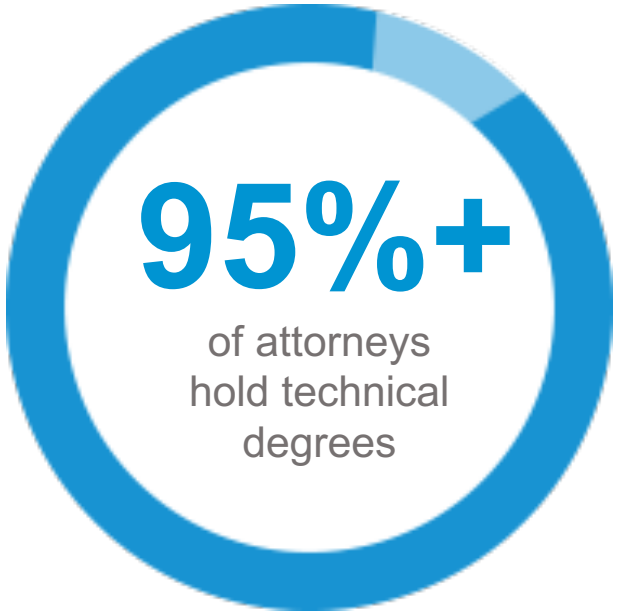
Knobbe Martens

Introduction to Knobbe Martens

October 28, 2020

Vlad Teplitskiy

Knobbe Martens Profile



Global Practice

through large network of
Foreign Associates

7 Offices Nationwide

Orange County
Los Angeles
New York
San Diego
San Francisco
Seattle
Washington D.C.

200 Highest number of registered patent attorneys in the US practicing across a **vast array** of industries

250+ lawyers & scientists

All our attorneys are **focused only on intellectual property and technology law**
as opposed to general practice firms that have smaller IP departments

Knobbe Martens Is a Full Service IP Firm

Patents

- Design Patents
- Global Portfolio Management
- Patent Prosecution
- USPTO Ex Parte Patent Proceedings

Litigation

- Appellate Practice and the Federal Circuit
- Arbitration and Other ADR
- Complex/Joint Defense Litigation
- Consumer Electronics Litigation
- Consumer Products Litigation
- Copyright and Design Patent Litigation
- ITC Litigation
- Nationwide Litigation
- Trade Secret Litigation
- Trademark and Unfair Competition Litigation
- Trials

USPTO Trials & Post-Grant Proceedings

- Covered Business Methods
- Derivation Proceedings
- Inter Partes Review
- Patent Interferences
- Post-Grant Review

Trademarks & Brand Protection

- Domain Name and Website Content Disputes
- International
- Trademark Clearance, Registration and Enforcement
- TTAB Proceedings

Data Privacy & Security

- Audits
- Breach Preparedness and Response
- Compliance with Federal, State and International Laws
- Marketing and Behavior Analytics Compliance
- Privacy by Design
- Privacy Policies and Notices

Copyrights

IP Strategy

- Due Diligence
- Opinions and Counseling

IP Transactions and Agreements

Importance of Working with Trusted Foreign Partners

- Review of specification and claims prior to filing
- Assistance with best practices for local jurisdictions (e.g., deferral of costs, divisional strategy, assignments and other formal matters, etc.)
- Reduction of miscommunications and bad news (e.g., appeals, divisionals, extensions, etc.)
- Matching of competence in IP and technology
- Direct contact to the person managing a case
- Proactive prosecution (e.g., expedited examination, examiner interviews, etc.)
- Sharing of ideas (e.g., new legal and practical developments)

Result: value for money for our clients

Knobbe Martens

Questions?

vlad.teplitskiy@knobbe.com

DIGITAL PATENTS AT THE EPO: TRENDS AND CHALLENGES

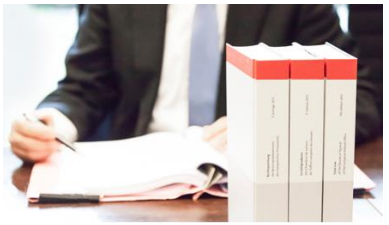
Silvia Dondi – European Patent Attorney

bugnion
The way to

AGENDA

- legal framework
- Machine Learning (ML) and Artificial Intelligence (AI): are they mathematical methods ?
- examination methodology for mixed-type inventions: two-hurdles approach
- a selection of practical examples
- fresh news from the EPO: patentability of computer-implemented simulations (G1/19)

LEGAL FRAMEWORK - EPC



- European patents shall be granted for any **invention**, in all fields of **technology**, provided they are new, inventive and have industrial application.

NON-INVENTIONS

a) discoveries, scientific theories, 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

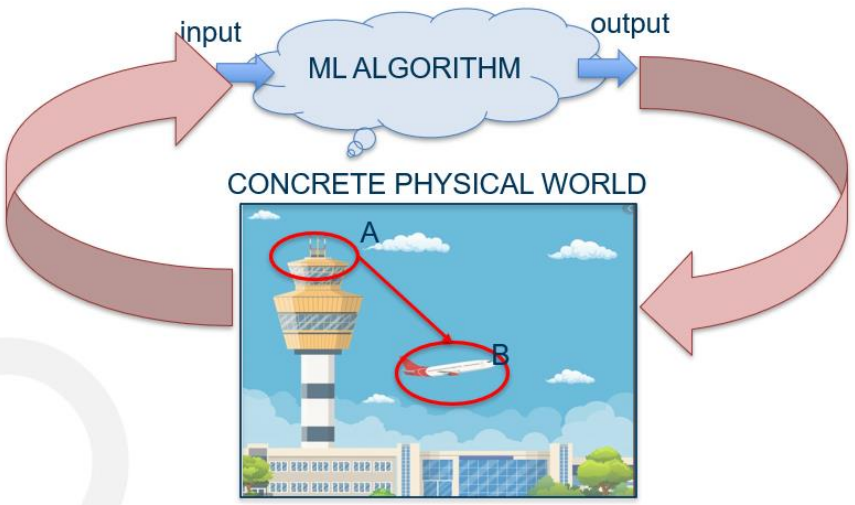
TECHNICALITY BORDER

Claimed subject-matter		
	as such - excluded	not as such - not excluded
(a)	discoveries, mathematics	technical application
(b)	aesthetics creations	concrete substrate
(c)	mental acts, games, business	computer implemention
(c')	computer programs	further technical effect
(d)	presentation of information	physiological effect human-machine interaction
(d')	data structures	functional data

non-technical domain ⟵ ⟶ **technical domain**

AI / ML: BORDERLINE ?

