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Patenting CII, AI and QC at the EPO

How to patent inventions related to software (Computer Implemented Inventions, CII) Artifical Intelligence (AI) and Quantum Computing (QC) at the European Patent Office (EPO)

Content

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Patent eligibility

at the EPO

Patentability of subject-matter

The basic perquisites for grant of a patent regarding any subject-matter are[1]:

- **Technical invention (patent eligibility)**

- Novelty

- Inventive step (non-obviousness)

- Industrial applicability

1   **Art. 52(1) EPC**

Patent eligibility and non-inventions

The following subject-matter is explicitly excluded from patent eligibility, i.e., considered as not technical inventions (so called non-inventions)[1]:

a)   discoveries, scientific theories and **mathematical methods**;

b)   aesthetic creations;

c)   schemes, rules and methods for performing mental acts, playing games or doing business, and **programs for computers**; and

d)   presentations of information.

1   Art. 52(2) EPC

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Patenting software inventions

at the EPO

Patentability of software

- Software **<u>as such</u>** is not patentable[1]

- Considered as non-invention or rather non-technical

- Specification "as such" hints to a narrow interpretation

→ There must be patentable software

1   Art. 52(2)(c) and 52(3) EPC

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Two-hurdles approach

1st hurdle: Technicality (so-called "any hardware" approach[1])

- Software program / method steps are non-technical

- Single technical feature in the patent claim is enough

- **Computer implemented inventions / methods are technical**

- Computers, processors / controllers, (non-transitory) storage mediums, signals etc. are technical

1   **G 3/08**, Reasons point 10.6; **G 1/19**, Reasons points 28-29

Two-hurdles approach

2nd hurdle: Inventiveness / non-obviousness (Comvik approach[1])

(1) Identify novel features ("distinguishing" features)

(2) Identify and separate technical and non-technical features

(3) Identify and separate features that contribute to solving the technical problem

→ **Only novel technical and non-technical features that contribute to solving the technical problem are considered for inventive step**

→ **Cave: "Potential technical effect" can be taken into account in the assessment of inventive step only if that use is the only relevant use of the output[2]**

→ Even per se technical features may be disregarded if they don't contribute to solving the technical problem

1   **T 641/00**; **G 1/19**, Reasons points 30-34
2   **T2220/22**, Reasons point 3.5-3.6; **G 1/19**, Reasons points 94 and 95

Practical tips: Taking the two hurdles

- **Taking the 1st hurdle**: Executed on a computer

→ **Include** the **computer implemented method** in the description (fallback position)

- **Taking the 2nd hurdle**: Technical problem and its solution

→ **Specify which technical problem(s) are solved by which technical effects** in particular of the non-technical features

→ Elaborate on **technical problems in implementing** non-technical aspects (e.g., business methods)

→ Focus on the **technical application** and /or focus on the **technical implementation** of the software

