

GPAI Intellectual Property (IP) Primer

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Disclaimer

This document does not seek to make any legal assessment on whether, in a given case, intermediate and final products or outputs of Artificial Intelligence (AI) development and utilization qualify for protection under applicable intellectual property or trade secrets laws; whether AI developers holding IP or trade secrets can successfully assert legal protection against unauthorized use of the subject-matter of protection by third parties, or whether AI developers using input from other sources will or will not infringe third party rights or trade secrets.

Whether IP or trade secrets protection exists for specific subject-matter will need to be assessed in the light of the concrete legal requirements of the applicable national law. Moreover, in AI contexts, legal practice is currently challenged by most difficult questions of interpretation and application of statutory provisions drafted prior to the advent of AI. National courts may take years to finally settle these questions, and the legislature may further intervene at any time to adapt existing IP and trade secrets laws to the needs of AI development. Thus, this document must be read against the backdrop of the legal situation existing at the time of its drafting.

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Introduction

This is a simple and practical guide to intellectual property (IP) for AI practitioners. The targeted audience is small and medium-sized enterprises (SMEs) who plan to develop or employ AI technologies, but it is also useful for anyone who is interested in AI. In this document, “AI” is synonymous to an information system that uses machine learning (ML) technologies in some part of the system. An AI system is a machine-based system that is capable of influencing the environment by producing an output (detections, predictions, recommendations, or decisions) for a given set of objectives. It uses machine and/or human-based data and inputs to:

- (i) perceive real and/or virtual environments;
- (ii) abstract these perceptions into models through analysis in an automated manner (e.g., with machine learning), or manually, and
- (iii) use model inference to formulate options for outcomes. AI systems are designed to operate with varying levels of autonomy.

This document consists of five sections. Chapter 1 (*What is Intellectual Property (IP)?*) provides an overview of the concepts of intellectual property. Chapter 2 (*IP Issues in AI*) describes IP issues specific to AI. Chapter 3 (*Difference Between Jurisdictions*) is on legal rules, with a special focus on differences between different jurisdictions. Chapter 4 (*IP Management for SMEs*) has tips for SMEs on how to manage IP. Each section is concluded with a list of useful resources. The readers are encouraged to follow these links to further understand the topics. Finally, the last chapter, Chapter 5, is dedicated to FAQs.

1. What is Intellectual Property (IP)?

Intellectual property (IP) protects various kinds of intangible subject-matter as defined by intellectual protection (IP) law. What is not protected under IP law can be freely used by others. In particular, technical information will only enjoy protection if it constitutes an invention that is protected by a valid patent or if it fulfills the requirements for trade secrets protection.

IP law distinguishes a broad range of intellectual property rights (IPRs) with quite distinct requirements. Trade secrets law complements IP law; it depends on the national jurisdiction whether trade secrets law is understood as part of IP law. This document covers both IP law and trade secrets law.

For SMEs, as for any business, IPRs are important in two different regards: on the one hand, SMEs can actively use the IP system to reap the economic benefits of their innovation activities. Hence, SMEs have to decide whether and how they will use the IP system to protect their intangible assets. On the other hand, in conducting their business, SMEs may equally run the risk of infringing the IPRs of others and thereby become the target of IP infringement actions.

Innovators and creators can rely on IPRs as legal instruments for various purposes, such as to protect their freedom to operate in product and service markets, to prevent others from free-riding on their investment, facilitate co-operation with others or open innovation, or license their rights to monetize the results of their innovative activities.

The various fields of IP law are constantly exposed to technological developments, which in turn continuously produces responses from IP practice and legislation. For example, software development led to changes in patent and copyright law. Similarly, the emergence of AI and related technologies currently challenges the IP system. Many questions relating to the application of existing IP law in the context of AI are fraught with legal uncertainty. In sum, it cannot be assumed that questions concerning IP law that arise in an AI context will have to be answered in the future as they are answered today.



1.1. A brief overview of the various forms of intellectual property rights

We will focus here on the type of intellectual property rights that may be relevant to protect the input to AI-development, AI-related technologies and the results of AI applications. The following text does not specifically address certain forms of IP protection such as trademarks and design rights. However, this does not prevent SMEs from making use of the latter rights. For instance, SMEs can use trademarks to distinguish their goods and services from those of other firms.

1.1.1. Patent law

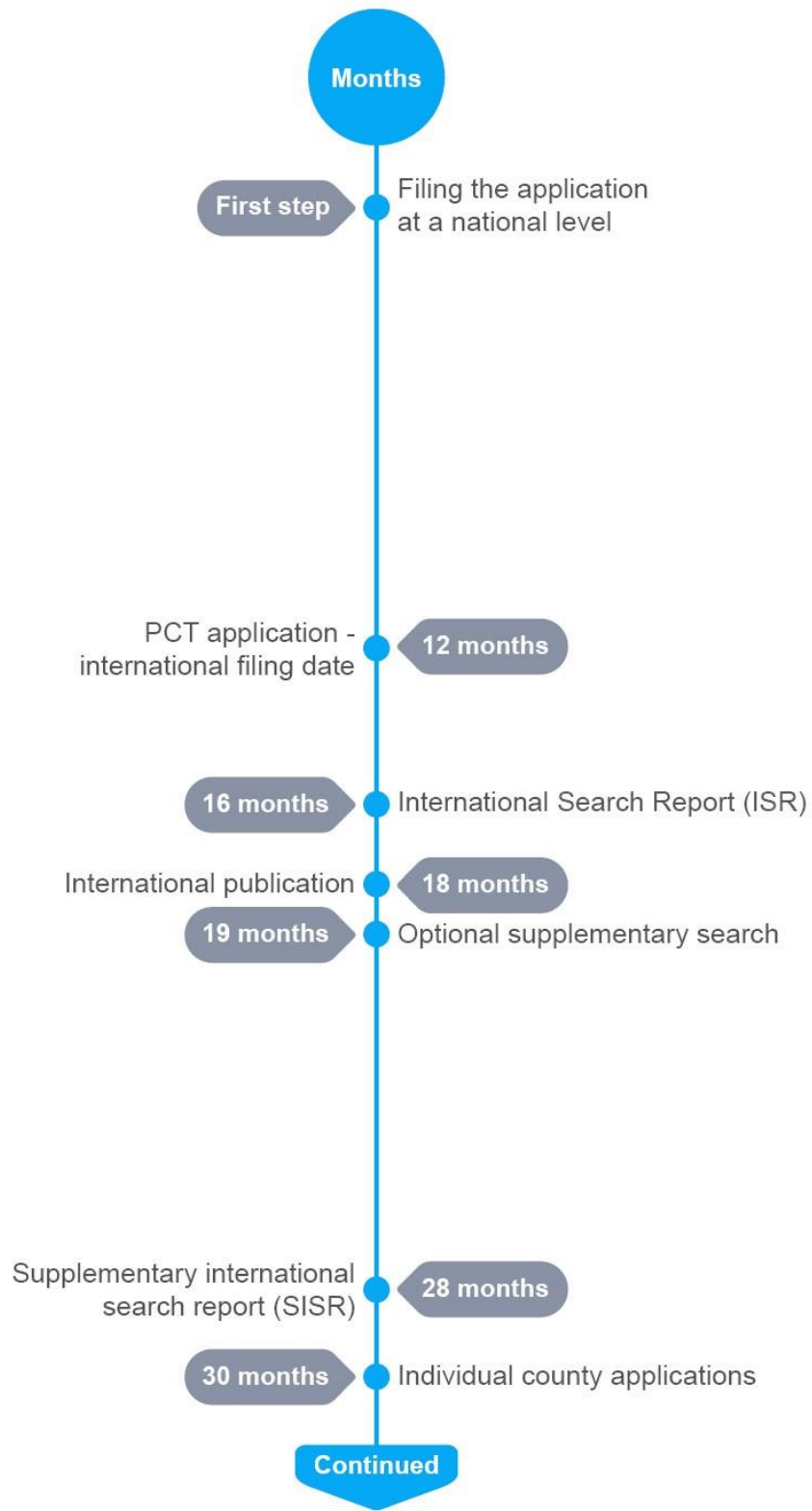
As all IPRs, patents are granted by patent offices for a given national territory. This means that SMEs have to decide for which countries they need protection and then apply for patents in all of these countries. Even where firms act in global markets, they will regularly choose to only seek patent protection for the major national markets. To some extent, international law alleviates the administrative and financial burden for inventors. In Europe, inventors can apply for “European patents” before the European Patent Office. European patents are so-called “bundle patents”. The applicant can choose for which of the 38 Member States of the European Patent Organization it seeks patent protection. For European patents, both the requirements for patentability are harmonized and the examination and grant procedure are centralized before the EPO. But once the European patent is granted, the national prongs of a European patent are protected just as national patents.

Patents are granted for inventions in all fields of technology. As regards the patentability requirements, most jurisdictions require novelty, inventive step and industrial application, while US law requires novelty, non-obviousness and utility. In general, these requirements and their interpretation only differ in nuances among jurisdictions. However, in an AI context, it is most important to note differences as regards the concept of an “invention”. In the AI context, most of the inventions will reside or will be implemented through software and their patentability is subject to different approaches in the world which requires to work with patent attorneys to identify what and how an AI invention can be patented.

Prior to obtaining the 20-year protection from the date of the first filing, the patent application, examination and grant procedure consumes time and financial resources. For illustration, the graph below provides a timeline of this procedure for the so-called “International Patent Application” under the Patent Cooperation Treaty (PCT). The PCT system allows for such application and leads to a centralized search for the state of the art, while the final examination and grant remains the task of the various patent offices.



TIMELINE FOR PATENT APPLICATION



For SMEs that have made an invention it is most important to keep in mind the requirement of novelty. To fulfil this requirement, the inventions must not be part of the state of the art. Novelty can be destroyed by any communication to the public anywhere in the world before the filing of the patent application, be it in form of a written or oral description, the use of the invention or any other form. To safeguard novelty, it is important for any inventor not to disclose its invention to any person who is not bound by a confidentiality agreement.

Hence, patent data are an important source where novelty destroying information can be found. However, it is important to note that any prior communication to the public suffices to destroy novelty. Furthermore, novelty is understood as “international” novelty. Any communication of the invention to the public wherever it takes place, by anybody and in any language will destroy novelty. This also means that even patent offices will often overlook novelty destroying facts. Since the validity of patents can be challenged at any later point in time, patents therefore are of a rather “probabilistic” nature. Even where an applicant has obtained a patent, there remains a considerable risk that at a later stage a court may confirm invalidity of the patent and refuse its enforcement.

Emerging new technologies regularly raise the question of how to apply the patentability requirements to them. This has indeed been the case for computer programs with legislation and jurisprudence getting increasingly stable. However, jurisdictions still disagree on how to answer this question. The same phenomenon is happening now with new emerging technologies, such as AI. What may be considered as important at this stage is to understand that a patent protects a technical solution to a technical problem by technical means. Whether such means rely on computing or a physical device is generally irrelevant. This explains why jurisdictions that exclude computer programs (as such) from the concept of inventions still grant patents for “computer-implemented inventions”.

In some (by far not all) jurisdictions, utility model rights are available to provide a second-tier protection system for inventions in addition or as an option to patents. These rights can be particularly attractive to SMEs since they allow for quicker grant procedures at much lower costs. This is so because the patent office will typically not examine the substantive requirements for protection during the grant procedure, leaving it to a later infringement court to decide this matter. In this regard, utility models come with the considerable disadvantage of being more fragile than patents. Depending on the jurisdiction the substantive requirements for utility models may be exactly the same as for patents, or, especially in emerging and developing economies they are somewhat lower to create incentives for innovation for local developers.

1.1.2. Copyright

Contrary to patents, copyright offers an inexpensive and automatic form of protection of works in the sense of original creations. Hence, copyright protection does not depend the fulfillment of any formality such as registration. With the technical development, copyright protection has been extended from the classical categories of literary and artistic works to new categories of works, such as photographs and films. Nowadays copyright law also provides protection for computer programs. Yet only elements of the program code that fulfil the originality requirements of a work will enjoy protection.

