
Car Racing AI workshop

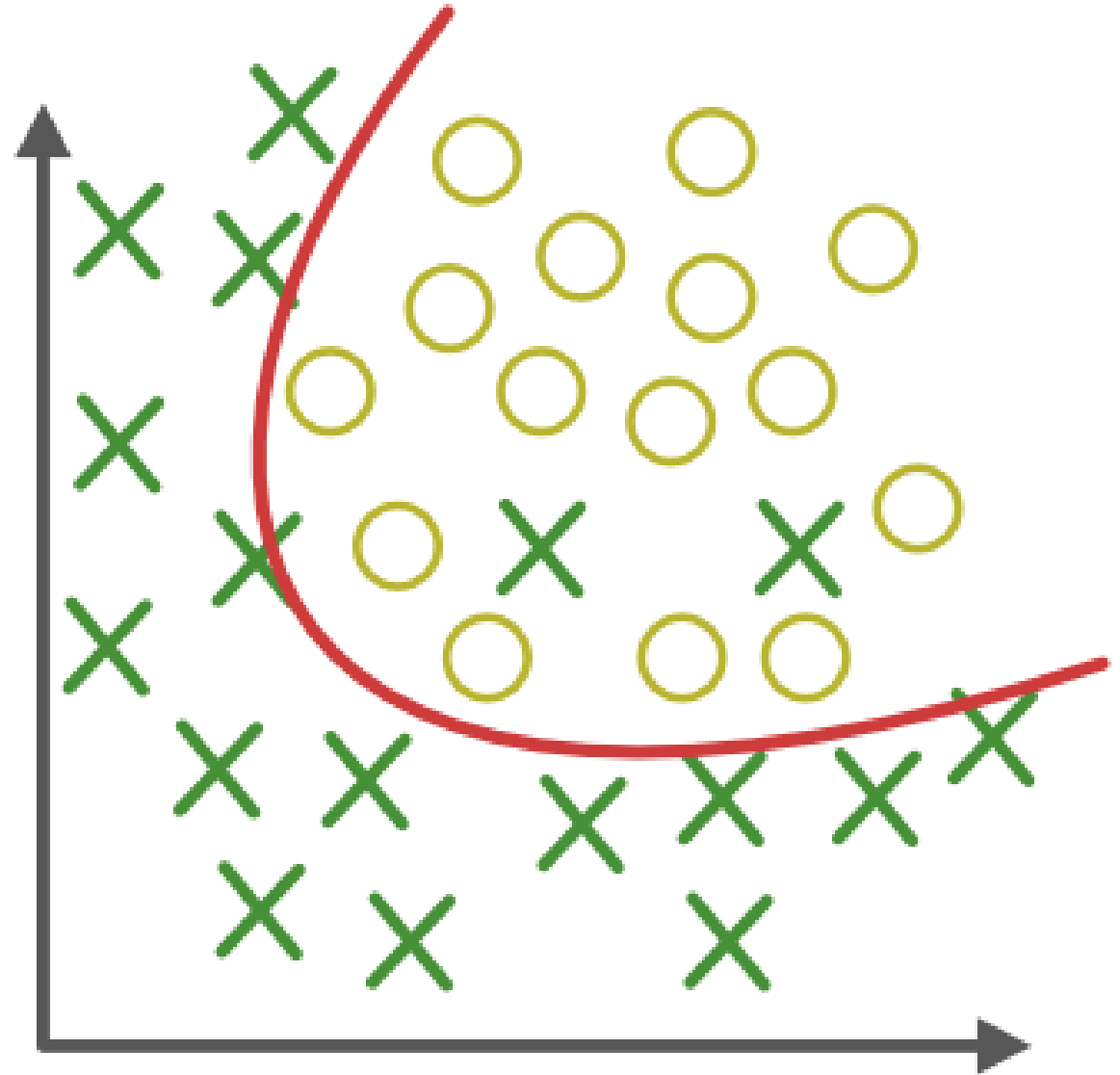
ITSC Summer Camp 2025

Types of AI??

Picking the brains of AI...

