The EPO‘s Practice for Assessing AI-Related Patent Applications

BARDEHLE PAGENBERG

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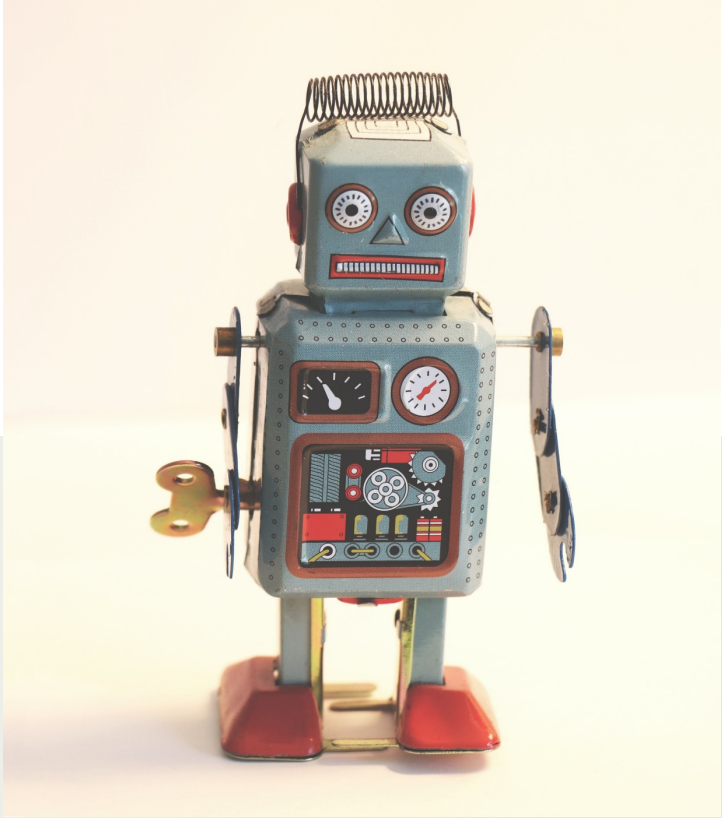
Increasing Financial Support in Europe for AI Development and Research

- **European Commission announced investments of 20 billion Euros[1]**
- **German government aims at promoting Germany to one of the leading AI developers[2]**

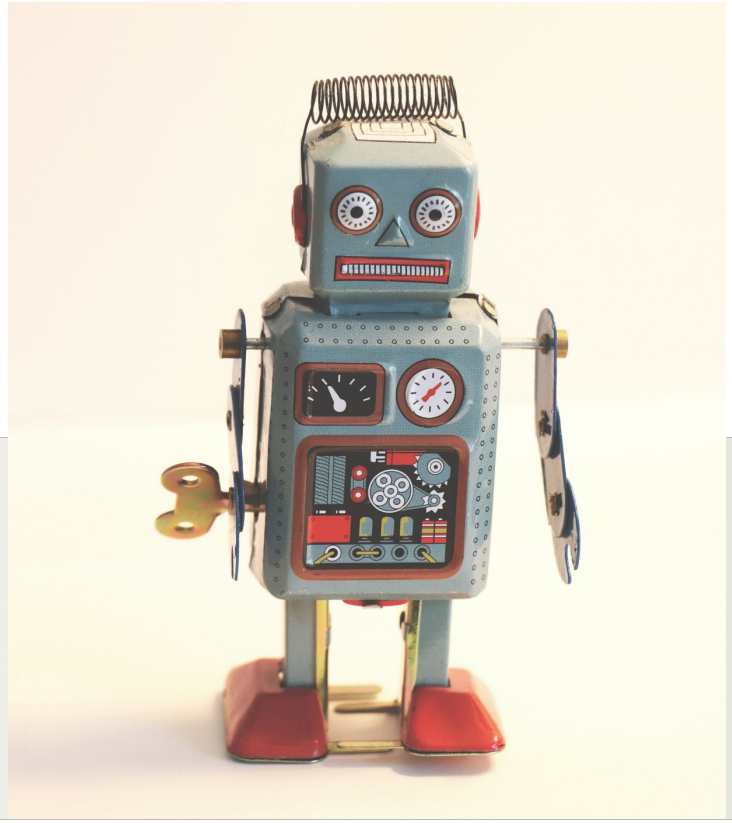


[1]https://ec.europa.eu/germany/news/intelligenz20180425_de
[2]https://www.ki-strategie-deutschland.de/home.html

Why are Patents Important for this?

- **Lots of private investors rate companies based on the number of owned patents**
- **Exchange Traded Funds Magazin[1]:**

  „Companies are analysed using two key figures: [the first one is] the number of AI-related patents [...].”
- **To get investors, patents are required!**

