CPC COOPERATIVE PATENT CLASSIFICATION

G PHYSICS
(NOTES omitted)

INSTRUMENTS

G06 COMPUTING; CALCULATING OR COUNTING
(NOTES omitted)

G06N COMPUTING ARRANGEMENTS BASED ON SPECIFIC COMPUTATIONAL MODELS

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

3/00		**Computing arrangements based on biological models**
3/002	.	{Biomolecular computers, i.e. using biomolecules, proteins, cells (using DNA G06N 3/123; using neurons G06N 3/061)}
3/004	.	Artificial life, i.e. computing arrangements simulating life
3/006	. .	based on simulated virtual individual or collective life forms, e.g. social simulations or particle swarm optimisation [PSO]
3/008	. .	based on physical entities controlled by simulated intelligence so as to replicate intelligent life forms, e.g. based on robots replicating pets or humans in their appearance or behaviour
3/02	.	Neural networks
3/04	. .	Architecture, e.g. interconnection topology

WARNING

Group G06N 3/04 is impacted by reclassification into groups G06N 3/0464, G06N 3/0475, G06N 3/0495 and G06N 3/0499.

All groups listed in this Warning should be considered in order to perform a complete search.

3/0409	. . .	{Adaptive resonance theory [ART] networks}
3/0418	. . .	{using chaos or fractal principles}
3/042	. . .	Knowledge-based neural networks; Logical representations of neural networks
3/043	. . .	based on fuzzy logic, fuzzy membership or fuzzy inference, e.g. adaptive neuro-fuzzy inference systems [ANFIS]
3/044	. . .	Recurrent networks, e.g. Hopfield networks

WARNING

Group G06N 3/044 is impacted by reclassification into group G06N 3/0442.

Groups G06N 3/044 and G06N 3/0442 should be considered in order to perform a complete search.

3/0442	. . . .	characterised by memory or gating, e.g. long short-term memory [LSTM] or gated recurrent units [GRU]

WARNING

Group G06N 3/0442 is incomplete pending reclassification of documents from group G06N 3/044.

Groups G06N 3/044 and G06N 3/0442 should be considered in order to perform a complete search.

3/045	. . .	Combinations of networks

WARNING

Group G06N 3/045 is impacted by reclassification into group G06N 3/0455.

Groups G06N 3/045 and G06N 3/0455 should be considered in order to perform a complete search.

3/0455	. . . .	Auto-encoder networks; Encoder-decoder networks

WARNING

Group G06N 3/0455 is incomplete pending reclassification of documents from group G06N 3/045.

Groups G06N 3/045 and G06N 3/0455 should be considered in order to perform a complete search.

3/0463	. . .	{Neocognitrons}
3/0464	. . .	Convolutional networks [CNN, ConvNet]

WARNING

Group G06N 3/0464 is incomplete pending reclassification of documents from group G06N 3/04.

Groups G06N 3/04 and G06N 3/0464 should be considered in order to perform a complete search.

3/047   **. . .** Probabilistic or stochastic networks

> **WARNING**
>
> Group G06N 3/047 is impacted by reclassification into group G06N 3/0475.
>
> Groups G06N 3/047 and G06N 3/0475 should be considered in order to perform a complete search.

3/0475   **. . .** Generative networks

> **WARNING**
>
> Group G06N 3/0475 is incomplete pending reclassification of documents from groups G06N 3/04 and G06N 3/047.
>
> Groups G06N 3/04, G06N 3/047, and G06N 3/0475 should be considered in order to perform a complete search.

3/048   **. . .** Activation functions

3/049   **. . .** Temporal neural networks, e.g. delay elements, oscillating neurons or pulsed inputs

3/0495   **. . .** Quantised networks; Sparse networks; Compressed networks

> **WARNING**
>
> Group G06N 3/0495 is incomplete pending reclassification of documents from group G06N 3/04.
>
> Groups G06N 3/04 and G06N 3/0495 should be considered in order to perform a complete search.

3/0499   **. . .** Feedforward networks

> **WARNING**
>
> Group G06N 3/0499 is incomplete pending reclassification of documents from group G06N 3/04.
>
> Groups G06N 3/04 and G06N 3/0499 should be considered in order to perform a complete search.

3/06   **. .** Physical realisation, i.e. hardware implementation of neural networks, neurons or parts of neurons

3/061   **. . .** {using biological neurons, e.g. biological neurons connected to an integrated circuit}

3/063   **. . .** using electronic means

3/065   **. . . .** Analogue means

3/067   **. . .** using optical means

3/0675   **. . . .** {using electro-optical, acousto-optical or opto-electronic means}

3/08   **. .** Learning methods

> **WARNING**
>
> Group G06N 3/08 is impacted by reclassification into groups G06N 3/0895, G06N 3/09, G06N 3/091, G06N 3/092, G06N 3/094, G06N 3/096, G06N 3/098 and G06N 3/0985.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

3/082   **. . .** modifying the architecture, e.g. adding, deleting or silencing nodes or connections

3/084   **. . .** Backpropagation, e.g. using gradient descent

3/086   **. . .** using evolutionary algorithms, e.g. genetic algorithms or genetic programming

3/088   **. . .** Non-supervised learning, e.g. competitive learning

3/0895   **. . .** Weakly supervised learning, e.g. semi-supervised or self-supervised learning

> **WARNING**
>
> Group G06N 3/0895 is incomplete pending reclassification of documents from group G06N 3/08.
>
> Groups G06N 3/08 and G06N 3/0895 should be considered in order to perform a complete search.

3/09   **. . .** Supervised learning

> **WARNING**
>
> Group G06N 3/09 is incomplete pending reclassification of documents from group G06N 3/08.
>
> Groups G06N 3/08 and G06N 3/09 should be considered in order to perform a complete search.

