

Software specific IP issues

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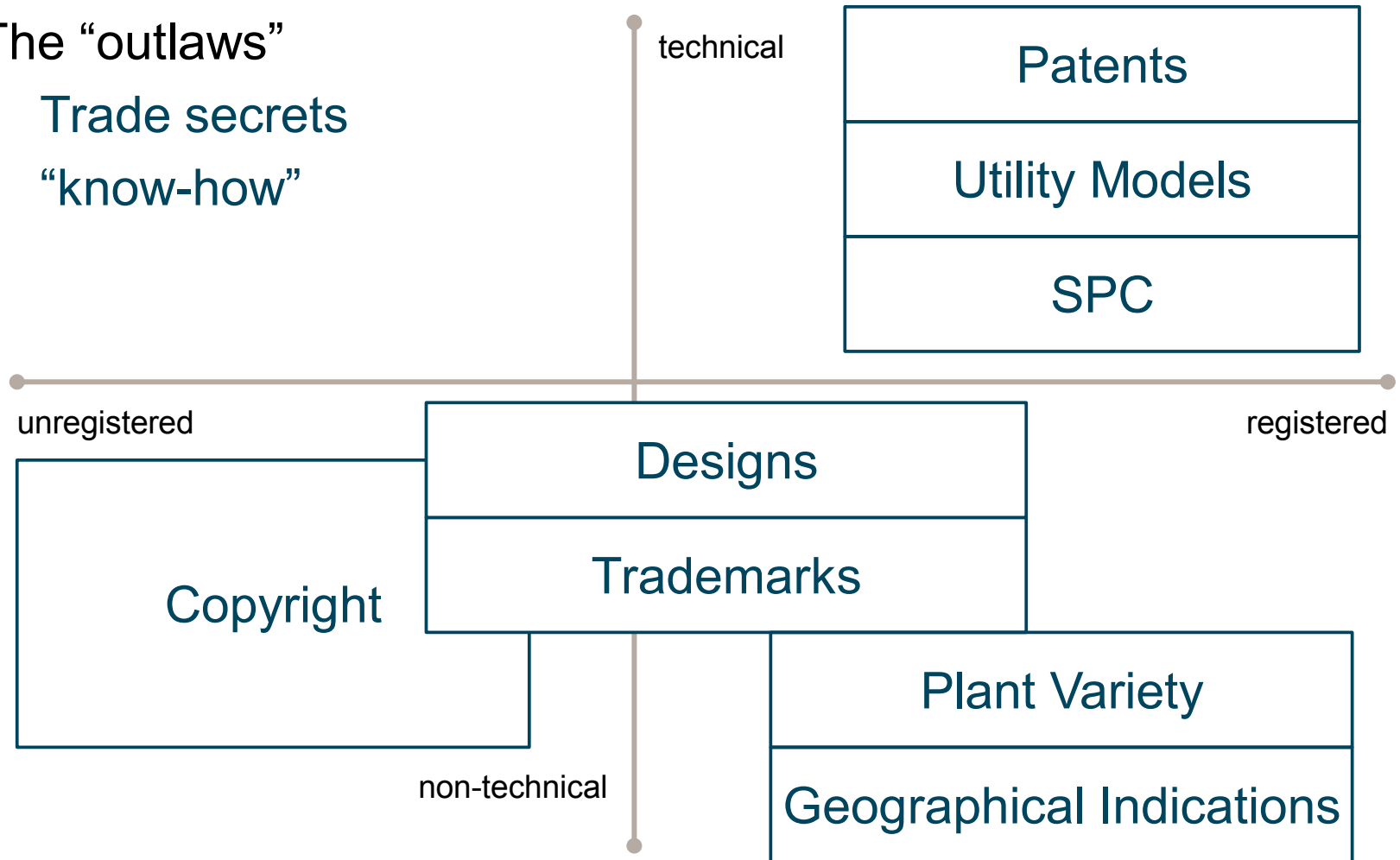
Outline

- Introduction: Software and IP
- Patenting Computer-implemented Inventions at the EPO
- Patenting enabling technologies
 - Artificial intelligence
 - Blockchain technology
- Practical issues