Copyrights laws also protect creative compilations of works, data or other elements provided that the arrangement or the selection of the individual elements fulfil the originality requirement for copyright protection. This is important in the context of the data economy, since also databases as a collection of data can qualify for copyright protection under said requirements, while the individual data are not protected.

In the European Union, and some other jurisdictions that follow the EU model, the law also provides for a sui generis database right under the condition of ‘substantial investment in either the obtaining, verification or presentation of

the contents.’ While this legislation only protects databases as a compilation of data, and therefore does not provide for a right in the individual data, it may still come with the potential of obstructing the use of the individual data by prohibiting the extraction or utilization of a substantial part of the contents of the database.

Some jurisdictions distinguish so-called “related rights” (also “neighboring rights”) from copyright protected works. The EU sui generis database right can be considered as one of those related rights. However, related rights also include the phonogram producer’s right, which does not depend on the copyright protection of the recorded sounds, as well as protection for photographs that do not fulfil the originality requirement. The latter protection applies to photographs that are made by machines, such as satellites, a great number which are used for the purpose of training AI.

The term of protection for works is rather long (70 years post mortem in most jurisdictions), which is not justified by the rather short innovation cycles in the software industry.

1.1.3. Trade Secrets

Trade secrets, including technical know-how, are generally defined as secret information that is commercially valuable because it is secret. In addition, legislation generally requires that the owner of the trade secrets engages in reasonable measures to protect the secrecy of the information. This latter requirement will mandate imposing confidentiality obligations on employees and third parties with whom trade secrets are shared.

The requirements for and the scope and level of protection of trade secrets can differ depending on the jurisdiction, and in some jurisdictions, it may even be exposed to criminal sanctions.¹ With technologies becoming increasingly more complex, we can notice that trade secrets are also becoming increasingly more important, and therefore subject to disputes. Disputes may especially arise when an employee leaves a company to move to a competitor.

1.1.4. Protection of Data

Data as such are not protected by a specific form of legislation for intellectual property. Even sui generis database protection as it exists in the EU in particular does not seek to protect data as such but only the “collection of data”. Certain forms of data, such as pictures or texts, can however be protected by copyright or related rights (see above).

Where no IP nor trade secrets protection is available, *de facto* holders of data, supported by the use of technical protection measures, can still assert *de facto* exclusivity and restrict the use of “their” data by contractual (data licensing) arrangements. It is also important to bear in mind that many data protection laws around the globe protect the privacy interests in personal data, equally resulting in restricting the ability of third parties to use such data.

Both *de facto* data holding and personal data protection need to be distinguished from intellectual property. *De facto* data holding can only lead to contractual restrictions binding the other party of the agreement. It does not provide direct claims against any third party. Personal data protection provides the data subject with considerable exclusionary power, which the data subject can also use for economic purposes. However, personal data is not protected as an asset in the sense of property. What is protected is the privacy interest in the data. This explains why the data subject can only give her consent to the use of the data, but not completely assign her rights. Under some

¹ Star Technologist Who Crossed Google Sentenced to 18 Months in Prison, <https://www.nytimes.com/2020/08/04/technology/levandowski-google-uber-sentencing-trade-secrets.html>.



laws (e.g., EU) the data subject has even a non-waivable right to withdraw consent, which is very different from the grant of permanent IP licenses.

1.2. What are the benefits of intellectual property rights?

In general, intellectual property rights provide those who hold them with exclusive control of the subject-matter of protection. Thereby, IPRs can provide the holder of the right with a competitive advantage in IP-related product markets. For instance, patented inventions can lead to process innovations that lower the costs of production of particular goods. Or they lead to product innovations in form of better or completely new goods and services. In both cases consumers will prefer the products of the right holder to those of competitors, either because they are cheaper or because they offer higher quality or product features not met by the products of competitors.

Original right holders may either engage themselves in the production of goods or the provision of services for which they use their IP rights. Or they can assign or license their rights to others. In particular, licensing allows firms to concentrate their business activity on the development of new technologies, while others (as licensees) will implement these technologies in marketable products.

Licensing can also enhance access. If right holders do not hold enough production capacity, licensing is an easy way to increase output and income for right holders without additional investment. Specific licensing models, while still building on the same IP system, are employed to disseminate technology more broadly. For instance, open source licensing allows licensees to further develop the software and to share the software with others under the same conditions. More specific to AI, there are initiatives fostering more collaboration and data sharing. For example, many algorithms are nowadays available under open source licenses, as well as some licenses for open data collaboration.²

Patent holders may also commit to offering their patents for free, but with certain expectations that licensees will do the same as regards their follow-on innovations.² Standard development organizations (SDOs) whose mission it is to enable industry-based development of technology standards, such as for mobile telecommunications, require the contributors to the standard to license their standard essential patents on fair, reasonable and non-discriminatory (FRAND) terms. This is to guarantee quick dissemination and implementation of the standard in the industry in the interest of all technology providers, implementers and the public.

IPRs are private rights. This means that it is for the right holders to enforce their rights before the courts against alleged infringers. The most important remedies that IP law provides for are injunctions and damage claims. Injunctions prevent others from continuing to infringe the relevant IPR. For past infringements, the right holder can also claim financial compensation for the damage incurred.

However, the use of the right is not without boundaries. IP laws typically include a set of exceptions and limitations which typically pursue the objective to strike a fair balance between the economic interests of the right holder and the interests of user and the public. In addition, there are also external limitations. In particular, right holders may only use their rights within the boundaries of competition (antitrust) law.

² Venturebeat, Linux Foundation unveils new permissive license for open data collaboration (June 23, 2021) available at <<https://venturebeat.com/2021/06/23/linux-foundation-unveils-new-permissive-license-for-open-data-collaboration>> (accessed October 10, 2022).



1.3. The public interest in intellectual property

While intellectual property law provides for private rights, the legislature pursues public interest goals in adopting and designing the IP laws. In general, IPRs aim at enhancing innovation and creativity with a view to improving the well-being of society at large.

Hence, intellectual property can be described as private property serving a public interest. This is not a contradiction in itself. Quite to the contrary, the legislature uses the private economic interest of the right holder to enhance innovation without public funding. This makes IP law the central legal tool for creating incentives for innovation and creativity of private businesses in the market economy. The public interest dimension of IP law also explains that the IP laws should in principle not be designed in a way that would not allow right holders to use their rights contrary to the public interest.

This requires the legislature, IP offices and courts to develop, apply and interpret IP law in a manner to optimize the innovation output against the backdrop of rapidly evolving technologies. Thereby, they have to strike an adequate balance between exclusivity and access. On the one hand, the law has to provide strong remedies where they are needed to maintain the individual firm's incentives to innovate. On the other hand, it also has to provide the legal framework to enable collaboration where sharing of knowledge is superior to restrictive approaches to innovation. Accordingly, IP law constitutes the background legislation for many forms of collaboration, including standardization or open source licensing, which promote access of others to the use of IP.

As regards artificial intelligence, firms in their daily practice have to understand whether and how IP law protects the input to AI development as well as AI tools and the output of AI applications. In this regard, depending on the jurisdiction the law remains to a large extent unsettled and is very much in flux. In other words, the law still has to adjust to find the right innovation balance, but to a large extent still leaves many actors, including SMEs in particular, in a situation of legal uncertainty.

1.4. Resources

As this document cannot fully inform SMEs on intellectual property, the following resources are listed to provide more hands-on information.

- WIPO e-Learning center: <https://welc.wipo.int/>
- European IPR helpdesk: https://intellectual-property-helpdesk.ec.europa.eu/regional-helpdesks/european-ip-helpdesk_en

2. IP Issues in AI

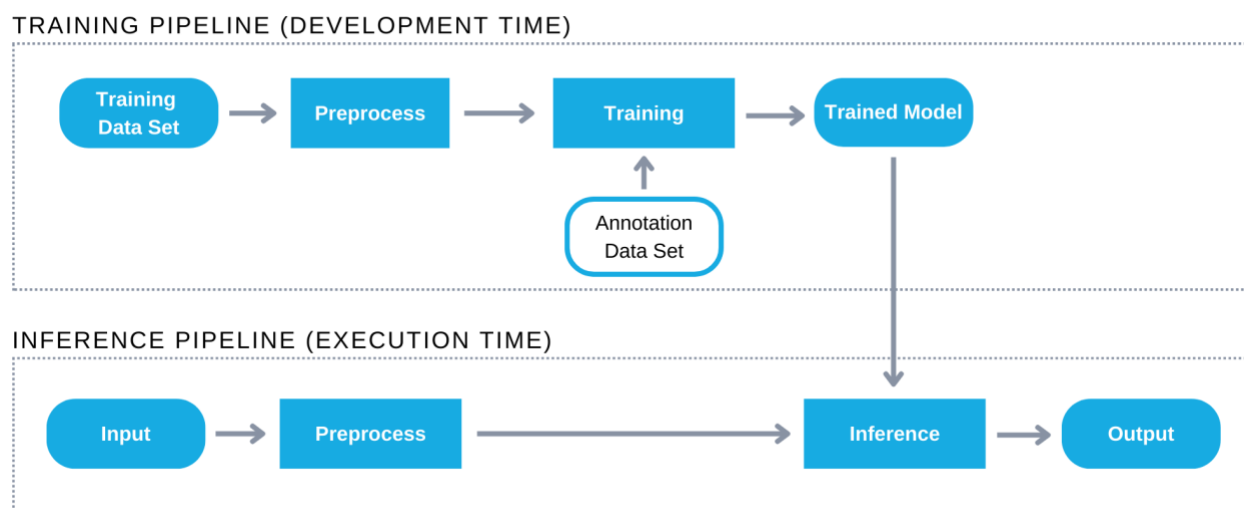
A correct understanding of how an AI system works is the precondition for identifying how IP laws apply in an AI context.



2.1. How does AI work?

At a very high level, an AI system will consist of using data (annotated or not) with tools (i.e., pipelines, algorithms) to develop a trained model.

The development of an AI system, or an ML system, is divided in two main phases. The first phase is the training phase where the algorithm is provided with training data (**Training Data Set**) to learn from. During the training process, the training algorithm finds patterns between the input data with its labels and the wanted output data. This results in a **Trained Model**, the parameters and the predictions algorithm (a mechanism fed on past data to predict future information). Then the parameters of the trained model are frozen, thus becoming the **Inference Model**. The second phase consists of providing new inputs to obtain predictions, which is the output.



2.2. A closer look at AI work products

An AI system should be seen as a composition of different parts, not as a whole and unique system. Each of these parts can individually be considered in this analysis. From an IP point of view, the following work products can to be considered for protection under existing and future laws:

- **Training dataset:** As the initial element of the training, the performance of an AI system depends heavily on the size and the quality of the training dataset and its annotations. Building such a dataset requires many processes such as collecting/recording, cleaning, filtering, labeling, and/or aggregating by data scientists. Most of them will be annotated. For example, pictures of animals tagged with the name of the animal. Such dataset can be built by an individual or a company collecting its own data (for example, operating data of its factories) or can be licensed. Protecting such dataset with IPR could create an incentive to create high-quality datasets. Indeed, as highlighted in a 2020 Gartner report³, poor data quality can cost up to \$12.8 million USD per year.

³ Magic Quadrant for Data Quality Solutions, 2020.

- **Unique training data item:** From the dataset as such, one has to distinguish the unique training data item, such as a picture which can be labelled or not. Unique data item is often acquired from other sources. Depending on the unique data item, it can be IP protected or not. Where data is acquired, that third parties may hold IP rights in the data.
- **Trained model:** The training process is very computationally expensive. As an example, the cloud computing cost for training AlphaGo is estimated to be \$35m USD.⁴ In addition, the trained model can be endlessly retrained with new datasets, hence it can be reused in various ways.
- **Software code:** The software, as the orchestra conductor, enables the whole system to function by implementing the pipelines and all the phases to develop the AI.
- **Output:** The output is what will come out of the inference pipeline. For example, if an AI system is trained to identify animals over some pictures, the output will be the identification of the animals on a new set of pictures. This information as enriched data may have increased value. In some cases, the use of AI can even go further, as it may generate new creations. For example, some AI-assisted tools may help to create new music (for example, applying the rhythm of Beethoven's 5th symphony to a recent song). AI can also be used in the context of generating inventions.