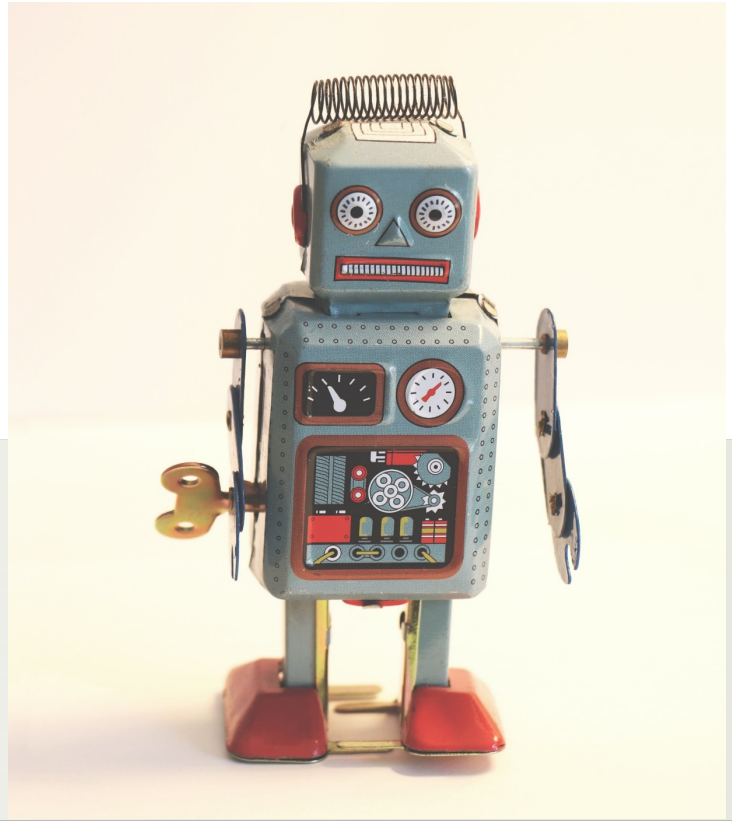


[1]http://proxy.dbagproject.de/mediacenter/magazine/etfmagazin/etfm18q4.pdf

The EPO takes this Serious…

- **Extended Guidelines for Examination[1]**
- **Include clear advice regarding patentability of AI-related inventions**

  → **Further development of the rules regarding <u>patentability of software</u>**



Europaisches Patentamt
European Patent Office
Office européen des brevets

[1]https://www.epo.org/law-practice/legal-texts/html/guidelines/d/g_ii_3_3_1.htm

What is the Key Issue regarding Patentability of AI?

- **AI-relates inventions are mostly based on software**
- **But software “as such” is excluded from patent protection (Art. 52 EPC)**
- **But under specific circumstances <u>software is patentable</u>**

→ Main aspect of this talk!

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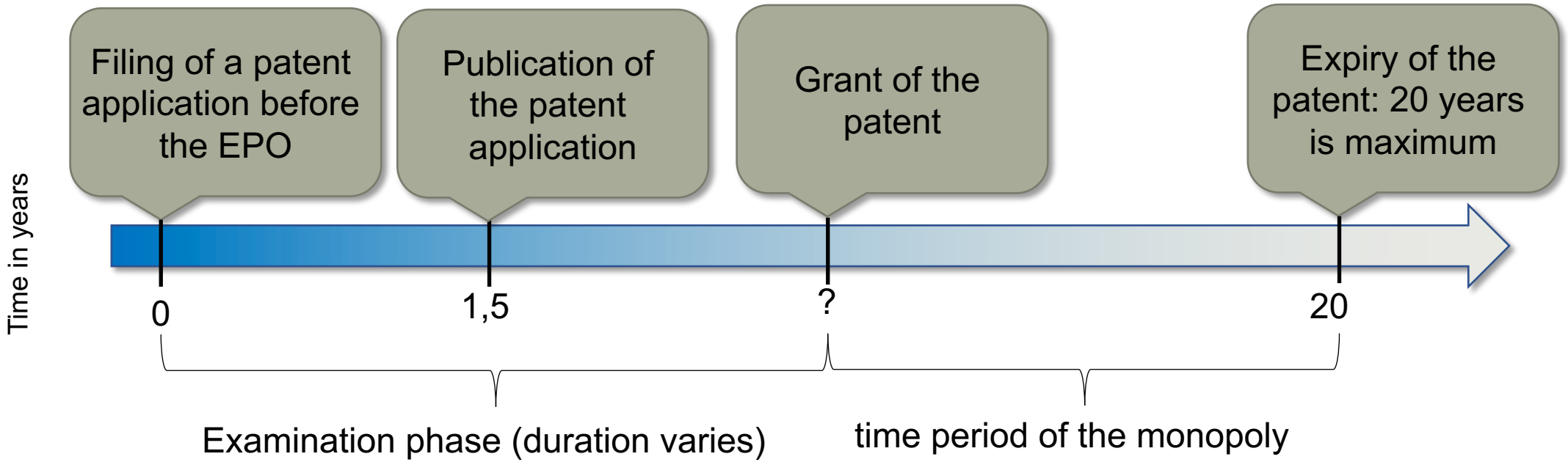
How to Obtain a Patent: Typical Time Line



Examination phase for AI-related inventions
Assessing whether an invention:
1. is patent-eligible (not excluded)
2. is novel over the prior art and involves an inventive step

EPO has developed „Two Hurdle Approach“

The EPO’s “Two Hurdle Approach”