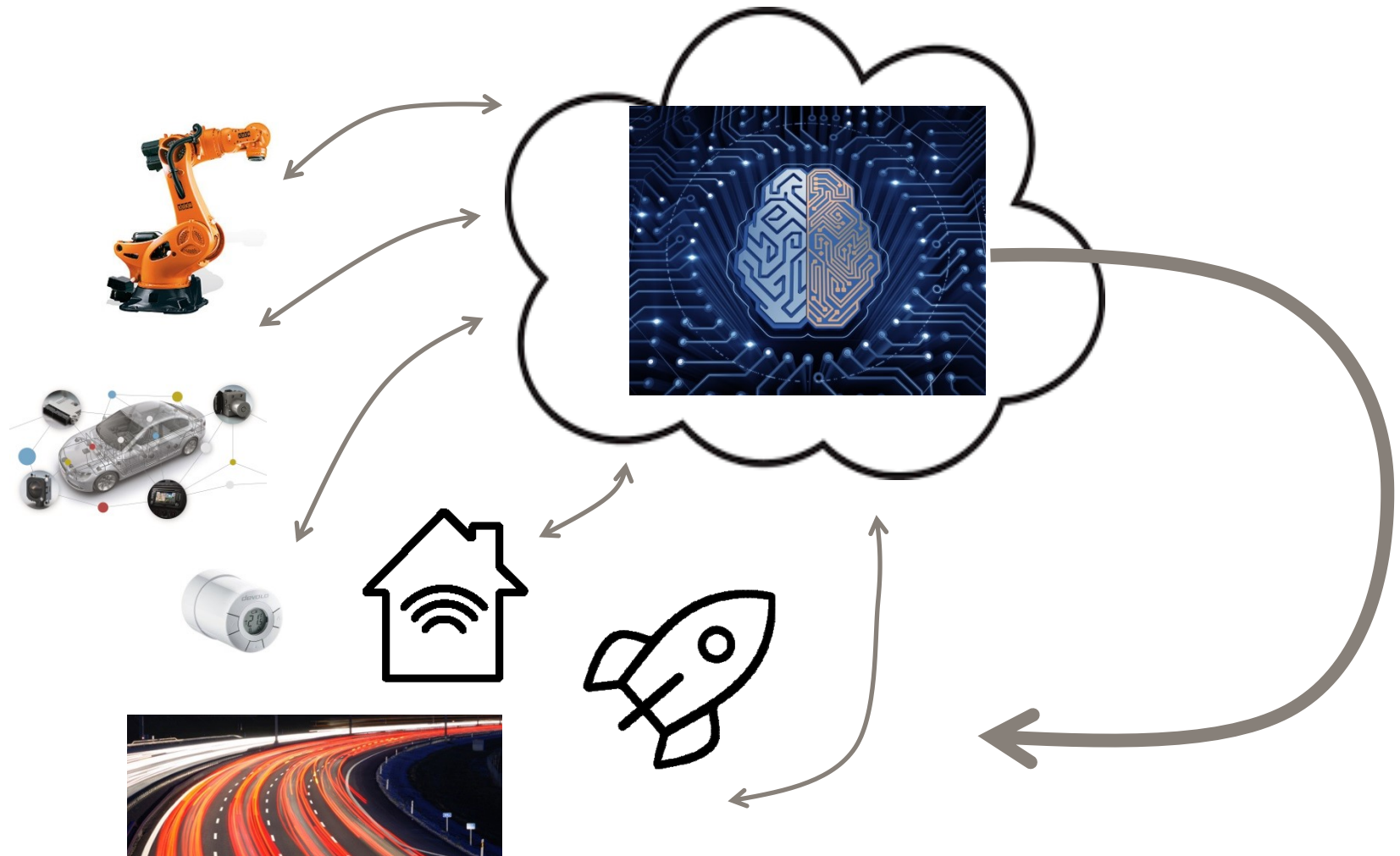
IP Rights: Overview

The “outlaws”

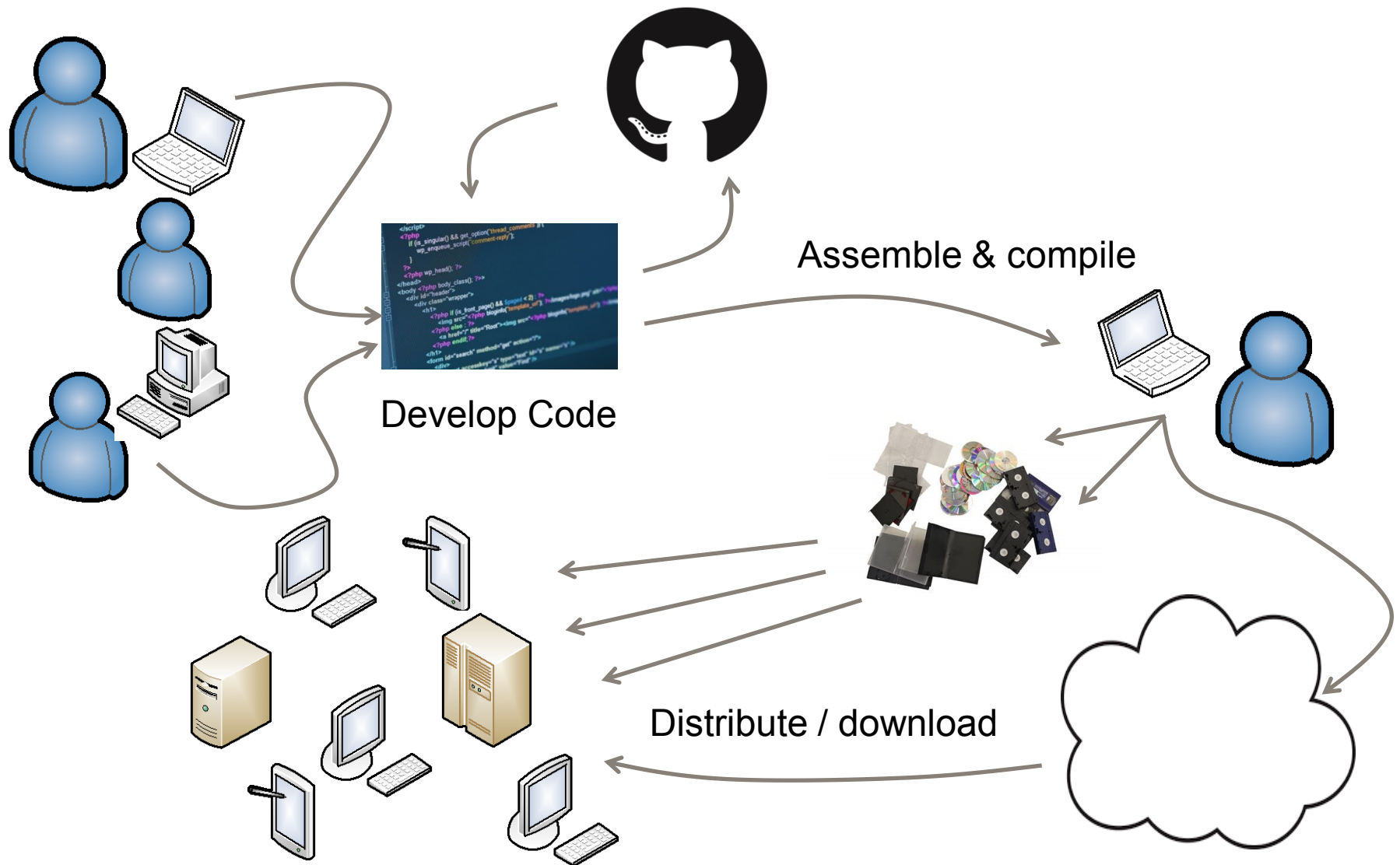
- Trade secrets
- “know-how”



Internet of Everything / 4th Industrial Revolution



Characteristics of Software



Characteristics of Software

Traditional products

- One creator/author
- Direct application of products / methods
- Limited interoperability with other products / methods
- Straight forward distribution routes

→ One innovation == one (main) IP right

Software

- Many actors, various distribution routes
- Is software technical or a creation of mind?