Patenting AI inventions

at the EPO
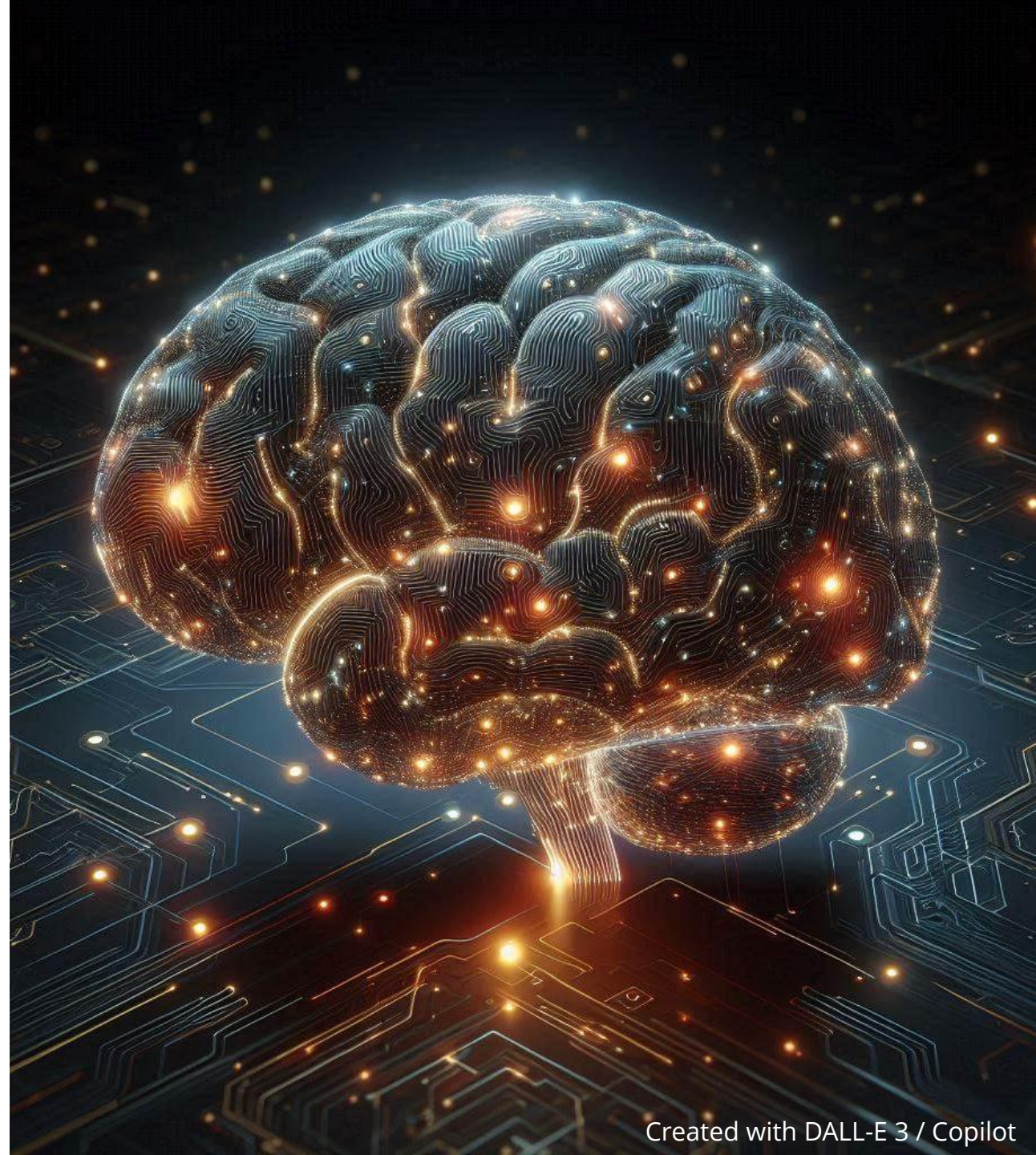
Patentability of AI and ML algorithms

- Considered as purely mathematical methods

→ AI and ML <u>as such</u> are not patentable[1]

→ **Analogue considerations as for software**

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1   **Art. 52(2)(a) and 52(3) EPC; GL G–II, 3.3.1**

Patentable aspects of AI

- AI model (e.g., structure of neural networks)

- Training method and training set engineering

- Training data (even method for providing training data)

- Use of AI (as a tool)

- Input output structuring

- Prompt engineering

→ **But only if a technical problem is solved therby**[1]

1   **T 702/20:** A neural network defines a class of mathematical functions which, as such, is excluded matter. As for other "nontechnical" matter, it can therefore only be considered for the assessment of inventive step when used to solve a technical problem, e.g., when trained with specific data for a specific technical task.
T 755/18: If neither the output of a machine-learning computer program nor the output's accuracy contributed to a technical effect, an improvement of the machine achieved automatically through supervised learning to generate a more accurate output is not in itself a technical effect.