AI-related application

low

higher

1. Hurdle:
Excluded or not?
Patent-eligibility

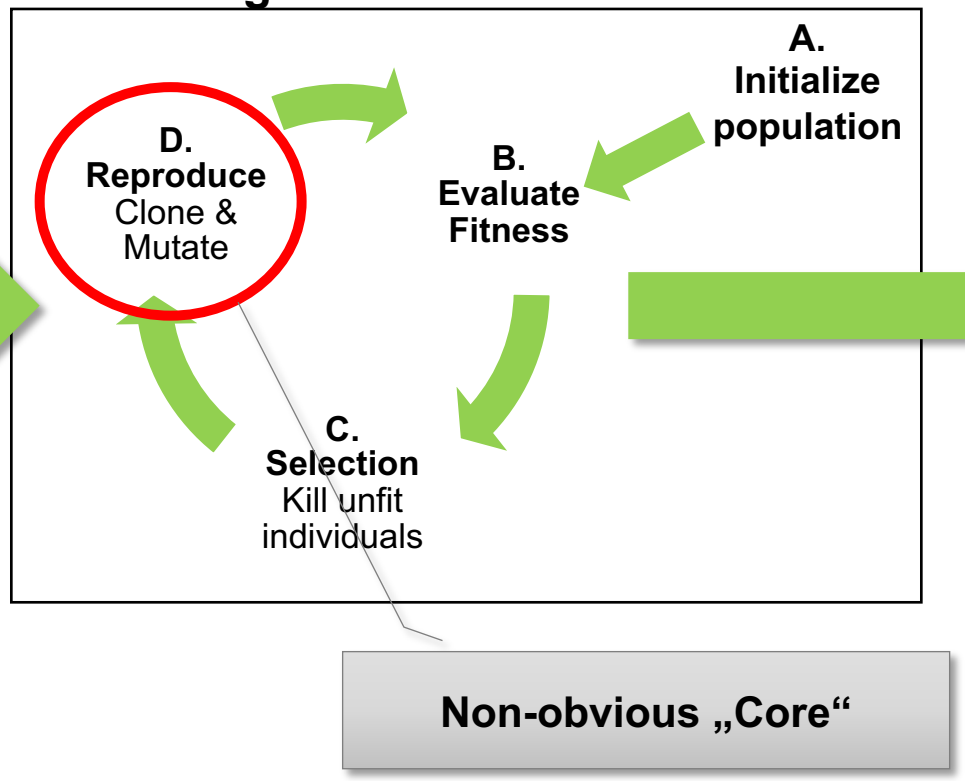
2. Hurdle:
Required qualities?
Novelty & inventive step

Example invention: AI-based optimization of steel beams

Input:

Known shapes of steel beams

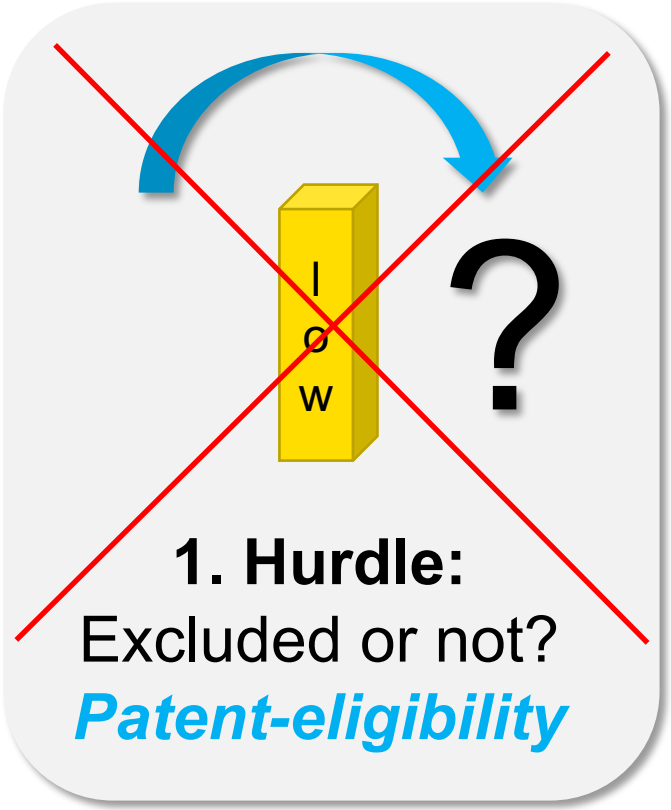
Genetic algorithm



Result:
Optimized steel beam

Improved payload characteristics

#1 Hurdle - Patent-Eligibility



What is claimed:

A method, comprising the steps of:

a. creating an initial population;
b. evaluating the fitness of individuals;
c. removing unfit individuals from population;
d. novel & non-obvious cloning and mutating of survivors;
e. if quality is below threshold, return to step b.

Patent-eligible?

No, because there is no technical means required for performing this method
→ software „as such“

#1 Hurdle - Patent-Eligibility

1. Hurdle:
Excluded or not?
Patent-eligibility

What is claimed:

A computer-implemented method, comprising the steps of:

a. creating an initial population;
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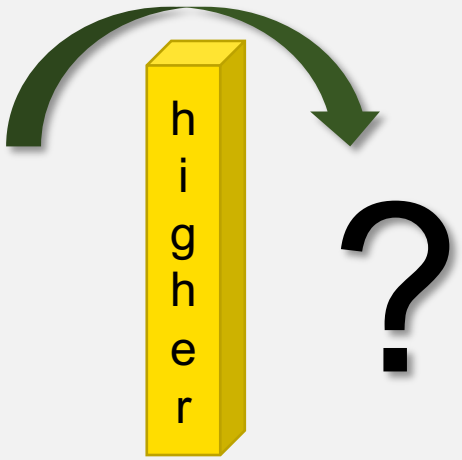
Patent-eligible?