An AI System, as defined in the OECD's Recommendation on AI is a "machine-base system that can, for a given set of human-defined objectives make predictions, recommendations, or decisions influencing real or virtual environments. AI systems are designed to operate with varying levels of autonomy."⁵ In short, this identifies an AI system as an intelligent agent (a logic and operational model with enablers). Additional elements as so-called data lakes, data traceability, production and maintenance are not elements of an AI System but parts of an external environment of AI Systems in the live cycle of it, partly in the process of developing, usage and utilization. One also has to distinguish the computing power which derives from the fiscal component and enabler of AI System.

2.3. The challenges of AI in IP

As is the case with any new technology, AI raises new questions and challenges that are currently addressed by legislatures, IP offices, courts and practitioners around the world.

Input to AI development

AI developers often rely on input that they acquire from others. This may include (training) datasets or pre-trained models. Individual training data can be protected by copyright, such as certain writings, photographs, audiovisual works. Sound recordings may benefit of the so-called phonogram producer's right. Even where photographs or films are not protected as original works of authorship (such as pictures made by satellites), some jurisdictions may provide protection under a related right. Datasets, even where they contain data that are not individually protected, can constitute copyright protected databases or benefit from sui generis database protection (the latter in the EU and some other countries following the EU model). Whether models can be copyright-protected as computer programs may still be considered an open question. In any instance, whether protection exists has to be assessed on an individual basis. Where third parties provide access to such protected data, there may be a risk that the data provider does not hold all rights. In such instance, the data-sharing contract with the provider should address this risk.

⁴ <https://deepmind.com/research/case-studies/alphago-the-story-so-far>

⁵ OECD, Recommendation of the Council on Artificial Intelligence (OECD/Legal/0449, adopted May 20, 2019).



It should also be noted that data holders who share data often ‘claim ownership’ in their data in the data-sharing agreement. This alone does however not suffice to amount to any intellectual property right that can be relied upon against persons who are not parties to the agreement. Still this practice shows that de facto data holding suffices to exclude others from access to data, and such data holders may use contract terms in data-sharing agreements to restrict the use of the data by the data recipient. Whether in some instances data holders could claim additional protection under trade secrets law, is a matter to be assessed in the individual case. In addition, the case law on how to assess trade secrets law in such a context still needs to develop.

As regards AI input, the question is not only whether the input is protected by IP law or trade secrets law. Another question is whether the use of such input, in particular training data, will amount to the use of the underlying IP right. Some jurisdictions, such as the EU, have by now explicitly addressed the question of whether and when text and data mining, such as in form of web scraping, is covered by copyright protection or should fall under a copyright exception. However, the exception only becomes relevant where the text and data mining involves a “reproduction” of copyright protected material.

Patenting AI

Patent applications in AI have drastically increased in recent years. The WIPO registered 12,473 AI patent applications in 2011. At the end of 2017, 55,660 AI patent applications were filed.⁶ However, filing does not mean that the patent will be granted if it does not meet the patentability criteria. The key problem lies in the different practices and approaches of patent offices, as some are still very reluctant to grant a patent on AI.

In general, AI-related inventions will be considered as computer-implemented inventions under specific conditions (and depending on jurisdiction) to benefit from patent protection. For example, an AI system purely based on computational models and mathematical algorithms is not likely to be patentable, but an AI application that solves a specific technical problem especially as part of a device may be patentable (for example, the use of a neural network in a heart-monitoring apparatus for the purpose of identifying irregular heartbeats makes a technical contribution). Another object of patents can be the specific technical invention to make AI systems work more efficiently (for example, a specific technical implementation of neural networks by means of graphics processing units (GPUs)).⁷ As regards these AI-implemented inventions an open question is how to fulfil the disclosure requirement of patent law.

In addition, there are a number of strategy points to consider, even where a patentable AI-related invention exists. One consideration is the longevity of the invention’s value. Given that it will take a number of years for a patent to issue, if the value of your invention will wane in a few years, it may be advisable to have that invention remain a trade secret. Another consideration is whether infringement of the resulting patent would be detectable. If not, trade secret may again be the better option. Given that many AI inventions are comprised of open source algorithms trained on certain data sets, disclosing the invention with no way to enforce it simply provides your competitors a roadmap to your technology. Obtaining a patent is a lengthy and complex process, and requires the assistance of a patent attorney. Once the patent has issued, it will incur maintenance fees as time progresses. All of these considerations should be assessed before obtaining patent protection for any invention.

Moreover, it is important to distinguish AI-assisted inventions from AI-implemented inventions. In the former case, AI is only used for the purpose of inventing, while the invention as such does not include any AI element. In such case, the patent examiner assessing the patentability in a patent office, without specific notice, will not even know that AI was used in the process of inventing. In this regard, additional unresolved questions arise, in particular as

⁶ WIPO, WIPO Technology Trends 2019: Artificial Intelligence (2020).

⁷ EPO, Artificial Intelligence (May 2, 2022) available at <<https://www.epo.org/news-events/in-focus/ict/artificial-intelligence.html>> (accessed 2 October 2022).



regards the assessment of the inventive step (non-obviousness) requirement. Here, more concretely, it is to be asked whether the traditional benchmark of the “person ordinarily skilled in the art” as a human being can still apply.

Inference model

Being composed of parameters and weights, the nature of the inference model is quite complicated to assess. It is still unsure whether such model as a so far unknown potential object of protection falls within the scope of copyright protection, the database *sui generis* right or whether it could even constitute a patentable invention. It could more likely qualify as a trade secret, provided that the conditions are met. Also, as AI systems can be reverse engineered and so the inference model, this needs to be anticipated in the IP protection strategy an AI developer will define.

Patentability of the trained model/inference model

Before the inference phase, the model is frozen in order to stop it from training indefinitely. But if the algorithm is perpetually training, the question will be how to protect an endlessly changing model? To illustrate this issue, if a patent is filed for an AI invention, is the inference model covered by this patent? If yes, what if the model is retrained but no specific changes have been made to the global AI system?

Protection of the output

The issue of granting IP rights for the output of AI has already been intensively debated for quite some time. There is both a debate as to whether AI can be considered an autonomous creator of copyright-protected works or whether AI can also be considered an inventor. The first case is more realistic since in some instances, such as for translations, AI systems can act absolutely in lieu of a human being. In addition, apart from the selection of the text to be translated, no human being is involved. Most copyright systems, linking the originality requirement with human creativity would however reject copyright protection and not consider such AI output as a copyrightable “work”. For instance, EU copyright law requires a “free creative choices” made by a human being. In practical terms, it should also be considered that the exclusion of AI-generated creations can easily be circumvented by making creative adaptations to the results of the AI application.

More recently, practice around the globe was confronted with the attempt to get the AI system called DABUS designated as the inventor in the context of a number of patent filings in different jurisdictions. In a first round, the idea has found some support, namely, by the South African Patent Office and the Federal Court of Australia. By now, however, it has become clear that Dr Thaler, the developer of DABUS, has lost his battle. Other patent offices and courts throughout the world, including those of the EU, the UK and the US as well as finally the Full Federal Court of Australia, vacating the Federal Court’s judgment, have confirmed that only humans can be considered inventors.⁸ Indeed it is important to keep in mind that AI can never act completely autonomously in the context of inventing. Quite to the contrary, developing AI for the purpose of inventing requires a lot of human input in arranging and preparing the data as well as training the AI system. And finally, human beings make a conscious decision to apply AI as a tool to make the invention. It should be noted that, in the DABUS case, the dispute was not on whether there was an invention fulfilling the patentability requirements, which after all remains the more important question.

2.4. Resources

- ITIF’s response to USPTO RFC (<https://itif.org/publications/2020/01/10/comments-us-patent-and-trademarkoffice-impact-artificial-intelligence>)

⁸ Yet Dr Thaler’s appeal to the High Court of Australia was still pending in October 2022.



- Artificial Intelligence and Intellectual Property Law Position Statement of the Max Planck Institute for Innovation and Competition of 9 April 2021 on the Current Debate:
https://www.ip.mpg.de/fileadmin/ipmpg/content/stellungnahmen/MPI_PositionPaper_SSRN_21-10.pdf •
<http://startup-together.com/startup-together-com-contributions/20190709-protecting-ai-related-innovation/>

3. Difference Between Jurisdictions

3.1. Outline of different jurisdictions

We believe that it would be valuable to share information on each country's legal practices in an AI context in order to enhance innovation and commercialization of AI and to efficiently promote contract practices regarding IP. This could help minimize the risk of infringing third-party IPRs in the process of developing and providing AI solutions as well as to raise the awareness and capability of firms to protection the results of AI development.

Although the IP statutes of the various jurisdictions are to some degree harmonized, partially as a result of international law obligations, it still depends on the courts in each state whether certain information is qualified as a copyrighted work or whether certain technical information fulfils the requirements of a patentable invention.⁹

Moreover, international law and even national legislation still fail to address most recent IP issues arising in an AI context, such as access to information, data, libraries of algorithms or the IP protection of elements of the AI architecture and the output of AI application. A partial solution could be found in contract law. However, also there, the law and practice still need to evolve, and international initiatives for globally applicable licensing models such as open source and creative commons licensing are tailor-made for software and copyright-protected works, respectively, and do not seem to be a perfect fit for the licensing of training data and AI models.

The threshold of whether some specific information can be protected as a trade secret, as well as the scope of protection, may also vary among jurisdictions. Even where the statutory law appears to be the same, courts of different jurisdictions may interpret these requirements quite differently. This may especially be the case for trade secrets law where the requirements leave a lot of scope for interpretation.

Since full international harmonization of IP law at this time is unrealistic, it is better to facilitate AI business by proposing guidelines for contracts relating to the licensing of data for the purpose of AI development, on the one hand, and to minimize the risk of IP infringement, on the other hand.

In the following the documents compares practices of IP law among different states, and looks at the guidelines about data contracts regarding AI in each country (if they exist).

- **Patent law:** Generally speaking, a patent is an exclusive right granted by a public authority for any invention that is new, involves an inventive step and is capable of industrial application.¹⁰ Patent laws provide for explicit

⁹ The most comprehensive multilateral IP agreement is the WTO/TRIPS Agreement which interact with the agreements of the World Intellectual Property Organization (WIPO). See WIPO, Implications of the TRIPS Agreement on Treaties Administered by WIPO (1996) available at <www.wipo.int/edocs/pubdocs/en/wipo_pub_464.pdf> (accessed October 2, 2022).

¹⁰ These are the requirements most frequently used in national legislation and the WTO/TRIPS Agreement. The latter explicitly states that the criteria of "non-obviousness" and "utility", which are used in the US in particular, should be deemed synonymous with "inventive step" and "capability of industrial application".



exceptions which may include the law of nature, natural phenomena, discoveries, abstract ideas, scientific theories, mathematical methods, aesthetic creations and presentation of information, as well as rules and methods for performing a mental act, playing games or doing business. In the AI context, differences relating to the requirements under which a computer program can be considered a patentable invention (Europe vs. US, Canada and Japan) are most important. On the one hand, European countries (following the approach of the European Patent Convention) only grant patents where the AI system under specific conditions (computer-implemented inventions), while the US, Canada and Japan also allows for the patenting of the mere software of AI systems. Here, jurisdictions compete for the better approach. But such fragmentation also creates the risk of infringement if business is extended to another country where the law is more open to AI patenting.