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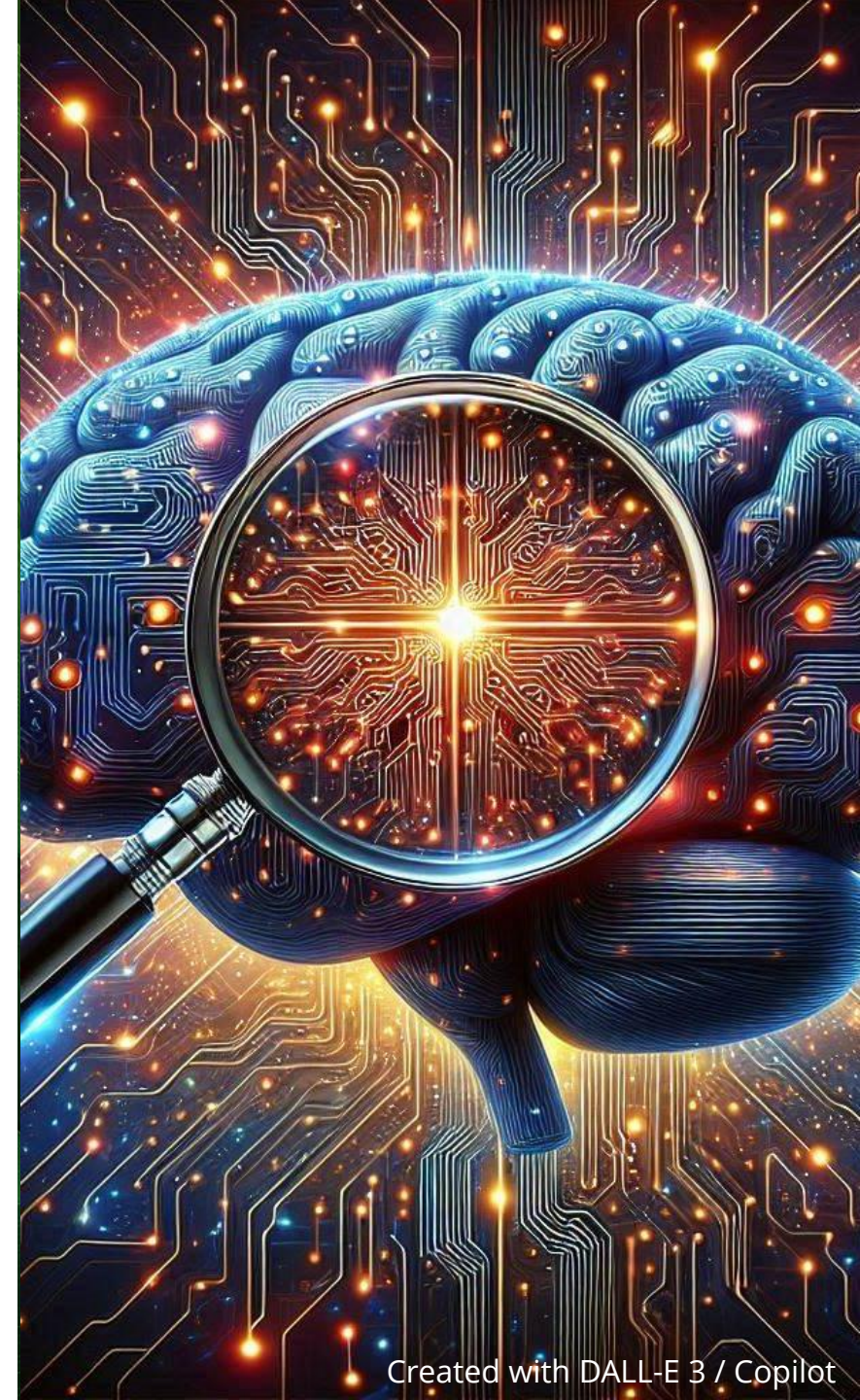
# AI for solving a technical problem