Protection of Software



Software



Patent

Copyright

Trademark

Design

Trade Secret

Protection of Software: Patents



Software

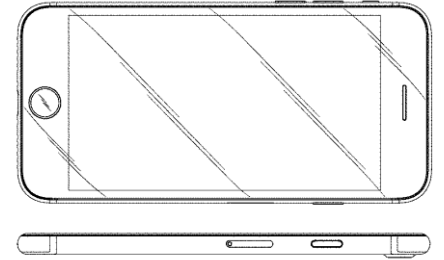
Patent

Copyright

Trademark

Design

Trade Secret



"Electronic device", D0800716,
Apple Inc.

Protection of Software: Designs



Software

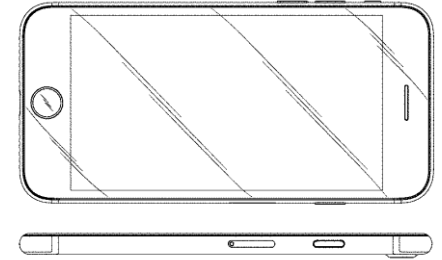
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Copyright

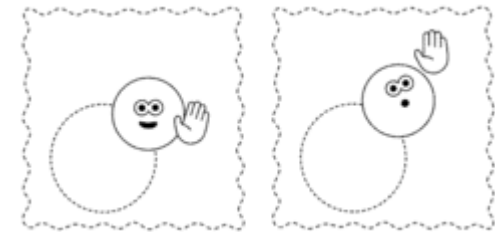
Trademark

Design

Trade Secret



"Electronic device", D0800716, Apple Inc.



"Display screen with animated graphical user interface", D0800780, Microsoft Corporation

Protection of Software: Trademarks



Software

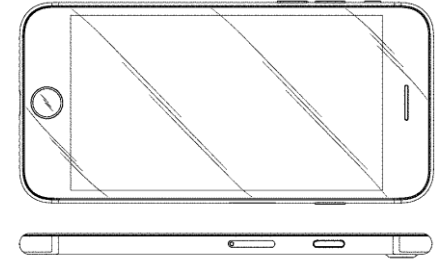
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Copyright

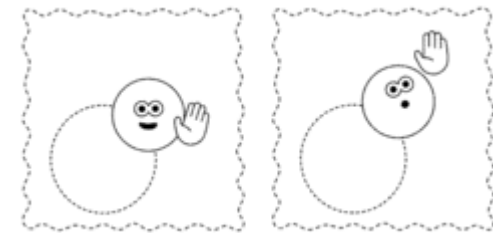
Trademark

Design

Trade Secret

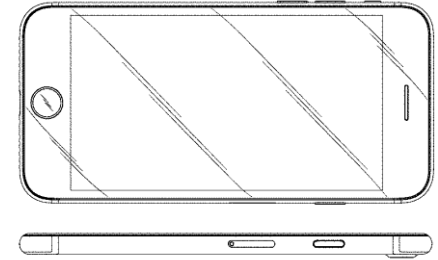
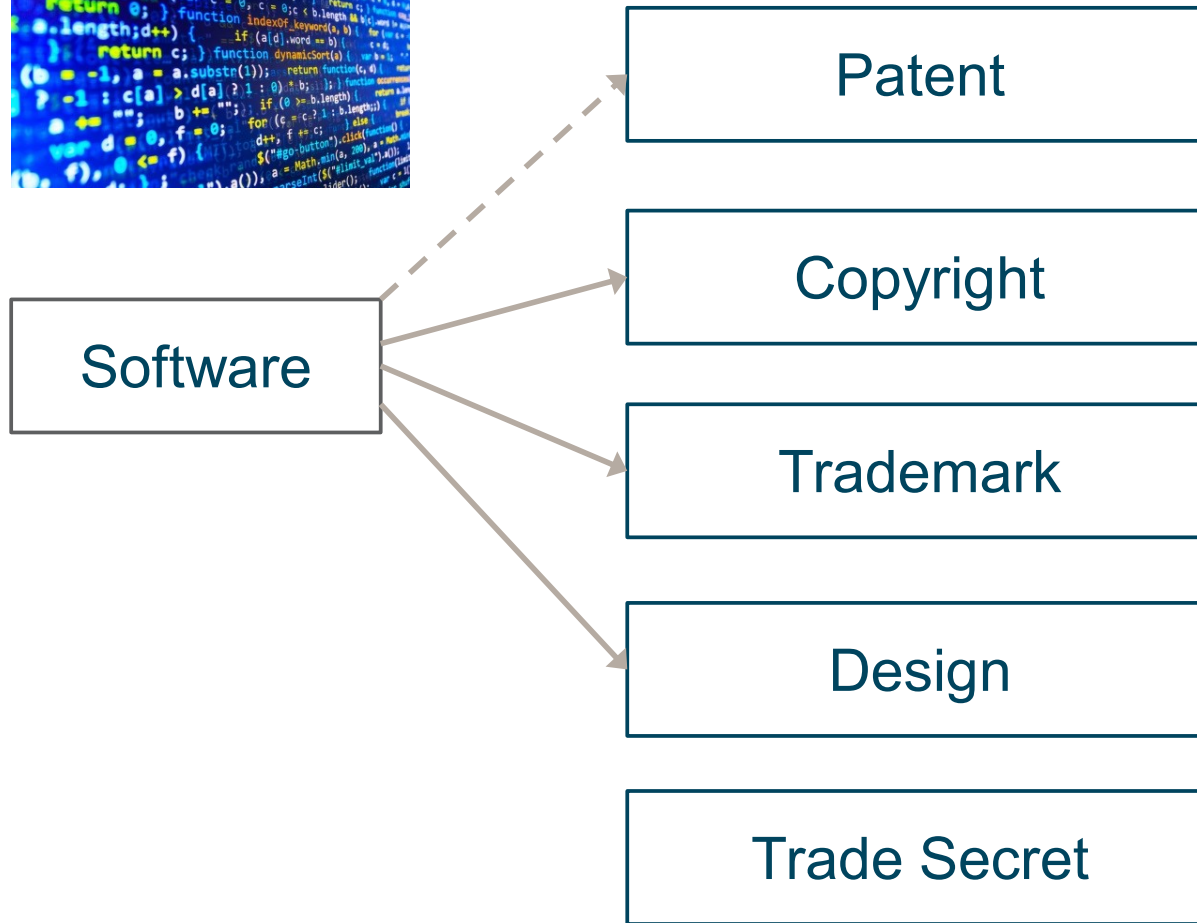


