
THE HISTORY OF AI
IN GAMES

INTRODUCTION

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WHAT IS AI IN GAMES? WHAT ARE ITS MAIN DIRECTIONS?

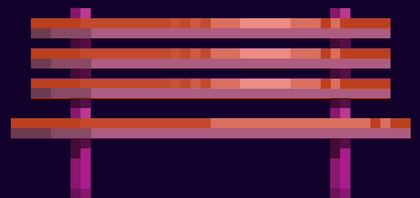
Artificial intelligence in games is the use of algorithms and machine learning to solve game problems, create intelligent opponents, and automate game processes.

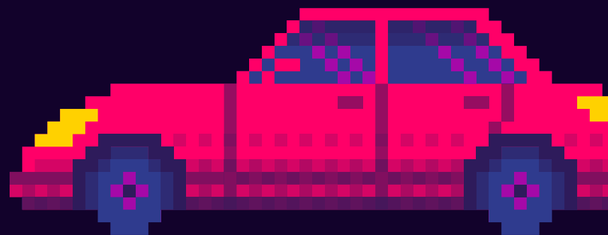
🎯 AI game engines for playing against humans (chess, go, poker)

Video games — NPCs with advanced behavior, procedural generation

⚡ Automatic passing — speedrun, solving puzzles, reaching records

🧠 Research — games as a test environment for AI algorithms

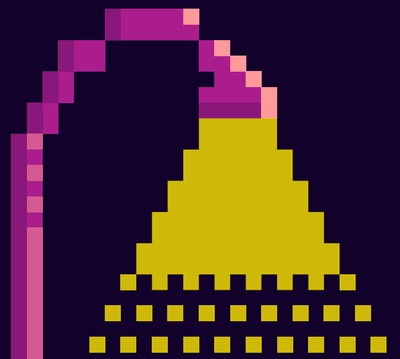




KEY HISTORICAL YEARS

1997	Deep Blue defeats Kasparov (a symbol of classic game AI)
2013	DQN — learning directly from pixels (Atari)
2017	AlphaGo / AlphaGo Zero / AlphaZero — self-play + MCTS + deep networks
2019	OpenAI Five (Dota 2), AlphaStar (StarCraft II)
2020+	hybrids (NNUE in Stockfish), PCGML and the massive use of ML in game pipelines

METHODS AND APPROACHES



OPTIMIZATION AND SEARCH

This method is used to find the best solution in conditions of a large number of possible options.

CONTENT GENERATION

This method is used to automatically create content such as game levels, maps, and scenarios.

REINFORCEMENT LEARNING

A learning method in which an agent learns based on interaction with the environment, receiving rewards for correct actions.

ALPHAGO И ALPHAZERO

AlphaGo and AlphaZero use sophisticated systems to analyze data, find patterns, and select optimal moves in games.

AlphaGo includes three components: assessing the current situation, predicting the opponent's actions, and choosing the best move.

AlphaZero learned from scratch, analyzing millions of games against itself. Unlike AlphaGo, it did not use human data. This approach has allowed us to create unique strategies.

RESULT

AlphaGo: In 2015, she defeated the world go champion Li Sedol (4:1), in 2016 — Fan Hui (5:0).

AlphaZero: Showed results in 2017, defeating Stockfish in chess (28:0), Leela Chess Zero in checkers (100:0) and Elmo in go (100:0) for several hours of training.