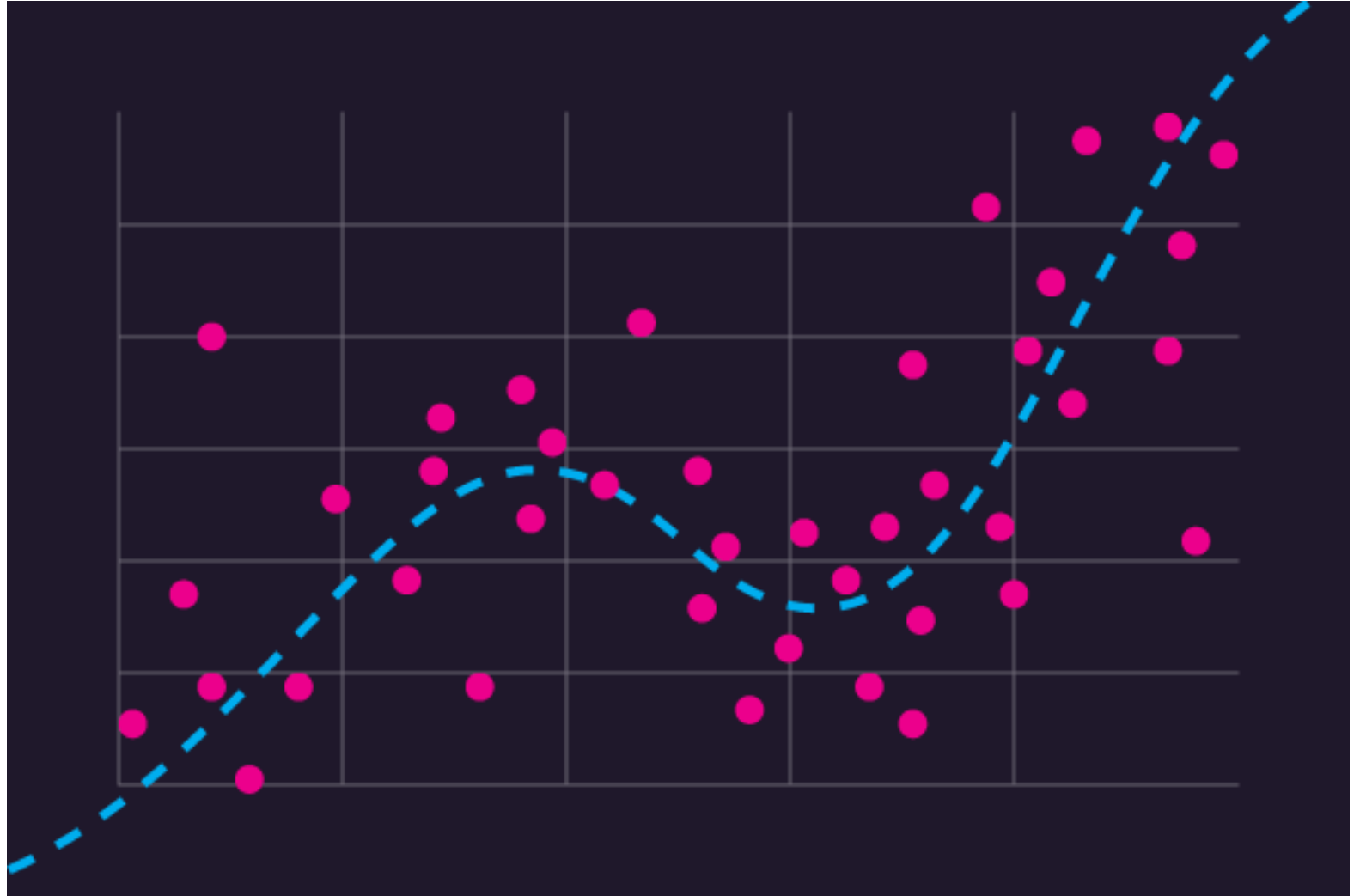
Classification Problem

Segregation of data points



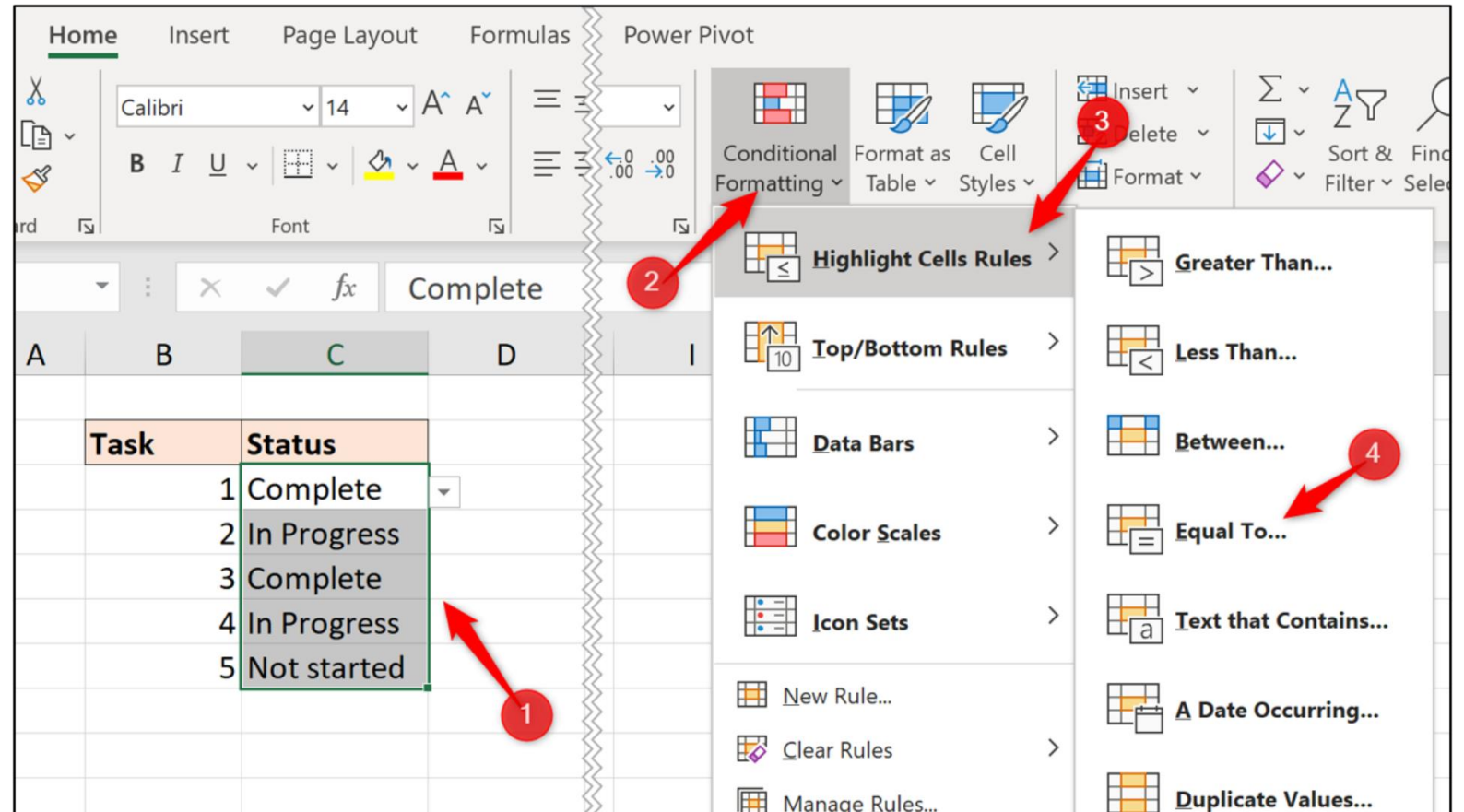
Regression

*Generalisation of data
points*



Rule-based System

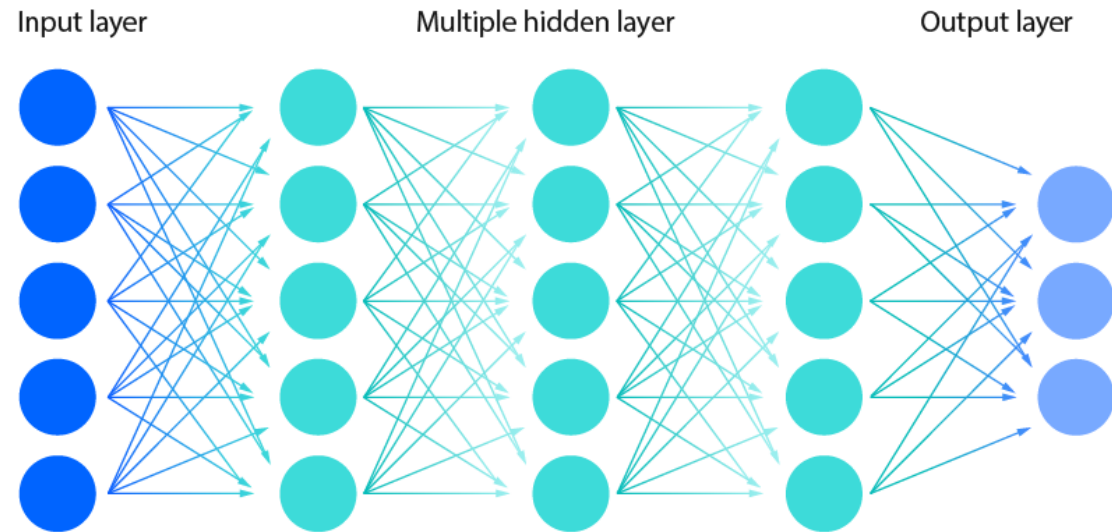
Using human-made rules to create a result