"Electronic device", D0800716,
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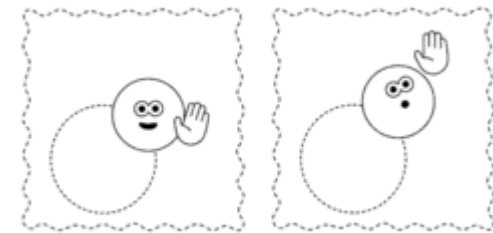


"Display screen with animated graphical user
interface", D0800780, Microsoft Corporation

Protection of Software: Copyright

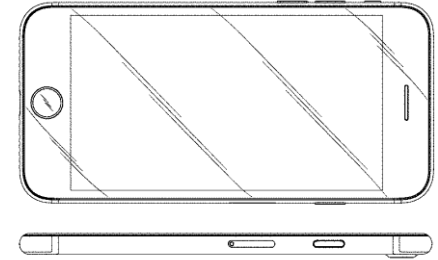
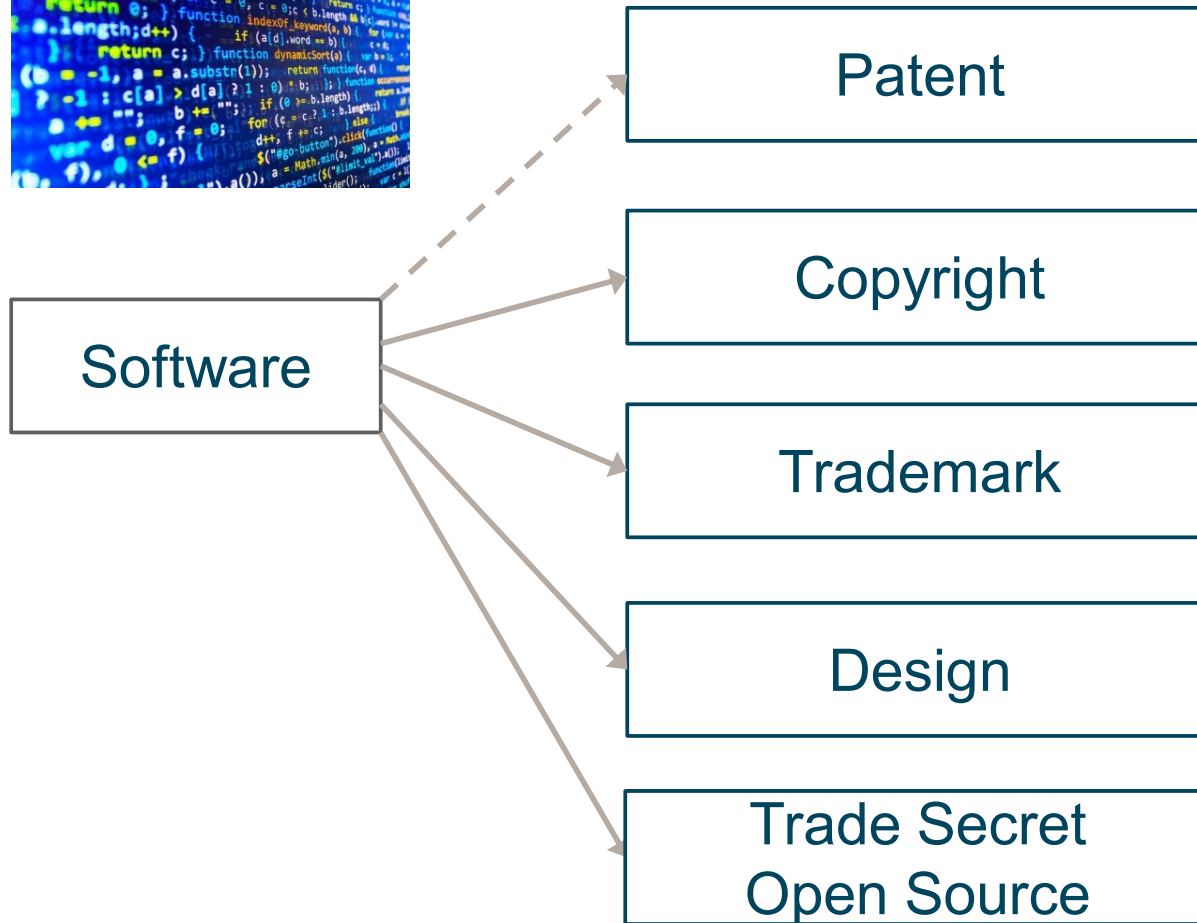


"Electronic device", D0800716, Apple Inc.

