Artificial Intelligence:
Four Ways Analytics Think Like You

The rise of robotics has mirrored a boom in artificial intelligence (AI) – software that mimics what we know about how humans think. The combination of AI and analytics powers increasingly intelligent machines that perform advanced human tasks. "AI Analytics" are already used in many business applications. Here are four examples of analytics that imitate the way you think, and how they are used.
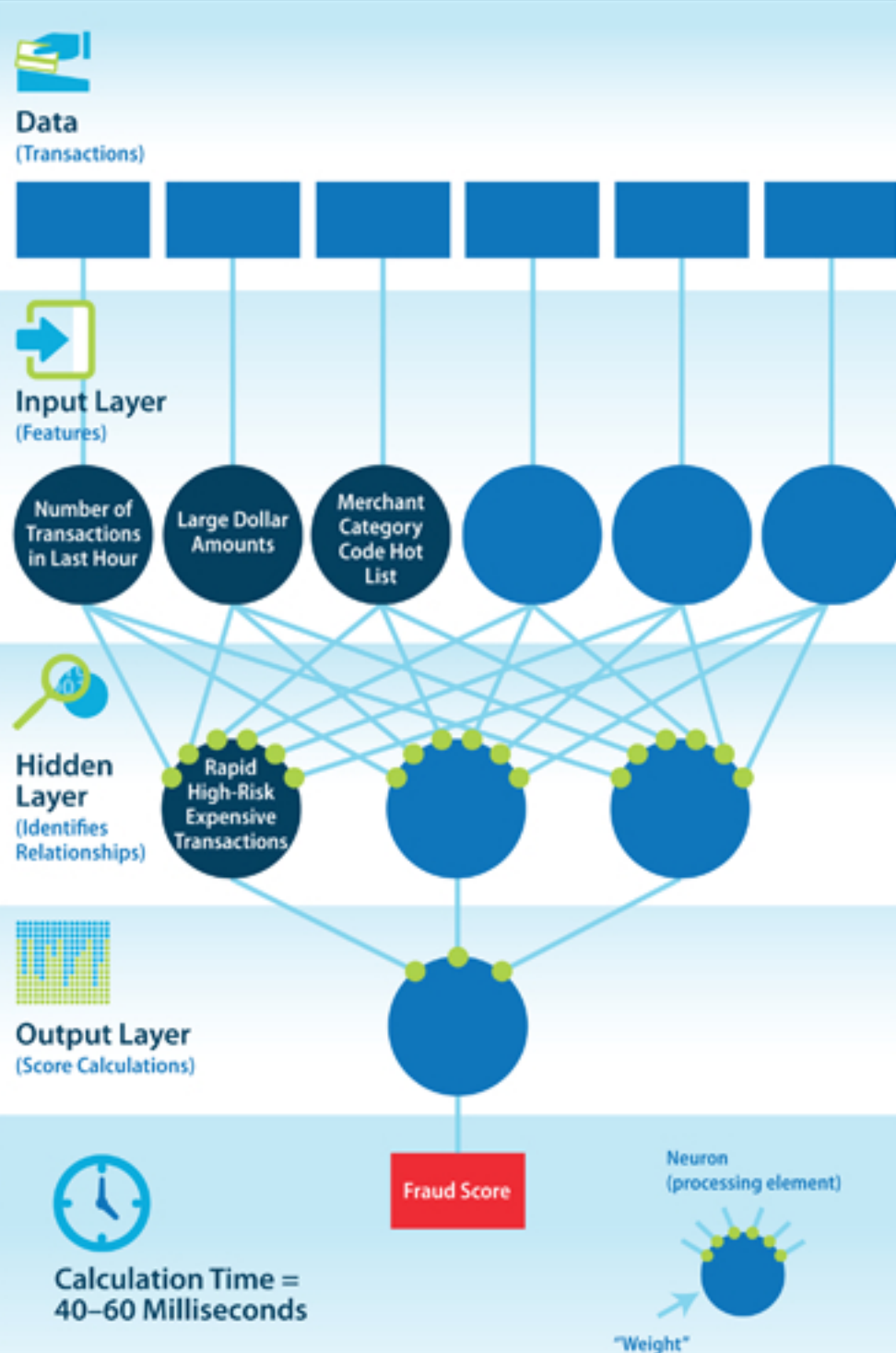
Neural Networks

INSPIRED BY: Neurons in the brain that store knowledge in their connections to other neurons and the strength of those synapses.

EXAMPLE BUSINESS USE: Detecting payment fraud.

HOW IT WORKS: Makes connections between incoming data and specific outcomes, changing the "weight" of connections to improve performance.