- **Copyright:** Copyright law provides for exclusive rights to original creations without the need of fulfilling formalities. Copyright law was first created for protecting literary and artistic works, but it nowadays also protects computer programs. National jurisdictions may differ as regards the concept of originality. For instance, in the US a modicum of human creativity is required, while EU copyright law requires that the author has made creative choices. This also applies to computer programs. For this reason, where only parts of a copyrighted work are copied or used, there will only be an infringement if the copied element themselves fulfil the requirements of creativity. Conversely, objects developed at preliminary stages of the program development (e.g., preparatory materials, projects of logic and model, source-code, object-code or user manuals) will be protected, provided that they fulfil the requirement for originality. Beyond copyright, some jurisdictions also recognize so-called related (or neighboring) rights for non-creative subject-matter. For the AI context, the availability of related rights protection of non-original photographs, films or mere sound-recordings is most relevant. Moreover, EU law and a number of some countries following the EU approach do not only protect databases that fulfil the originality requirements as regards the arrangement or the selection of the elements, but also other databases, provided that they are based on substantial investment (so-called *sui generis* database rights). Some jurisdiction provides for more or less limited exceptions for TDM (text and data mining). In the EU, for instance, the TDM exception generally allows research organizations and cultural heritage institutions to apply TDM for the purpose of scientific research, while the law vests right holders with the power to opt-out from the exemption to retain their exclusive rights as regards TDM by private entities. Copyright law allows for multiple forms of licensing, including the copyleft model, open access licensing of software and creative commons licensing of other categories of works. Such latter forms of licensing usually do not extend to commercial usage, except for when the rules are respected and proper compensation is guaranteed.
- **Trade secrets:** Despite the fragmentation of a common understanding of the scope of the concept of “trade secret”, it is seen and protected by many jurisdictions as an object of unfair competition law. This has an international law basis in TRIPS Agreement. There are three requirements of information to be considered a trade secret: (a) it has to be secret; (b) it needs to have commercial value because of being secret; and (c) the holder of the secret has made reasonable steps to keep it secret. All three elements create considerable scope for legal interpretation by national courts. Moreover, the TRIPS does not fully harmonize the conditions for an infringement of trade secrets in the sense of a „use of trade secrets contrary to honest commercial practices“. Given the obvious legal uncertainties surrounding the trade secrets concept, a particularity of the system is that whether somebody can claim trade secrets protection will typically only be established when courts decide in infringement proceedings. However, in whatever manner a court will later decide a case, if a data recipient agrees to a confidentiality obligation, as a reasonable step to keep the information secret, the data recipient will always be bound by contract law. Confidentiality obligations are indeed part of the licensing and sharing of trade secrets and a most important measure to secure protection. The kinds of information can vary enormously. It could include a production method, a sales method, customer relationships or any other technical or operational information useful for business activities. From a data perspective, the object of trade secret is usually data that is generated by the trade secrets holder. However, no jurisdiction explicitly addresses whether for instance external data captured by the sensors of a device from some public space or the personal environment of the user of such device could qualify as trade secrets. However, nothing argues against considering AI models or

entire AI systems as potential trade secrets, the use of which can also be licensed to others if the secrecy is secured by way of confidentiality obligations.

- **Data:** Raw data as such does not qualify as an object of IP protection. Personal data, as data that identifies a person or makes a person identifiable, is protected by data protection rules (e.g., the General Data Protection Regulation in the EU). However, data protection law protects the privacy interest of the data subjects and, therefore, although data subjects may also use their data protection rights for economic purposes, needs to be distinguished from IPRs as property rights. To qualify for copyright protection or related rights protection raw data need to fulfil additional requirements (see above). Furthermore, the information contained in raw data could be protected by trade secrets. Some countries ensure free flow of personal and non-personal data across borders under mutually recognized rules established by regional law, free trade agreements or specific data-related agreements. By now, it is generally agreed that the sharing of data will generally increase innovation in the interest of society and in the light multiple public interest goals. Therefore, legal frameworks, especially for licensing, that enhance voluntary data sharing should be promoted. Where data holders refuse to share data with the objective to control markets (especially aftermarket), legislatures have started to legislate on new data access and use rights to make data more broadly accessible (e.g. the IoT data access and use right of the European Commission's Data Act Proposal).
- **Trademark and design protection:** AI systems can also be protected by trademarks, which refers specifically to the name of AI systems used in markets. The design of the interface between the AI system and user could also qualify for design protection (or even, and in parallel to, copyright protection). Trademarks and design protection typically depend on registration by the national or supranational IP trademark and design offices. EU law also recognizes protection of unregistered designs for a period of three years.

3.2. Differences by jurisdictions (the European Union, the United States, Canada, and Japan)

In this section, we share basic information of several jurisdictions, notably the European Union (EU), the United States (US), Canada, and Japan. We believe that an introduction to these jurisdictions will be able to help understand the basic characteristics of IP law and regulations in different jurisdictions of the US, Europe and Asia.

Tables 1 to 5 in the Annex summarize statutes related to IP in each country and gives some examples.

3.3. Resources

- WIPO site URL: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1055.pdf

4. IP Management for SMEs

After introducing the different types of intellectual property rights and how they apply IP law to AI, we would like to provide guidance for better understanding how intellectual property rights can help businesses as well as for defining and executing IP strategies. Obviously, this document only describes some of the fundamental aspects and can never replace a thorough analysis to develop a tailor-made IP strategy for individual firms and their specific business model.



4.1. Understand your business

First, you should understand your business. The goal of this step is to analyze your business and identify the key assets that contribute to the success to your business and how intellectual property rights can help you to achieve your business objectives.

What is your business model? Who are your customers? What values do you provide to them? Who are the ones you need to partner with? Who are your competitors? What differentiates your business from them? What are the internal key assets that contribute to the valuation of your company? What do your human resources, customer base, unique technologies and specific business model contribute to your commercial success? Also, what are the third-party assets you are depending upon?

If your key assets include unique technologies and/or business models, answer the following questions:

- Is your technology/business model simple and clear enough that your competitor can easily replicate? Or, does it consist of a complex set of knowledge that is hard to document and transfer?
- Is the speed of penetrating the market or lead time the essential driver of your success? And therefore, would a more open approach to sharing your technology enhance your commercial success?
- What is the patent landscape in your field of operation?
- Is your business dependent on third-party assets protected by IPRs?

For example, if you are developing a new AI technology to help some companies implement predictive maintenance, you may want to consider various options depending on your business context:

- If your technology is not accessible to your customers (e.g., it will be hosted on your server excluding third-party access), will it make sense to file a patent application all the details with the risk to explain to your competitors what your technology is about? As an option you may consider patent only some aspects of the technology, while keeping the other aspects secret, which may exclude others from being able to implement the patented technology.
- If the success of your company depends on the quality of the AI that you provide to your customers, for which fostering access and sharing of data is crucial, and if your early entry and speed of innovation will be sufficient to effectively compete in the market, it will make more sense to distribute your technology under an open source license, which may also motivate others to share their data?

4.2. Setting your IP strategy

Having now a clear picture of your key assets, your business environment and your business goals, the question is now how intellectual property rights can help you. For this, we provide some specific considerations around AI under the following conditions:

- The availability of certain IPRs is not certain, and more than that, it is not clear whether you will be able to enforce potential IPRs; and
- The need to access certain datasets create additional constraints.

Identify the value of your business

Part of the process of formulating your strategy is to identify the value of your business. What is it about your offering that makes it special, different and desirable to your (potential) customers? Those attributes are not only where you should invest your efforts, they are also the aspects of your business you will want to protect with one or more forms of intellectual property, if available.



Create your own IPRs

Generally, in most jurisdictions, a company will IPRs in the assets created by its own employees. Depending on the jurisdiction, some specific provisions may be required in the employment contracts to secure such rights.

Partnering with a third party may be also a very good source of intellectual property; this can be with customers, suppliers, universities, or others, but it will require to set up the appropriate agreements including provisions to deal with the ownership and the exploitation of the intellectual property created. Such research and development (R&D) agreements must respect the applicable competition laws.

Finally, intellectual property rights can be acquired, too if you need specific rights that you do not already possess. Sometimes companies acquire patents or families of patents even if they are not practicing or planning to practice those patents. Instead, they may wish to create a defensive portfolio, so that they have leverage in the event they are sued by a practicing patent holder. A defensive portfolio, however, is of little value against the non-practicing entity.

Protect your IPR

As highlighted in Chapter 1, and taking into account Chapters 2 and 3 on AI-related technologies and jurisdictional differences, different IPRs may be available to protect your assets. It is important to keep in mind that protecting an asset does not necessarily mean that one will have a proprietary strategy and enforce it strictly. We will explain in more details different strategies available to create value based on IPRs later on.

Access third-party IPRs

You may need to access certain IPRs owned by a third parties and this may cover different types of situations:

- You need to access certain technologies or assets. To achieve this, you may be able to decide between purchasing the rights in the technology or assets or taking a license. You may also be able to choose between different licensing models.
- It is more difficult to assess the risk of infringing third-party rights, especially patents, when you develop your own goods or services. Since AI-related patents grew by an average of 28 percent annually between 2012 and 2017, reaching a number exceeding 50,000 patent families in 2017,¹¹ it is clear that it has become practically impossible to monitor the patent landscape comprehensively before making investment decisions concerning your own products.

As a startup, your investors may request a study on your freedom to act. Therefore, it makes sense for you to generally get sufficient general knowledge of the relevant patent landscape for assessing your risks¹² and to consider some of the following mitigation actions:

- Securing access to relevant third-party patents through a license, whether individually or through some form of partnership or joint-venture, or even through acquisition.
- Adopting a defensive strategy with the goal of creating a cross-licensing situation. This will mean developing a patent portfolio you can leverage for defensive purposes and to secure cross-licenses with companies owning patents you may infringe yourself.
- Accessing the technology through the patent holder or under its protection: For example, many cloud service providers will offer AI functions such as image or voice recognition, and using such functionalities will give you

¹¹ https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1055.pdf

¹² Please note that this is not common practice in US and for heavily patented technologies as it may be impossible to understand the relevant patent landscape, and knowledge of certain patents may expose you to future claim of willful infringement.



access to all their patents related to them, or the patents for which they secured access to (generally they offer some form of IP indemnity should you be accused of infringing third-party patents). The same form of protection exists when you buy certain hardware as well.

- Leveraging open source implementation of certain technologies: In general, some open source licenses will include a patent license that will offer to any user some protection under the patents filed by the contributors/implementers of such open source. Moreover, the open source community is likely to react strongly against any IP infringement assertion contrary to the open source standard.
- Securing a license from certain patent pools: primarily for audio and video technologies such as MPEG4, some patent holders agree to offer all their patents under a one-stop-shop offering. This may help having access to most, if not all, of the patents related to a specific technology.

Accessing Data for AI

Access to data is certainly a central and complex question around AI and we invite to read through the work done by the GPAI Data Governance Working Group¹³ and especially their framework paper.¹⁴

Please note here that we are not touching on privacy considerations, which will be subject to very specific regulations.

In practical terms and considering the situation today, how can you secure access to the data that you need?

- If you are working with one of your customers, they may authorize you to access their data. Such access is likely to be limited to the work you are doing and if you are planning to re-use such data or the trained model developed using its data, you should seek secure the right to do so in your agreement with your customers.
- Certain datasets are available as a commercial service and, therefore, access will depend on the commercial terms as fixed by the data holder (some of the data may be individually copyright-protected and the entire dataset may constitute a copyright-protected or a sui generis protected database).
- Certain datasets are widely and openly available and can be used freely, but you should still read the terms of the license. For example, *Waymo* is making available data relating to autonomous driving under various specific terms and limited terms prohibiting any commercial use, and, hence, using such datasets to develop a trained model for one of your customers or to offer some services is explicitly prohibited.¹⁵
- Use open source datasets especially if they allow use under a license of Creative Commons with their open data initiative.¹⁶ The Linux Foundation is also hosting an initiative for licensing datasets. Also, in these cases, what is essential is to understand the terms and conditions of the licensing agreement.
- Certain jurisdictions are offering certain exceptions to use copyrighted materials for machine learning, especially for the purpose of text and data mining (see Chapter 3 above about text and data mining exceptions).