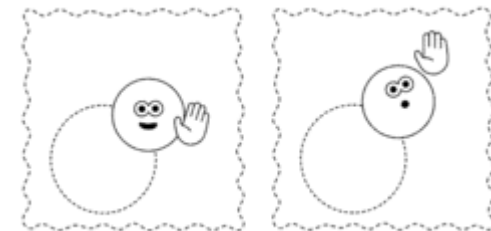


"Display screen with animated graphical user interface", D0800780, Microsoft Corporation

Protection of Software: Trade Secrets



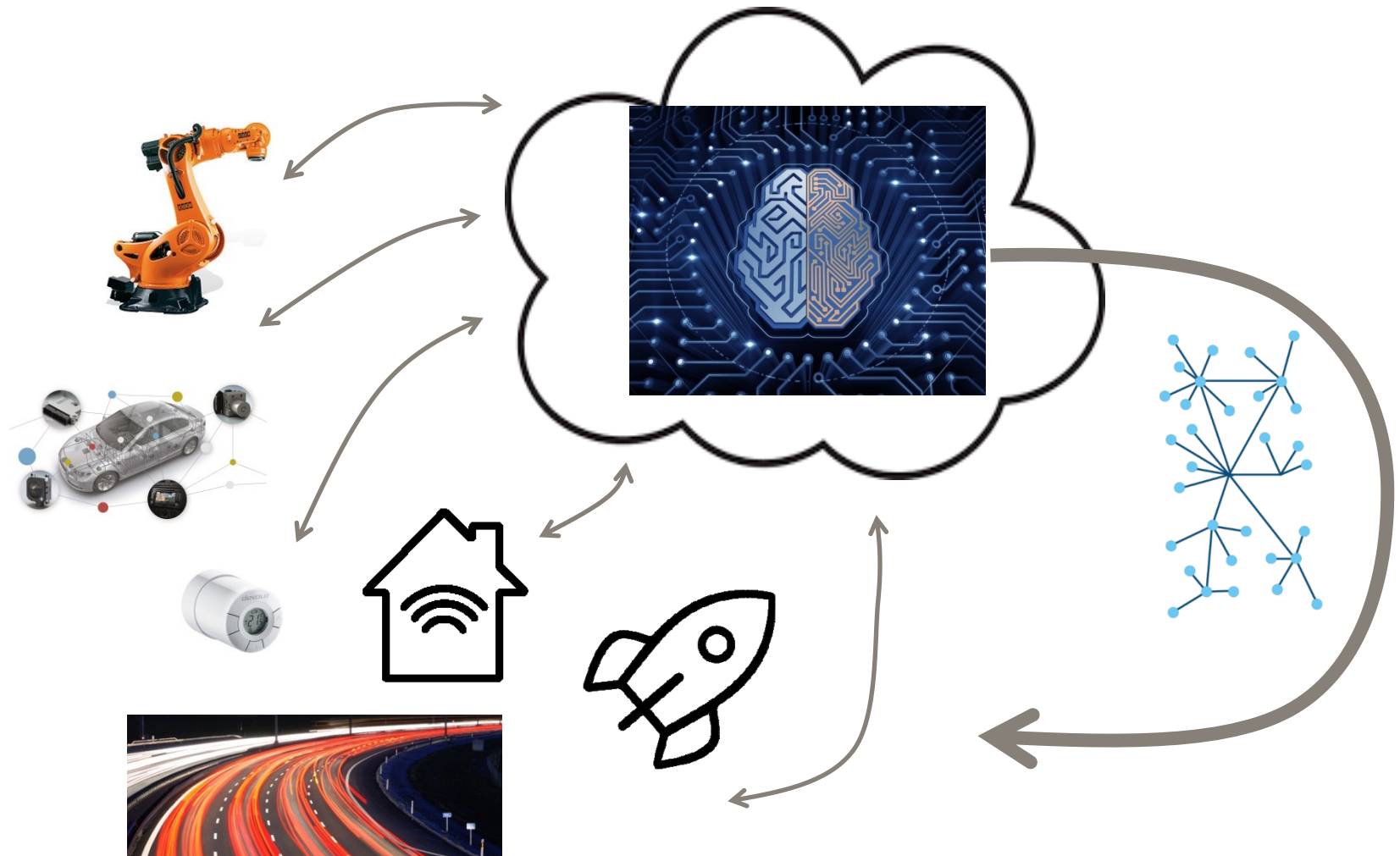
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The EPO approach towards Software

Internet of Everything / Industry 4.0



Software at the EPO

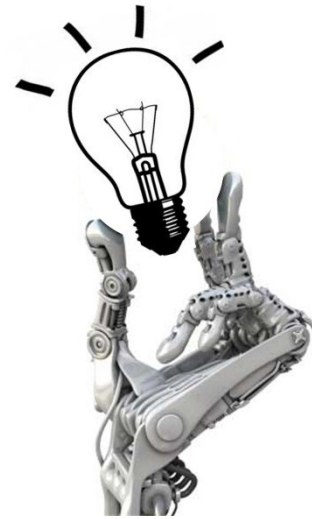


Software = “Computer-implemented Inventions” (CII)

Two hurdles approach

- 1st hurdle: **Technical character**, Art. 52 (2) EPC, e.g. “computer-implemented”
- Claims may contain a mix of technical and non-technical features
- 2nd hurdle: Assessment of novelty & inventive step based on features that contribute to the technical character
Art. 54, 56 EPC, EPO-GL G-VII, 5.4, T 641/00 – COMVIK
 - Do the individual “software” steps contribute to the **technical character**?