Data (Transactions)

Input Layer (Features)
- Number of Transactions in Last Hour
- Large Dollar Amounts
- Merchant Category Code Hot List

Hidden Layer (Identifies Relationships)
- Rapid High-Risk Expensive Transaction

Output Layer (Score Calculations)

Fraud Score

Neuron (processing element)

"Weight"

Calculation Time = 40–60 Milliseconds

Deep Networks

INSPIRED BY: How neurons in the brain use multiple stages of processing in the visual cortex to learn to recognize faces and classify objects.

EXAMPLE BUSINESS USE: Automatic video analysis and speech transcription.

HOW IT WORKS: Combines bits of data into features, assembles features into more complex parts through multiple processing layers.

Diagonal Line Node

Face Node

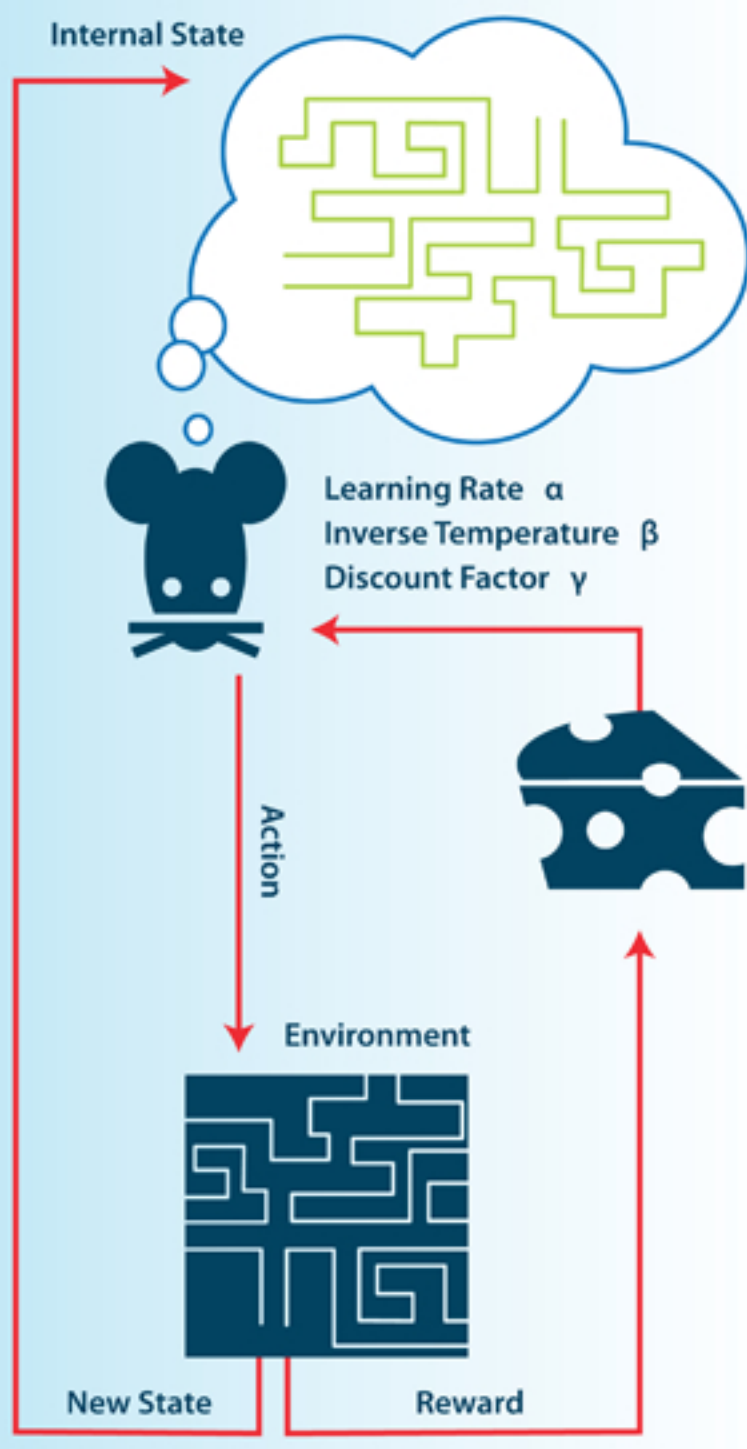Cat Node
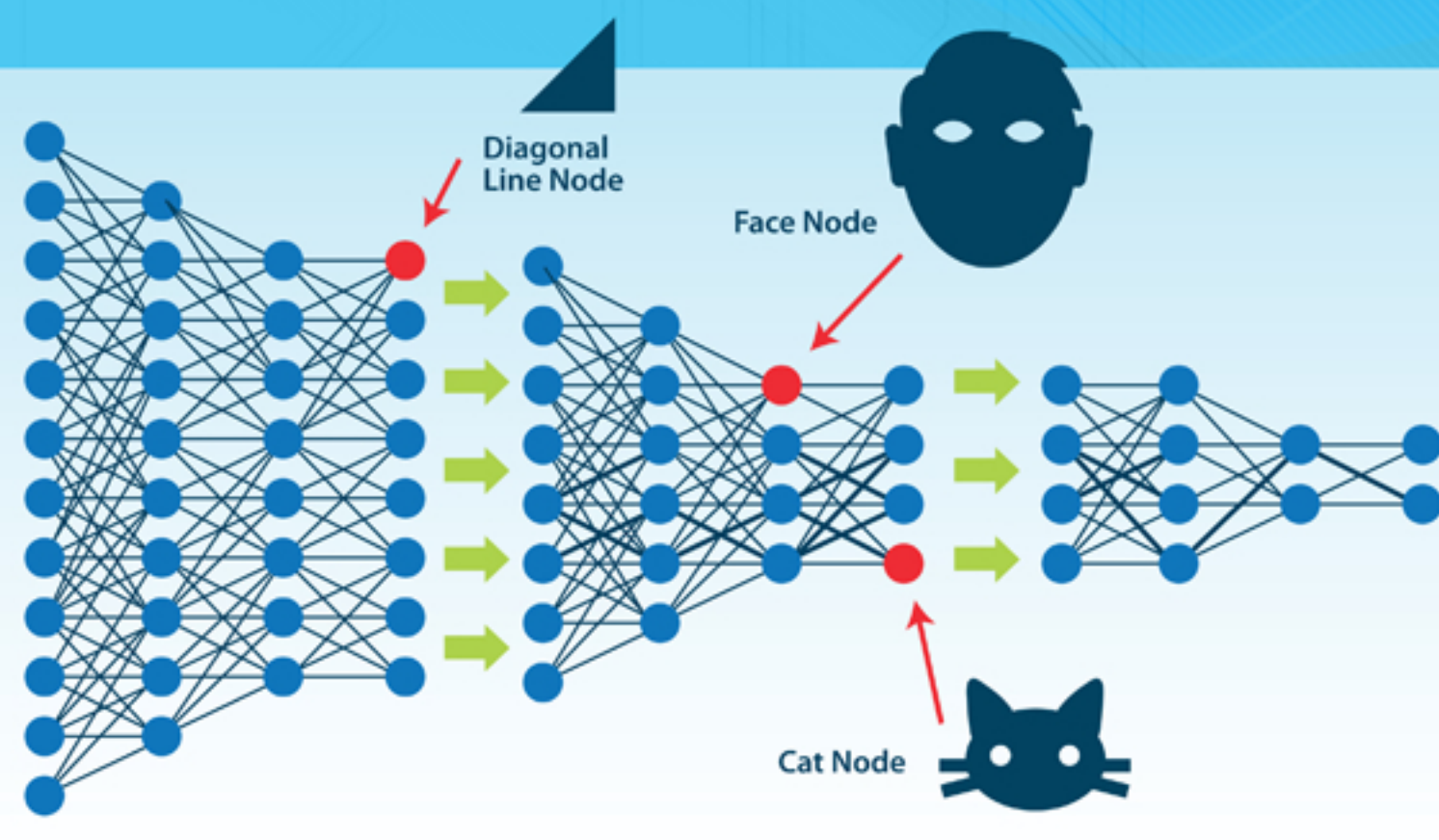
Neuro-Dynamic Programming

INSPIRED BY: Reward system of the brain, which enables us to learn complex task sequences through pleasurable or painful reward signals, which occur later in time.

EXAMPLE BUSINESS USE: Optimized high-frequency trading strategies.

HOW IT WORKS: Calculates impact of next step and all future possible steps to continually evaluate best next step to reach desired outcome.

Internal State

Learning Rate α
Inverse Temperature β
Discount Factor γ

Action

Environment

New State   Reward

Cyber-Analytics

INSPIRED BY: How the brain controls the body and its actions through synapses.

EXAMPLE BUSINESS USE: Identifying when malware has taken over computer.

HOW IT WORKS: Identifies the command and control relationship between two entities, such as a "bot" on an infected computer and the "bot master" that controls the bot.

Bot

Check for new command

Command

Check for new command

Command

HTTP C&C Server

Botmaster

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