- AI → computational systems capable of performing tasks that typically require human intelligence
- ML → systems that can **learn from data** for predicting future data or output of interest
- ML involves **maths**

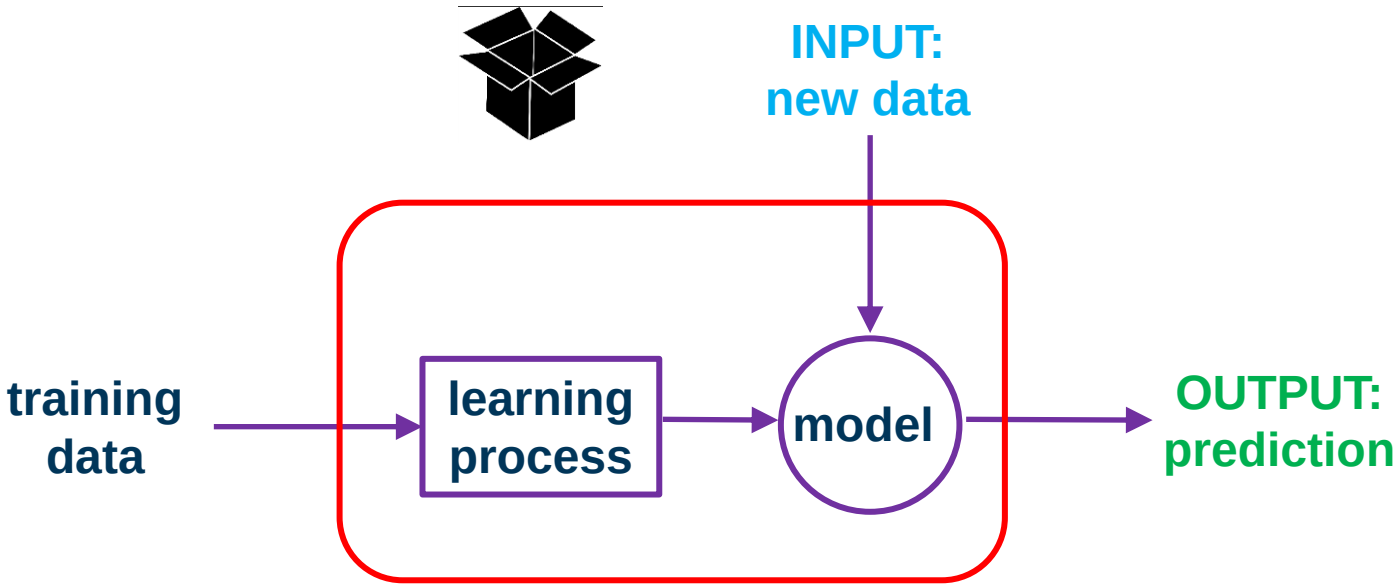


bugnion
The way to

AI TERMINOLOGY

Term or expression	Meaning?
Support vector machine	Abstract classifier **or** hardware **or** software (machine)
Reasoning engine	Abstract algorithm **or** hardware **or** software engine
Neural network	Abstract model **or** implemented model
Computational node	Conceptual entity **or** hardware node
Synaptic connection	Logical connection **or** hardware connection
Using AI, using machine intelligence	?

