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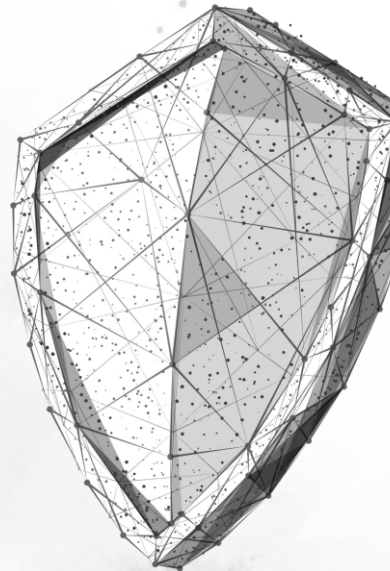
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ARTIFICIAL INTELLIGENCE: CURRENT STATE OF PATENTABILITY ISSUES

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INTRODUCTION

- 48.832 US Patent Practitioners: 12.778 active agents and 36.054 active attorneys (July 2021; USPTO – OED)
- 12.764 EPO representatives (Aug 2019; epi - Institute of Professional Representatives before the European Patent Office)
- 4.022 German Patent Attorneys (Dec 2020; German Patent and Trade Mark Office)
 - only about 1% of German Patent Attorneys have a degree in Computer Science

STATISTICS 2020 - EPO

180.250 patent applications in total (EP and PCT regional phase)

Origin: EPO states 45.2 %
 USA 24.6 %
 Japan 12.1 %
 ...

#	25 Top Applicants (EPO)		Anm.
1	Samsung	KR	3.276
2	Huawai	CN	3.113
3	LG	KR	2.909
4	Qualcomm	US	1.711
5	Ericsson	SE	1.634
...
11	Raytheon Technologies	US	1.284
12	Alphabet	US	1.117
13	Microsoft	US	1.087
14	Johnson & Johnson	US	1.049
15	Intel	US	1.011
18	General Electric	US	775
20	HP	US	699

Source: [EPO Annual review 2020](#)

STATISTICS 2020 - GPTO

▣ 62.105 patent applications in total (DE and PCT national phase)

▣ Origin: Germany 68.0 %
 Japan 11.7 %
 USA 9.5 %
 ...

#	50 Top Applicants (GPTO)		Anm.
1	Robert Bosch GmbH	DE	4.033
2	Schaeffler Technologies AG & Co. KG	DE	1.907
3	Bayerische Motoren Werke AG	DE	1.874
4	Daimler AG	DE	1.638
5	Volkswagen AG	DE	1.493
6	Ford Global Technologies, LLC	US	1.324
...
9	Intel Corporation	US	975
15	GM Global Technology Operations LLC	US	534
23	International Business Machines Corporation	US	306
27	Deere & Company	US	248

Source: [GPTO Annual report 2020](#)

OTHER TOPICS

Not covered today:

- AI as inventor
- AI as tool for inventors, examiner, attorneys
 - Prior art
 - Search, Classification
 - Drafting
 - ...

PATENTABLE INVENTIONS – ARTICLE 52 EPC

- (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.

NOVELTY – ARTICLE 54 EPC

(1) An invention shall be considered to be new if it does not form part of the state of the art.

(2) The state of the art shall be held to comprise everything made available to the public by means of a written or oral description, by use, or in any other way, before the date of filing of the European patent application.

...

INVENTIVE STEP – ARTICLE 56 EPC

An invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art. [...]

EXAMINATION OF AI (AND CII) APPLICATIONS

- ⌘ [T 641/00 COMVIK](#): “*non-technical elements do not contribute to inventive step*”
- ⌘ Current examination scheme regularly confirmed: [G 3/08](#) (Programs for computers), [G 1/19](#) (Patenting of simulations)
- ⌘ 2 hurdles for patentability:
 - ⌘ First hurdle – eligibility – invention must have technical character; hurdle is low, easy to overcome (“use of a computer”); there are exclusions
 - ⌘ Second hurdle – inventive step – only technical features can contribute, i.e. “*features contributing to a technical solution of a technical problem in view of the closest prior art*” (G1 /19)

FIRST HURDLE - ELIGIBILITY

- ⌘ Patent eligibility is assessed under Article 52 EPC (exclusions)
- ⌘ Prior art is not considered
- ⌘ The use of a computer in the claimed subject-matter makes it eligible

- ⌘ Developed by case law (COMVIK, confirmed in [G 1/19](#))
- ⌘ Exemplary wording to overcome the hurdle:
 - ⌘ “A computer-implemented method comprising steps...”
 - ⌘ “A computer-readable medium comprising instructions which, when executed by a computer, cause the computer to carry out the method of claim ...”
 - ⌘ More examples [EPO Guidelines F-IV 3.9.1](#)

SECOND HURDLE - PATENTABILITY

- ⌚ Problem-solution-approach: only features contributing to the technical character of the invention are assessed (COMVIK)
- ⌚ Can mathematical method steps contribute?
- ⌚ EPO Guidelines: *“Artificial intelligence and machine learning [...] are per se of an abstract mathematical nature, irrespective of whether they can be “trained” based on training data.”*
- ⌚ But mathematical models can qualify (as contributing):
 - ⌚ by its application to a field of technology, and/or
 - ⌚ by being adapted to a specific technical implementation.