Yes, technical means can be trivial
→ #1 hurdle taken!

#2 Hurdle – The Required Qualities



2. Hurdle:
Required qualities?
Novelty & inventive step

What is claimed:

A computer-implemented method, comprising the steps of:

a. creating an initial population;
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e. if quality is below threshold, return to step b.

To take the second hurdle, the claimed subject-matter must

1) be novel and

2) has to involve an inventive step

#2 Hurdle – 1st Quality: Novelty

individual comparison

What is claimed:

A computer-implemented method, comprising the steps of:

a. creating an initial population;
b. evaluating the fitness of individuals;
c. removing unfit individuals from population;
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e. if quality is below threshold, return to step b.

Novel?

Yes, if none of the prior art documents discloses all features

#2 Hurdle – 2nd Quality: Inventive Step

combination allowed

What is claimed:

A computer-implemented method, comprising the steps of:

a. creating an initial population;
b. evaluating the fitness of individuals;
c. removing unfit individuals from population;
d. novel & non-obvious cloning and mutating of survivors;
e. if quality is below threshold, return to step b.

Inventive step?

Only non-technical „software/math“

→ not considered for assessment of inventive step

#2 Hurdle – 2nd Quality: Inventive Step

What to do? Claim technical context and argue technical effect!

Convince examiner that at least features d. contributes to solve the technical problem of **optimizing the payload of a steel beam**

A computer-implemented method for optimizing the payload of a steel beam, comprising the steps of:

a. creating an initial population;
b. evaluating the fitness of individuals;
c. removing unfit individuals from population;
d. novel & non-obvious cloning and mutating of survivors;
~~*e. if quality is below threshold, return to step b.*~~

Then these features are considered to have technical character and are considered for inventive step assessment!

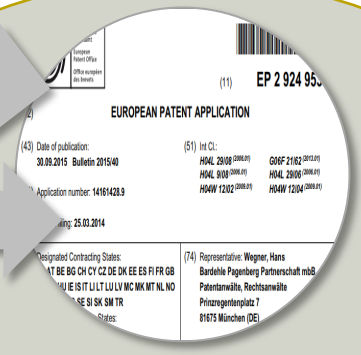
What about feature e.? Simple mathematical comparison
→ **Does highly likely not have a technical effect**
→ **Not considered (but doesn’t matter)**

#2 Hurdle – 2nd Quality: Inventive Step

Rendered obvious?

combination

combination



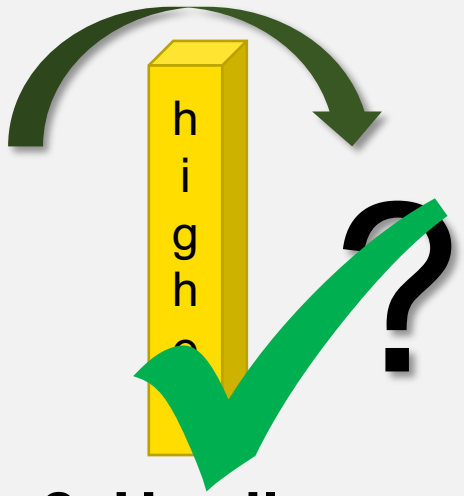
Closest Prior art

Technical features

Non-technical features

Non-technical features cannot contribute to inventive step
→ **ignored**

#2 Hurdle – 2nd Quality: Inventive Step



2. Hurdle:
Required qualities?
Novelty & inventive step

What is claimed:

A computer-implemented method for optimizing the payload of a steel beam, comprising the steps of:

a. creating an initial population;
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d. novel & non-obvious cloning and mutating of survivors;
e. if quality is below threshold, return to step b.

Inventive step?

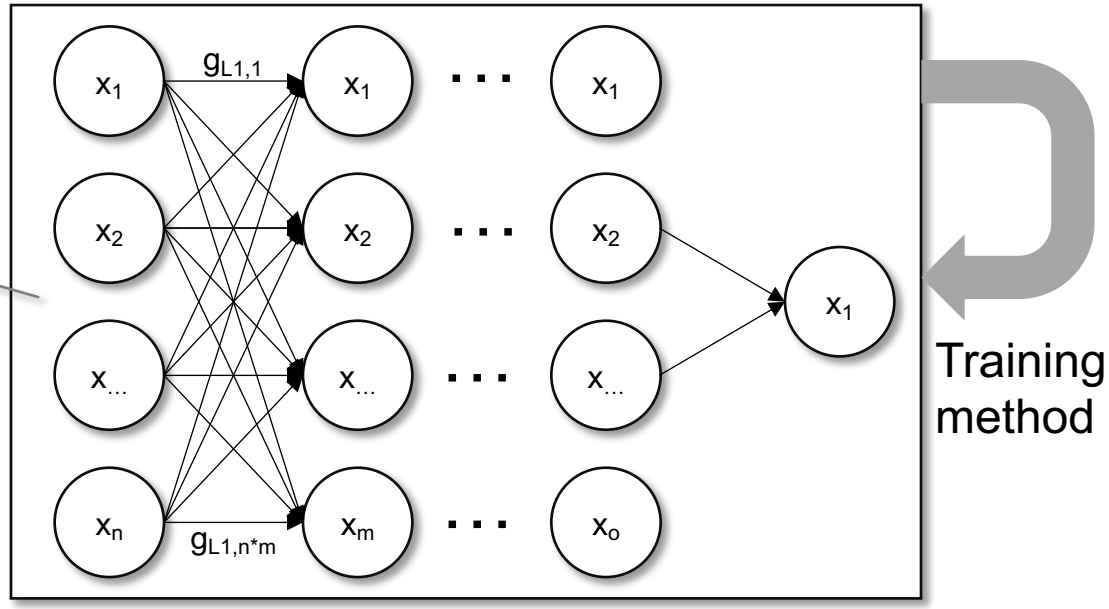
Yes, if feature d. produces a technical effect that serves a technical purpose

Who Defines what is Technical?