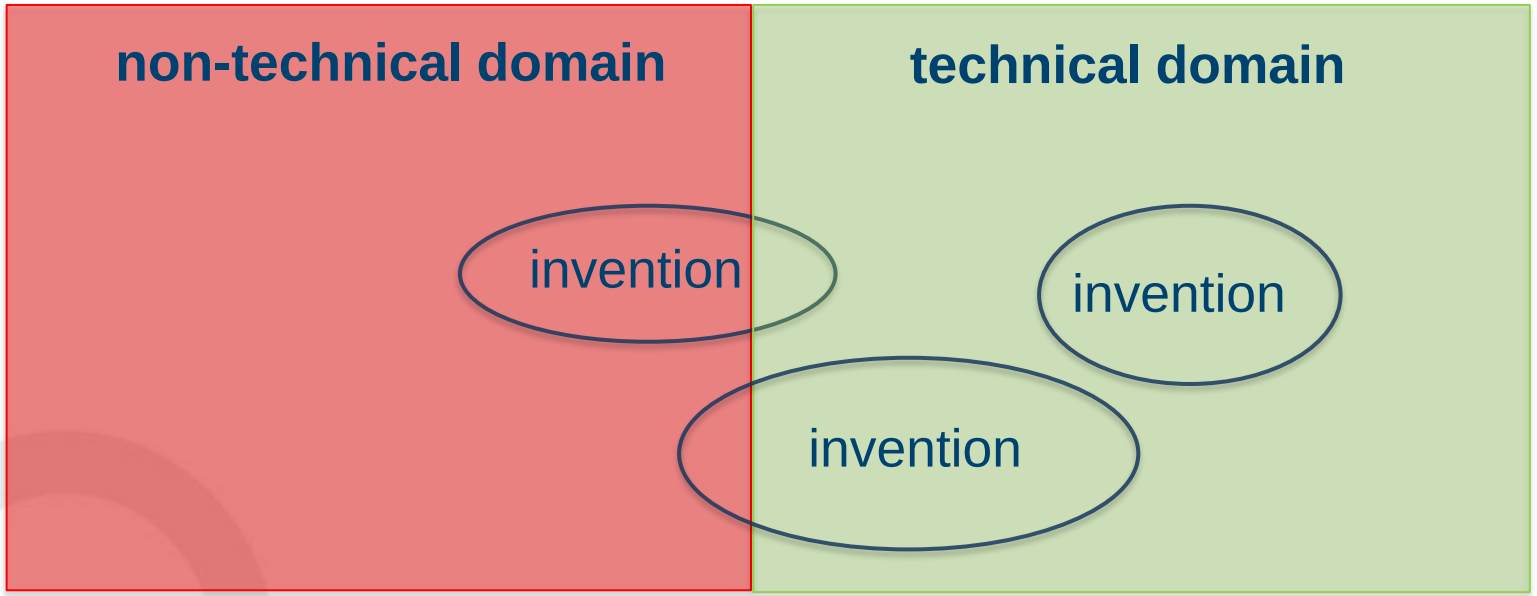
AVOID THE «BLACK BOX» FALLACY



- explain the «black box»
- establish a concrete link between ML and the real world

MIXED-TYPE INVENTIONS

claims comprising technical and non-technical features



TWO-HURDLES APPROACH

- **1st hurdle:** eligibility as invention

- **2nd hurdle:** patentability
  - clarity
  - novelty
  - inventive step

1st HURDLE: is it an invention ?

non-technical domain

- pure abstract computational models and algorithms
- may serve a technical purpose
- serves a generic technical purpose (classification, regression, clustering, dimensionality reduction)

technical domain

- involving the use of technical means
- adapted for a specific technical implementation or serving a specific technical purpose
- having technical application

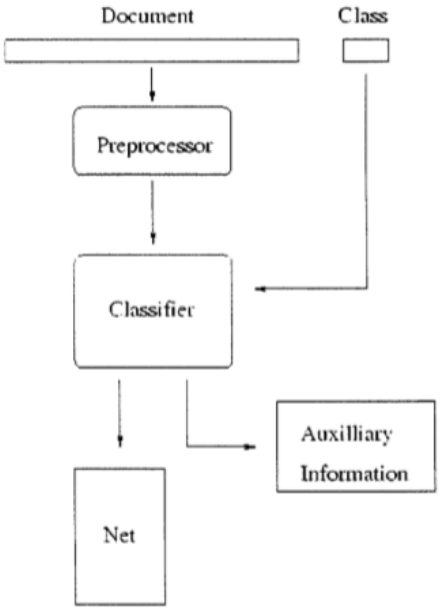
- data / parameters of technical nature

EXAMPLE N. 1 – documents classification (T 1358/09)

- using ML for retrieval of documents in an archive

issue: extracting relevant information from a huge archive

solution: vectors based on terms for classifying the documents



EXAMPLE N. 1 – claim as filed

A method for building a classification model for classifying unclassified documents based on the classification of a plurality of documents which respectively have been classified as belonging to one of a plurality of classes, said documents being digitally represented in ***a computer***, said documents respectively comprising a plurality of terms which respectively comprise one or more symbols of a finite set of symbols, and said method comprising the following steps:

- representing each of said plurality of documents by ***a vector of n dimensions***, said n dimensions forming ***a vector space***, whereas the value of each dimension of said vector corresponds to the frequency of occurrence of a certain term in the document corresponding to said vector, so that said n dimensions span up a vector space;
- representing the classification of said already classified documents into classes by separating said vector space into ***a plurality of subspaces*** by one or more ***hyperplanes***, such that each subspace comprises one or more documents as represented by their corresponding vectors is said vector space, so that said each subspace corresponds to a class.

EXAMPLE N. 1 – is it an invention ?

- generic technical purpose: classifying text documents
- pure mental act
- non-technical problem: mere semantic
- terms are data of non-technical nature

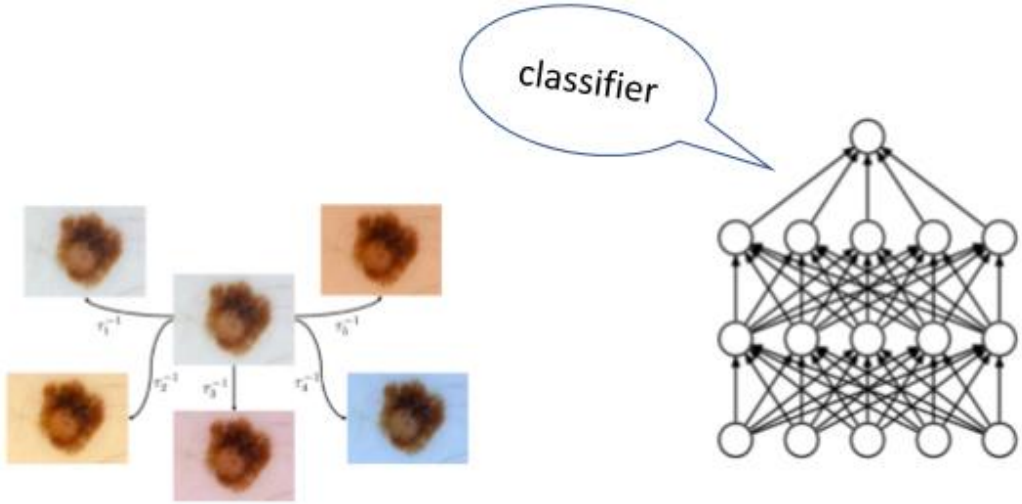
1st hurdle NOT PASSED!

EXAMPLE N. 2 – medical images classification

- using ML for recognising anomalous skin lesions

issue: limited amount of available samples in medical fields

solution: augmenting the number of samples

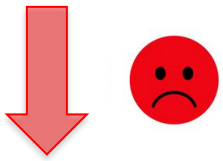


EXAMPLE N. 2 – claim as filed

A method for classifying images based on training ***a neural network*** with a second set of training images obtained by augmenting a first set of training images by means of rotating a first set of images in colour space to include skin colour variations.