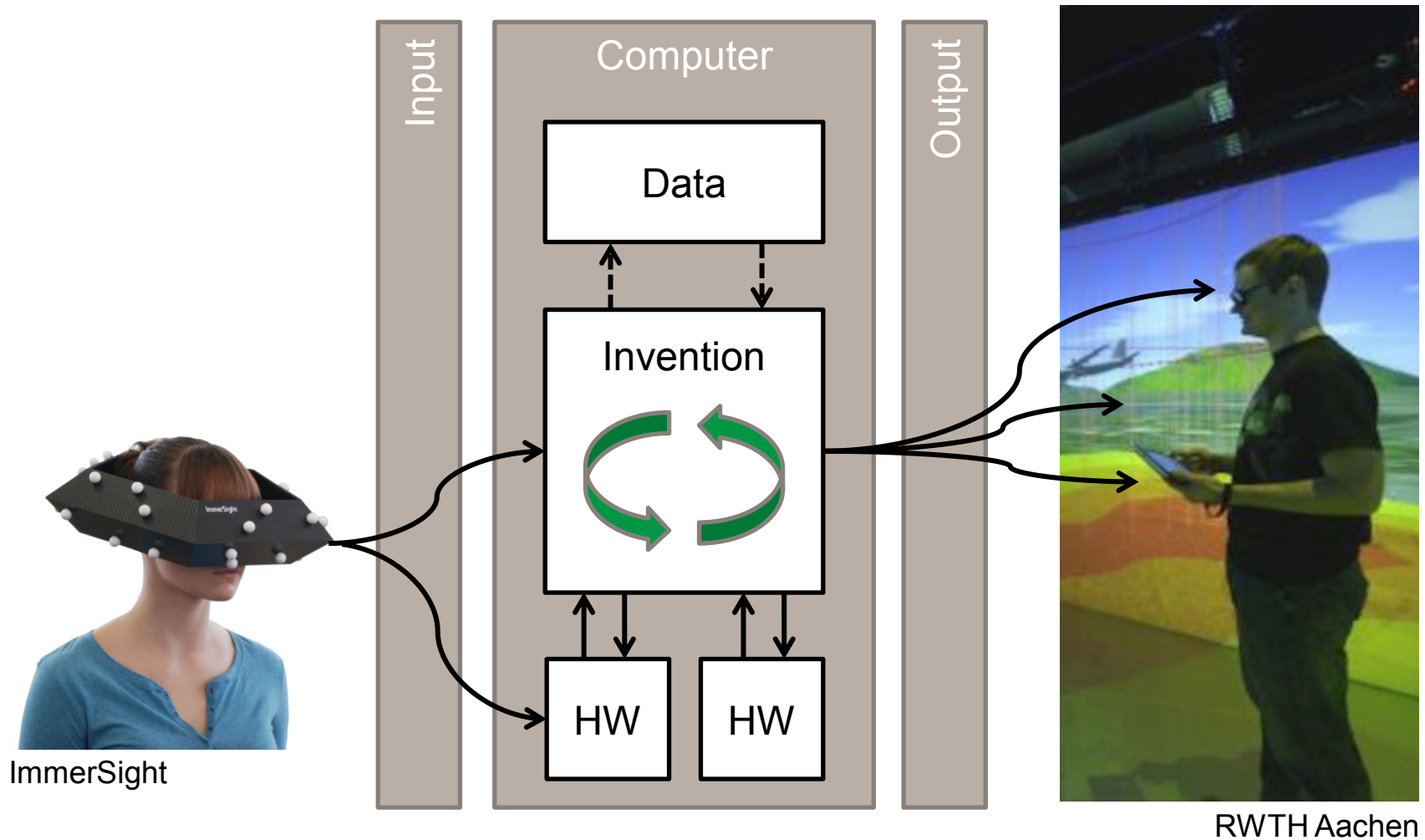
Software at the EPO – Inventive Step



Assessment of Inventive Step for CII

- Features that do not contribute to the technical character form part of the objective technical problem.
- As a consequence, these “non-technical” features are known to the skilled person as a “requirement specification”
- Presence of inventive step is determined based on:
 - Technical distinguishing features
 - Distinguishing features that contribute to the technical character, hence, have a technical effect

Where are Technical Features (at the EPO)?