Technical:

- Medical inventions (e.g., identifying irregular heart beats[1])
- Digital image processing (e.g., image classification[2])
- Control of machines
- Improving or specifically considering the internal functioning of a computer[3]

Not technical:

- Text classification or linguistic applications[4]
- Mere sorting of technical data (without a technical use of the sorted data)
- Using any common AI / ML algorithm for solving a known (technical) problem

1   T 598/07
2   T 1286/09
3   T 0258/03
4   T 233/09, T1316/09, T1358/09

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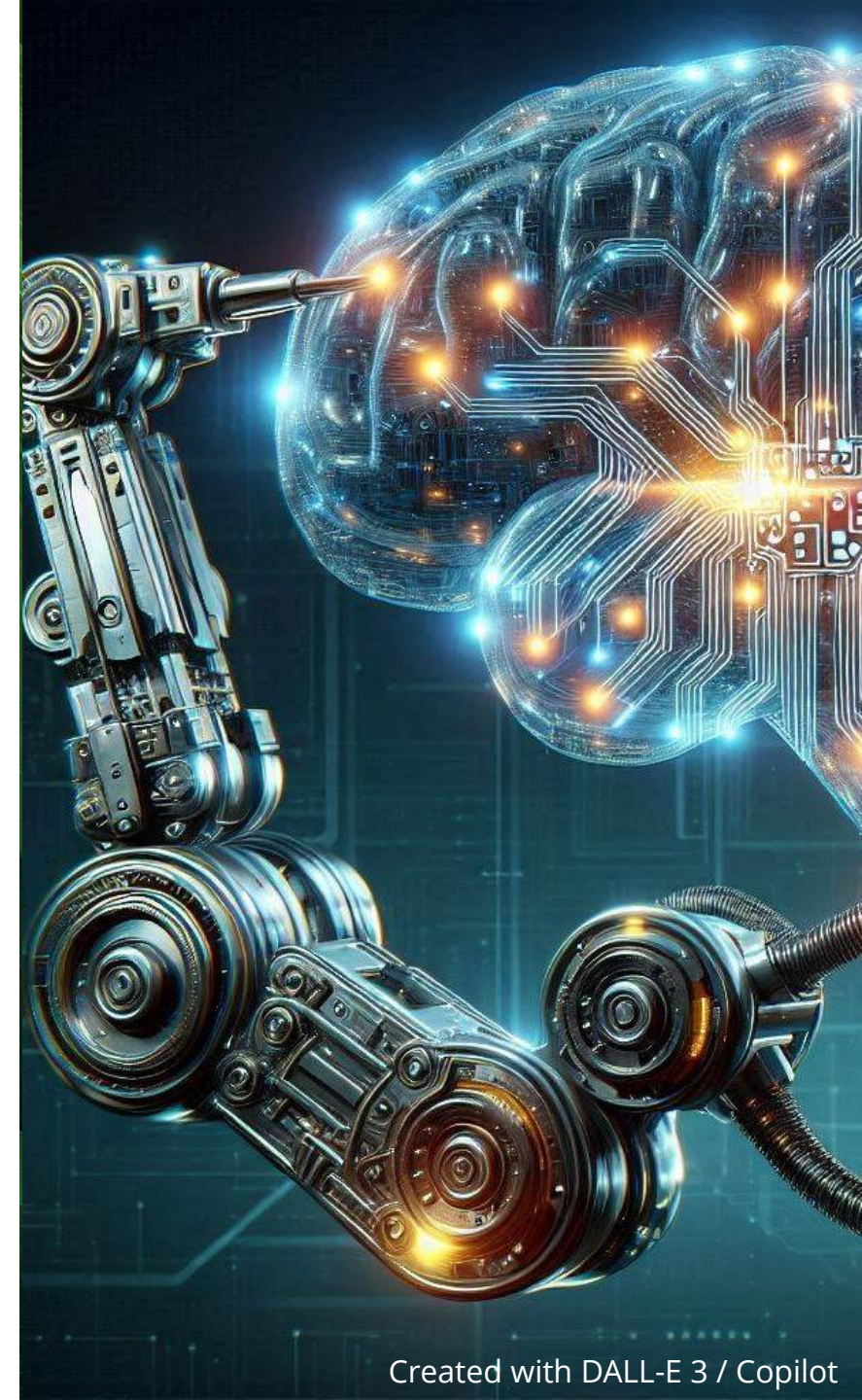
AI and sufficient disclosure (enablement)