EXAMPLE N. 2 – is it an invention ?

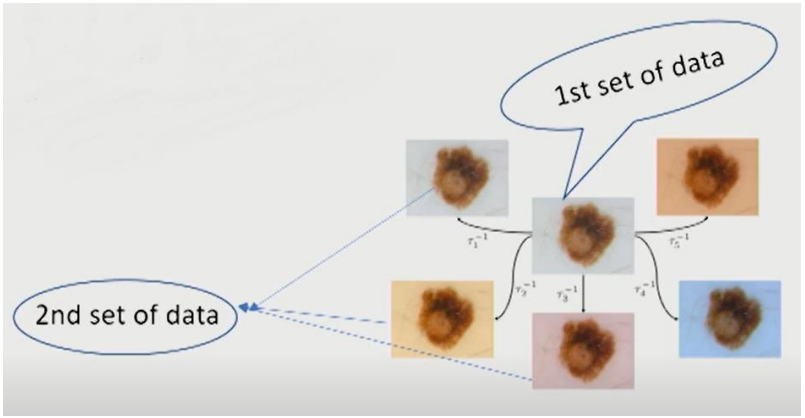
- generic technical purpose: classifying images
- pure mental act
- non-technical problem (apparently)
- are images data of technical nature ?



1st hurdle NOT PASSED!

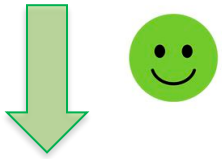
EXAMPLE N. 2 – amended claim

A <u>computer-implemented</u> method for classifying images <u>of skin lesions</u> based on training ***a neural network*** with a second set of training images obtained by augmenting a first set of training images by means of rotating a first set of images in colour space to include skin colour variations.



EXAMPLE N. 2 – is it an invention now?

- ✓ computer is a technical means
- ✓ technical field: healthcare
- ✓ specific technical purpose: classifying skin lesions using a computer
- ✓ technical problem solved: recognising skin lesions
- ✓ skin images are data of technical nature



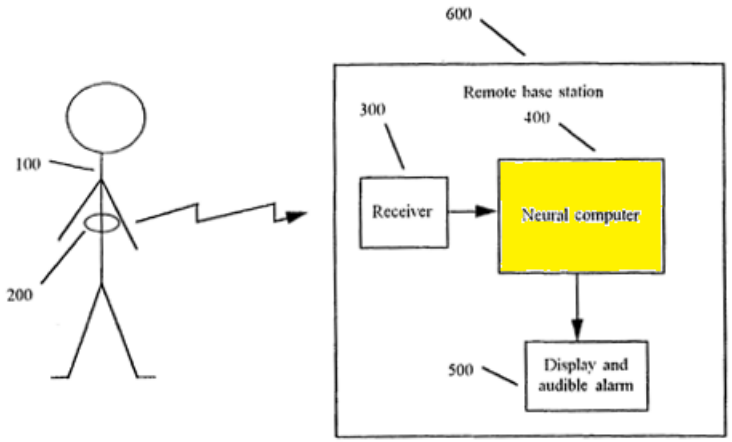
1st hurdle PASSED!

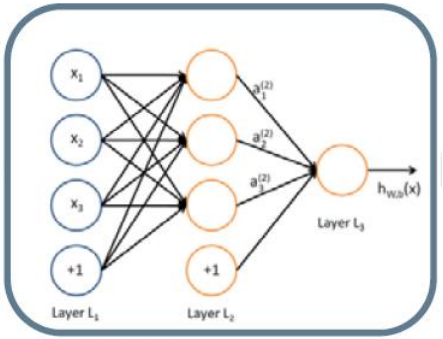
EXAMPLE N. 3 – heart monitoring (T 598/07)

- use of a neural network in heart monitoring for identifying irregular heartbeats

issue: false positive signals

solution:reliable distinction between normal and abnormal signals





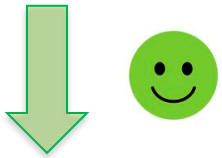
EXAMPLE N. 3 – claim as filed

A heart monitoring method comprising the steps of:

- receiving ***an electrocardiograph signal*** from a patient during a monitoring phase,
- preprocessing the electrocardiograph signal to suppress the noise and to analyse the shape of each pulse of said electrocardiograph signal to obtain a plurality n of values representative of the shape of each pulse of said electrocardiograph signal,
- forming ***an n dimensional vector*** from said plurality n of values,
- comparing the n dimensional vector with a stored plurality m of n dimensional reference vectors defining **an n dimensional volume** to determine the proximity of the n dimensional vector to said reference vectors, and
- outputting ***a signal*** if it is determined that the n dimensional vector is within or beyond a threshold range of said n dimensional reference vectors.

