

Artificial Intelligence Overview

Logic Programming *weeks 2 & 3*

Propositional logic e.g. $(A \wedge B) \rightarrow C$

Proofs, truth tables, proof procedures.

Predicate calculus e.g. $\text{likes}(\text{bob}, X)$

Constants, functions, predicates, variables, relationships, unification.

Backtracking

Tracing steps backwards to re-satisfy goals.

Artificial Neural Networks *weeks 4 & 5*

Neurons

Dendrites/input, axons/output, synapses/connections, strength thresholds.

Training

Data in \rightarrow output \rightarrow comparison \rightarrow weights modified.

Single layer

Linear combination, activation function, bias, weights, linear.

Multi-layer

Input, hidden, and output layers, non-linear, many uses, parallel/real-time.

Games as a Context for AI *week 6*

Specifications

Quick/real-time, predictable resources, understandable behaviour.

Pathfinding

Breadth/depth first searches, node graphs.

Dijkstra's Algorithm *week 7*

Key ideas

Planning, divide and conquer, all possible paths, general graphs.

Method

Find lowest cost, close that node, re-estimate neighbour costs, then update and link.

Limitations

Entire solution in advance, does not react to changes or other moving objects.

A* and Further Optimisations *week 8*

Heuristics

Manhattan, diagonal, or Euclidian distance.

Optimisations

3D map conversion, path patching, pre-calculating, symmetry.

AI Planning *weeks 9 and 10*

Requirements

Initial and goal states, actions, preconditions, effects, parameters.

Heuristic functions

Informed searching.

Bayesian Reasoning *week 14*

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