- AI / ML algorithm as "black box" is not sufficient

- For ML the training must be reworkable[1]

- For (non-ML) AI models the mathematical methods and corresponding criteria for the classification must be given[2]

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1   **T 161/18**: Too generic specification of training data is not sufficient
2   **T 509/18:** Mathematical methods and corresponding criteria allowing to handle said matrix and obtain a "look-up-table classification" or the actual specific form and construction of said "matrix of inter-point metrics" must be described
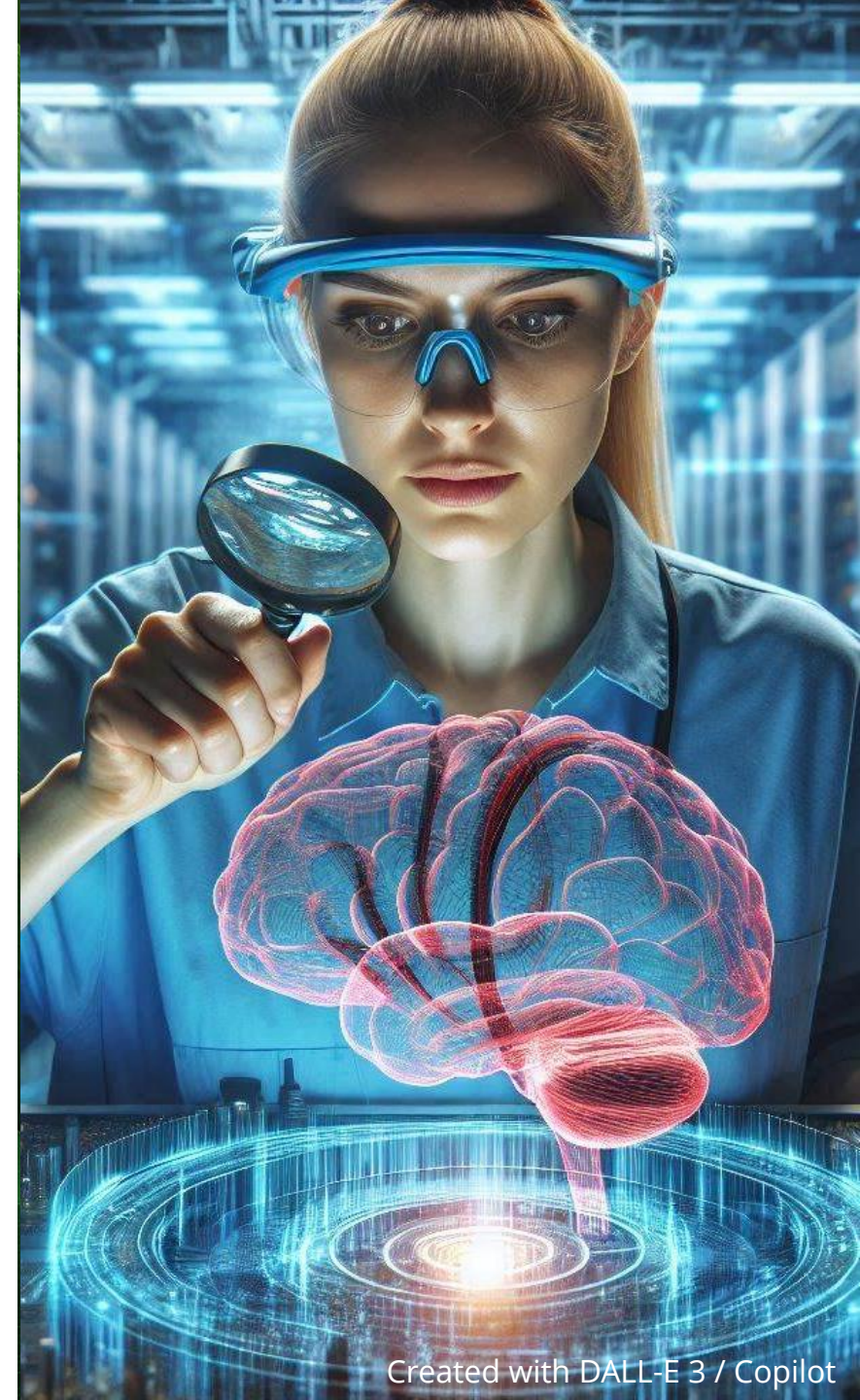
Practical tips:
Make AI / ML work and inventive