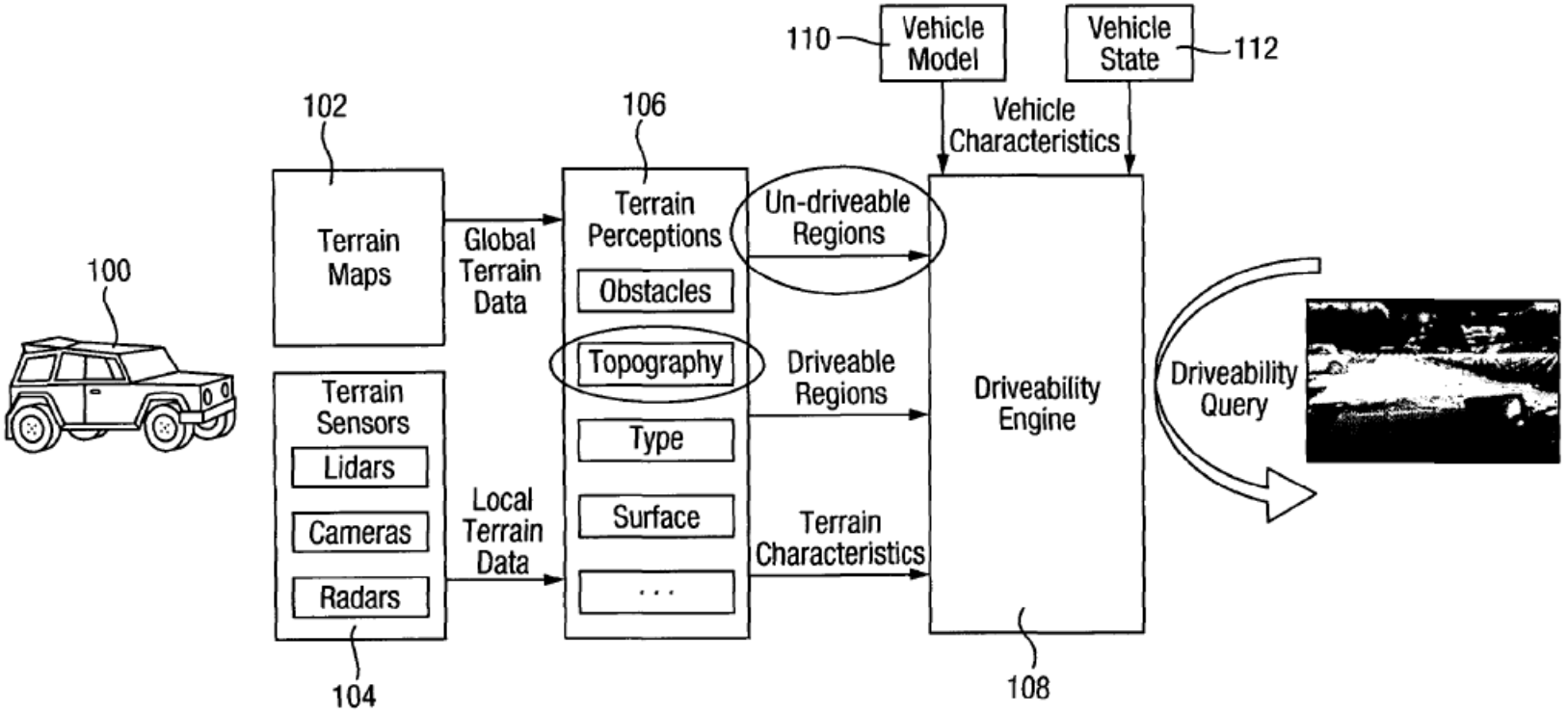
EXAMPLE N. 3 – is it an invention ?

- ✓ technical field: healthcare
- ✓ specific technical purpose : monitoring heartbeats
- ✓ technical problem solved: identify irregular heartbeats
- ✓ electric signals are data of technical nature



1st hurdle PASSED!

EXAMPLE N. 4 – assisting vehicle guidance



EPO© (based on EP2591443)

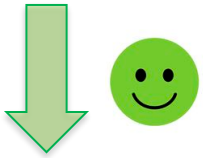
EXAMPLE N. 4 – claim as filed

A method of assisting vehicle guidance over terrain, the method including:

- training (306) at least ***one first classifier technique*** (308) using ***a first set*** of terrain classifier ***training data*** (304), such that the at least one first classifier technique is trained to output at least one probability value (314) usable to classify terrain;
- using the at least one first trained classifier technique (308) to generate ***a second set*** (312) of terrain classifier ***training data***;
- training (320) ***a second classifier technique*** (322) using the output of the at least one first classifier technique for the second set (312) of terrain classifier training data, and additional data (318) including ***an image-based representation of the terrain*** of the second data set, such that the second classifier technique is trained to output a probability value (326) usable to classify terrain.

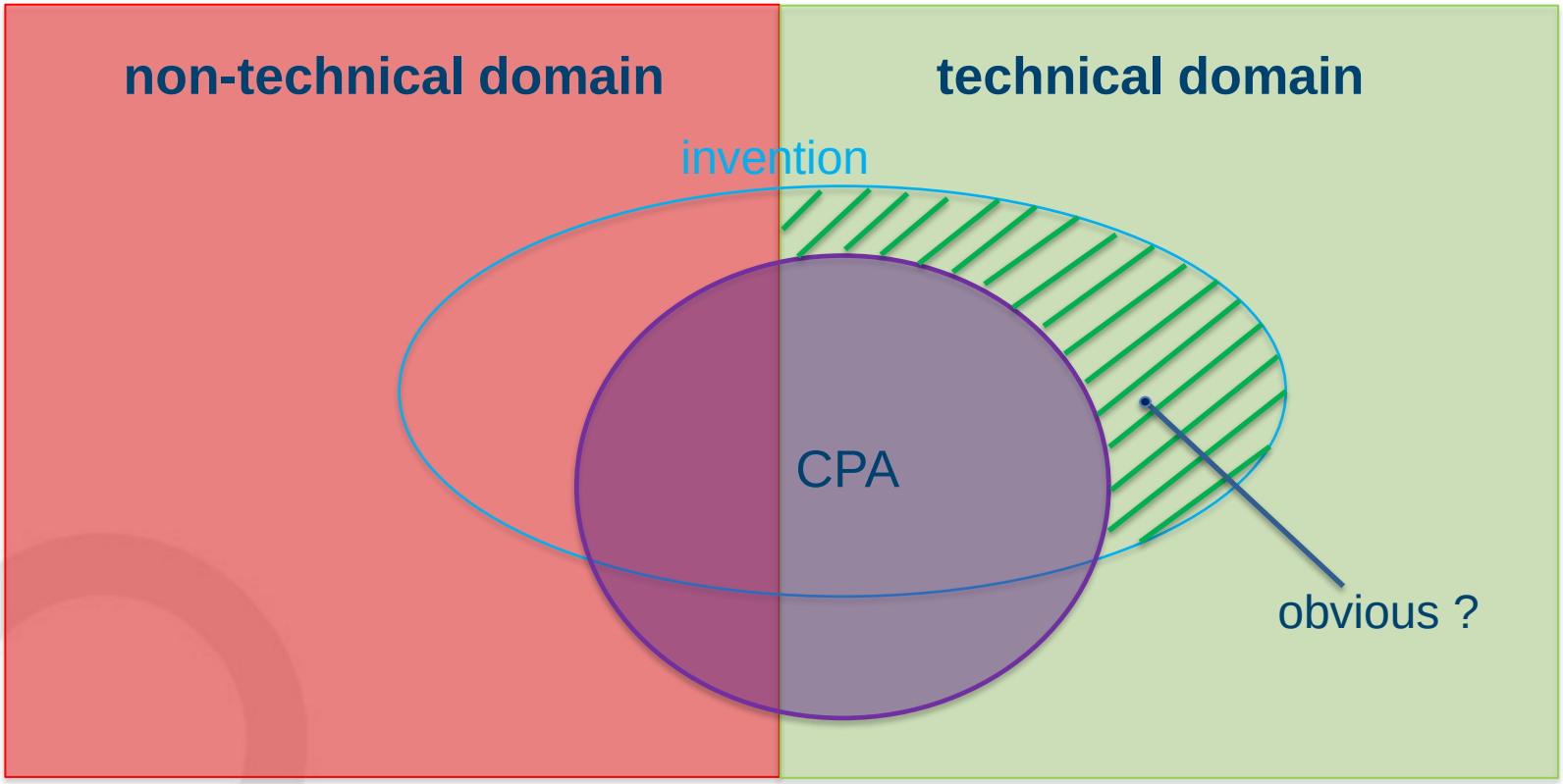
EXAMPLE N. 4 – is it an invention ?