Neural Network

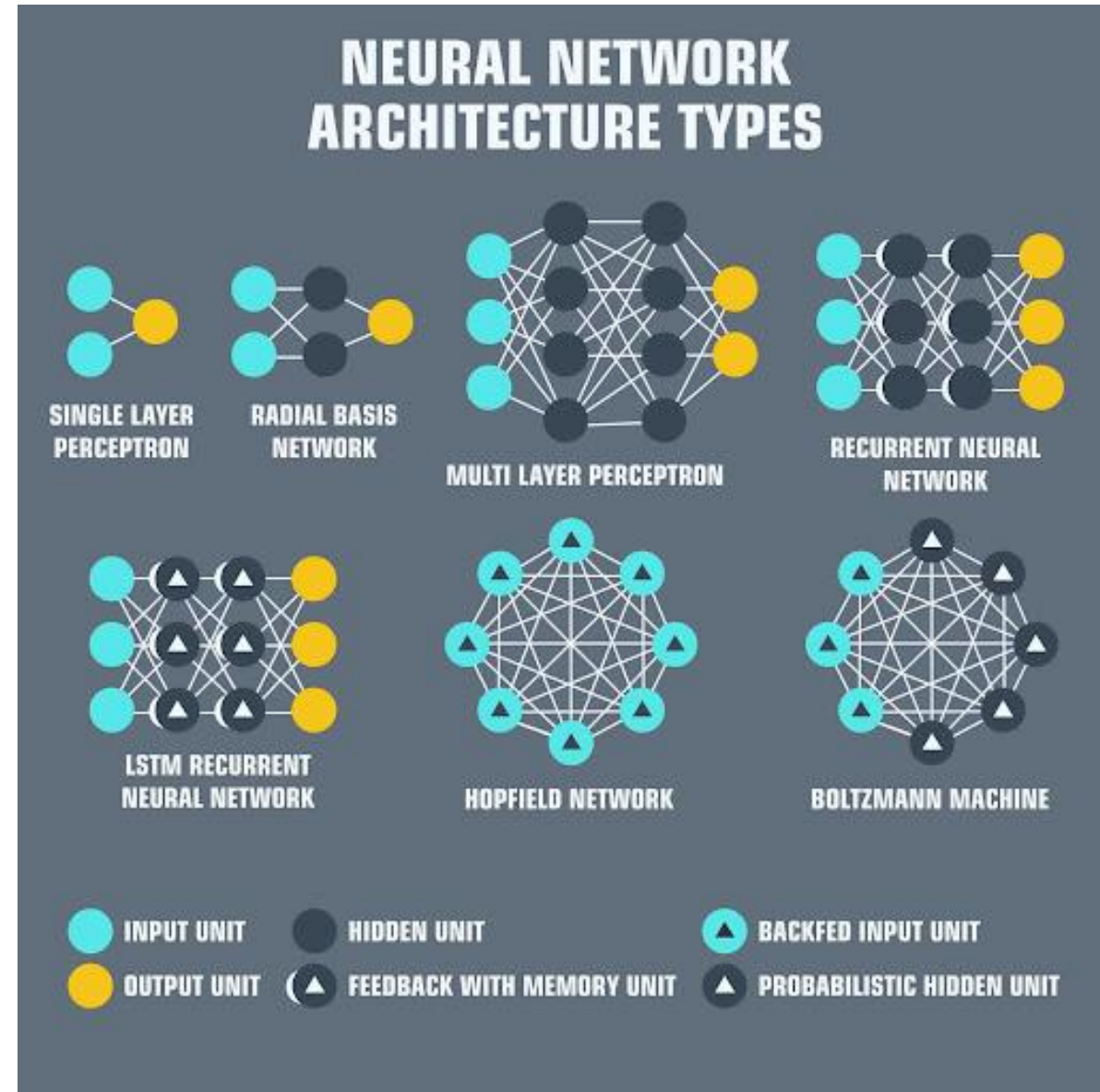
Most versatile type of AI*

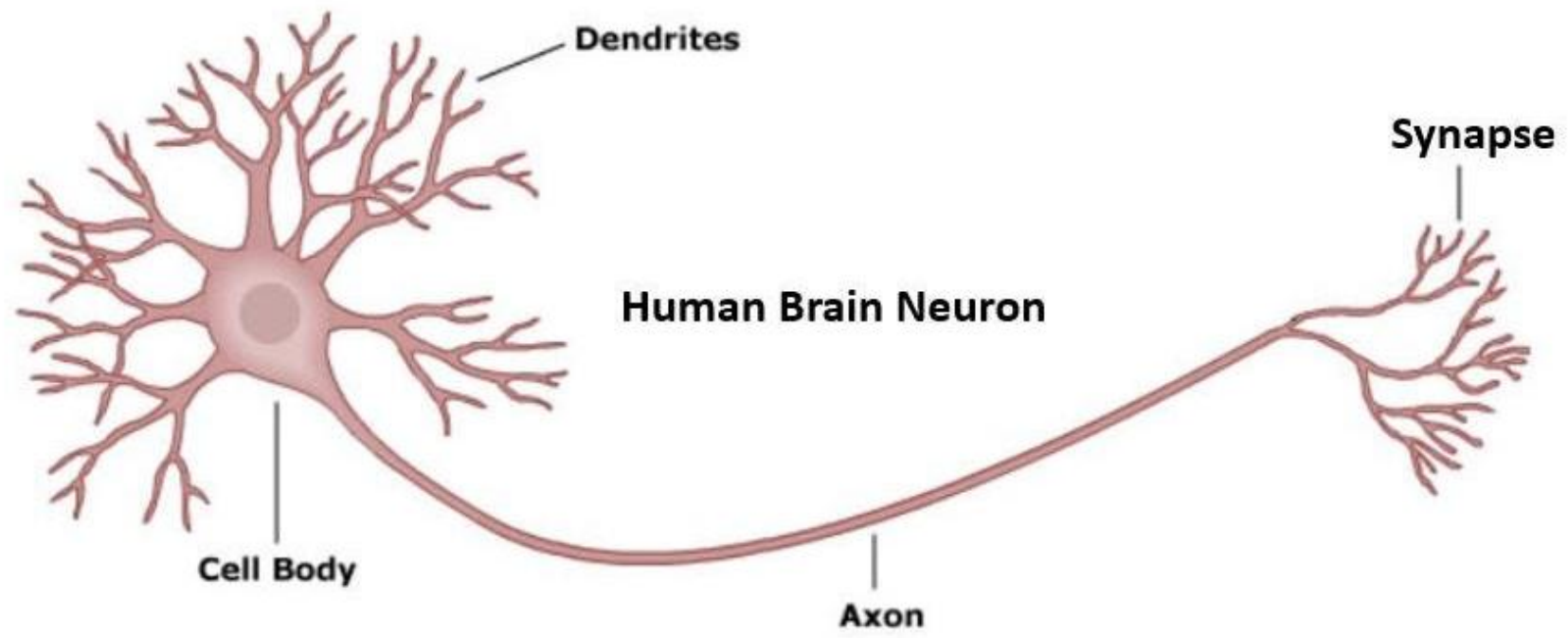
