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Spring 2018 Vol. 16, Issue 2

A review of developments in Intellectual Property Law



## Trade Secrets in 2018: The Law Is Still Trying to Catch Up to Technology

By Joshua R. Rich

Two cases this year have demonstrated that, although trade secret protections have become better aligned with protecting high tech trade secrets, there is still a long way to go. First, in *Waymo v. Uber*, the hard-fought litigation laid bare the perils of ignoring red flags when hiring employees away from competitors. But it also showed that there are difficulties in ensuring departing employees do not steal trade secrets and concerns enforcing rights against the new employers. Second, *People v. Aleynikov*, in combination with its predecessor federal case, has shown that criminal laws are still not well-written in responding to misdeeds in the virtual environment. Together, the two cases make it clear that many employers and employees have yet to figure out how to incorporate the norms and protections of trade secret laws into their employment practices and conduct.

The *Waymo v. Uber* case started with a bang on February 23, 2017, when Waymo

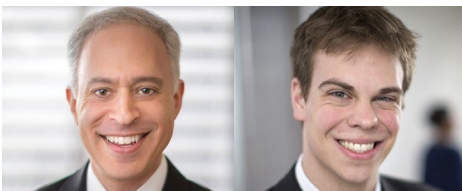
(formerly the self-driving car division of Google) filed a Complaint in the U.S. District Court for the Northern District of California for trade secret misappropriation under the Federal Defend Trade Secrets Act ("DTSA"), trade secret misappropriation under the California Uniform Trade Secret Act ("CUTSA"), patent infringement, and unfair competition in violation of the California Business and Professional Code § 17200. The case grew out of the actions of Anthony Levandowski, a former manager in Google and Waymo's self-driving car project. Before his departure from Waymo, among other misdeeds, Mr. Levandowski downloaded 14,000 files related to LiDAR sensors from Waymo's design server to his company-issued laptop, moved the files to a personal hard drive, then wiped the company-issued laptop and never used it again. He kept those confidential files for his future use. Mr. Levandowski then formed two competing self-driving vehicle companies, OttoMotto LLC and Otto Trucking LLC, that Uber bought two months later for \$680 million, in large

part to acquire the two companies' LiDAR system. Uber did so because it viewed the need to develop self-driving vehicles (including a LiDAR-based sensor system) as an "existential imperative." Uber also hired Mr. Levandowski as its vice president in charge of its self-driving car project.

Soon after Waymo filed its Complaint, the parties started fighting for the upper hand in the litigation. Waymo filed a motion for preliminary injunction on its trade secret misappropriation claims; Uber filed a motion to compel arbitration of all of Waymo's claims as part of a previously unpublicized arbitration proceeding that Waymo had brought against Mr. Levandowski. And Mr. Levandowski intervened in the case to fight having to testify, turn over documents, or provide a privilege log, even though he was still employed by Uber. The parties vigorously disputed the motions.

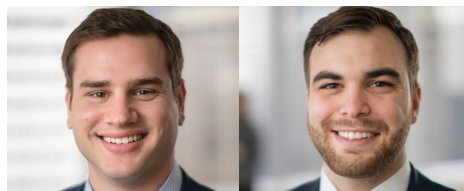
After expedited discovery, Judge William Alsup issued a trio of orders on May 11, 2017 that fundamentally shifted the dynamics of

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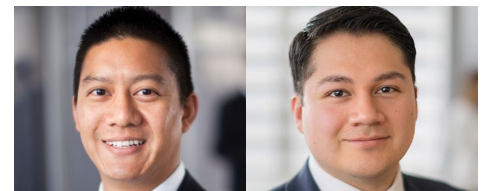
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the case. First, he rejected Uber's request for arbitration because Uber was not a party to the employment agreement that compelled arbitration of the dispute between Waymo and Mr. Levandowski. Second, Judge Alsup found that the facts supported many of Waymo's accusations of Mr. Levandowski's misconduct and provided Waymo certain "provisional relief," including ordering Uber to remove Mr. Levandowski from any role related to LiDAR and to use its influence over Mr. Levandowski to require him to cooperate in assembling certain evidence of his misconduct. But most shockingly, Judge Alsup also referred the case to the U.S. Attorney to consider criminal investigation of trade secret theft, based on the evidentiary record compiled to date in the case.

Criminal referrals from civil cases are quite rare, but trade secret misappropriation under the DTSA is one of the few federal civil actions that is also a potential federal crime. The DTSA was incorporated into the pre-existing Economic Espionage Act ("EEA"), a criminal statute that has been used to prosecute computer crimes (as in the case of Sergey Aleynikov, whose recent problems are discussed below). While the EEA's first provision covers economic espionage – that is, trade secret theft for the benefit of a foreign country or foreign agent – another provision (§ 1832(a)) criminalizes trade secret theft more broadly. Basically, any person who steals or knowingly receives trade secrets related to interstate commerce, intending to convert them to their own benefit and knowing that the conversion will harm the rightful owner of the trade secrets, is subject to both civil liability under the DTSA and criminal jeopardy under the EEA, including up to ten years in prison.