- technical field: automotive
- specific technical purpose: assisting vehicle guidance
- technical problem solved: predicting the behaviour of a vehicle on upcoming terrain
- terrain and vehicle parameters are data of technical nature



1st hurdle PASSED!

2nd HURDLE – is it inventive ?



PROBLEM-AND-SOLUTION APPROACH

Modified for mixed-type inventions

- Identify technical features
- Closest prior art
- Distinguishing features
- (Technical) effect
- Objective technical problem
- Inventive step?

The presence of an inventive step may only be supported by those features of the claim which provide a technical effect serving a technical purpose

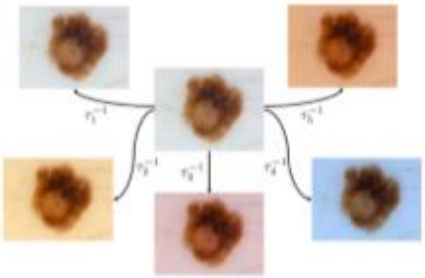
EXAMPLE N. 2 – examining inventive step

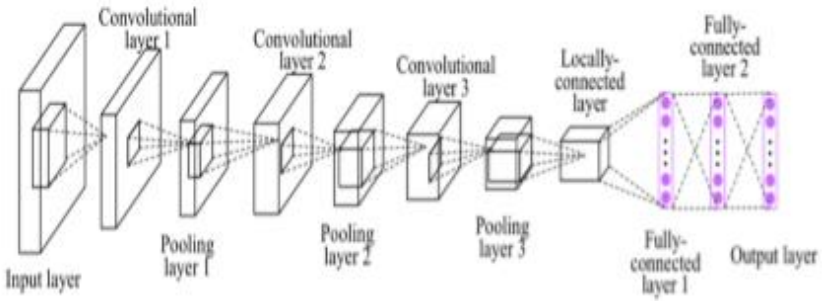
A computer-implemented method for classifying images of skin lesions based on training ***a neural network*** with a second set of training images obtained by augmenting a first set of training images by means of rotating a first set of images in colour space to include skin colour variations.

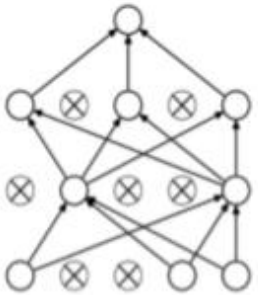
D1: ***neural network*** for detecting skin lesions

EXAMPLE N. 2 – further amendment

A computer-implemented method for training *a deep convolutional neural network* to classifying images of skin lesions ~~based on training a neural network~~ with a second set of training images obtained by augmenting a first set of training images by means of rotating a first set of images in colour space to include skin colour variations; and applying ***dropout function*** by randomly de-activating nodes in the deep convolutional neural network.

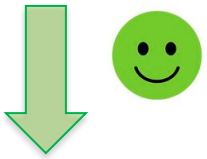




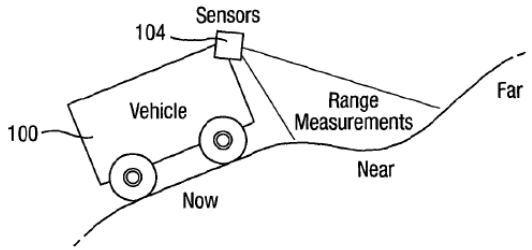


EXAMPLE N. 2 – is it inventive ?

- D1: ***neural network*** for detecting skin lesions by ML
- technical differences: deep convolutional neural network + dropout technique
- technical effect: more appropriate classification of skin lesions over D1



2nd hurdle PASSED!