Accessing trained models for reuse

More AI systems are using pre-trained models. Instead of training a model from scratch, you will use a **model already trained by somebody else based on various data that are not available to you**. Then, through various techniques and especially transfer learning, you will be able to use this trained model slightly **modified to address your needs**. The exact legal or commercial conditions under which such trained models can be used, some of them being under some proprietary license, some others being under open source license, can differ. For example, *YOLO* is a pre-trained

¹³ <https://gpai.ai/projects/data-governance/>

¹⁴ <https://gpai.ai/projects/data-governance/gpai-data-governance-work-framework-paper.pdf>

¹⁵ <https://waymo.com/open/terms>

¹⁶ <https://creativecommons.org/about/program-areas/open-data/>



model for object recognition, and it is generally available under MIT license¹⁷, i.e. a very permissive license that allows any company to use it, including for commercial purposes. The *GPT-3*¹⁸, a trained model for NLP (Natural Language Processing), will be accessible through a commercial license with financial conditions attached, but you may also consider open source alternatives to GPT-3.¹⁹ What is important to keep in mind is that any trained model and the associated datasets will have specific licenses that need to be reviewed to ensure that they can be used according to your needs and objectives.

Create value with your IP

Having intellectual property rights is a first step, but then will come the question of how to use such IPR to achieve your business goals. In this regard you may choose from various approaches. It is therefore difficult to summarize these, as these approaches differ for different IPRs. They also depend on the individual components of your technologies.

For example, you may consider filing patents on your key technologies and more widely protecting your business defensively so that you can secure a cross-license if needed. This will help you to secure funding from investors.

This will not preclude you from making some of your technologies accessible through an open source model to facilitate its adoption, or a dual licensing model so that customers can choose between an open source license or a proprietary license, or to reserve the open source model to some enablers (such as certain ML algorithms).

4.3. Execute

4.3.1. Create the team

You should build the organizational capability for managing IP. At first when the company is small, an officer, such as a CTO, can take over all the IP-related management tasks. Later, after the company grows larger, you may need to establish a department dedicated to IP.

You may also need an outside counsel to assist you, especially in form of a qualified and registered patent attorney. In any country, professional associations of lawyers or patent attorneys will have lists of their members available.

4.3.2. Optimize IP-related costs

Managing IP is costly. You should always be conscious of the balance between the IP-related costs and its benefit in your business context.

Patent filling cost

Typically, to procure and maintain one patent costs \$30,000 USD or €100,000 (in case you file the patent in three EU countries and the US) for its lifetime of 20 years.²⁰ This number includes the cost for filing a patent application and the annual maintenance fees, but does not include the cost of the inventor's work time for the invention, preparing

¹⁷ A very permissive license such as the MIT license or BSD will allow you to use and/or modify the trained models and also use the corresponding dataset for any commercial purpose with some simple obligations to mention some copyrights and disclaimer of warranties notices.

¹⁸ <https://openai.com/api/pricing/>

¹⁹ <https://www.ankursnewsletter.com/p/openai-gpt-3-vs-open-source-alternatives?triedSigningIn=true>

²⁰ The numbers may increase if another party brings opposition proceedings to prevent the grant of the patent.



the necessary documents, office actions, monitoring the market for possible infringement, and lawsuits (if such events occur).

If your invention does not seem to be worth the patenting costs, here are some other ways to protect your invention:

- Keep the idea as a trade secret instead of filing a patent: The AI field is evolving quickly. If you expect that your idea will become outdated soon (for example, within the next 6-12 months), keeping your idea secret is a reasonable alternative to filing a patent (see “Cost of Maintaining Trade Secret” below).
- Publish the invention: If you are not concerned that your competitor copies your idea, publishing it (e.g., as a technical paper or a web article) will prevent others to file a patent on the same idea.
- Consider a PCT Application: If you plan to file your patent in multiple jurisdictions, applying for PCT (Patent Cooperation Treaty) will save a significant amount of cost.

Patent Search/Clearance Cost

To avoid infringing third-party patents, you may check²¹ whether the idea has been already patented. There are a number of commercial patent databases. If you are on a tight budget, you may use free search engines, such as FreePatentsOnline.com. Building appropriate query by yourself is not easy and there are chances that you may miss critical patents in your search. Instead, you may use a professional patent search service which may cost anywhere between \$100 USD and \$3,000 USD per search.

Cost of Maintaining Trade Secrets

Protecting your invention as a trade secret instead of filing a patent is a viable option to minimize cost. However, you should be aware of the fact that there are costs associated with maintaining trade secrets, too, because you have to take reasonable measures to secure the secrecy, such as authentication and access control, together with periodical auditing. Trade secrets protection is also more fragile, since protection depends on the maintenance of secrecy. The information may leak at some moment or another person independently comes up with the same idea and makes it public.

Cost of Lawsuits and Insurance

Costs of enforcing IPRs vary enormously among jurisdictions and among the different type of rights, ranging from several hundred thousand € for patent litigation in France, and a bit more in Germany, to several millions of US\$ for in the US. The costs of enforcing copyright are substantially lower.

Regarding insurance against third-party claims or against third-party infringement of your IP, very limited offers exist today in the market, but it is a rapidly evolving market.²² Costs can range from a limited coverage for €50,000 a year, to a certain percentage of the amount for which you would like to be covered.

4.4. Further Resources

- Enterprising Ideas: a guide to Intellectual property for start-ups:
https://www.wipo.int/edocs/pubdocs/en/wipo_pub_961.pdf
- How startups and SMEs should think about IP: an investor's perspective:
https://www.wipo.int/wipo_magazine/en/2021/02/article_0006.html

²¹ Please note that this is not necessarily common practice especially in case of a densely populated patent landscape, as this may be costlier rather than waiting for the search report to be performed by the patent office.

²² See <https://news.bloomberglaw.com/ip-law/ip-insurers-see-their-time-as-now-with-covid-19-in-background>



- More on data: <https://gpai.ai/projects/data-governance/gpai-data-governance-work-framework-paper.pdf>
- Montreal Data License (<https://www.montrealdatalicense.com/en>): an easy-to-use, web-based tool for generating data license language.
- Contract Guidelines on Utilization of AI and Data a comprehensive guide for contracts between a user company and an AI technology supplier: <https://www.meti.go.jp/press/2019/04/20190404001/20190404001-2.pdf>

5. FAQ for Entrepreneurs in AI

Question: I am developing new products or services using AI technologies to improve them. Should I protect these improvements?

Answer: Yes, improving your products or services by using AI technologies could be protected through IPRs, especially by patents, if it helps to solve new technical problems as they may be considered technical means. Such innovation may be protected by patents but as well by copyright if your innovation is delivered through software.

Question: I am developing new AI related technologies. Should I protect such technologies, and how? Or should I release them under an open source license?

Answer: Various forms of intellectual property can help to protect your innovation, especially patents. Open source licensing equally depends on the existence of IP protection. Hence, open source licensing is not an alternative to IP protection. Whether you should use open source licenses or a more proprietary approach (or a dual licensing approach) depends on a number of considerations.

Question: What about the output of AI? Can it be protected?

Answer: The answer is not straightforward. It is still not completely clear how the patentability requirements, especially the inventive step/non-obviousness requirement, are to be applied to AI-assisted inventions. Patent offices and courts will not recognize AI as an inventor for the time being, which is however an issue that needs to be distinguished from patentability. Copyright protection will typically require originality involving some human creativity as part of the creation.

Question: I need data to train my AI system. Can I use any kind of dataset available?

Answer: No, you need to check whether such a dataset is available under specific terms and conditions. This is also the case for software elements. Where software is made available under an open source license, you may freely use it within the boundaries of the licensing terms.

Question: I am working with a customer using their data to develop an AI invention to assist them in their business. Who will own what?

Answer: It is very important that you define contractually who will own what, especially the trained models, as you may be interested (and your customer, too) to have your AI trained with more data coming from other customers. Obviously, your customer will be interested in the protection of their own data and in excluding access to such data by its competitors, which your customer will typically claim to be guaranteed in the contract with you.

Question: Within my company we gathered very interesting non-personal data and we would like to monetize it as a business. Can I protect such data?

Answer: To summarize, data is not generally benefitting from IP protection. Therefore, at least in cases where not all the data are covered by copyright or related rights protection, it will be important for you to define the conditions of both the access to such data and the use of the data through contractual means. It is equally important to include a confidentiality requirement to exclude further sharing of the data with third persons and to secure potential trade secrets protection.



Annex

Table 1

Table 1 - Patents			
1 - Requirements			
EU	US	Canada	Japan

One can either file a patent at a national patent office, or at the European Patent Office (EPO).	Inventions must be novel and nonobvious, as well as not “directed to a judicial exception” “without significantly more”. Approach to subject matter has evolved through substantial case law (notably <i>Diamond v Diehr</i>; <i>Alice Corp. v CLS Bank</i>; <i>Mayo v Prometheus Labs</i>, among others).	Inventions must be novel and nonobvious, and have a “discernible physical effect” (beyond “mere calculation”).	Inventions need to have “novelty” (meaning, objectively something new based on the date and time when the applicant filed the patent application with the Japan Patent Office), and be “advanced”. In the case of computer programs, it is sometimes disputed whether or not they “utilize the laws of nature.” Since “invention” is the creation of technical ideas that “utilize natural laws,” it is clear on whether mere abstract and artificially decided concepts fall under the category of the creation of technical ideas that “utilize natural laws.” In addition, even if the program merely adds content such as recordings and displaying data by using general computer functions in accordance with these abstract concepts and artificial arrangements. It does not fall under the category of creation of technical ideas “using natural laws” (Intellectual Property High Court, September 24, 2014).
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		<i>Patent Act</i>	<i>Patent Act</i>
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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 capable of industrial application.	35 USC § 101 Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.	Section 2: “Invention means any new and useful art, process, machine, manufacture, or composition of matter, or any new and useful improvement in any art, process, machine, manufacture, or composition of matter.”	Article 29 (1) An inventor of an invention that is industrially applicable may be entitled to obtain a patent for the said invention, except for the following:
Article 52 EPC (2) The following in particular shall not be regarded as inventions within the meaning of paragraph 1:	Judicial exceptions: abstract ideas, laws of nature, and natural phenomena [“the basic tools of scientific and technological work”, from Alice, quoting <i>Gottschalk v Benson</i>]. However, an invention is not rendered patent-ineligible simply because it involves a judicial exception.	Section 27(8) [What may not be patented] No patent shall be granted for any mere scientific principle or abstract theorem.	(i) inventions that were publicly known in Japan or a foreign country, prior to the filing of the patent application;

(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.	Alice/Mayo test: Step 1: Does the claimed subject matter fall within the four statutory categories in §101 (process, machine, manufacture, or composition of matter)? If no, it is patent-ineligible. If yes, proceed to Step 2A. Step 2A: Is the claim “directed to” a judicial exception? If no, claim is patent-eligible. If yes, proceed to step 2B. Step 2B: Does the claim contain an “inventive concept” sufficient to “transform” the claimed abstract idea into a patent-eligible application? If yes, claim is patent-eligible. If no, claim is patent-ineligible. For Step 2B, the claim must include “additional features” to ensure “that the [claim] is more than a drafting effort designed to monopolize the [abstract idea].” Additional features must be more than “insignificant, extra-solution activity”, features described at a “high degree of generality”, or application to a	“Purposive construction” is used to construe the claims and determine whether the “actual invention has physicality and solves a problem related to the manual or productive arts”. All essential elements of the invention must be considered. In determining what is an “essential element”, the inventor’s intention must be considered (as far as that can be determined from the claims and specification). Must have physicality and a technical effect.	(ii) inventions that were publicly worked in Japan or a foreign country, prior to the filing of the patent application; or
	particular field of use. It is highly subjective and often conflated with analysis of obviousness (inventive concept does not equal inventive step).		