The case law of the EPO‘s Boards of Appeal!

Some Examples of the EPO’s Case Law

A novel neuronal network (or algorithms for classification, clustering, regression and dimensionality reduction etc.)



- **Technical or non-technical?**
- **No: According to the EPO’s Guidelines, neuronal networks are *per se* of an abstract mathematical nature, irrespective of whether they can be "trained" based on training data**

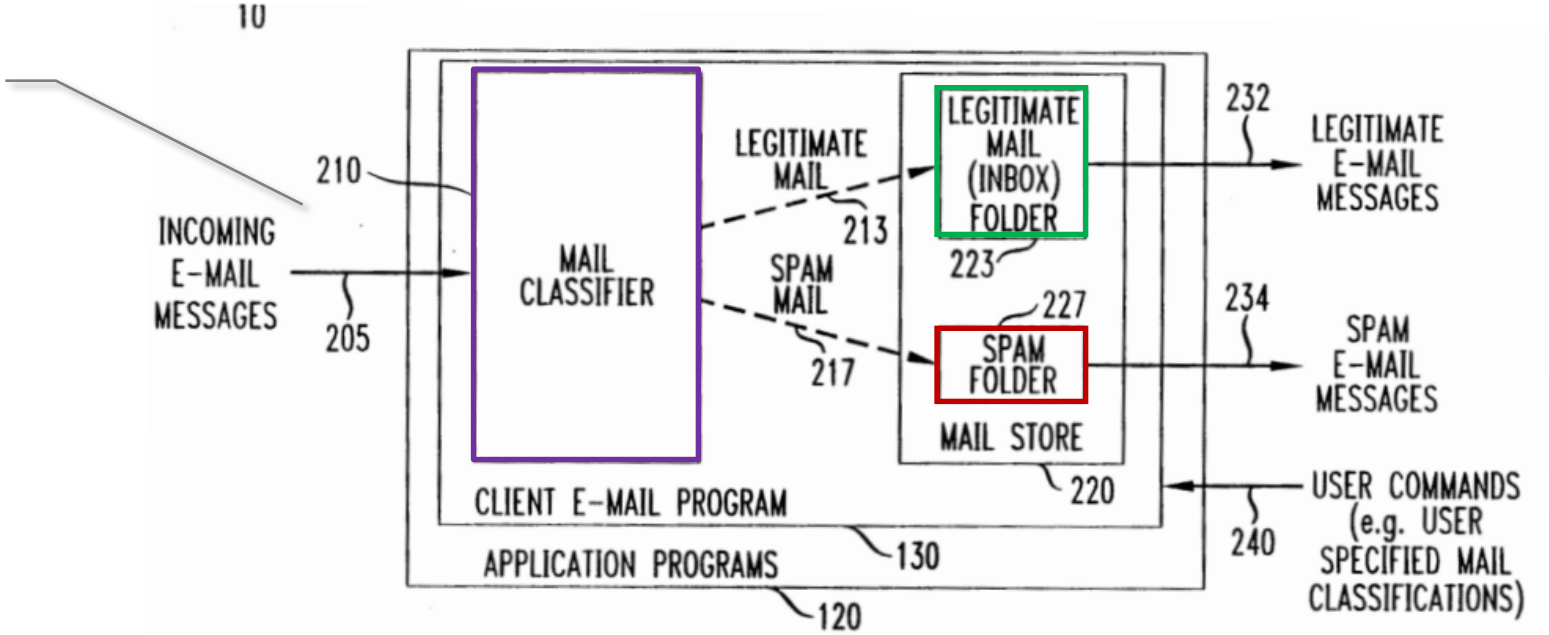
Some Examples of the EPO’s Case Law

The use of a neural network in a heart-monitoring apparatus for the purpose of identifying irregular heartbeats

- **Technical or non-technical?**
- **Yes: Such a “medical” method provides a technical contribution.**

Some Examples of the EPO’s Case Law

„Core“ idea: Maximum-Likelihood-Classifier that analyses content of emails



- **Technical or non-technical?**
- **No: Emails are technical, but not their content!**
  - **The content is only of <u>non-technical linguistic</u> nature.**

Some Examples of the EPO’s Case Law

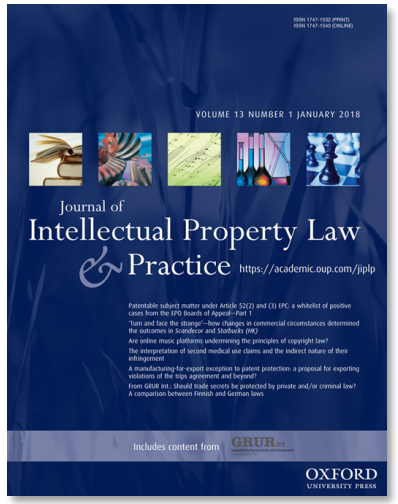
Neuronal network based classification of digital images based on low-level features like edges or pixel attributes