3/091   **. . .** Active learning

> **WARNING**
>
> Group G06N 3/091 is incomplete pending reclassification of documents from group G06N 3/08.
>
> Groups G06N 3/08 and G06N 3/091 should be considered in order to perform a complete search.

3/092   **. . .** Reinforcement learning

> **WARNING**
>
> Group G06N 3/092 is incomplete pending reclassification of documents from group G06N 3/08.
>
> Groups G06N 3/08 and G06N 3/092 should be considered in order to perform a complete search.

3/094   **. . .** Adversarial learning

> **WARNING**
>
> Group G06N 3/094 is incomplete pending reclassification of documents from group G06N 3/08.
>
> Groups G06N 3/08 and G06N 3/094 should be considered in order to perform a complete search.

3/096   **. . .** Transfer learning

> **WARNING**
>
> Group G06N 3/096 is incomplete pending reclassification of documents from group G06N 3/08.
>
> Groups G06N 3/08 and G06N 3/096 should be considered in order to perform a complete search.

3/098	. . .	Distributed learning, e.g. federated learning

> **WARNING**
>
> Group G06N 3/098 is incomplete pending reclassification of documents from group G06N 3/08.
>
> Groups G06N 3/08 and G06N 3/098 should be considered in order to perform a complete search.

3/0985	. . .	Hyperparameter optimisation; Meta-learning; Learning-to-learn

> **WARNING**
>
> Group G06N 3/0985 is incomplete pending reclassification of documents from group G06N 3/08.
>
> Groups G06N 3/08 and G06N 3/0985 should be considered in order to perform a complete search.

3/10	. .	Interfaces, programming languages or software development kits, e.g. for simulating neural networks
3/105	. . .	{Shells for specifying net layout}
3/12	.	using genetic models
3/123	. .	DNA computing
3/126	. .	Evolutionary algorithms, e.g. genetic algorithms or genetic programming

5/00		**Computing arrangements using knowledge-based models**
5/01	.	Dynamic search techniques; Heuristics; Dynamic trees; Branch-and-bound
5/013	. .	{Automatic theorem proving}
5/02	.	Knowledge representation; Symbolic representation
5/022	. .	Knowledge engineering; Knowledge acquisition
5/025	. . .	Extracting rules from data
5/027	. .	{Frames}
5/04	.	Inference or reasoning models
5/041	. .	{Abduction}
5/042	. .	{Backward inferencing}
5/043	. .	Distributed expert systems; Blackboards
5/045	. .	Explanation of inference; Explainable artificial intelligence [XAI]; Interpretable artificial intelligence
5/046	. .	Forward inferencing; Production systems
5/047	. . .	Pattern matching networks; Rete networks
5/048	. .	Fuzzy inferencing

7/00		**Computing arrangements based on specific mathematical models**
7/01	.	Probabilistic graphical models, e.g. probabilistic networks
7/02	.	using fuzzy logic (computing arrangements based on biological models G06N 3/00; computing arrangements using knowledge-based models G06N 5/00)
7/023	. .	{Learning or tuning the parameters of a fuzzy system}
7/026	. .	{Development tools for entering the parameters of a fuzzy system}
7/04	. .	Physical realisation
7/043	. . .	{Analogue or partially analogue implementation}
7/046	. . .	{Implementation by means of a neural network (neural networks using fuzzy logic G06N 3/043)}
7/06	. .	Simulation on general purpose computers
7/08	.	using chaos models or non-linear system models

10/00		**Quantum computing, i.e. information processing based on quantum-mechanical phenomena**

> **WARNING**
>
> Group G06N 10/00 is impacted by reclassification into groups G06N 10/20, G06N 10/40, G06N 10/60, G06N 10/70 and G06N 10/80.
>
> All groups listed in this Warning should be considered in order to perform a complete search.

10/20	.	Models of quantum computing, e.g. quantum circuits or universal quantum computers

> **WARNING**
>
> Group G06N 10/20 is incomplete pending reclassification of documents from group G06N 10/00.
>
> Groups G06N 10/00 and G06N 10/20 should be considered in order to perform a complete search.

10/40	.	Physical realisations or architectures of quantum processors or components for manipulating qubits, e.g. qubit coupling or qubit control

> **WARNING**
>
> Group G06N 10/40 is incomplete pending reclassification of documents from group G06N 10/00.
>
> Groups G06N 10/00 and G06N 10/40 should be considered in order to perform a complete search.

10/60	.	Quantum algorithms, e.g. based on quantum optimisation, quantum Fourier or Hadamard transforms

> **WARNING**
>
> Group G06N 10/60 is incomplete pending reclassification of documents from group G06N 10/00.
>
> Groups G06N 10/00 and G06N 10/60 should be considered in order to perform a complete search.

10/70	.	Quantum error correction, detection or prevention, e.g. surface codes or magic state distillation

> **WARNING**
>
> Group G06N 10/70 is incomplete pending reclassification of documents from group G06N 10/00.
>
> Groups G06N 10/00 and G06N 10/70 should be considered in order to perform a complete search.

G06N

10/80	. Quantum programming, e.g. interfaces, languages or software-development kits for creating or handling programs capable of running on quantum computers; Platforms for simulating or accessing quantum computers, e.g. cloud-based quantum computing

> **WARNING**
>
> Group G06N 10/80 is incomplete pending reclassification of documents from group G06N 10/00.
>
> Groups G06N 10/00 and G06N 10/80 should be considered in order to perform a complete search.

20/00 Machine learning

20/10 . using kernel methods, e.g. support vector machines [SVM]

20/20 . Ensemble learning

99/00 Subject matter not provided for in other groups of this subclass

99/007 . {Molecular computers, i.e. using inorganic molecules (using biomolecules G06N 3/002)}