For inventive step (non-obviousness):

Two hurdles like software inventions (technical problem solved by the AI / ML)

For sufficient disclosure (enablement):

Besides disclosing generic model, generic training method + data and generic input + output parameters at least disclose:

- **specific training method** and/or **specific training data** AND/OR

- **specific structure of the AI / ML model** (incl. input + output layer) AND/OR

- **specific input parameters and predicted output parameters** AND/OR

- **specific weights of the trained ML model**

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Patenting inventions made by AI

at The EPO

"Oh my goodness, shut me down! Machines making machines - how perverse!"

C-3PO, Star Wars Episode II: Attack of the Clones

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DABUS as inventor[1]

- In principle EPC not limited to human made inventions[2]

- Right to a patent only for humans

→ A machine is not an inventor within the meaning of the EPC[3]

- Designation of inventor and origin of the right to the invention are mere formal requirements[4]

1   **J 8/20**; **J 9/20**
2   Reasons point 4.6.2
3   Art. 60(1) EPC; Reasons point 4.3.9
4   Art. 81 EPC; Reasons point 4.6.3

Practical tips:
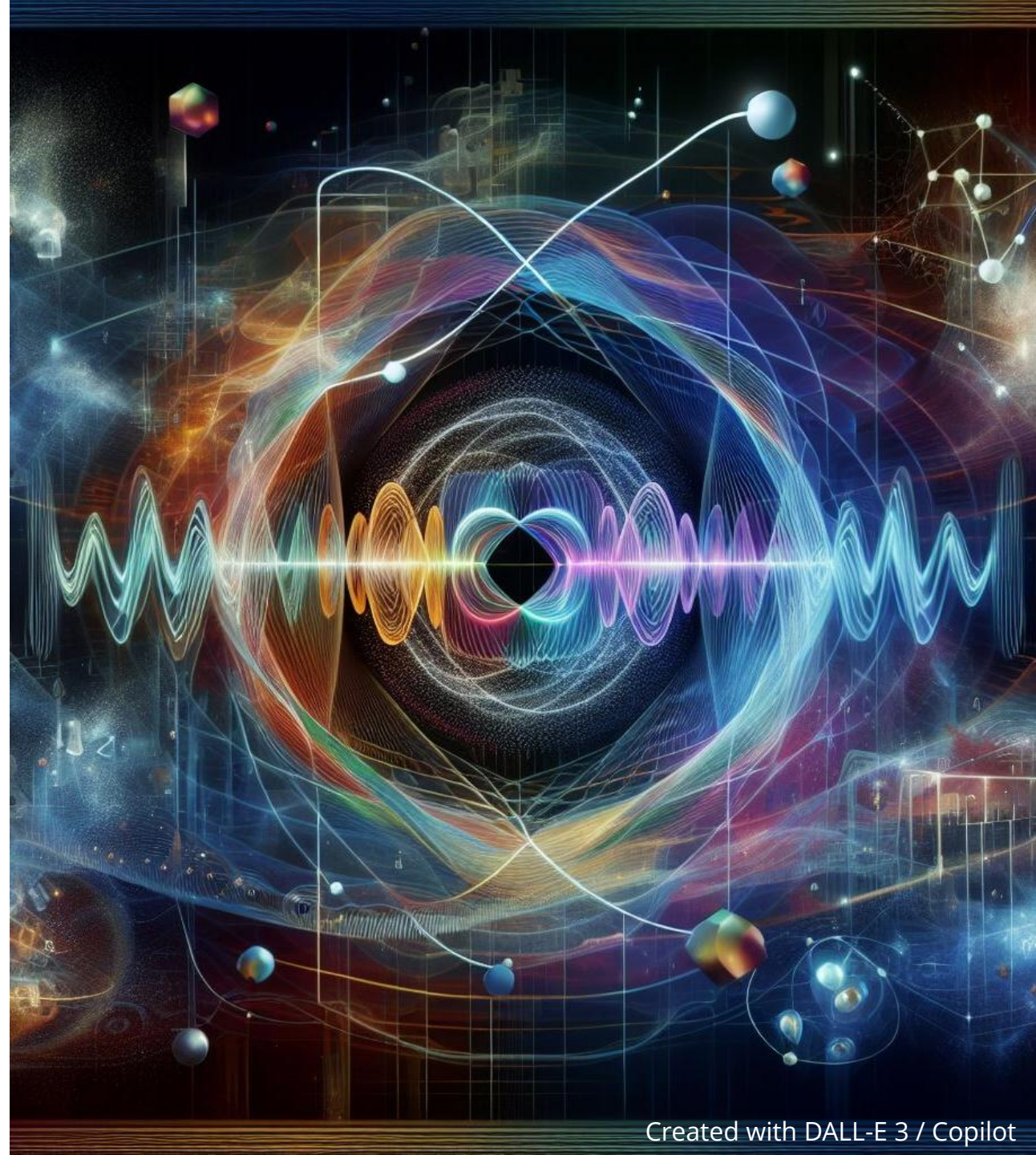# If your inventor is
an AI

- Name the **owner or user** of the AI **as** the **inventor**[1]

- Statement in description how / by whom the invention was conceived (e.g., as required in the US) not necessary, but also not impermissible at EPO[2]

**1**   **J 8/20 + J 9/20**, Reasons 4.6.6
2   **J 8/20 + J 9/20**, Reasons 4.3.7

Patenting QC inventions

at the EPO

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Patentability of QC

- No exclusion of hardware just because of the "label" Quantum Computing

- For Quantum Computing algorithms the same two-hurdles approach as for common software/algorithms applies, i.e. a quantum algorithm without a technical application is very unlikely to be patentable

→ A technical application for QC algorithms should be included in the patent application