DQN И ATARI

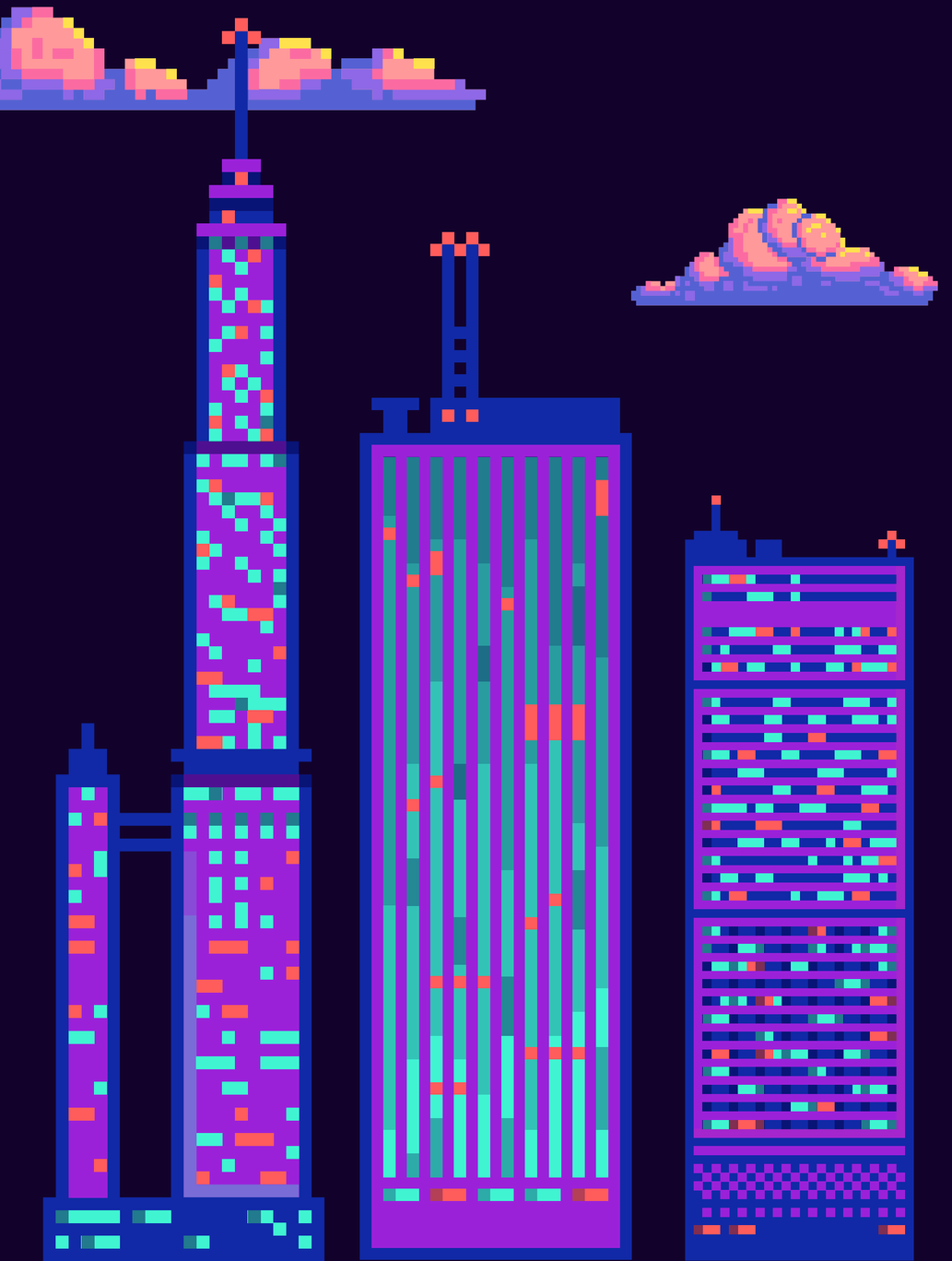
DQN is an algorithm from DeepMind (2013), which for the first time showed that an agent can learn to play games directly from the screen image.

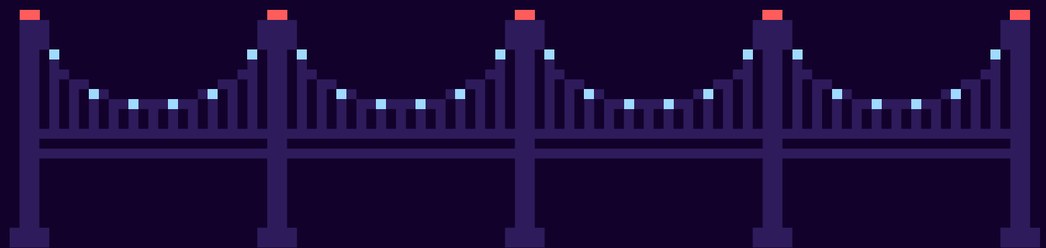
The network receives a frame from the game (pixels) as input, runs it through convolutional neural networks, and outputs Q-values, an estimate of the usefulness of each action.