Deep neural network

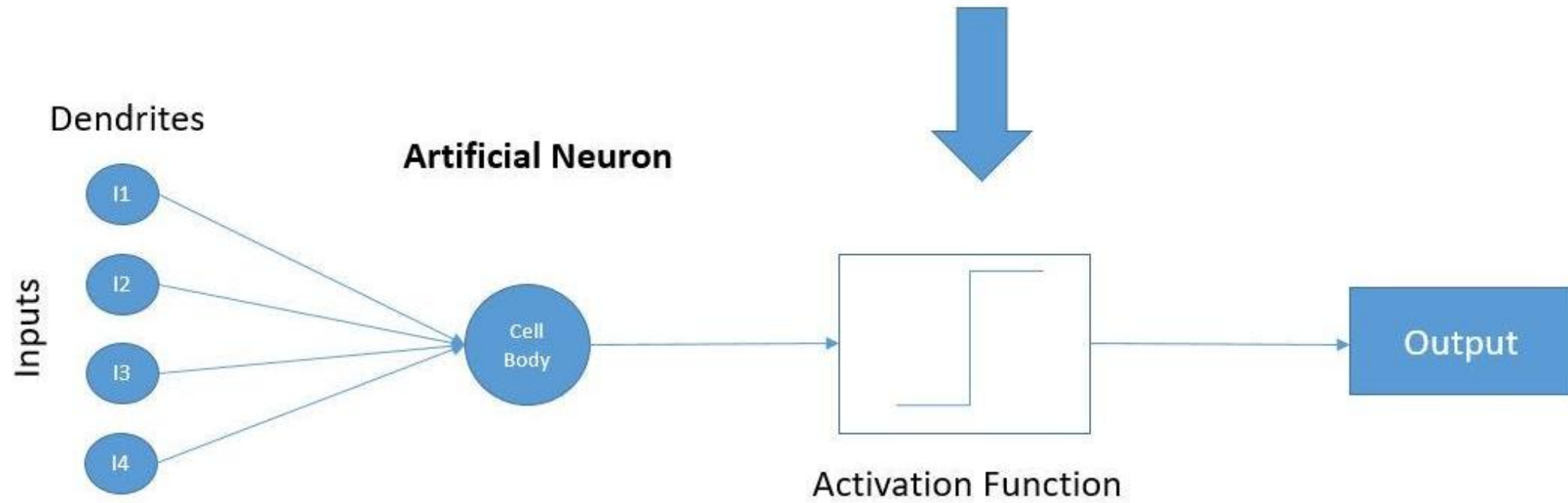
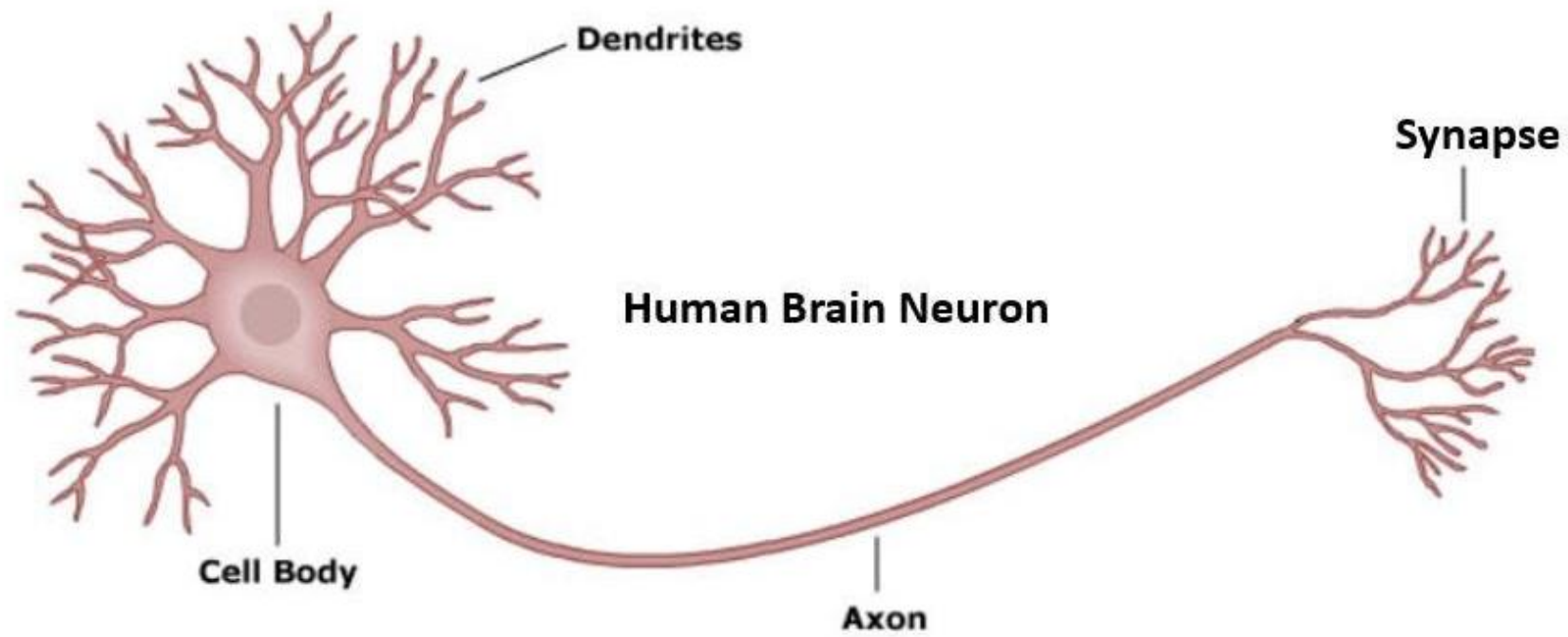