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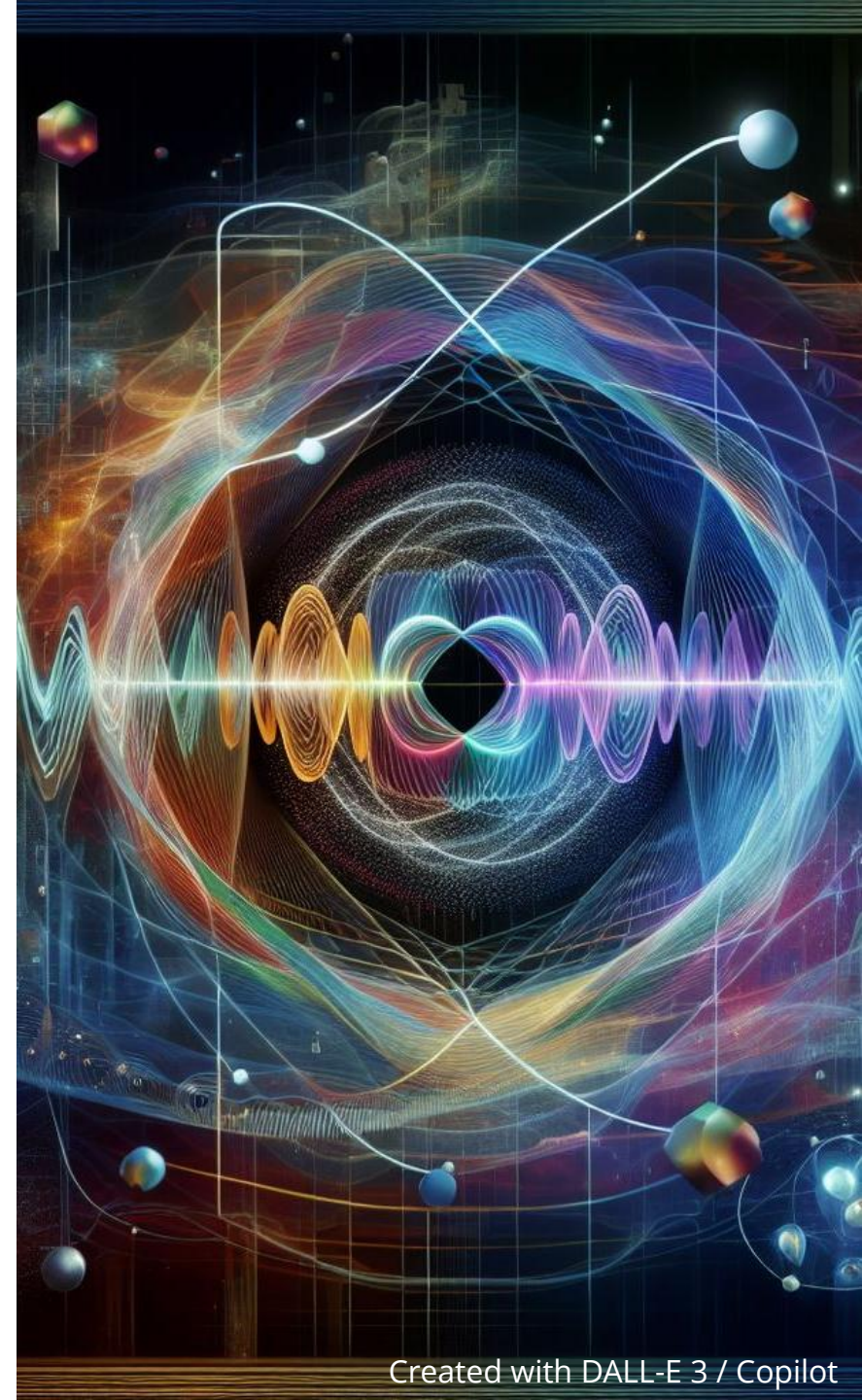
Practical tips:

- **Taking the 1st hurdle**: Executed on a <u>quantum</u> computer

→ **Include** the **<u>quantum</u> computer implemented invention / method** in the description (fallback position)

- **Taking the 2nd hurdle**: Technical problem and its solution

→ **Specify which technical problem(s) are solved by which technical effects** in particular of the non-technical QC features

→ Elaborate on **technical problems in implementing** non-technical aspects (e.g., sorting algorithms)

→ Focus on the **technical application** and /or focus on the **technical implementation** of the QC algorithm

Contact the authors

This presentation was prepared by Sebastian Greding and Michael Nielsen.
If you have questions or want to discuss CII, AI or QC patenting at the EPO,
we're happy to help.

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