Engineering and Physical Sciences Research Council

Sufficiency of patent disclosure on AI inventions

Sixth session of the WIPO Conversation

"Frontier technologies – AI Inventions"

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UKRI Research Node on TAS Governance & Regulation

UKRI Research Node on Trustworthy Autonomous Systems Governance and Regulation

Home

THIS NODE WILL EXPLORE HOW TO DEVISE A FRAMEWORK FOR THE REGULATION OF AUTONOMOUS SYSTEMS – TO HELP THEM RESPOND TO COMPLEXITIES OF THE WORLD THEY FUNCTION IN.

Introducing the Node – our Introduction Report is now available to read, download and circulate!

In order for autonomous systems to become trustworthy, we will need frameworks of informal and formal governance that must

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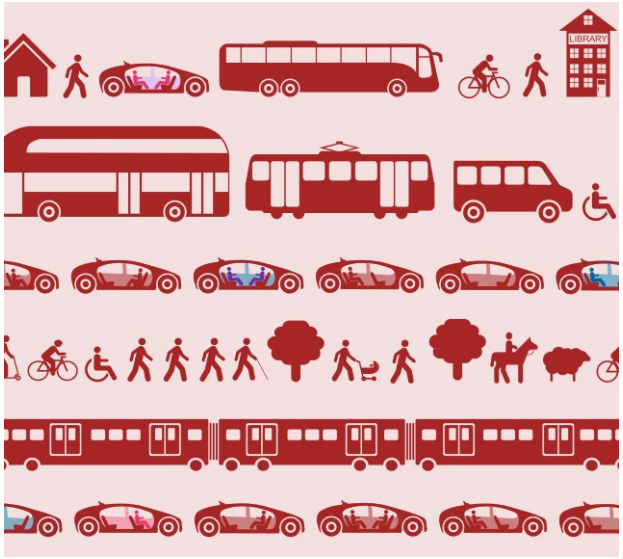
AI-based inventions

Mobility:

Autonomous vehicles

Health:

AI as a Medical Device (AIMD)



AI in care:

AI used in care and the ageing process

The underlying issues

- AI is a tool: the degree of automation; human-in-the-loop
- AI has potential to exacerbate existing problems of bias, discrimination, inequality, human health and safety.
- Patents as a regulatory tool for AI governance.
- Considering all stakeholders, what kind of IP policy can contribute to AI innovation for human flourishing?

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Types of disclosure

Disclosure: sufficiency in patenting

EPC Art 83 disclosure of the invention

-who is the ***person*** having ordinary skilled in the art (**PHOSITA**)?

-What is **prior art**?

-**Enablement**: disclosure needs to enable PHOSITA to rework the invention

Disclosure in AI governance

Explainable AI: for ensuring trust, fairness and accountability

-explainability

-transparency

-interpretability

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Disclosure in AI governance

Transparency

GDPR Art 5.1(a): transparency

Personal data shall be: processed lawfully, fairly and in a transparent manner in relation to the data subject ('lawfulness, fairness and transparency')

AI Act Art 13: sufficient transparency & interpretability

High-risk AI systems shall be designed and developed in such a way to ensure that their operation is sufficiently transparent to enable users to interpret the system's output and use it appropriately.

Impact assessment

GDPR Art 35: privacy impact assessment (PIA)

A privacy impact assessment (PIA) or data protection impact assessment (DPIA) refers to the obligation of the controller to conduct an impact assessment and to document it before starting the intended data processing.

AI Act Art 10: high-risk AI data governance

Training, validation and testing data sets shall be subject to appropriate data governance and management practices: (a) the relevant design choices; (b) data collection; (c) relevant data preparation processing operations, such as annotation, labelling, cleaning, enrichment and aggregation; (d) the formulation of relevant assumptions, notably with respect to the information that the data are supposed to measure and represent; (e) a prior assessment of the availability, quantity and suitability of the data sets that are needed; (f) examination in view of possible biases; (g) the identification of any possible data gaps or shortcomings, and how those gaps and shortcomings can be addressed.