In order to assess the eligibility of a software, the EPO adopted the twostep approach known as the <i>Comvik</i> approach: – a technical feature; – an inventive step: the technical feature can be considered as non-obvious.		Particularly relevant cases: - <i>Free World Trust v Électro Santé Inc</i>, 2000 SCC 66, and <i>Camco v Whirlpool</i>, 2000 SCC 67: judgments adopting and setting out purposive construction. - <i>Amazon.com Inc v Canada (Commissioner of Patents)</i>, 2011 FCA 328: business methods are not unpatentable <i>per se</i>. - <i>Yves Choueifaty v Attorney General of Canada</i>, 2020 FC 837: Federal Court rejected the “problem-solution approach” to purposive construction used by the Patent Office and clarified the determination of essential elements. After Choueifaty (which was not appealed), the Patent Office has since published a Practice Notice (PN202004) outlining a revised approach. Among other things, they note as follows: “The mere fact that a computer is identified to be an essential element of a claimed invention for the purpose of determining the fences of the monopoly under purposive construction does not necessarily mean that the subject matter defined by the claim is patentable subject matter and outside of the prohibition under subsection 27(8) of the Patent Act. In such a case, it is necessary to consider whether the computer cooperates together with other elements of the claimed invention and thus is part of a single	(iii) inventions that were described in a distributed publication, or inventions that were made publicly available through an electric telecommunication line in Japan or a foreign country, prior to the filing of the patent application.
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		actual invention and, if so, whether that actual invention has physical existence or manifests a discernible physical effect or change and relates to the manual or productive arts.”	
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Specific conditions for AI or ML inventions: Specific clauses in the EPO Guidelines for Examination concerning Artificial Intelligence and Machine learning inventions have been added. (G-II, 3.3.1 – Artificial intelligence and machine learning). Artificial intelligence and machine learning have been defined in these specific clauses as, “computational models and algorithms for classification, clustering, regression, and dimensionality reduction, such as neural networks, genetic algorithms, support vector machines, k-means, kernel regression, and discriminant analysis”. As they can refer to abstract models or algorithms, they cannot be patented as such (art.52 (2) and (3) EPC). Those inventions will inevitably need to imply a technical effect (Art. 54 and 56 EPC). The EPO provides a few examples of the technical effect. For example, the use of a neural network in a heart-monitoring apparatus for the purpose of identifying irregular heartbeats makes. On the opposite, this has no technical effect on the classification of text documents, solely in respect of their textual content. Lastly, and more interestingly, the EPO specifies that if “a classification method serves a technical purpose, the steps of generating the training set and training the classifier may also	Note that arguments based on the 2019 PEG are recognized during prosecution at the USPTO but have not always been successful in US lower courts (not yet tested at the USSC).	(2) Where, prior to the filing of the patent application, a person ordinarily skilled in the art of the invention would have been able to easily make the invention based on an invention prescribed in any of the items of the preceding paragraph, a patent shall not be granted for such an invention notwithstanding the preceding paragraph.	
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contribute to the technical character of the invention if they support achieving that technical purpose”. Concerning the disclosure of information (art. 83 EPC), an application shall disclose the invention in a manner sufficiently clear and complete for it to be carried out by a skilled person. As an example, in the case T161/18, an AI-related invention may require the disclosure of underlying algorithms and/or corresponding training steps.			
		Article 2 (1) “Invention” in this act means the highly advanced creation of technical ideas utilizing the laws of nature.	

Table 1 - Patents

2 - Duration of protection

EU	US	Canada	Japan
Article 63 EPC (1) The term of the European patent shall be 20 years from the date of filing of the application [given the annuities are paid].	35 USC §154 (a)(2) Subject to the payment of fees under this title, such grant shall be for a term beginning on the date on which the patent issues and ending 20 years from the date on which the application for the patent was filed in the United States or, if the application contains a specific reference to an earlier filed application or applications under section 120, 121, 365(c), or 386(c) from the date on which the earliest such application was filed.	Patent Act, s 44 Subject to section 46 [payment of maintenance fees], where an application for a patent is filed under this Act on or after October 1, 1989, the term limited for the duration of the patent is 20 years from the filing date.	General Rule Article 67 (1) The duration of a patent right shall expire after a period of 20 years from the filing date of the patent application.

Table 1 - Patents			
3 - Examples			
EU	US	Canada	Japan

Decision G 1/19 on the patentability of simulation methods, and especially on the assessment of the inventive step of computer-implemented simulations. A computer-implemented simulation of a technical system or process that is claimed as such can, for the purpose of assessing inventive step, solve a technical problem by producing a technical effect going beyond the simulation's implementation on a computer. For that assessment it is not a sufficient condition that the simulation is based, in whole or in part, on technical principles underlying the simulated system or process. This case might be applied to AI related inventions, as the same criteria might be kept for analyzing the inventive criteria of an AI-related invention. The DABUS cases Two patent applications have been filed, where a machine called "DABUS", which is described as "a type of connectionist artificial intelligence", is named as the inventor. The applications were refused by the EPO on the grounds that they do not meet the legal requirement that an inventor designated in the application has to be a human being, and not a machine.	In addition to the EU, the DABUS cases were also rejected in the US. In light of the "current" state of US law, the USPTO concluded that an inventor must be a "natural person". The more technical details, the better the chances of success: - <i>DDR Holdings v Hotels.com</i>, 773 F.3d 1245 (Fed. Cir. 2014): the claims addressed a technological problem "particular to the internet"; - <i>Biax Corp. v. NVIDIA Corp.</i> (Civil Action No. 09-cv-01257-PAB-MEH): patents at issue directly included substantial sections of code, technical details. Subject matter was not raised as an issue.	Landmark Graphics Corporation (Re), 2021 CACP 9 (PAB Decision, post-Choueifaty): Claims related to "the steps of a computer-implemented algorithm for improved modeling of oil, gas, and water production profiles of prospective wells and the economic returns associated with them". Also included the step of "(e) using the data from the simulation engines in a well perforation and completion process" (which was considered to be a practical application). In preliminary consideration, before release of the FC judgment in Choueifaty, considered the claims unpatentable. However, by the time of the decision, Choueifaty applied and the CIPO Practice Notice PN202004 had been released. Analyzing the claims as directed by PN2020-04, the PAB concluded the claims comprised patentable subject matter.	N/a
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Table 1 - Patents

4 - Remedy against infringement

EU	US	Canada	Japan
Infringement and validity of patents in Europe are under the responsibility of the competence of national courts and authorities. This means that patents must be litigated separately in each country where they have effect and are infringed.	Monetary remedy, injunctive relief, and may include punitive damages. 35 USC §284 Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer together with interest and costs as fixed by the court. When the damages are not found by a jury, the court shall assess them. In either event the court may increase the damages up to three times the amount found or assessed. 35 USC §286 Except as otherwise provided by law, no recovery shall be had for any infringement committed more than six years prior to the filing of the complaint or counterclaim for infringement in the action. 35 USC §287 To recover for infringement of any patented article, the article must be marked with a patent notice or the infringer must have been notified and continued to infringe.	Federal Court jurisdiction. Injunctions are possible, but rare, especially when monetary award would be sufficient relief. Interlocutory injunctions are very rare. May include punitive damages. S 55(1) of Patent Act A person who infringes a patent is liable to the patentee and to all persons claiming under the patentee for all damage sustained by the patentee or by any such person, after the grant of the patent, by reason of the infringement. S 55(2) A person is liable to pay reasonable compensation to a patentee and to all persons claiming under the patentee for any damage sustained by the patentee or by any of those persons by reason of any act on the part of that person, after the specification contained in the application for the patent became open to public inspection, in English or French, under section 10 and before the grant of the patent, that would have constituted an infringement of the patent if the patent had been granted on the day the specification became open to public inspection, in English or French, under that section.	Injunctive relief, compensation, and criminal sanctions.

Table 2

Table 2 - Utility model			
1 - Requirements			
EU	US	Canada	Japan
There was a proposition to harmonize the utility model regulation across the European Union, but it has been abandoned.	Utility models are not available in the US. However, under the Paris Convention, foreign utility models may form the basis for a priority claim.	Petty patents are no longer available in Canada. However, under the Paris Convention, foreign utility models may form the basis for a priority claim.	In general, creation of technical ideas utilizing the laws of nature is not publicly known, and not easy to be make.
In France, the PACTE law no. 2019486 of May 22, 2019, reformed the utility model system. The new PACTE law also added the possibility to convert a utility certificate into a patent application.	N/a	N/a	Article 3 (1) A creator of a device that relates to the shape or structure of an article or combination of articles and is industrially applicable may be entitled to obtain a utility model registration for said device, except when the following applies:
The utility certificate is a property title issued by the French Patent Office, which, like a patent, gives a monopoly of exploitation on an invention: - For a maximum period of 10 years, instead of 20 years for the patent; - For which no prior art search report is established during the examination procedure, unlike the patent application.	N/a	N/a	(i) the device was publicly known in Japan or a foreign country, prior to the filing of the application for a utility model registration therefore;

The new PACTE law also added the possibility to convert a utility certificate into a patent application.	N/a	N/a	(ii) the device was publicly worked in Japan or a foreign country, prior to the filing of the application for a utility model registration therefore; or
The new PACTE law also added the possibility to convert a utility certificate into a patent application.	N/a	N/a	(iii) the device was described in a distributed publication, or a device that was made publicly available through an electric telecommunication line in Japan or a foreign country, prior to the filing of the application for a utility model registration therefore.
	N/a	N/a	(2) Where, prior to the filing of the application for a utility model registration, a person ordinarily skilled in the art of the device would have been exceedingly easy to create the device based on a device prescribed in any of the items of the preceding paragraph, a utility model registration shall not be granted for such a device notwithstanding the preceding paragraph.
	N/a	N/a	Article 2 (1) “Device” in this Act means the creation of technical ideas utilizing the laws of nature.
	N/a	N/a	In the Utility Model Act

Table 2 - Utility model

2 - Duration of protection

EU	US	Canada	Japan
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Article 63 EPC (1) The term of the European patent shall be 20 years from the date of filing of the application (given the annuities are paid).	35 USC §154 (a)(2) Subject to the payment of fees under this title, such grant shall be for a term beginning on the date on which the patent issues and ending 20 years from the date on which the application for the patent was filed in the United States or, if the application contains a specific reference to an earlier filed application or applications under section 120 , 121 , 365(c) , or 386(c) from the date on which the earliest such application was filed.	Patent Act, s 44 Subject to section 46 (payment of maintenance fees), where an application for a patent is filed under this Act on or after October 1, 1989, the term limited for the duration of the patent is 20 years from the filing date.	General Rule Article 67 (1) The duration of a patent right shall expire after a period of 20 years from the filing date of the patent application.
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Table 2 - Utility model			
3 - Examples			
EU	US	Canada	Japan
Not very common.	N/a	N/a	Rarely used.

Table 2 - Utility model			
4 - Remedy against infringement			
EU	US	Canada	Japan

Infringement and validity of patents in Europe are the competence of national courts and authorities. This means that patents must be litigated separately in each country where they have effect and are infringed.	Monetary remedy, injunctive relief, and may include punitive damages. 35 USC §284 Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court. When the damages are not found by a jury, the court shall assess them. In either event the court may increase the damages up to three times the amount found or assessed. 35 USC §286 Except as otherwise provided by law, no recovery shall be had for any infringement committed more than six years prior to the filing of the complaint or counterclaim for infringement in the action. 35 USC §287 To recover for infringement of any patented article, the article must be marked with a patent notice or the infringer must have been notified and continued to infringe.	Federal Court jurisdiction. Injunctions are possible, but rare, especially when monetary award would be sufficient relief. Interlocutory injunctions are very rare. May include punitive damages. S 55(1) of Patent Act A person who infringes a patent is liable to the patentee and to all persons claiming under the patentee for all damage sustained by the patentee or by any such person, after the grant of the patent, by reason of the infringement. S 55(2) A person is liable to pay reasonable compensation to a patentee and to all persons claiming under the patentee for any damage sustained by the patentee or by any of those persons by reason of any act on the part of that person, after the specification contained in the application for the patent became open to public inspection, in English or French, under section 10 and before the grant of the patent, that would have constituted an infringement of the patent if the patent had been granted on the day the specification became open to public inspection, in English or French, under that section.	Injunctive relief, compensation (punitive damage is not allowed), and criminal sanctions.
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Table 3

Table 3 - Copyright			
1 - Requirements			
EU	US	Canada	Japan

The EU regulatory framework is composed of 11 directives and two regulations.

