes
Based on rules	No	No	Yes	No
Inspired by brain	No	Yes	No	yes
Example	ChatGPT	Terminator	Expert systems	Neural networks

**Where do we
actually, see AI ?**



AI in Everyday Life

Daily Action

Unlocking phone with face



Watching TikTok / YouTube



Asking ChatGPT



Google Maps route



Spam email detection



Voice assistant



AI Behind It

Computer Vision

Machine Learning

NLP

Machine Learning

Machine Learning

NLP (Natural Language processing)