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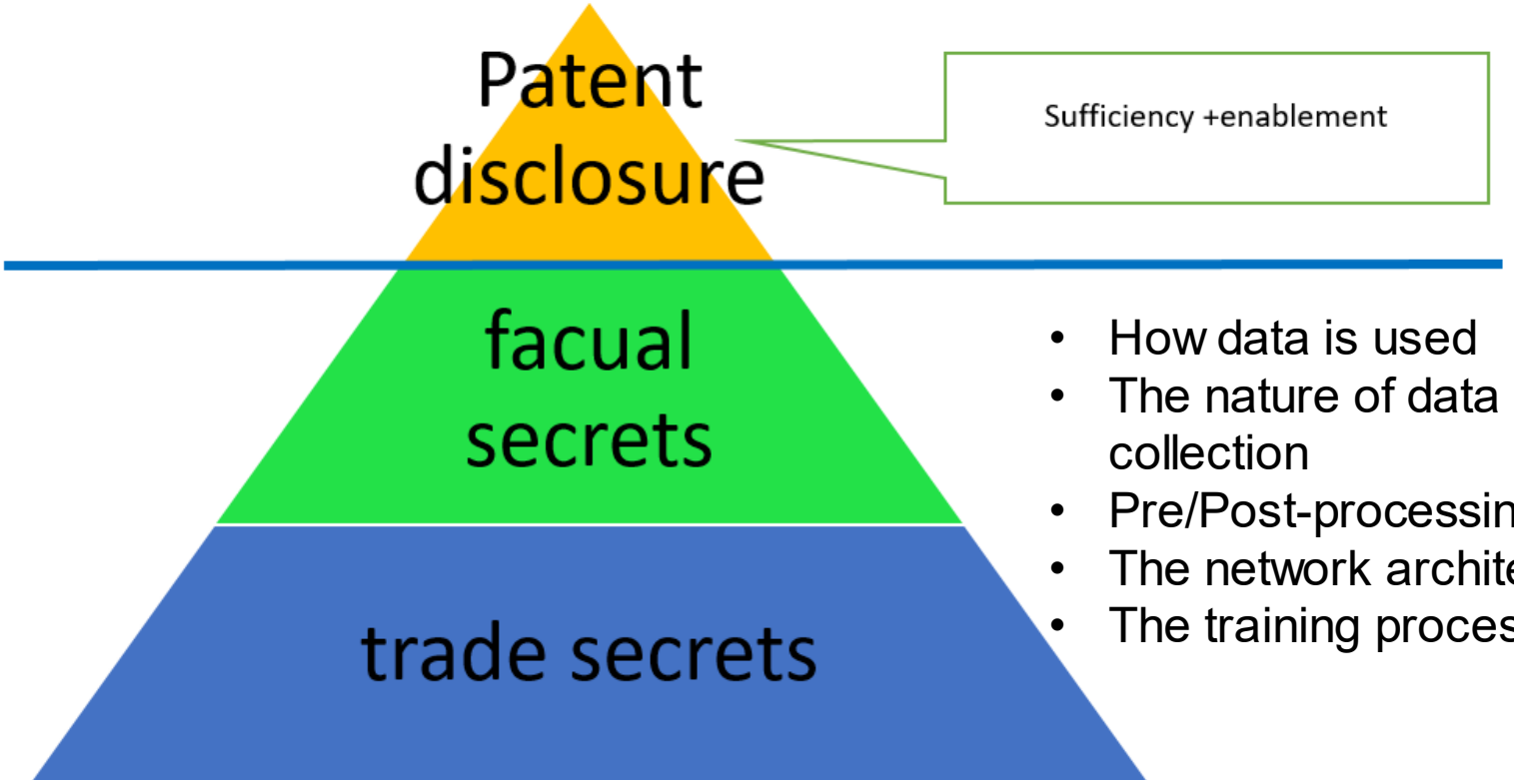
Patent disclosure: the iceberg