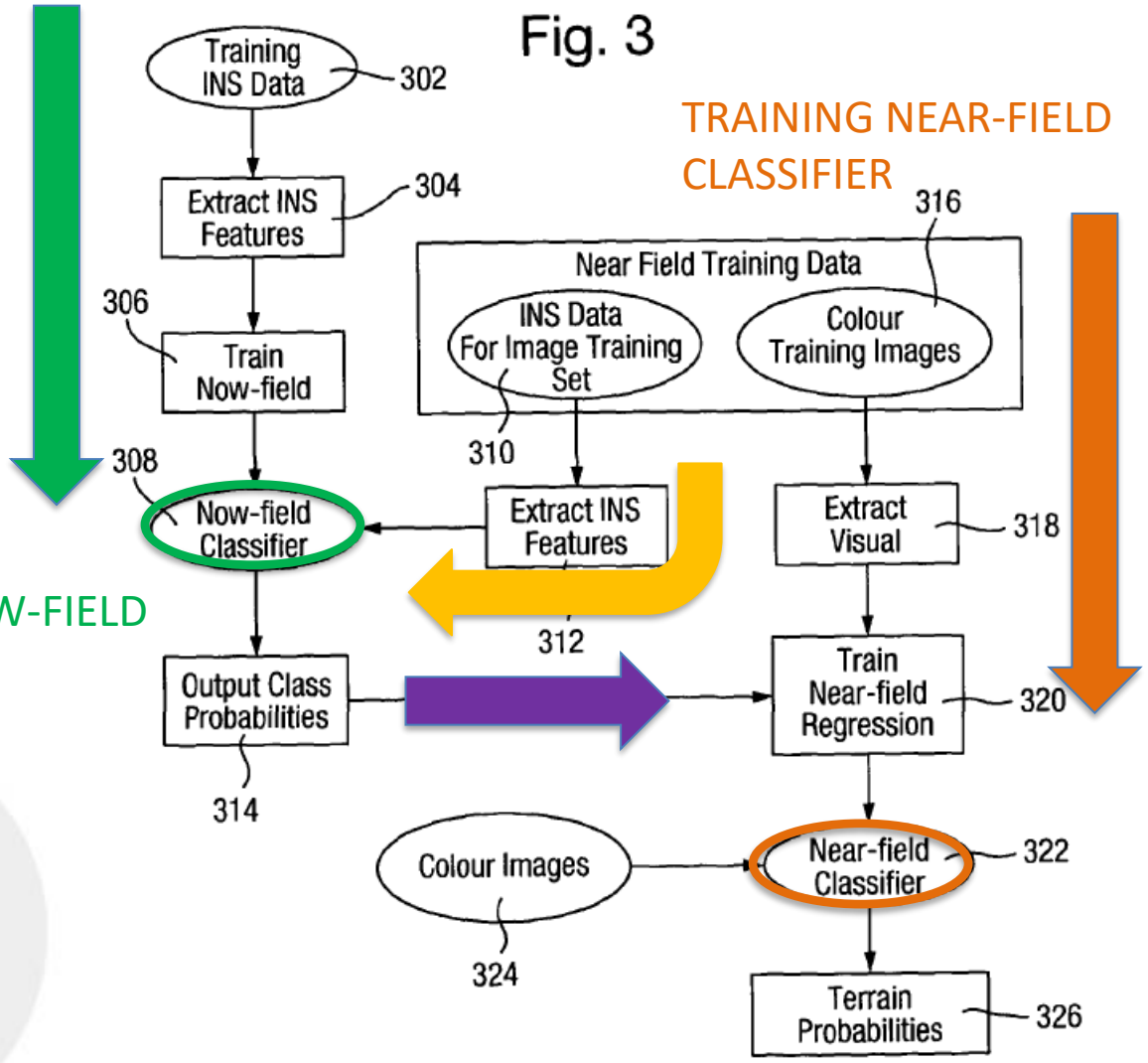


EXAMPLE N. 4 – examining inventive step

A method of assisting vehicle guidance over terrain, the method including:

- training (306) at least ***one first classifier technique*** (308) using ***a first set*** of terrain classifier ***training data*** (304), such that the at least one first classifier technique is trained to output at least one probability value (314) usable to classify terrain;
- using the at least one first trained classifier technique (308) to generate ***a second set*** (312) of terrain classifier ***training data***;
- training (320) ***a second classifier technique*** (322) using the output of the at least one first classifier technique for the second set (312) of terrain classifier training data, and additional data (318) including ***an image-based representation of the terrain*** of the second data set, such that the second classifier technique is trained to output a probability value (326) usable to classify terrain.

EXAMPLE N. 4 – the method



EXAMPLE N. 4 – opinion in Chapter I

- NOT clear (same wording for different features, inconsistencies)
- NOT novel in view of prior art
- **dependent claim 5 considered inventive**

the second classifier technique comprises

a Regression Model technique

EXAMPLE N. 4 – amended claim

A method of assisting vehicle guidance over terrain, the method including:

- training (306) at least ***one first classifier technique*** (308) using ***a first set of*** terrain classifier ***training data*** (304), such that the at least one first classifier technique is trained to output at least one probability value (314) usable to classify terrain;
- obtaining ***a second set*** (312) ***of*** terrain classifier ***training data*** and using the at least one first trained classifier technique (308) to generate ***an output*** ~~second set (312) of terrain classifier training data~~;
- training (320) ***a second classifier technique*** (322) using ~~the~~ said output of the at least one first classifier technique for the second set (312) for the second set of terrain classifier training data, and additional data (318) including an image-based representation of the terrain of the second data set, such that the second classifier technique is trained to output a probability value (326) usable to classify terrain, characterised in that the second classifier technique comprises ***a Regression Model technique*** (320).

EXAMPLE N. 4 – EPO's official action

- NOT clear

➢ technical difference: the second classifier technique comprises ***a regression model technique***

➢ technical effect: linking the results of the 1st classifier with the results of the 2nd classifier

➢ conclusions: regression technique to correlate different experimental datasets is **well-known to the skilled person** and constitutes one of several solutions the skilled person would select in order to establish correlation between datasets.

2nd hurdle NOT PASSED!