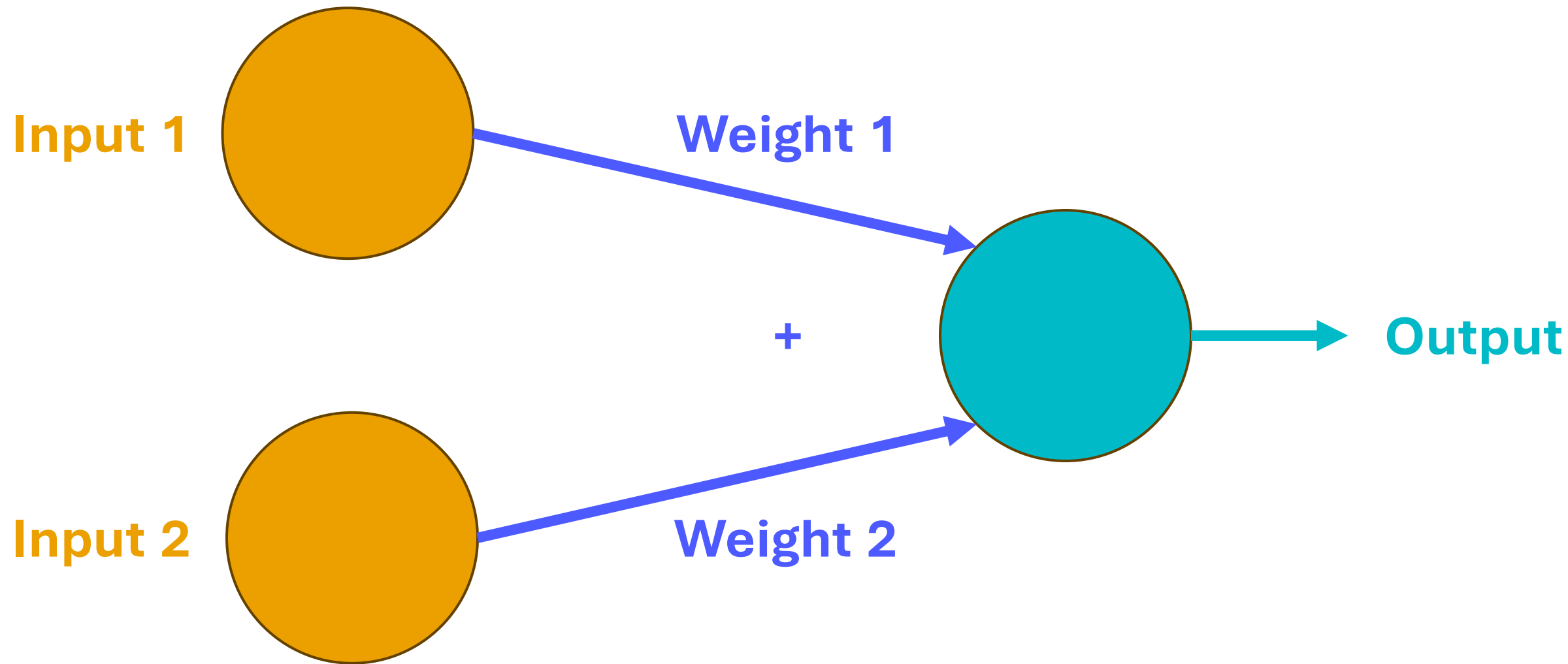
Neural Network

Most versatile type of AI*

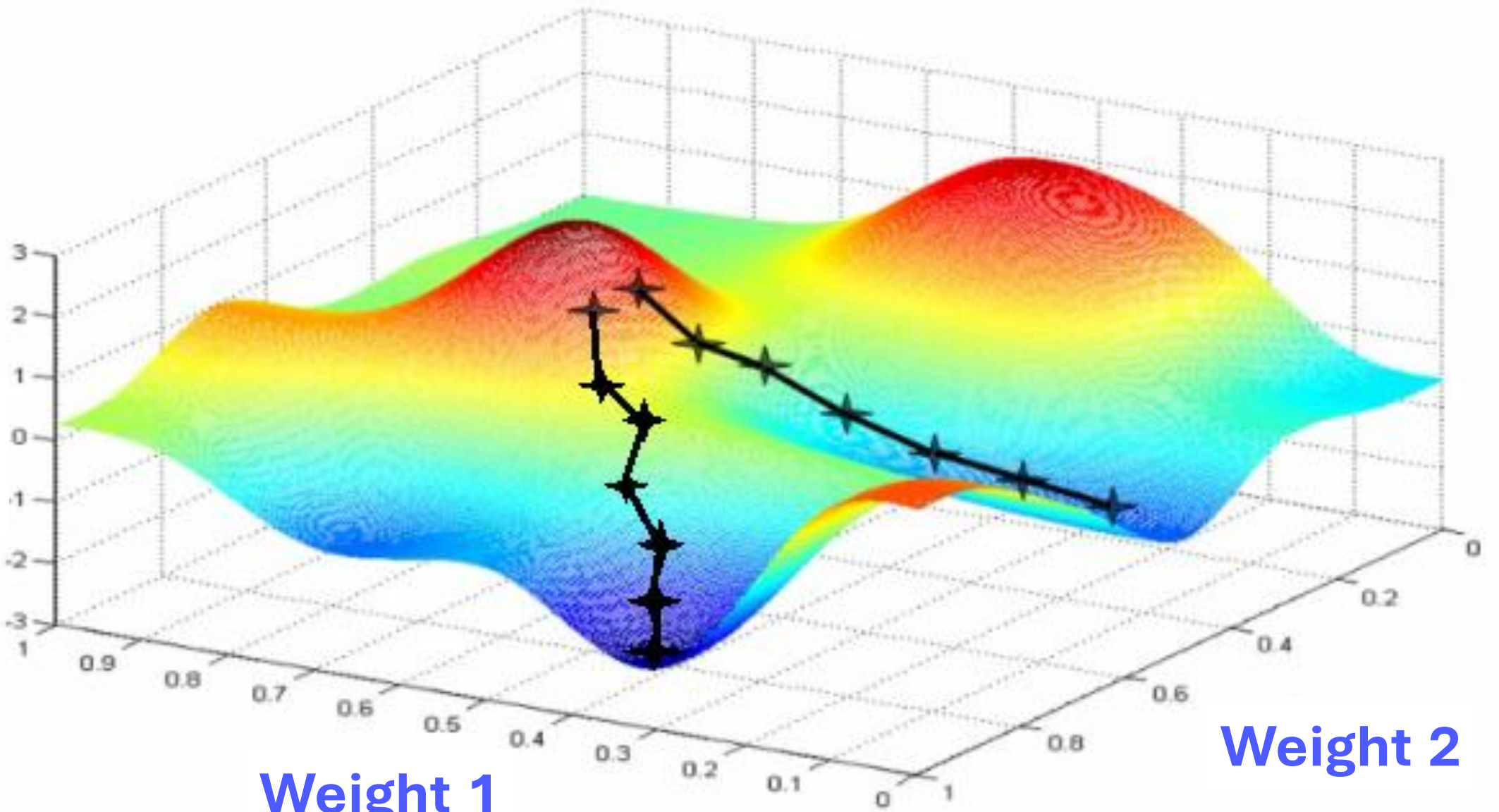








**Output
Score**

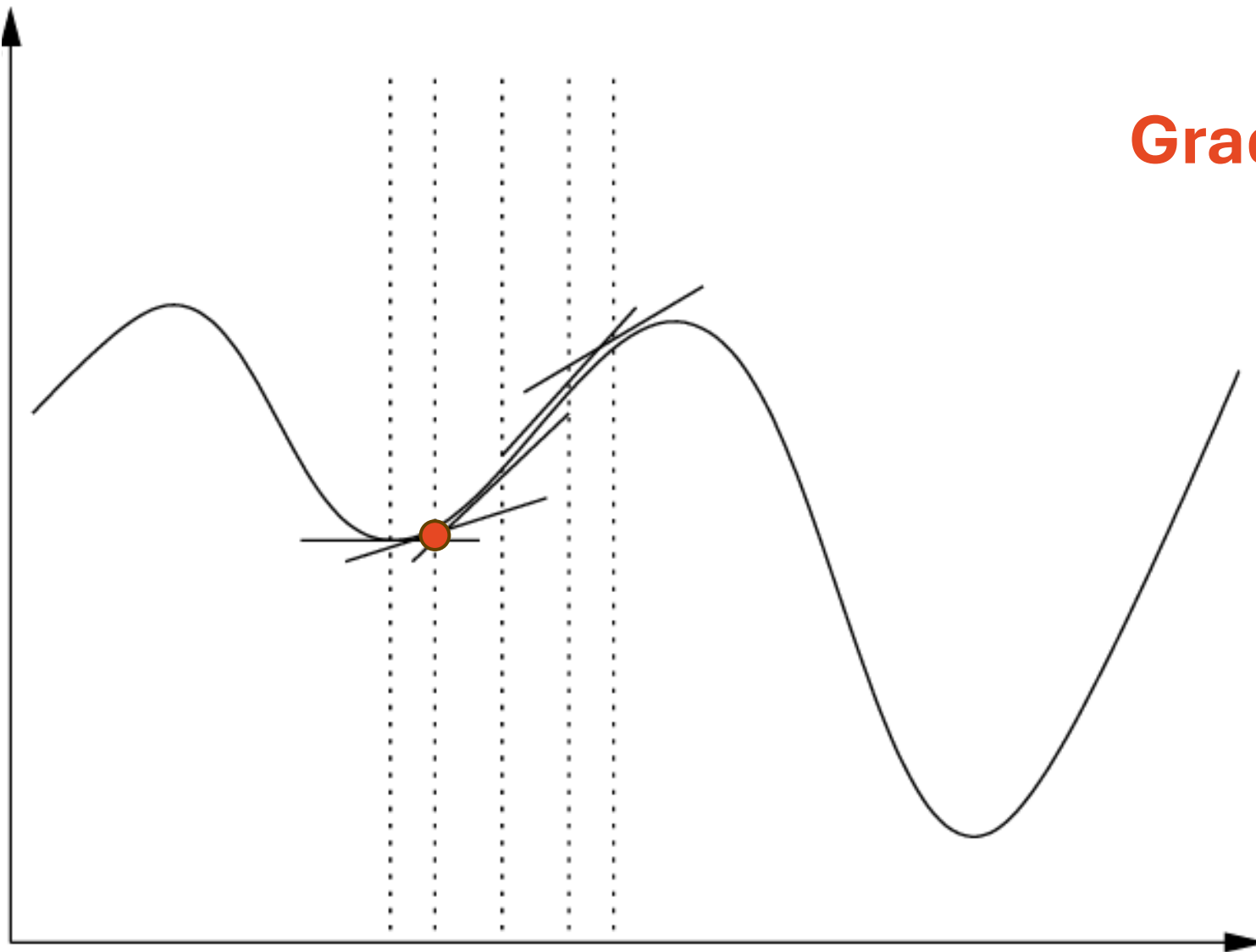


Weight 1

Weight 2

Output
Score

2D hill
Gradient ascent

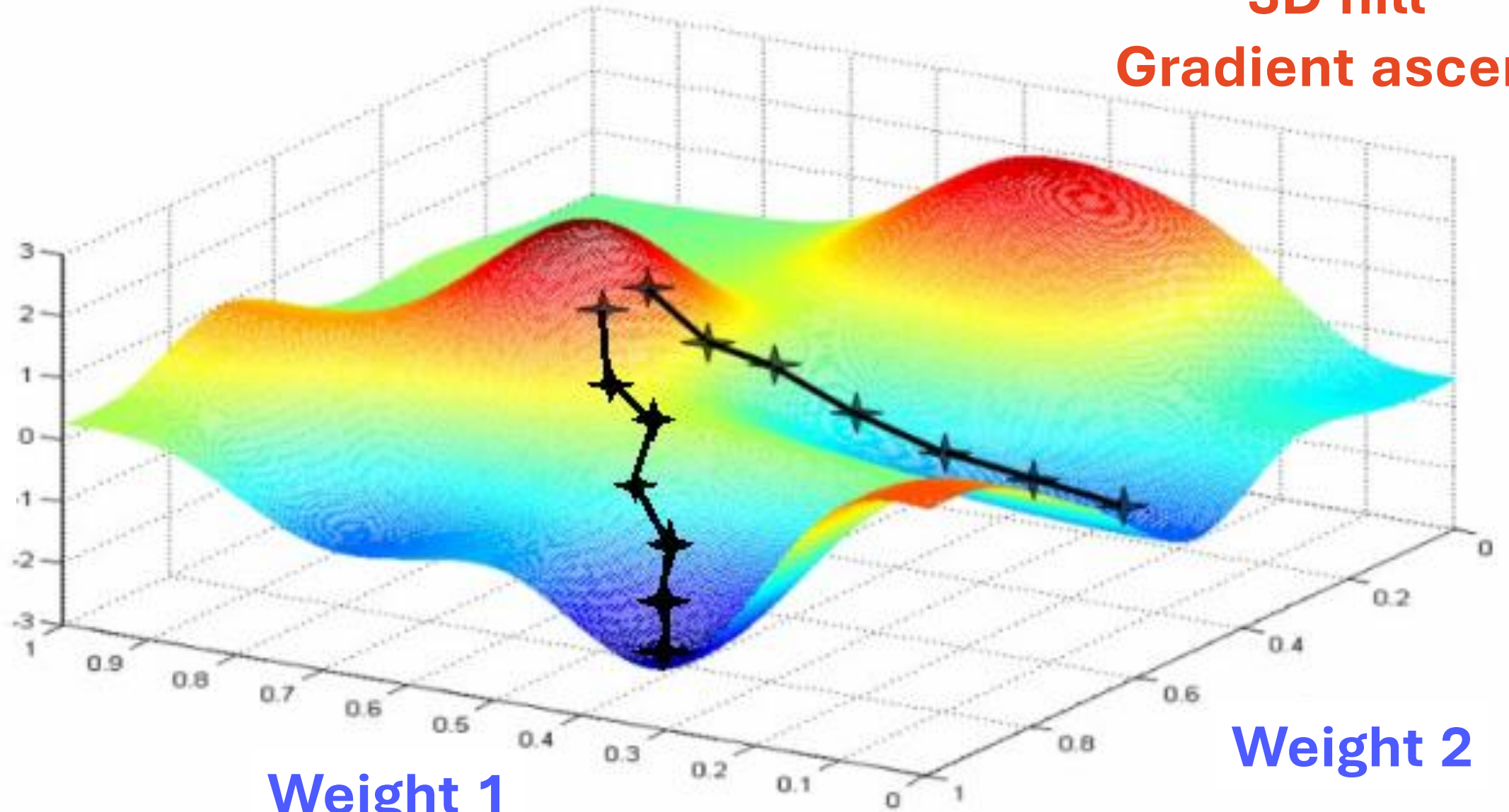


Weight 1



×1

3D hill Gradient ascent



Output
Score

Weight 2

Weight 1

×2

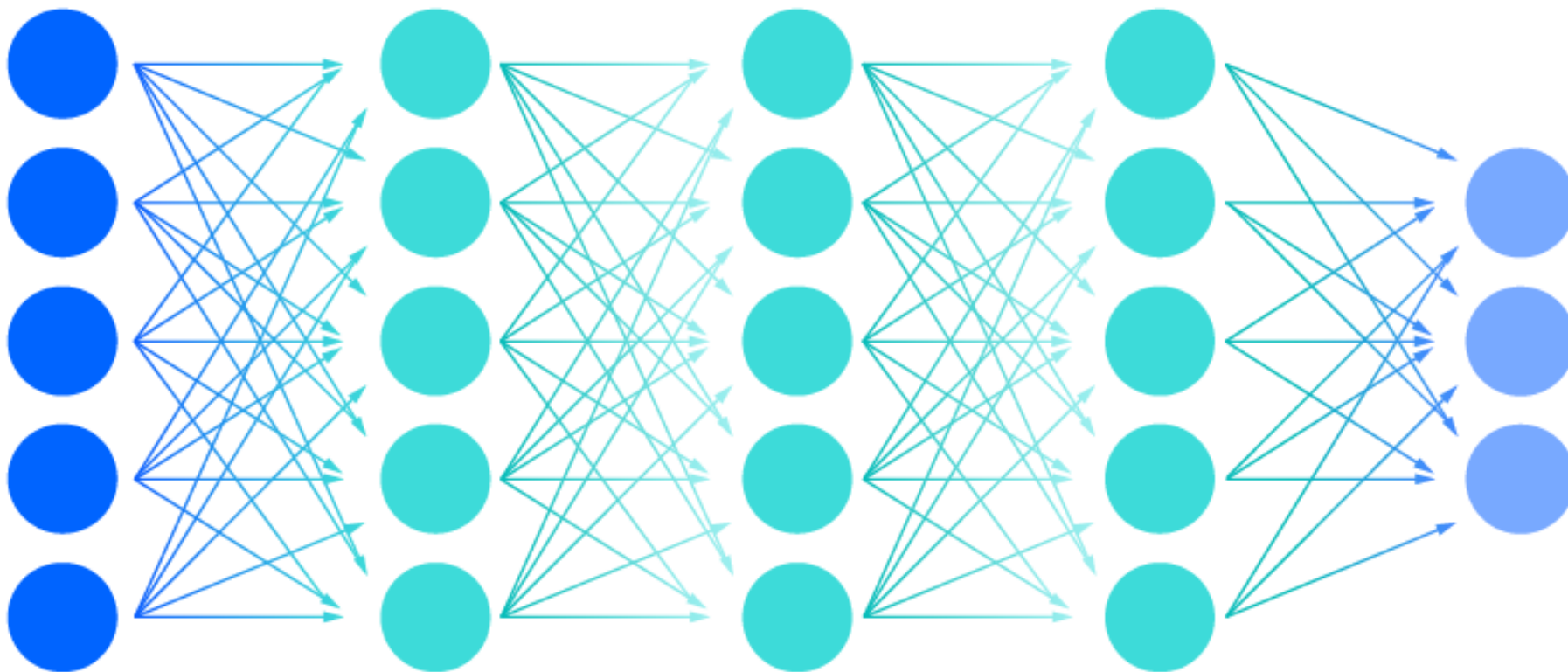


Deep neural network

Input layer

Multiple hidden layer

Output layer

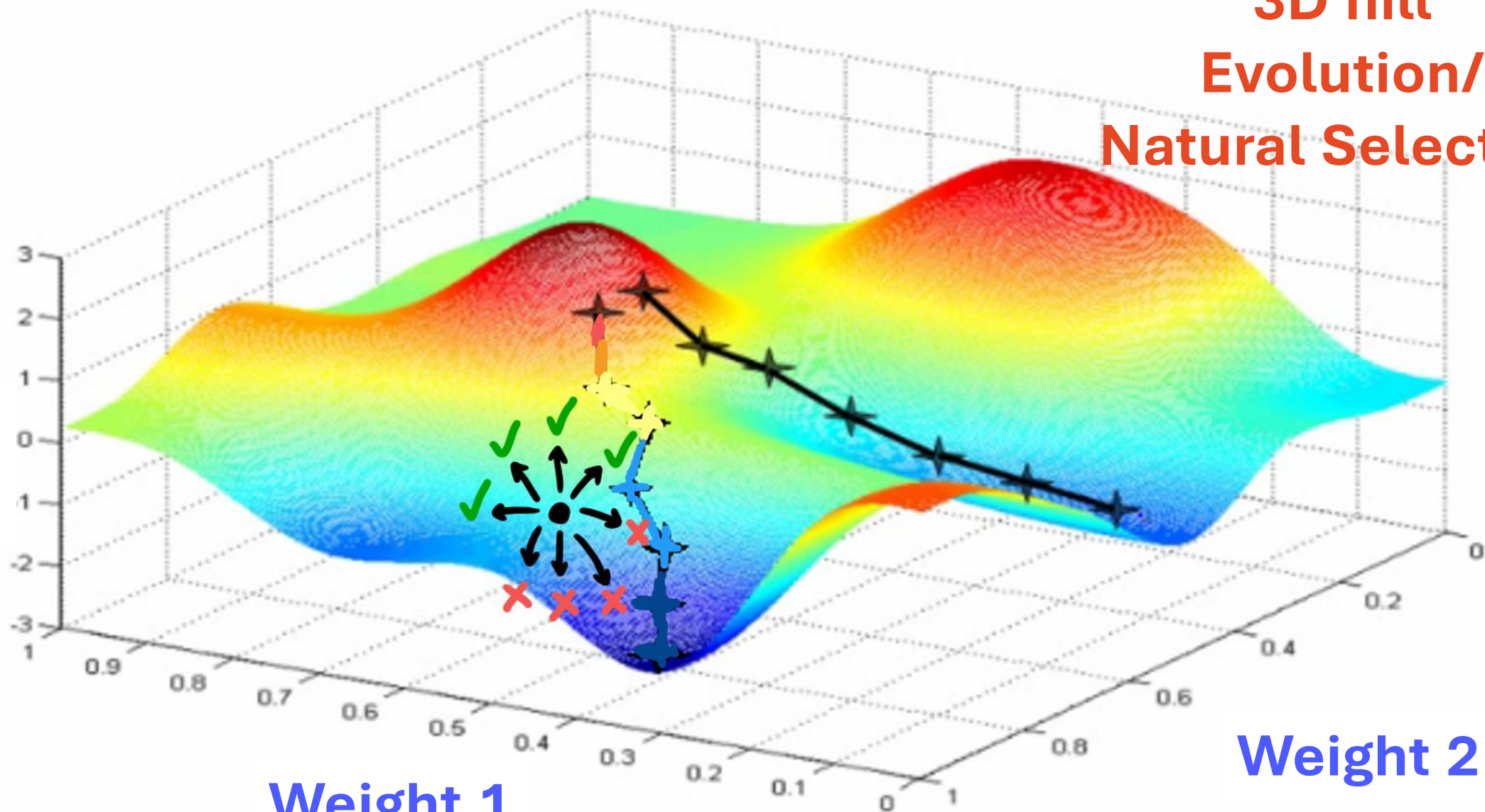


×90



**3D hill
Evolution/
Natural Selection**

**Output
Score**



Weight 2

Weight 1

GradAsc

- *Guaranteed to reach a maximum (hilltop)*
- *Explore every dimension*
- *Slow with big network*

NatSel

- *Not guaranteed...*
 - *Does not explore every dimension*
 - *Same* speed regardless of network size*
-

I want to play car where is my car why are you talking so much what is wrong with you

The interface is divided into several sections:

- Settings (Top Left):** Includes sliders for Ticks per Generation (2000), Target Population Size (50), Survival Harshness (4), Reproduction Harshness (1), Neural Network Mutation Rate (0.5), and a checkbox for Parent should Mutate? (unchecked).
- Genetic Data Table (Middle Left):** A table with columns: Gen, Population, Survival, Best Score.
- Controls (Bottom Left):** Includes buttons for Start, Stop after this, Tick: 0/2000, Export Selected Car, and Reset Leaderboard.