Example: Face recognition

- **Technical or non-technical?**
- **Yes: Operating on low-level features is considered technical.**

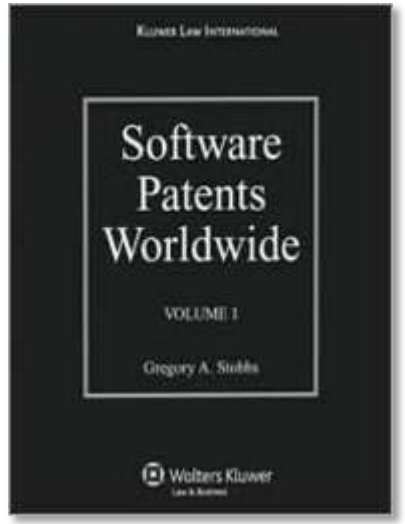
Recommended Reading

“Patentable subject matter under Article 52(2) and (3) EPC: **a whitelist of positive cases** from the EPO Boards of Appeal”
(Stefan V. Steinbrener)



“Software Patents Worldwide”

EPC chapter
(Stefan V. Steinbrener)



Putting it together…

- A computer-implemented AI-related invention is patentable if
  - it solves a **technical problem**…
  - … using **technical means.**
  - Only **technical features** are considered for assessing inventive step.
  - What is **technical** is defined by the EPO’s **case law → “grey area”**

Thank you!

Should you have any questions,
do not hesitate to contact me via email:

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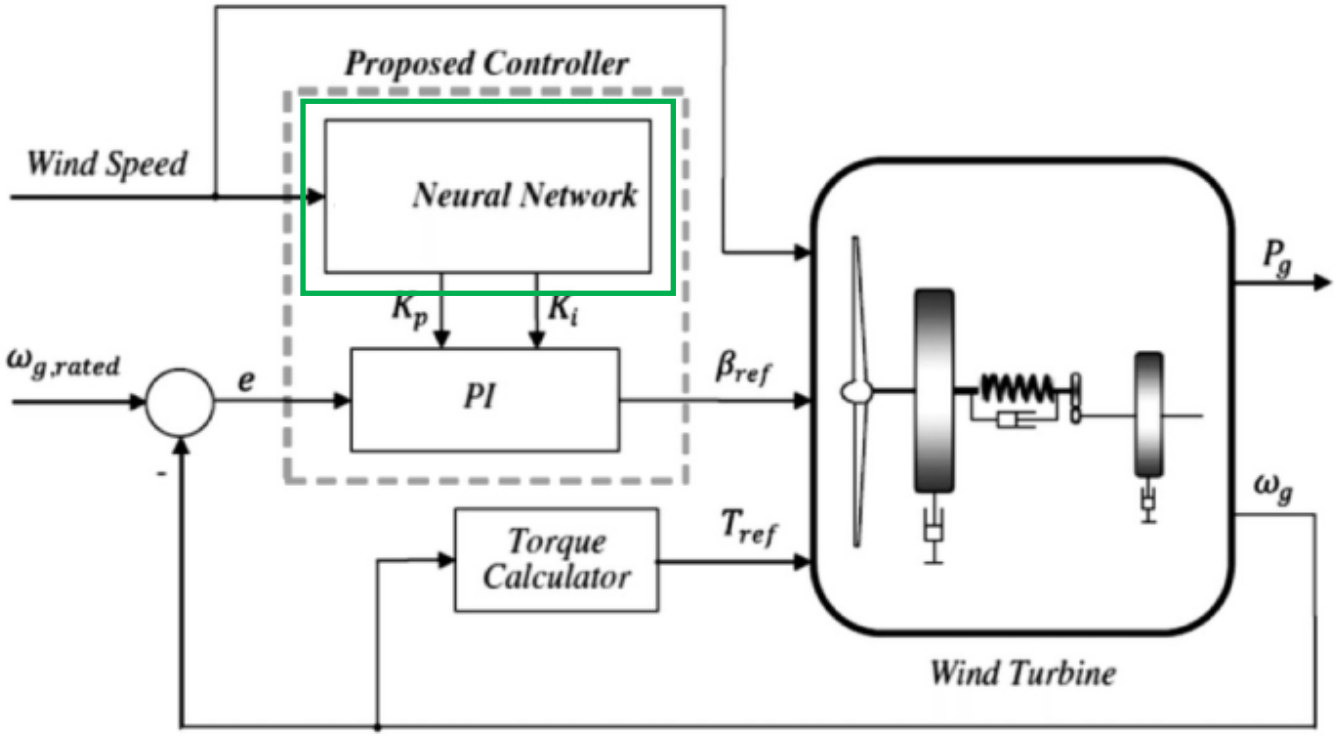
Backup Slides