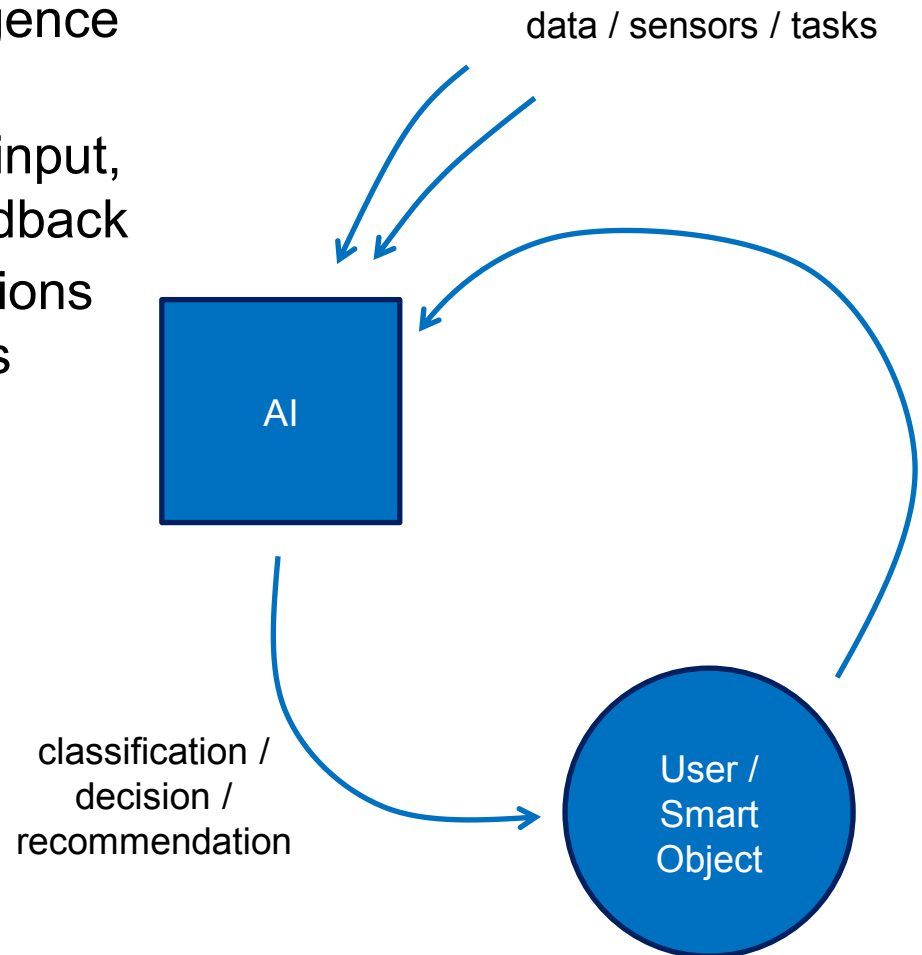


Artificial Intelligence

Artificial Intelligence

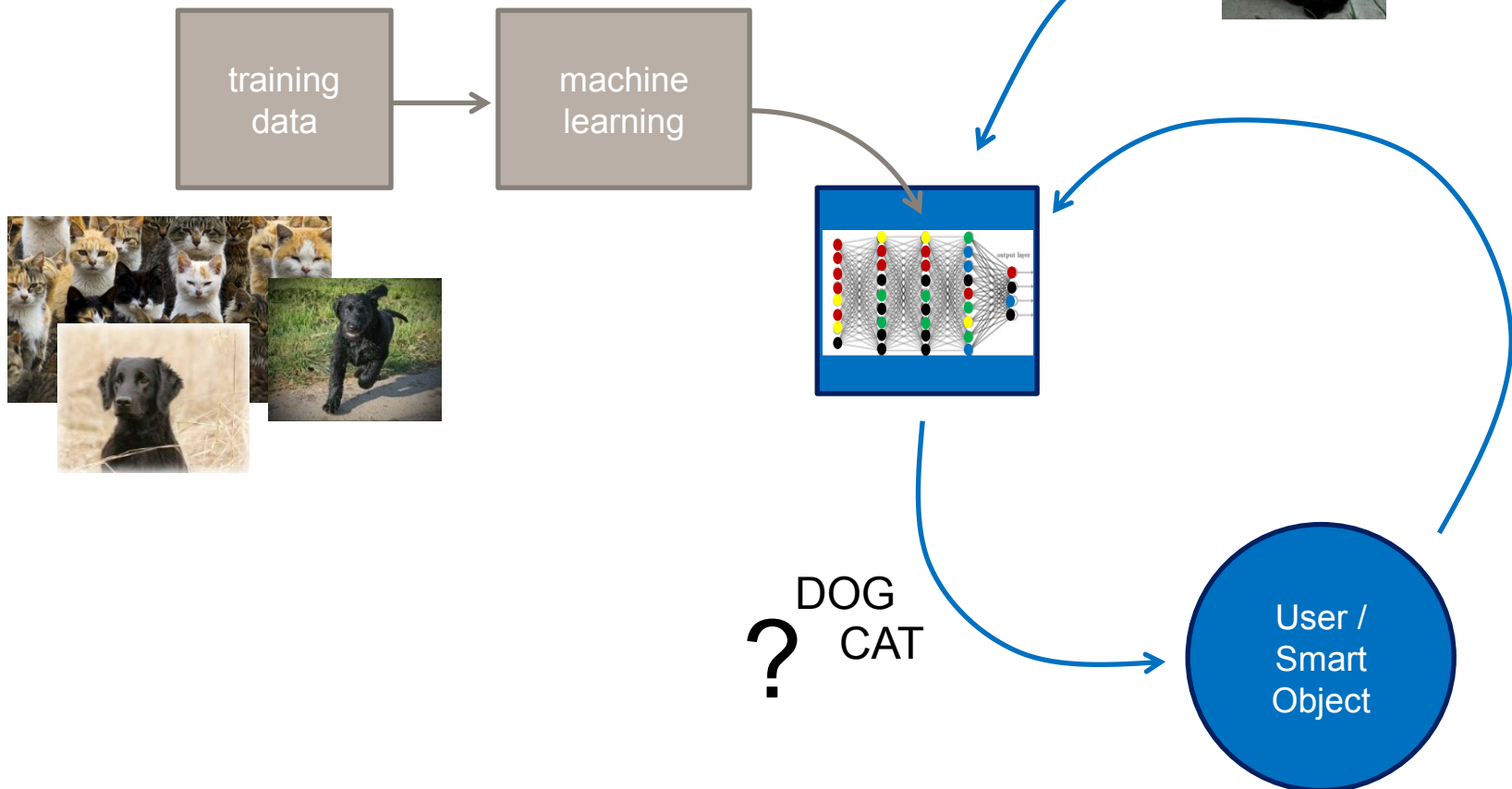
Artificial intelligence, AI, is intelligence demonstrated by machines

- “AI core” reacts on external input, such as data / sensors / feedback
- classifies input to take decisions or provide recommendations (inference)



Training

AI core has to be trained for each particular task



Guidelines for Examination / AI

- “Artificial intelligence and machine learning are based on computational models and algorithms [...]. Such computational models and algorithms are *per se* of an **abstract mathematical nature**, irrespective of whether they can be "trained" based on training data.”
- “expressions such as "support vector machine", "reasoning engine" or "neural network" [...] usually refer to **abstract models** devoid of technical character”

Guidelines for Examination, G-II, 3.3.1

→ AI/machine learning technology is examined the same way as CIIIs

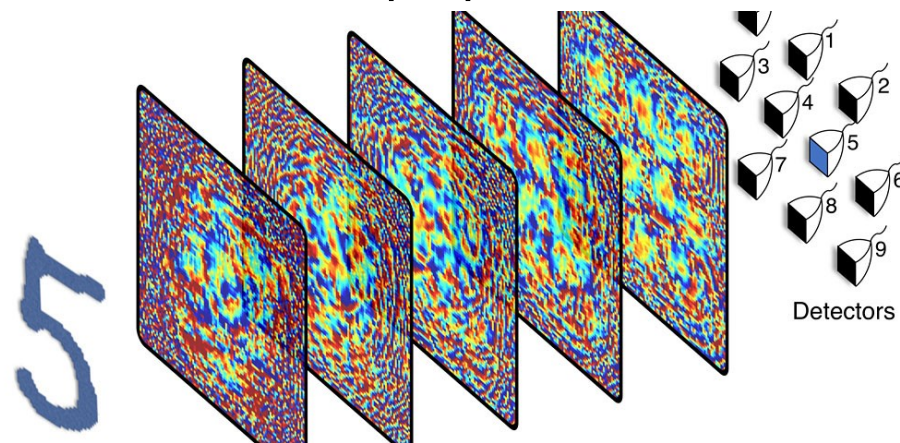
Guidelines for Examination / AI

- Fields of **technology** / technical contribution of AI inventions
 - use of neural networks in a heart-monitoring apparatus for the purpose of identifying irregular heartbeats
 - classification of digital images, videos, audio or speech signals based on low-level features (e.g. edges or pixel attributes for images) are further typical technical applications of classification algorithms.
 - Generating a training set and training a classifier may also contribute to the technical character if they support achieving a technical purpose
- However: “classifying text documents solely in respect of their textual content is **not** regarded to be per se a technical purpose but a linguistic one”