General rule

To be protected by copyright, the work must:

- Meet the criteria of originality (the creator has to make free choices in creating the work) (excluding ideas or concepts).

Computer programs

- Directive 2009/24/EC of the European Parliament and of the Council of 23 April 2009 on the legal protection of computer programs

Computer programs, and its preparatory materials, are protected if it is original in the sense that it is the author's own intellectual creation. Computer programs are protected as literary works, but there is no clear definition given by the Directive.

The *SAS Institute Inc. vs. World Programming Ltd.* case clarified that the source code and the executive code are the form of expression of a computer program and are therefore protected by copyright under the Directive.

Protected under Copyright:

- The preparatory material
- The source-code
- The object-code
- The user manuals

17 USC §101 defines "computer program" as a set of statements or instructions to be used directly or indirectly in a computer to bring about a certain result."

17 USC §201

Copyright vests initially in the author or authors. The author(s) are those who create the work and fix it in a tangible medium.

S. 306 of the Compendium of US

Copyright Office Practices

"The US Copyright Office will register an original work of authorship, provided that the work was created by a human being."

S. 2 of the Copyright Act

Definition of *literary work*: "literary work includes tables, computer programs, and compilations of literary works; (*oeuvre littéraire*)".

Computer program: "a set of instructions or statements, expressed, fixed, embodied or stored in any manner, that is to be used directly or indirectly in a computer in order to bring about a specific result."

In *Klivington Bros v Golberg* (1957) the courts held that a work must be an "original expression of thought of its originator" and not a mere copy of another work.

In *CCH Canadian v Law Society of Upper Canada*, the SCC developed the Canadian conceptualization of originality as encompassing aspects of both the product (in that it cannot be a mere copy), and the process (in that it must be an "exercise of skill and judgment" by the author).

Copyright Act Article 2 (1)(i)

"Work" means a production in which thoughts or sentiments that are creatively expressed, and which falls within the literary, academic, artistic or musical domain.

NOTE: Only creative expression is protected; thoughts, feelings, ideas, and facts are not protected. What is creative expression in a program? Since the programming language system is strict due to the nature of programs, the choice of combinations of instructions is limited in order to make the computer function as economically and efficiently as possible.

The Copyright Act protects the specific expression of a program, not its functions or ideas. Therefore, if the specific description of a program is almost the same regardless of who creates it due to restrictions on expression, or if it is very short or commonplace, it is considered that the individuality of the creator has not been demonstrated. On the other hand, if the entire program consisting of the expression of commands, combination of commands, and order of commands has room for other expressions, and if some individuality of the creator is expressed, creativity exists.

The Intellectual Property High Court, April 27, 2016, Case No. 2014 (ne) 10059, 10088, adopted the above interpretation and decided that creativity exists.

New exceptions - The Directive 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market. The new Directive introduces new exceptions, such as the text and data mining exceptions. The first one is an exception for the benefit of research organizations and cultural heritage institutions that carry out data mining for scientific research purposes, to which right holders cannot object. The second one is an exception or limitation to the rights of right holders for the benefit of any data mining, whatever its purpose, even commercial, provided that the right holder has not expressed his opposition, or “opt-out”. Text and data mining means, “any automated analytical technique aimed at analyzing text and data in digital form in order to generate information which includes, but is not limited to patterns, trends, and correlations”. Please note that it is a directive and it has to be transposed by Member states.	Fair use is a non-exhaustive list in the US and text and data mining (TDM) has been found to be fair use in numerous circumstances. In particular, when used for other enumerated purposes (e.g., “scholarship and research”), TDM is often considered to benefit the public and to be a fair use. Commercial services may still defend TDM as fair use if the use is sufficiently transformative/satisfies the fair use analysis. For instance, <i>A.V. v iParadigms, LLC</i> (4th Cir. 2009) - iParadigms created “TurnItIn” database which analyzes student work against other Internet content to assess likelihood of plagiarism. Considered a “highly transformative” use.	In 2019, the Parliamentary Standing Committee on Industry, Science, and Technology recommended “that the Government of Canada introduce legislation to amend the Copyright Act to facilitate the use of a work or other subject-matter for the purpose of informational analysis.” (Statutory Review, June 2019, pg. 87) “Informational analysis” proposed as a ground of fair dealing similar to, but broader than, “text and data mining”. The review quoted one definition as: “informational analysis [is] ‘the derivation of information from data’; for example, through text and data analysis, ‘and not the actual use and commercialization of that data.’” Proposed changes are not yet implemented. (The same review also recommended making the list of fair dealing purposes illustrative rather than exhaustive; again, not yet implemented.)	New flexible copyright exceptions Objectives: It is expected to create innovations that utilize technologies related to “<i>Industry 4.0</i>”, such as IoT, big data, and artificial intelligence (AI). There were many exception provisions in the Japanese Copyright Law before this amendment, which specifically stipulate legal requirements. When a new use that deviates from the requirement is executed, even if the use does not substantially harm the interests of the right holder, it was pointed out that there was a risk of copyright infringement without the application of the exception clauses. In response to this situation, the industry had requested the establishment of exception provisions that can flexibly respond to the use of new copyrighted works that utilize new technologies in order to create innovation. It was decided to develop the “flexible exception provisions”. An example of provisions: Article 30-4 It is permissible to exploit a work, in any way and to the extent considered necessary, in any of the following cases, or in any other case in which it is not a person’s purpose to personally enjoy or cause another person to enjoy the thoughts or sentiments expressed in that work; provided, however, that this does not apply if the action would unreasonably prejudice the interests
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			of the copyright owner in light of the nature or purpose of the work or the circumstances of its exploitation: (i) if it is done for use in testing to develop or put into practical use technology that is connected with the
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			recording of sounds or visuals of a work or other such exploitation; (ii) if it is done for use in data analysis (meaning the extraction, comparison, classification, or other statistical analysis of the constituent language, sounds, images, or other elemental data from a large number of works or a large volume of other such data; the same applies in Article 47-5, paragraph (1), item (ii)); (iii) if it is exploited in the course of computer data processing or otherwise exploited in a way that does not involve what is expressed in the work being perceived by the human senses (for works of computer programming, such exploitation excludes the execution of the work on a computer), beyond as set forth in the preceding two items. Expected Effects of these provisions: It is expected that the creation of innovation will be promoted by making it possible to perform many of the following services without the permission of the copyright holder. Permitted Services: deep learning for artificial intelligence (AI) development, software research, and analysis for ensuring cybersecurity, location search service, information analysis service, etc., as long as these are considered as those that cause no disadvantage or a slight disadvantage to the right holder. Fair Use Doctrine
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			“Flexible exception provisions” are different from the fair use clause. Japan did not adopt it because: (1) Most Japanese companies have a high sense of legal compliance and resistance to litigation, and emphasize
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			clarity rather than flexibility of regulations. (2) Since the understanding of copyright is not sufficiently permeated through the public, too much increasing the flexibility of the exception provisions like fair use clauses increases the possibility of promoting infringement of rights due to negligence. (3) Since there is no statutory damages compensation system in Japan, there is a problem that even if a proceeding is filed, it often results in “cost collapse”. And even if general and comprehensive exception provisions such as fair use are created, the effect of promoting “fair use” of copyrighted works cannot be expected so much, but rather negative impact that “unfair use” is promoted is expected. (4) In addition, due to the division of roles between the legislature and the judiciary and the principle <i>nullum crimen sine lege</i> exception provisions such as fair use were not desirable.
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Table 3 – Copyright			
2 - Duration of protection			
EU	US	Canada	Japan

Copyright protects IP of the creation until 70 years after the death of the author, or 70 years after the death of the last surviving author in the case of a work of joint authorship.	For works created after January 1, 1978, copyright lasts for the life of the author, plus an additional 70 years. For an anonymous work/pseudonymous work/work made-for-hire, copyright runs for 95 years from the date of publication, or for a term of 120 years from the year of the work's creation; whichever expires first.	Copyright duration protects IP for the entirety of the creator of the work's lifetime, plus 50 years from the end of the calendar year in which the creator died. Increasing to life plus 70 years for many types of work (including literary works) with CUSMA. The current "transition period" ends on December 31, 2022.	General Rule Article 51 (1) The duration of copyright begins at the time the work is created. (2) Unless otherwise specified in this Section, a copyright subsists for a period of fifty years after the death of the author (or the death of the last surviving co-author, for a joint work; the same applies in paragraph (1) of next Article).
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	Works created prior to 1978 are subject to the common law of each state.	S 6, Copyright Act The term for which copyright shall subsist shall, except as otherwise expressly provided by this Act, be the life of the author, the remainder of the calendar year in which the author dies, and a period of fifty years following the end of that calendar year. S 7, Copyright Act Anonymous and pseudonymous works: 6.1 (1) Except as provided in section 6.2 and in subsection (2), where the identity of the author of a work is unknown, copyright in the work shall subsist until the end of 75 years following the end of the calendar year in which the work is made. However, if the work is published before the copyright expires, the copyright continues until the earlier of the end of 75 years following the end of the calendar year in which the first publication occurs and 100 years following the end of the calendar year in which the work was made.	
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Table 3 - Copyright			
3 - Examples			
EU	US	Canada	Japan

N/a	Naruto v Slater (2018) Main takeaways: - A monkey took pictures of himself/itself with a camera abandoned by a photographer (the “Monkey Selfies”). - The photographer included photos in a book. - The publisher, photographer, and website (which was used to make book) were sued by PETA and Dr.	Ha Vi Doan v. Clearview AI Inc., Case No. T-713-20 (Federal Court, proposed class action) Main takeaways: - Primarily based on privacy grounds, but also claims copyright impacts: Clearview AI algorithms scan photos to derive biometric data. - Allegedly infringes copyright in the photos thus scanned and therefore violates moral rights of	Japan sometimes writes it in contracts to prohibit secondary use of statistical models, annotations, and tagged training datasets. However, the attribution of copyright is not always clearly stated there. It is also not clear whether these are protected as creative expression under copyright law, but contracts are often made based on copyright law concepts.
	Engelhardt (who worked with the monkey) for copyright infringement. - Court held “animals other than humans – lack statutory standing under the Copyright Act”.	photographers. Basanta v Galerie NuEdge - Montreal artist sued for copyright infringement, as his AI bot randomly generates an image, and then compares it to a database of art to see the percentage match. - Because the database uses images online, there is a debate about whether it constitutes infringement	

Table 3 - Copyright

4 - Remedy against infringement

EU	US	Canada	Japan
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Copyright infringements are within the competence of national courts. Remedies against infringement are mostly harmonized in the EU; Sanctions, injunctions, statutory damages, punitive damages, etc.	Injunctions, impounding of infringing articles, actual damages, and profits. No punitive damages <i>per se</i>. Must be registered for statutory damages; attorney's fees to be recovered. Criminal sanctions under 17 USC §506(a).	Official registration of copyright is not required in Canada. Damages and injunctions are primary remedies. The owner of the infringed work can opt to receive damages based on: the actual damages suffered; profits lost, or prescribed statutory amount. Punitive damages may be available. S, 42 of copyright act provides criminal remedies (maximum penalty fine 1m CAD or imprisonment up to 5 years or both).	Injunctive relief, compensation, and criminal sanctions.
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Table 4