SECOND HURDLE - PATENTABILITY

- Technical application:
 - Claim specifies (explicitly or implicitly) how the output of the mathematical method is used
 - Use is technical
- Technical application examples:
 - determine cardiac output from arterial blood pressure
 - controlling a specific technical system or process, e.g. an X-ray apparatus or a steel cooling process
 - digital audio, image or video enhancement or analysis, e.g. de-noising, detecting persons in an image
 - separation of sources in speech signals; speech recognition, e.g. mapping speech input to text output
 - encoding data for reliable and/or efficient transmission or storage, e.g. error-correction, compression
 - en-/decrypting or signing electronic communications; generating keys in an RSA cryptographic system
 - optimizing load distribution in a computer network

SECOND HURDLE - PATENTABILITY

- Specific technical implementation:
 - mathematical models are specifically adapted to exploit the hardware
 - mathematical models are designed based on technical considerations relating to the internal functioning of the computer
- Specific technical implementation examples:
 - implementing a neural network using a Graphics Processing Unit
 - Distributing calculations using a specific parallel computer architecture
 - adaptation of polynomial reduction algorithm matched to word size of computer hardware
 - choice of the claimed bit strings and matrices and respective operations determined by technical considerations concerning how to efficiently perform the method steps in parallel

SECOND HURDLE - PATENTABILITY

- ⌘ Functional data vs. Cognitive Data:
- ⌘ A data structure or format can contribute to the technical character of the invention if it produces a technical effect:
 - ⌘ Data structure has a technical function in a technical system
 - ⌘ Data structure inherently comprises, or maps to, the technical features
- ⌘ Cognitive data are those data whose content and meaning are only relevant to human users and do not contribute to producing a technical effect.
- ⌘ Other non-functional data exist: Structure of a computer program (structure maps to excluded subject-matter).

TECHNICAL SUBJECT MATTER – NO

- ⌘ T 1201/10 product codes solve a business problem rather than a technical one
- ⌘ T 0797/11 process planning and business optimization
- ⌘ T 1135/11 representation and processing of numbers representing "security levels"
- ⌘ T 1627/11 whether data sources should be searched in combination or via separate searches
- ⌘ T 2073/11 changing the recipient's name or address or even the "delivery status" of a delivery
- ⌘ T 2399/11 track genre
- ⌘ T 2465/11 the probability of a user being interested in specific data items
- ⌘ T 0969/12 that a user is a member of certain pre-defined groups
- ⌘ T 1098/12 to enable users to try out software on a mobile terminal for a limited time at a lower price
- ⌘ T 1221/12 play lists
- ⌘ T 1232/12 a fair trading environment
- ⌘ T 1242/13 data storage capacity on demand business scheme
- ⌘ T 0005/13 letting a parser and rules-based engine rely on the same rules is not driven by technical considerations
- ⌘ T 0748/13 allowing the user to select his queue image
- ⌘ T 1776/13 improving personalization of advertising for mobile devices using peer rating
- ⌘ T 1895/13 way of associating information with trade related data is not technical, since it is cognitive data
- ⌘ T 2276/13 limited number of requests that a user can impart over a predetermined period of time essentially represents a business policy
- ⌘ T 1040/14 surrounding support of a a USB autorun device is a leaflet, a flyer or a promotional card
- ⌘ T 1179/14 adjusting a user's security rating in view of the security rating of that user's communication
- ⌘ T 0535/15 associating a piece of content with different rights during different "release windows"
- ⌘ T 0755/18 improving machine learning (re efficiency) is not technical

TECHNICAL SUBJECT MATTER – YES

- T 0929/15 voice request being associated with the identity of the user is technical
- T 0943/16 history data is used for predicting the future use or workload of the system is technical
- T 0731/17 accessing information contained in a database store via a database server is technical
- T 2388/17 sending a search resource including instructions that cause the client device to generate a search interface is clearly technical
- T 1247/18 indexing, creating an index store and accessing the index store using the search engine all contribute to the technical character

FURTHER READING

- EPO Guidelines for Examination:
 - [Index for Computer-Implemented Inventions](#)
 - [F-IV 3.9.1 “Cases where all method steps can be fully implemented by generic data processing means”](#)
 - [G-II 3.3.1 “Artificial intelligence and machine learning”](#)
 - [G-II 3.6.3 “Data retrieval, formats and structures”](#)
 - [G-VII 5. “Problem-solution approach”](#)

- Decisions:
 - [T 641/00 COMVIK](#)
 - [G 3/08](#)
 - [G 1/19](#)



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THANK YOU FOR YOUR ATTENTION

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