- Track (Center):** A large green rectangular area representing the race track. A red dot indicates the car's position. Text at the bottom left of the track says "LMB: Draw Track RMB: Erase Track". A "Clear Stadium" button is at the bottom right.
- Car View (Top Right):** A smaller green rectangle showing the car from the front (0°) and back. A vertical line indicates the car's position. A "Probe" bar is on the right.
- Statistics (Bottom Right):** Includes a "Road Score" section with a table: Every tick, onTrack → +0.2, offTrack → -0.5. Below this are "Max TPS (est.): 0", "Current TPS: 0", and "Target TPS: 200".
- Neural Network (Bottom Right):** A diagram showing an "Input Layer" with a red circle containing a "P". It connects to a "Hidden" layer (10 nodes) and an "Output" layer (2 nodes). The "Input Layer" has a list of inputs: Probe Dist. (checked), Car Speed, Car Angle, Car Position, Track Angle, Lap Count, On Track?, Road Score, Perf. Score, and Current Tick.

Tip: Think about what each control does and what implications it has.

cck.wtf/racing-ai

I want to play car where is my car why are you talking so much what is wrong with you

The screenshot displays the 'cck.wtf/racing-ai' web application interface, which is designed for a car racing simulation using a neural network. The interface is divided into several functional areas:

- Top Left: Natural Selection** - A control panel for evolutionary parameters including 'Ticks per Generation' (2000), 'Target Population Size' (50), 'Survival Harshness' (4), 'Reproduction Harshness' (1), 'Neural Network Mutation Rate' (0.5), and 'Parent selection'. It includes a table with columns for 'Gen', 'Population', 'Survival', and 'Best Score', and buttons for 'Start', 'Stop after this', and 'Tick: 0/2000'.
- Bottom Left: Leaderboard** - A table showing the performance of different cars with columns for 'Rank', 'Gen', 'Score', 'Lap', 'Speed', and 'On Track'. It features buttons for 'Export Selected Car' and 'Reset Leaderboard'.
- Center: Racing Stadium** - A large green rectangular area representing the race track. It contains a small red dot indicating the car's position. Controls at the bottom include 'LMB: Draw Track', 'RMB: Erase Track', and a 'Clear Stadium' button.
- Top Right: Garage** - A panel showing the car's orientation ('Front (0°)', 'Back') and a 'Probe' value (0). It includes buttons for 'Import Car', 'Reset Settings', and a 'Race mode?' toggle.
- Bottom Right: Neural Network** - A section for configuring the neural network. It lists 'Input Layer' parameters: 'Probe Dist.' (checked), 'Car Speed', 'Car Angle', 'Car Position', 'Track Angle', 'Lap Count', 'On Track?', 'Road Score', 'Perf. Score', and 'Current Tick'. It also shows 'Hidden' (10, 4, ...) and 'Output' (2) layers. To the right are two circular icons with double-headed arrows, likely for adjusting network parameters.
- Far Right: Road Score and TPS** - A section displaying 'Road Score' (Every tick, onTrack → +0.2, offTrack → -0.5), 'Max TPS (est.): 0', 'Current TPS: 0', and 'Target TPS: 200'.