Table 4 - Trade secret			
1 - Requirements			
EU	US	Canada	Japan

The European Directive 2016/943 on the protection of undisclosed knowhow and business information (trade secrets) against their unlawful acquisition, use and disclosure (known as the Trade Secrets Directive). According to Article 2 of the directive, a trade secret is any information that: - is secret in the sense that it is not, as a body or in the precise configuration and assembly of its components, generally known among or readily accessible to persons within the circles that normally deal with the kind of information in question; - has commercial value because it is secret; - has been subject to reasonable steps under the circumstances, by the person lawfully in control of the information in order to keep it secret.	18 USC Chapter 90 deals with trade secrets. 18 USC §1839 Trade secret means: - All forms and types of financial, business, scientific, technical, economic, or engineering information, including patterns, plans, compilations, program devices, formulas, designs, prototypes, methods, techniques, processes, procedures, programs, or codes, whether tangible or intangible, and whether or how stored, compiled, or memorialized physically, electronically, graphically, photographically, or in writing if: (A) the owner (person or entity) has taken reasonable measures to keep such information secret; and (B) the information derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable through proper means by, the public. According to the USPTO, a trade secret (requires all three elements): - is information that has either actual or potential independent economic value by virtue of not being generally known, - has value to others who cannot legitimately obtain the information, and - is subject to reasonable efforts to maintain its secrecy. It also falls within jurisdiction of each state.	No legislation in Canada defines/protects trade secret. Trade secret protection outside of Quebec relies on the common law “breach of confidence” action. It is best protected by contracts. Proving breach of confidence does not require proving the information has commercial value or that positive steps were taken to keep the information secret. As affirmed in Supreme Court <i>case Lac Minerals Ltd. v. International Corona Resources Ltd.</i>, the elements of a breach of confidence action are: - the information must have a necessary quality of confidence about it; - the circumstances under which the information was imparted must give rise to an obligation of confidence; and - the defendant must have made unauthorized use of the information. (Note: no need to show independent economic value or reasonable efforts to maintain secrecy). Definition under the Criminal Code (s. 391, added for accession to CUSMA) does require independent economic value and reasonable efforts to maintain secrecy. Specifically, s 391(5): (5) For the purpose of this section, trade secret means any information that:	Trade secret is protected by the Unfair Competition Prevention Act if it meets the requirements. Unfair Competition Prevention Act Article.2 (6) Trade secret is defined as technical or business information that is: - kept secret - useful for business activities - not publicly known
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		(a) is not generally known in the trade or business that uses or may use that information; (b) has economic value from not being generally known; and (c) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy. Common law does not apply to Quebec for civil matters. “Trade secret” is not defined in the Quebec Civil Code. However, the Code contains two articles (1472 & 1612) which relate to trade secrets. 1472: A person may free himself from his liability for injury caused to another as a result of the disclosure of a trade secret by proving that considerations of general interest prevailed over keeping the secret and, particularly, that its disclosure was justified for reasons of public health or safety. 1612: The owner of a wrongfully disclosed trade secret may claim damages related to the cost of acquiring, perfecting and using the trade secret. Lost profits “may be compensated for through payment of royalties”.	
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Table 4 - Trade secret
2 - Duration of protection

EU	US	Canada	Japan
As long as it is kept secret.	As long as it is kept secret	As long as it is kept secret	As long as it fulfills the three aforementioned requirements of a trade secret.

Table 4 - Trade secret			
3 - Examples			
EU	US	Canada	Japan

N/a	Former Google executive (Anthony Levandowski), was criminally indicted over claims that he stole, or attempted to steal, confidential information from Google subsidiary (Waymo). Levandowski allegedly stole 14,000 sensitive self-driving car files from Waymo that served as the foundation for another company's self-driving car project. He pleaded guilty to criminal trade secret theft (and later pardoned).	Clamato juice formula and manufacturing methods (<i>Cadbury Schweppes Inc. v FBI Foods Ltd.</i>)	Any information that is useful for business activities may be protected. To be protected as a trade secret, the requirement of secrecy management (being kept secret) is important in practice. The information must be managed as a secret to the extent that those who come into contact with it can recognize that it is managed as a secret. For example, by taking measures to indicate that the information is confidential so that those who have access to the information can recognize that the information is a trade secret, and by limiting those who have access to the information (The Intellectual Property High Court, August 6, 2014, Case No. 2014 (ne), 10028). An example of concrete measures is applying a password and making it known to employees (The Intellectual Property High Court, April 27, 2016, Case No. 2014 (ne) 10059, 10088). For “usefulness” to be recognized, the specific information should be objectively useful for business activities. However, there is a case where the general definition of variables in the source code of a program is not useful (Intellectual
			Property High Court, August 21, 2019, Case No. 2018 (ne) 10092).

Table 4 - Trade secret

4 - Remedy against infringement			
EU	US	Canada	Japan
Provisional and precautionary measures, damages, injunctions and/or recurring penalty payments.	Through the Economic Espionage Act (1996), it is punishable by imprisonment and/or fines. The Defend Trade Secrets Act (2016) established a private civil cause of action for the misappropriation of a trade secret. Both are federal laws (i.e., enforcement no longer state-based). Civil remedies: injunctions, ordering that the secret be protected from public exposure, ordering seizure of material, and damages.	Injunctive relief, damages, and criminal sanctions, not exceeding 5,000 CAD (maximum penalty is imprisonment not exceeding 14 years, and may also be fines (on summary conviction)).	Civil measures: Injunction and/or compensation for loss or damage. Criminal measures: Imprisonment and/or penalty payments. Border measures: Import or export of products created by using trade secrets illegally.

Table 5

Table 5 - Data			
1 - Requirements			
EU	US	Canada	Japan

Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. The Database directive establishes a double protection of databases: - A copyright protection for the structure of the database that meets the criteria of originality; - A <i>sui generis</i> protection for the content of the database, that required “the investment of considerable human, technical and financial resources while such databases can be copied or accessed at a fraction of the cost needed to design them independently”. Several decisions in 2004 clarified the scope of the database <i>sui generis</i> right. It does not apply to databases that are the by-products of the main activity of an organization (i.e. IoT devices, big data, machine-generated data, etc.). NOTE: the European Commission is currently working on an update of this Directive to meet the new evolutions regarding the Single Digital Market and the free flow of non-personal data.	No <i>sui generis</i> data/database rights. Databases are generally protected by copyright law as compilations. Under the Copyright Act, a compilation is defined as “a work formed by the collection and assembling of preexisting materials or of data that are selected, coordinated, or arranged in such a way that the resulting work as a whole constitutes an original work of authorship. The term “compilation” includes collective works.” Underlying data is not automatically granted protection. The Copyright Act specifically states that the copyright in a compilation extends only to the compilation itself, and not to the underlying materials or data. A compilation of mere facts may not be copyrighted. Instead, a compilation may only be copyrighted if there is a creative or original act involved, i.e. in the selection and arrangement of materials. The protection is limited only to the creative or original aspects of the compilation. In the case of <i>Feist Publications, Inc. v. Rural Telephone Service Company, Inc.</i>, the U.S. Supreme Court ruled that a compilation work such as a database must contain a minimum level of creativity in order to be protected under the Copyright Act. Uncreative collections of facts are outside of Congressional authority	In the case of <i>CCH Canadian Ltd. v Law Society of Upper Canada</i> (leading case on originality) provides that a work (such as a compilation) is original only if it results from the exercise of skill and judgment. - Skill means the use of the author’s knowledge or aptitude in developing the work; - Judgment means the use of the author’s capacity to discern among possible options in producing the work - Requires the exercise of non-trivial, intellectual effort May be protected as a trade secret or through privacy legislation, as in the US (i.e., as a consequence of compliance with privacy obligations). Canada also lacks a single unified privacy framework, though a new framework has been proposed.	There are no <i>sui generis</i> laws for specifically protecting databases like the data protection law. Databases or data relating to AI development are fragmentally protected by the Copyright Act and the Unfair Competition Prevention Act. A copyright protection: “database” means an aggregate of data such as articles, numerical values, or diagrams, which is systematically constructed so that such data can be searched with a computer. A database that, by reason of the selection or systematic construction of information contained therein, constitutes a creation is protected as a work. In addition, personal data may also be protected by the Act on the Protection of Personal Information. Data that meets certain requirements can be protected under the Unfair Competition Prevention Act. This act protects “shared data with limited access” apart from trade secret protection (see Table 4), in order to improve an environment for secure data utilization. Unfair Competition Prevention Act Article.2 (7) “Shared data with limited access” is defined as technical or business information that is: - accumulated to a significant extent
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	under the Copyright Clause (Article I, § 8, cl. 8) of the United States Constitution, therefore no database right exists in the United States Could also be protected as a trade secret. May also be protected via privacy legislation, particularly where the data sets / databases contain personally identifiable information (i.e., unauthorized use of the data set would likely infringe the privacy rights of the data subject. Thus, when a company complies with its obligations towards users/data subjects, a <i>de facto</i> “data right” may arise. However, no single unified privacy law or framework in the US.		- managed by electronic or magnetic means - information to be provided to specific persons on a regular basis Objectives: Data is easily duplicated and provided. Unauthorized distribution can cause rapid and widespread damage. Even valuable data might not be (1) immediately subject to copyright protection, or (2) classified as a “trade secret” on the premise of sharing with others. It was difficult to stop its unauthorized distribution. Then, it was decided to protect valuable data that meets certain requirements as “shared data with limited access”. Currently, wrongful acquisition, use or disclosure of such data was positioned as “unfair competition” based on the Unfair Competition Prevention Act. Concepts and Examples of “shared data with limited access”: Concepts: Data that is expected to be utilized, such as creating new businesses and increasing the added value of services and products, mainly by being provided and shared by multiple parties among companies. Note: If information is kept secret, it would be protected as “trade secret” which means technical or business information useful for business activities, such as manufacturing or marketing methods, that is kept secret, and is not publicly known.
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			Examples of “shared data with limited access”: 3D high-precision map data; Ship or machine operation data; Maritime meteorological data, and consumption trend data.
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Table 5 - Data

2 - Duration of protection

EU	US	Canada	Japan
Term for copyright protection is 70 years. The term of protection for the <i>sui generis</i> right is 15 years. Any qualitatively or quantitatively “substantial change, which would result in the database being considered to be a substantial new investment,” can revive the fifteen-year term of protection.	Term for copyright protection is life (of a known author, post-1978), plus 70 years. Trade secrets can be protected indefinitely.	Term of copyright protection (for known author) is life of author, plus 50 years. Trade secrets can be protected indefinitely.	Term of copyright protection (for known author) is life of author, plus 70 years. “Shared data with limited access” under the Unfair Competition Prevention Act: As long as it fulfills the three aforementioned requirements of "shared data with limited access".

Table 5 - Data			
3 - Examples			
EU	US	Canada	Japan
N/a	Selected citations from US Presidents: The individual quotations themselves may or may not be subject to Copyright protection. However, the selection of the quotations involves enough original, creative expression that it would likely be protected by copyright.	- Phonebooks organized by headings. - Case summaries and headnotes (selecting and arranging specific elements of judicial decisions, note: CCH case). - According to the Canadian Bar Association, AI-created works might be within the meaning of original in the Copyright Act. That is, the CBA has suggested that “exercise of skill and judgment” does not necessarily preclude AI.	Data rights are unlikely to be legally disputed. This is because the parties have individually agreed on the use of the data by contracts. For example, in drafting a contract, parties insert specifications about the attribution of the rights of data and the terms of use into their contract, assuming that the database or data related to the business is protected by copyright law or Unfair Competition Prevention Act.

Table 5 - Data			
4 - Remedy against infringement			
EU	US	Canada	Japan
The Database Directive prohibits any extraction or re-use of all or substantial part of the contents of a database without the owner’s permission. The remedies available are identical to the remedies provided by copyright law, namely damages, injunctions, etc.	Copyright and/or trade secret remedies (see above). Privacy remedies vary depending on specific state/data. The US has hundreds of different pieces of privacy legislation.	Copyright and/or trade secret remedies (see above). Privacy remedies may include fines and/or damages (usually, however, payable to the data subject rather than the data controller).	Copyright and/or trade secret remedies (see above). Protection of “shared data with limited access” under the Unfair Competition Prevention Act: Civil measures: Injunction and/or compensation for loss or damage.

Disclaimer: Each row in the table does not necessarily show the exact correspondence among the jurisdictions.