Positive Examples

EP 2 801 000 B1: *Method for Controlling a Turbine using a neuronal network*



Positive Examples

EP 2 591 443 B1: Method For Assisting Vehicle Guidance Over Terrain

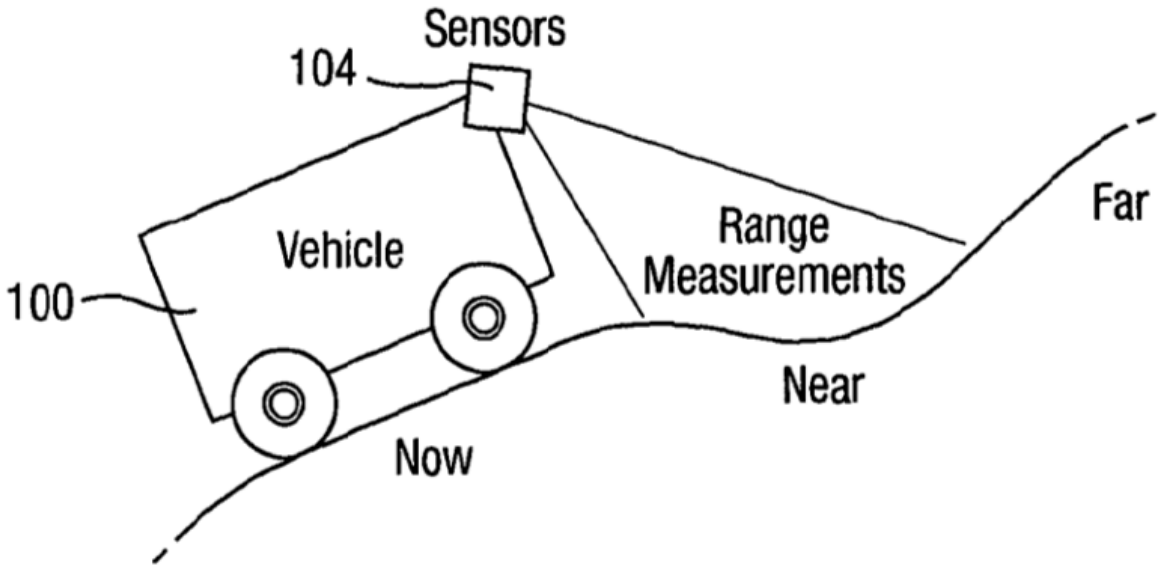
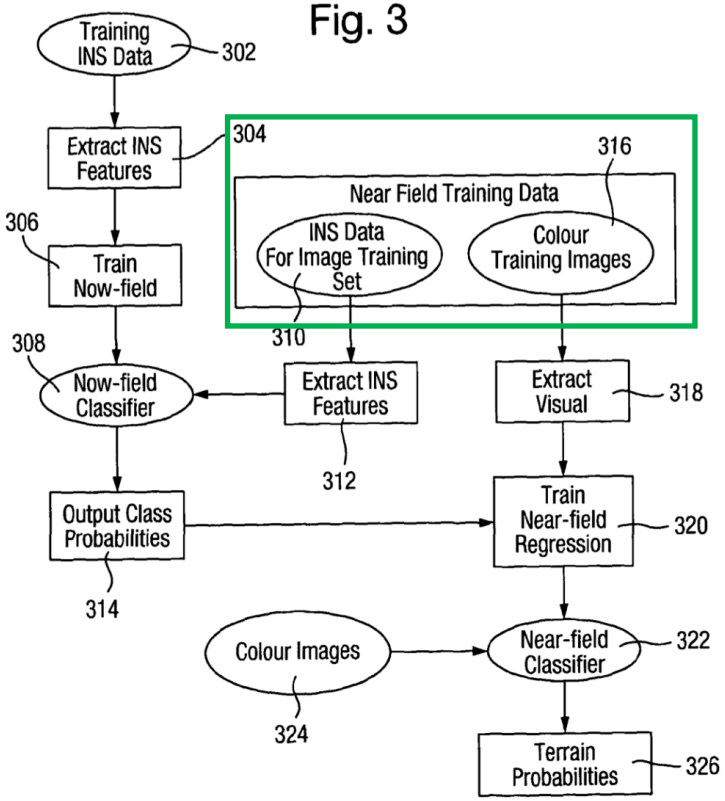


Fig. 3



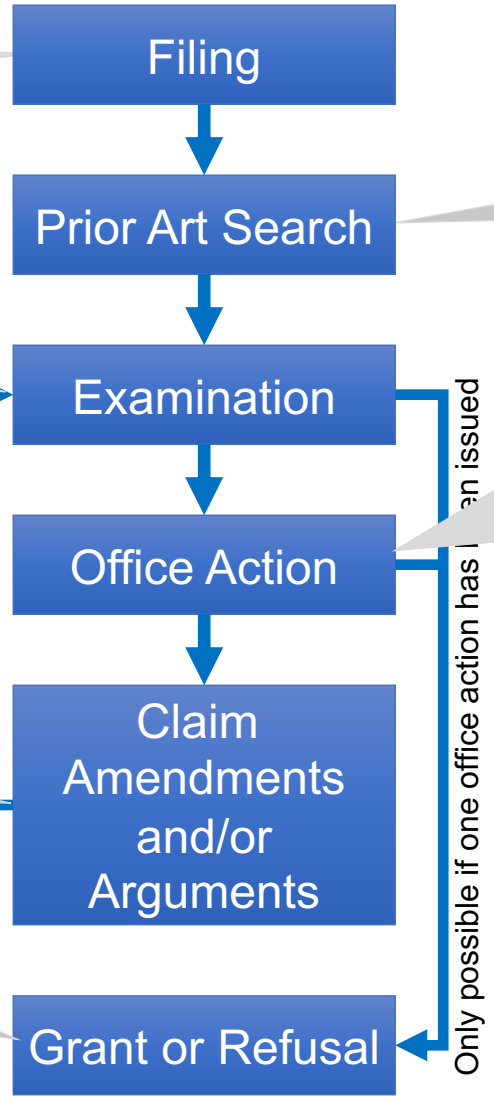
How to Obtain a Patent: The Examination Phase