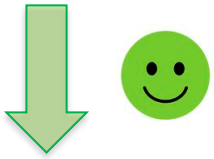
EXAMPLE N. 4 – granted claim

A method of assisting vehicle guidance over terrain, the method including:

- training (306) at least ***one first classifier*** ~~technique~~ (308) using ***a first set of terrain classifier training data*** (304) representative of a Now field of the vehicle, such that the at least one first classifier ~~technique~~ is trained to output at least one probability value (314) usable to classify terrain;
- obtaining ***a second set (312) of terrain classifier training data*** comprising image data (316) captured from a Near field of the vehicle and data (310) indicative of vehicle state characteristics sensed when the vehicle passes over terrain represented in the image data (316) captured from the Near field;
- using the at least one trained first ~~trained~~ classifier ~~technique~~ (308) to generate ***an output*** comprising at least one probability value usable to classify terrain using the data indicative of vehicle state characteristics in the second set of training data; and
- using ***a Regression Model technique*** (320) to associate ~~training (320) a second classifier technique (322) using~~ said output of the at least one trained first classifier ~~technique for~~ using the second set (312) of ~~terrain classifier~~ training data, ~~and~~ with ~~additional data (318) including an image-based representation of the terrain of~~ data derived from the image data in the second ~~data~~ set of training data ~~such that~~ thereby to train ***a second classifier*** ~~technique~~ (322) ~~is trained~~ to output a probability value (326) usable to classify terrain represented in image data captured in a Near field of the vehicle~~, characterised in that the second classifier technique comprises a Regression Model technique (320)~~.

EXAMPLE N. 4 – applicant's arguments

Claim 1 and Claim 14 now include the intermediate step of using a regression model technique to relate features extracted from a training data set that includes image data in a Near field of the vehicle with terrain types recognised by a terrain classifier trained on Now field training data when presented with training data comprising vehicle characteristics sensed when the vehicle passes over the terrain imaged in the Near field image data of the training data set as a basis for training a second terrain classifier. This has the advantage that a much larger training data set may be generated for training the second classifier than is possible with prior art techniques.



2nd hurdle PASSED!

PRACTICAL TIPS (I)

- provide technical context / application
- consider to state a **specific** technical purpose (*vs*. generic purpose)
- provide technical features contributing to the technical solution
- include components of the «black box»
- provide concrete link between ML and real world (*vs*. pure mental act)
- provide basis for arguing technical effects already at filing
- focus on human-machine interaction process (*vs*. fixed scenario)

PRACTICAL TIPS (II)

- in general: draft more claims in the same category
- specifically: draft more method claims (classifying, training, etc.)
- use claim categories in view of the distributed character of the invention

COMPUTER-IMPLEMENTED SIMULATION

EP 1546948A2

- a method of simulating the movement of a pedestrian crowd through a building such as a railway station or stadium
- the simulated movement **may** be used to design the building
- the simulation provides an accurate and realistic model of how real-world crowds move in a building → improves the building design process

THE REFERRAL

- Examining Division: lack of inventive step
- Board of Appeal: a technical effect requires a direct link with physical reality that a simulation method does not have
- Referral to the Enlarged Board of Appeal (**G1/19**)
- Oral Hearing on July 15, 2020 open to public

G1/19: THE QUESTIONS

1) In the assessment of **inventive step**, can the **computer-implemented simulation of a technical system or process** solve a technical problem by producing a technical effect which goes beyond the simulation's implementation on a computer, if the computer-implemented simulation is **claimed as such**?

2) If the answer to the first question is yes, what are the **relevant criteria** for assessing whether a computer-implemented simulation claimed as such solves a technical problem? In particular, is it a sufficient condition that the simulation is based, at least in part, on **technical principles** underlying the simulated system or process?

3) What are the answers to the first and second questions if the computer-implemented simulation **is claimed as part of a design process**, in particular for verifying a design?

G1/19: OUR ANALYSIS

1) Can **simulation methods implemented on a computer** provide a technical effect that goes beyond the basic technical effect produced by the electrical currents circulating inside the computer ?
2) If the Computer-Implemented simulations can be patented, which are the **criteria for the presence of inventive step** (which is the technical effect they shall produce to have inventive step) ?
3) If a Computer-implemented simulation is claimed as part of some larger process (a process for designing a building), to what extent does the simulation contribute to the inventive step? Do we need more on the "design" side or **are the simulation features sufficient for the inventive step** ?

THANK YOU!

Silvia Dondi

silvia.dondi@bugnion.eu

Marco Lissandrini

marco.lissandrini@bugnion.eu

Sandro Sandri

sandro.sandri@bugnion.eu

MORE INFO AT **WWW.BUGNION.EU**

Silvia Dondi

- Electronic Engineering Master degree and Ph.D in Information Technology at the University of Parma
- European and Italian Patent and Design Attorney
- Member of Examination Committee II for the EQE
- Working in Bugnion since 2008 and partner since 2017
- Experience in I.P. prosecution, counseling, opinions and litigation support with main focus in electronic devices, software, automotive, advanced driver-assistance systems, medical devices, food processing machines, elevators

Marco Lissandrini

- Aerospace Engineer, graduated at the Polytechnic University of Milan
- European and Italian Patent, Trademark and Design Attorney
- Managing Partner of Verona Office and Member of the Bugnion's Board of Directors
- 20-years experience in I.P. prosecution, counseling, opinions and litigation support
- Expert in aerospace, mechanical, medical equipment and devices, packaging machines, locking systems, computer software
- Hundreds of patent applications drafted and prosecuted, both before the Italian PTO and the EPO

Sandro Sandri

- Electrical Engineer, graduated at the University of Bologna (1979)
- European and Italian Patent, Trademark and Design Attorney
- 40-years experience in I.P.:
  Former search and substantive Examiner, as well as assistant in the Board of Appeal "Electricity" at the European Patent Office, The Hague and Munich;
  Founder and Managing Partner of Europatent-Euromark Srl, which merged into Bugnion in 2014.
- Expert in electronic, electrical, mechanical and software patents, fluently speaks English, German, French, Dutch and Italian.

Since 1968

12 Italian Offices

Bologna, Florence, Milan, Modena, Parma, Reggio Emilia, Reggio Calabria, Rimini, Rome, Udine, Varese, Verona

4 Additional Offices

Munich (Germany) → EPO
Alicante (Spain) →EUIPO
Republic Of San Marino
Los Angeles (U.S.A.) → *European Work*