Guidelines for Examination, G-II, 3.3.1

Patenting AI Technology

- I. Applying (known) AI for a particular technical purpose
 - II. Modifying / adapting AI technology for a technical purpose
 - Selecting and configuring training data
 - Adapting the learning approach
 - Determining coefficients/layout for the technical purpose
 - III. Underlying technologies
 - Machine-learning approach
 - Layout of “AI core”
 - Classification technology
- Link to **technical area** recommendable



Blockchain Technology

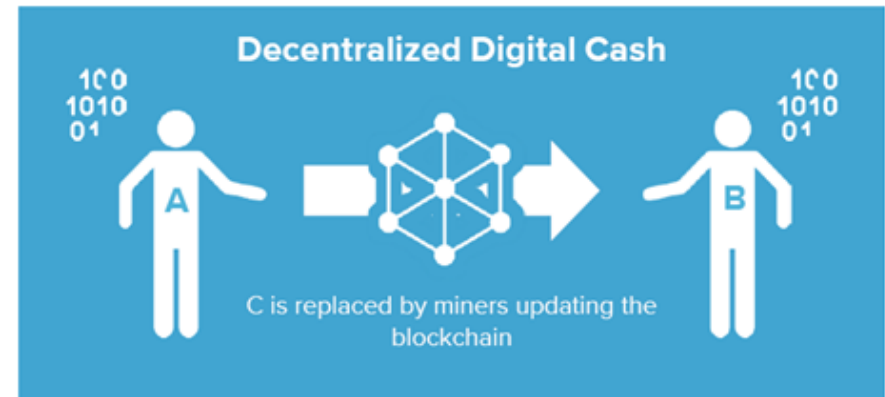
Blockchain

- Blockchain technology specifies a digital environment that manages transactions and keeps records of transactions
- Transactions in the digital environment are governed by **data blocks** that are arranged as **chains** → blockchain
- Blockchains are stored in a **decentralized** manner → distributed ledger
 - Each entity stores and updates a copy of the blockchain
 - Each entity stores an identical copy. Proposals for update originate from miners or validators + consensus finding
- Data blocks in the blockchain are **cryptographically** bound to each other: they cannot be manipulated

Patenting Blockchain Technology

- I. Applying (known) blockchain technology in a technical area
- II. Modifying / adapting blockchain technology for a technical purpose
 - For example, adapting blockchains for identity authentication, product tagging (drugs, food) or tracking

- III. Underlying technologies
 - Cryptography: PKI
 - Block construction
 - storage / maintenance: distributed ledger
 - Communication protocols



- Link to **technical area** recommendable

Perspective of Patent Practitioner



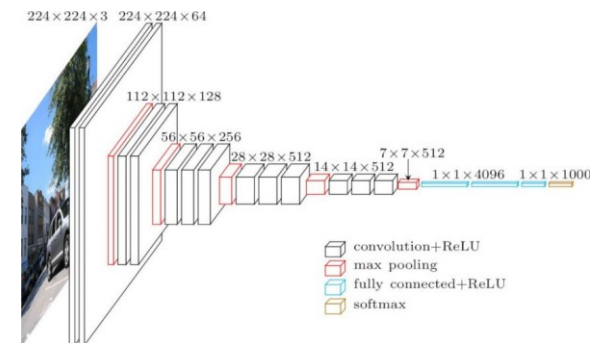
Technical Context

- Technical context is essential and should be provided in an EP application
 - Technical improvements
 - Technical application area
 - Technical/functional data
- Change of perspective: Invention has to be assessed in view of:
 - Hardware or network infrastructure (optimizing, accelerating, securing)
 - Interaction of components in a device or in a network (communication protocols)
 - Monitoring of infrastructure or environmental information (tracking, etc.)
 - Impact on infrastructure or environment

What your Patent Attorneys needs to know...

- Be specific!
 - “Performing a task *using AI*” is not sufficient
 - Concrete specification of technical environment / implementation details
 - Deconstruct an AI solution and consider elements separately
 - What are the technical problems solved?
- Examples for AI
 - Model architecture
 - Databases, annotations
 - Feature Extraction
 - Training Algorithm – any test results
 - Trained model (coefficients) ?

ConvNet Configuration					
A	A-LRN	B	C	D	E
11 weight layers	11 weight layers	13 weight layers	16 weight layers	16 weight layers	19 weight layers
input (224 × 224 RGB image)					
conv3-64	conv3-64 LRN	conv3-64 conv3-64	conv3-64 conv3-64	conv3-64 conv3-64	conv3-64 conv3-64
maxpool					
conv3-128	conv3-128	conv3-128 conv3-128	conv3-128 conv3-128	conv3-128 conv3-128	conv3-128 conv3-128
maxpool					
conv3-256 conv3-256	conv3-256 conv3-256	conv3-256 conv3-256	conv3-256 conv3-256 conv1-256	conv3-256 conv3-256 conv3-256	conv3-256 conv3-256 conv3-256 conv3-256
maxpool					
conv3-512 conv3-512	conv3-512 conv3-512	conv3-512 conv3-512	conv3-512 conv3-512 conv1-512	conv3-512 conv3-512 conv3-512	conv3-512 conv3-512 conv3-512 conv3-512
maxpool					
conv3-512 conv3-512	conv3-512 conv3-512	conv3-512 conv3-512	conv3-512 conv3-512 conv1-512	conv3-512 conv3-512 conv3-512	conv3-512 conv3-512 conv3-512 conv3-512
maxpool					
FC-4096					
FC-4096					
FC-1000					
soft-max					



VGG16 CNN Architecture

Thank you!

Q&A

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