Filing
The patent application is accorded a filing date

Examination
The EPO examiner assesses whether the invention:
- is patent-eligible
- is novel over the prior art and involves an inventive step

Amendments
Applicant may amend the claims to further distinguish the subject-matter of the invention from the cited prior art

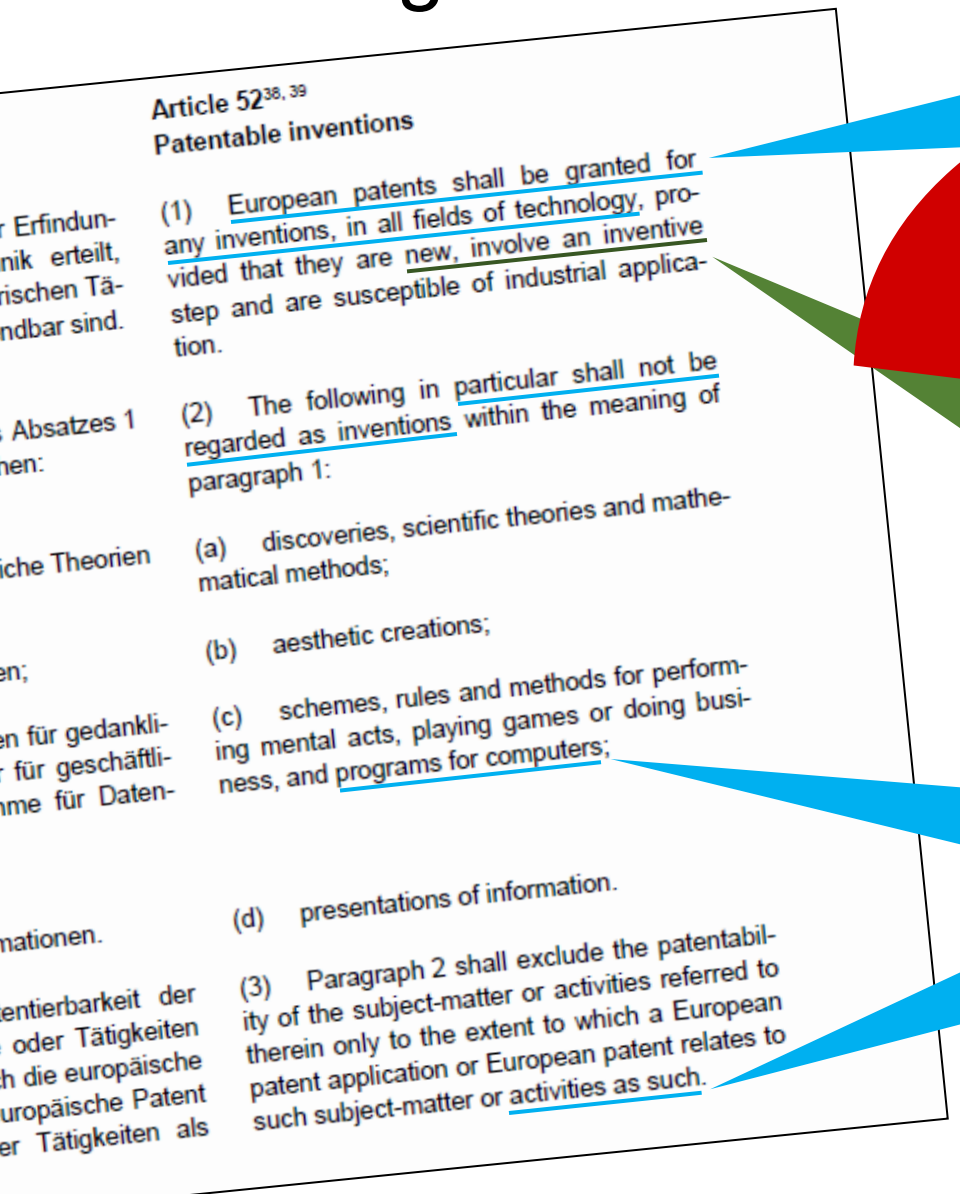
Grant or Refusal
If patent-eligible, novel and inventive → **Grant**
If not → **Reject**



Prior Art Search
Everything what was publicly available before the filing date is prior art

Office Action (Communication from the EPO to the Applicant)
If invention is novel and inventive
→ Issue „intention to grant“
Otherwise:
Provide applicant with the identified prior art and explanations why the invention is considered not novel or not inventive over the prior art

The Legal Basis



Article 52[38, 39]
Patentable inventions

(1) European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application.

(2) The following in particular shall not be regarded as inventions within the meaning of paragraph 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;

(d) presentations of information.

(3) Paragraph 2 shall exclude the patentability of the subject-matter or activities referred to therein only to the extent to which a European patent application or European patent relates to such subject-matter or activities as such.

Patent-Eligibility: Patents are only granted for „**inventions**“ that are „**technical**“

Required Qualities:
Novelty
&
Inventive Step

Computer programs **(i.e. software)** is **excluded from patent protection.**
However, only **„as such“!?!**