A tip at the bottom center reads: 'Tip: Choose the neural network inputs thoughtfully.'

cck.wtf/racing-ai

I want to play car where is my car why are you talking so much what is wrong with you

The interface is divided into several sections:

- Settings (Top Left):** Includes sliders for Ticks per Generation (2000), Target Population Size (50), Survival Harshness (4), Reproduction Harshness (1), Neural Network Mutation Rate (0.5), and a checkbox for Parent should Mutate?.
- Table (Middle Left):** A table with columns: Gen, Population, Survival, Best Score.
- Buttons (Bottom Left):** Start, Stop after this, Tick: 0/2000, Export Selected Car, Reset Leaderboard.
- Main View (Center):** A green rectangular area representing the track. A red dot and a grey dot are visible. Text at the bottom: LMB: Draw Track, RMB: Erase Track.
- Car View (Top Right):** A green rectangular area showing the car's perspective. Labels: Front (0°), Back, Probe°. A vertical bar on the right indicates the probe's position.
- Buttons (Middle Right):** Import Car, Reset Settings, Race mode? (checkbox).
- Scoreboard (Bottom Right):** Road Score: Every tick, onTrack → +0.2, offTrack → -0.5. Max TPS (est.): 0, Current TPS: 0, Target TPS: 200.
- Neural Network Diagram (Bottom Right):** A diagram showing an Input Layer (1 node), a Hidden Layer (10, 4, ... nodes), and an Output Layer (2 nodes). A red circle with a 'P' is connected to the Input and Output layers. A list of inputs is shown: Probe Dist. (checked), Car Speed, Car Angle, Car Position, Track Angle, Lap Count, On Track?, Road Score, Perf. Score, Current Tick.

Tip: Think about what each control does and what implications it has.

cck.wtf/racing-ai

I want to play car where is my car why are you talking so much what is wrong with you

The interface is divided into several sections:

- Top Left:** Configuration settings including Ticks per Generation (2000), Target Population Size (50), Survival Harshness (4), Reproduction Harshness (1), Neural Network Mutation Rate (0.5), and a checkbox for Parent should Mutate? Below these are tables for Gen, Population, Survival, and Best Score, and buttons for Start, Stop after this, and Tick: 0/2000.
- Bottom Left:** A table with columns Rank, Gen, Score, Lap, Speed, and On Track. Below the table are buttons for Export Selected Car and Reset Leaderboard.
- Center:** A large green rectangular area representing the race track. A small red dot and a small grey dot are visible. At the bottom, it says "LMB: Draw Track" and "RMB: Erase Track".
- Top Right:** A "Front (0°)" view showing a red car on a green track. A "Probe" is shown with a value of 0. Below this are buttons for Import Car, Reset Settings, and Race mode? (checkbox). A "Road Score" section shows: Every tick, onTrack → +0.2, offTrack → -5. Max TPS (est.): 0, Current TPS: 0, Target TPS: 200.
- Bottom Right:** A neural network diagram with an "Input Layer" (Probe Dist. checked, Car Speed, Car Angle, Car Position, Track Angle, Lap Count, On Track?, Road Score, Perf. Score, Current Tick), a "Hidden" layer (10 4 ...), and an "Output" layer (2). A pink circle with a "P" is connected to the Input and Output layers. A "Clear Stadium" button is at the bottom.

Tip: Think about what each control does and what implications it has.

cck.wtf/racing-ai

I want to play car where is my car why are you talking so much what is wrong with you

The screenshot shows the cck.wtf/racing-ai web application interface. It features a central green track with a white circular path and a red car icon. The interface is divided into several sections:

- Settings (Top Left):** Includes sliders for Ticks per Generation (2000), Target Population Size (50), Survival Harshness (4), Reproduction Harshness (1), Neural Network Mutation Rate (0.5), and a checkbox for Parent should Mutate?.
- Genetic Progression Table (Middle Left):** A table with columns: Gen, Population, Survival, Best Score.
- Start/Stop Controls (Bottom Left):** Includes buttons for Start, Stop after this, and Tick: 0/2000.
- Ranking Table (Bottom Left):** A table with columns: Rank, Gen, Score, Lap, Speed, On Track.
- Export/Reset Buttons (Bottom Left):** Includes buttons for Export Selected Car and Reset Leaderboard.
- Track Controls (Bottom Center):** Includes buttons for LMB: Draw Track, RMB: Erase Track, and Clear Stadium.
- Car View (Top Right):** A green rectangular area showing the car's perspective with 'Front (0°)' and 'Back' labels.
- Probe Meter (Top Right):** A vertical bar labeled 'Probe' with a value of 0.
- Import/Reset Buttons (Top Right):** Includes buttons for Import Car and Reset Settings.
- Race Mode (Top Right):** A checkbox labeled 'Race mode?'.
- Road Score (Top Right):** A text box showing 'Road Score: Every tick, onTrack → +0.2, offTrack → -0.5'.
- TPS Metrics (Top Right):** Includes 'Max TPS (est.): 0', 'Current TPS: 0', and 'Target TPS: 200'.
- Neural Network Diagram (Bottom Right):** A diagram showing an 'Input Layer' with a 'P' icon, a 'Hidden' layer with 10 nodes, and an 'Output Layer' with 2 nodes. It also includes a list of input features: Probe Dist. (checked), Car Speed, Car Angle, Car Position, Track Angle, Lap Count, On Track?, Road Score, Perf. Score, and Current Tick.

Tip: Choose the neural network inputs thoughtfully.

cck.wtf/racing-ai

I want to play car where is my car why are you talking so much what is wrong with you

The screenshot shows the cck.wtf/racing-ai game interface. The central area is a green track with a white circular path. A red car is at the top of the circle, and a grey car is at the bottom. The interface includes several panels:

- Settings Panel (Top Left):** Ticks per Generation (2000), Target Population Size (50), Survival Harshness (4), Reproduction Harshness (1), Neural Network Mutation Rate (0.5), and a checkbox for Parent should Mutate? (unchecked).
- Table (Bottom Left):** A table with columns: Rank, Gen, Score, Lap, Speed, On Track. It is currently empty.
- Buttons (Bottom Left):** Export Selected Car, Reset Leaderboard.
- Controls (Bottom Left):** Start, Stop after this, Tick: 0/2000.
- Track Controls (Bottom Center):** LMB: Draw Track, RMB: Erase Track, Clear Stadium.
- Probe Panel (Top Right):** Front (0°), Back, Probe° (0).
- Input Layer (Bottom Right):** A diagram showing a pink circle with a 'P' connected to two circular nodes. The nodes are labeled 'Input' (1) and 'Output' (2). The 'Hidden' layer has 10, 4, and ... nodes.
- Buttons (Top Right):** Import Car, Reset Settings, Race mode? (checkbox).
- Score Panel (Bottom Right):** Road Score: Every tick, onTrack → +0.2, offTrack → -0.5. Max TPS (est.): 0, Current TPS: 0, Target TPS: 200.

Tip: Choose the neural network inputs thoughtfully.

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The interface is divided into several sections:

- Settings (Top Left):** Includes sliders for Ticks per Generation (2000), Target Population Size (50), Survival Harshness (4), Reproduction Harshness (1), Neural Network Mutation Rate (0.5), and a checkbox for Parent should Mutate? (unchecked).
- Leaderboard (Bottom Left):** A table with columns: Rank, Gen, Score, Lap, Speed, On Track. It includes buttons for 'Export Selected Car' and 'Reset Leaderboard'.
- Track View (Center):** A green field with a white circular track. A red dot indicates the car's position. Controls at the bottom include 'LMB: Draw Track', 'RMB: Erase Track', and 'Clear Stadium'.
- Car View (Top Right):** A green rectangle showing the car's perspective. It includes a 'Front (0°)' label, a 'Back' label, and a 'Probe' value of 0.
- Neural Network Diagram (Bottom Right):** A diagram showing an 'Input Layer' with a red circle containing a 'P'. It connects to a 'Hidden' layer with 10 nodes and an 'Output' layer with 2 nodes. The diagram is labeled with 'Input', 'Hidden', and 'Output' layers.
- Controls (Top Right):** Includes buttons for 'Import Car', 'Reset Settings', and 'Race mode?' (unchecked). It also displays 'Road Score' (Every tick, onTrack → +0.2, offTrack → -0.5), 'Max TPS (est.): 0', 'Current TPS: 0', and 'Target TPS: 200'.

Tip: Choose the neural network inputs thoughtfully.

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