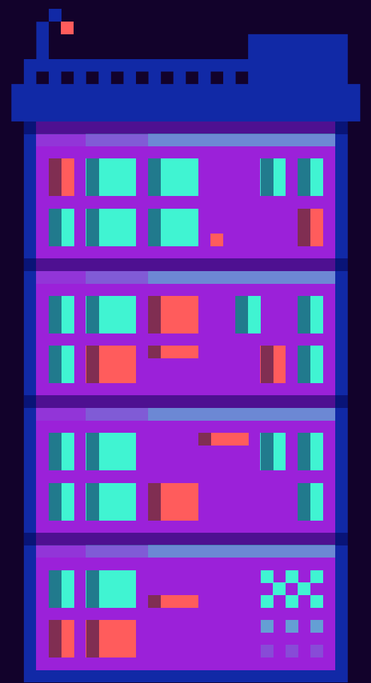
The agent selects an action (for example, ”move left”, ”jump”), receives a reward from the environment, and updates the weights of the network.

RESULT

In many Atari games (Breakout, Space Invaders, Pong), the agent has surpassed the human level.







CONTENT GENERATION (LEVELS, MAPS)

The game’s artificial intelligence is used to generate content — levels, maps, and scenarios.

The easiest way is random generation, like in Rogue or Minecraft.
More sophisticated methods use machine learning and allow you to create new maps based on existing ones.

This helps developers save time and adds variety to games.

AI IN SPEEDRANS

01

TAS (TOOL-ASSISTED SPEEDRUN)

This is a method of playing using special tools, such as an emulator, to slow down time, return to previous actions, and record perfect button clicks frame by frame.

02

Super Mario Bros.: AI finds optimal routes and glitches

03

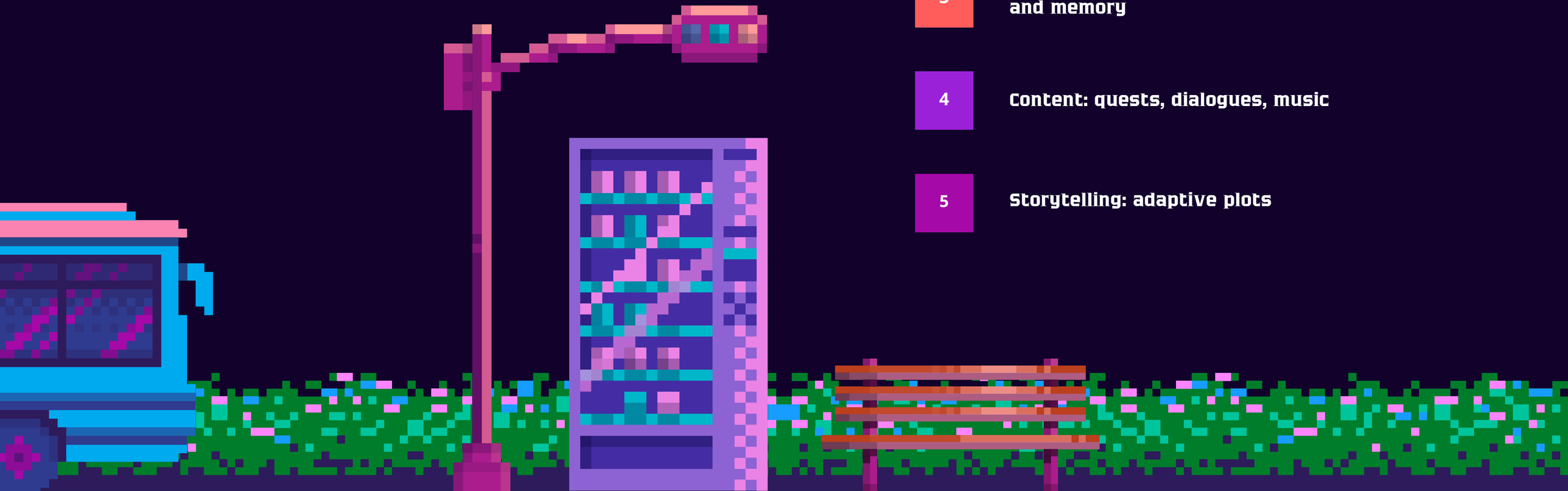
Pac-Man: Optimal behavior for avoiding ghosts

04

Tetris: Algorithms for maximum points and survival

AI IN THE GAMING INDUSTRY

1. World Generation: Minecraft, No Man’s Sky
2. Machine learning to adapt to the player’s style
3. Emotional AI — characters with mood and memory
4. Content: quests, dialogues, music
5. Storytelling: adaptive plots

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