- How data is used
- The nature of data and data collection
- Pre/Post-processing of data
- The network architecture
- The training process

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Case study

A method for determining cardiac output from an arterial blood pressure curve measured at a peripheral region, comprising the steps of:

measuring the arterial blood pressure curve at the peripheral region; arithmetically transforming the measured arterial blood pressure curve to an equivalent aortic pressure; and

calculating the cardiac output from the equivalent aortic pressure,

wherein the arithmetic transformation of the arterial blood pressure curve measured at the peripheral region into the equivalent aortic pressure is performed by the aid of **an artificial neural network having weighting values that are determined by learning**.

(PCT/AT2006/000457) WO/2007/053868

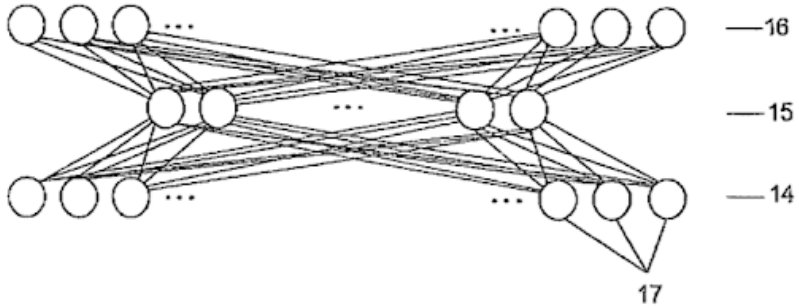

Fig. 3

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Training of an artificial neural network

Method for Determining Cardiac Output (U.S. Patent 8,920,327)

Includes a single independent claim regarding a method for cardiac output from an arterial blood pressure curve. The method is implemented via a cardiac device.

No issues on sufficiency were raised during the application

T0161/18 (Equivalent aortic pressure / ARC SEIBERSDORF)

… the specification was found lacking because it failed to 'disclose which input data are suitable for training the artificial neural network according to the invention, or at least one data set suitable for solving the technical problem at hand.'

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Disclosure of training data

Considering *reproducibility* and *repeatability* as well as *flexibilities* in individual case depending on the facts/context:

- The disclosure of training data may be required to *verify the functionality* of the model/black box. AI estimation would need verification of its accuracy.
- The *correlation* between the various datasets: such as actual experimentation results or existing statistic information in the description. (unless the correlation is known as common general technical knowledge, or *prior art*)
- The details of training data: depends on the nature of the invention: some require disclosing the type of data, others may require the specific training data.

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Machine learning

may require

- disclose the *adaption method* and how the initial algorithm changes;
- Or, the full set of *parameters* that govern adaptation

WIPO CONVERSATION ON INTELLECTUAL PROPERTY (IP) ARTIFICIAL INTELLIGENCE (AI) Second Session July 7 to 9, 2020, Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence(WIPO/IP/AI/2/GE/20/1 REV.) Comments by the European Patent Office (EPO)

Human expertise used to select data and to train the algorithms: Not required (the skilled person is object and based on the field of technology)

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Looking forwards

Sufficient disclosure EPC Art 83

- Interplay with trade secrecy
- Robust and *contextual* disclosure.
- More disputes will arise at *post-grant* infringement & enforcement
- International harmonisation.

Disclosure in AI governance

- Patents as a regulatory tool in a broader AI governance ecosystem.
- Transparency & disclosure as public policy (*Morality & ordre public* EPC Art 53)

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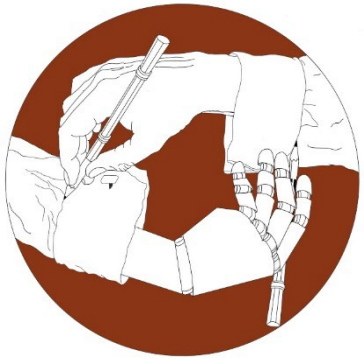

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