In light of the potential criminal charges, Mr. Levandowski refused to cooperate with Uber's attempts to comply with Judge Alsup's order on provisional relief. So fifteen days later, Uber fired him. His termination cost him a \$250 million hiring bonus from Uber, showing just how desperate he was to avoid the production of certain evidence against him and Uber.

Mr. Levandowski's gambit did not work; critical evidence of his misdeeds ended up being part of the evidentiary record. Most importantly, a due diligence report prepared by the investigative firm Stroz Friedberg for Uber's outside counsel ultimately had to be produced in the case. Uber had requested Stroz Friedberg

to undertake an investigation as part of its due diligence in relation to the purchase of OttoMotto LLC and Otto Trucking LLC. As part of that investigation, Stroz Friedberg interviewed Mr. Levandowski and he admitted to downloading and retaining Google documents, and also having had meetings prior to leaving Google with Uber executives and Google employees about moving his whole team to Uber. He also admitted that he had destroyed five disks of Google proprietary information just days before the interview, after an Uber executive instructed him not to do so. In an attempt to avoid any obligation to list the due diligence report on a privilege log or produce it, Uber made sure that it never received a copy of the report. But ultimately, after it was disclosed, the report was produced (by Uber's counsel) just days before trial was scheduled to start in October 2017. In light of the late production of the due diligence report, the trial was delayed until December 2017 to allow Waymo further discovery and preparation.

Then, in late November, another bombshell: Uber was forced to turn over a 37-page letter that a disgruntled former Uber employee had sent to Uber's in-house employment counsel in May 2017. The letter alleged that Uber had specific corporate groups charged with acquiring competitive intelligence in the form of competitors' trade secrets and unauthorized data. The letter further charged that Uber had violated court orders, rules, and governing laws by destroying evidence and evading discovery requests. It spelled out what had been done, how it had been done, and who had done it, including extensive allegations related to the Waymo litigation. The trial was again delayed to allow Waymo further discovery and preparation.

The case finally went to trial in February 2018, but not before Judge Alsup entered an "Omnibus Order on Extent to Which Accusations re Uber's Litigation Misconduct May Feature at Trial." Judge Alsup discussed in detail facts regarding Uber and Mr. Levandowski's spoliation of evidence, violations of prior court orders, and litigation misconduct, and explained the degree to which Waymo could (and could not) use those facts at trial to support its case. Judge Alsup also narrowed the case to only eight of the over 100 trade secrets that Waymo had initially identified. Then, one week into the trial, the parties abruptly announced they had settled the case, with Uber giving Waymo 0.34% of its stock (worth about \$245 million) and committing

not to use any Waymo trade secrets in its autonomous vehicles.

The *Waymo v. Uber* case showcased many of the difficulties in maintaining and enforcing trade secrets in a high tech company. Although employees need access to secrets during their employment in order to do their jobs, it is difficult to prevent the same employees from abusing that access (and misappropriating trade secrets) if they are intent on doing so. That is especially true if the employees lie during their exit interviews, as Mr. Levandowski did, and actively cover their tracks to avoid detection. Indeed, it appears that Google found out about Uber's alleged misappropriation only because of a misdirected supplier e-mail. But by the same token, companies must be extremely careful about bringing on employees from competitors and must seek only their expertise, not the confidential information they learned at their former employers. If they do not – and especially if they actively seek others' trade secrets, as Uber was alleged to have done – they may find that they are facing a jury that will be told that they are bad actors and that the only real issue is the magnitude of damages. It will take more education, and likely more litigation, before Silicon Valley companies put in place more robust protections for trade secrets in the hiring process, but doing so would help avoid future problems.

In another closely watched case, the long-running saga of Sergey Alenikov has drawn to a close with the New York Court of Appeals – the highest court in the state – affirming Mr. Aleynikov's conviction on state charges. The questions pending before the Court of Appeals were issues of statutory interpretation, but they go to the heart of the application of criminal laws to high tech. The Court of Appeals had to choose between allowing Mr. Aleynikov to walk free for actions that would generally be considered theft of intellectual property and twisting statutory language beyond its previously recognized meanings. If nothing else, Mr. Aleynikov's situation has shown the poor fit between criminal laws drafted decades ago and rapidly developing computer technologies.

Mr. Aleynikov drew the ire of prosecutors (first the U.S. Attorney for the Southern District of New York, then the Manhattan District Attorney) after he downloaded source code from Goldman Sachs's high frequency trading system in the last days before he left the firm, then saved it overseas. He was first prosecuted and convicted under the Federal National Stolen Property Act ("NSPA") and

EEA, but was freed by the U.S. Court of Appeals for the Second Circuit. The Second Circuit found that the NSPA did not apply to purely intangible property like source code, so it overturned that conviction. It also found the EEA had not been violated because the EEA covered only “trade secret[s] related to or included in a product that is produced for or placed in interstate or foreign commerce,” not trade secrets used in the practice of interstate or foreign commerce. Although Congress promptly changed the language of the EEA to remedy the problem after Mr. Aleynikov’s successful appeal, it was too late for him to be prosecuted under the revised Federal law.

Rather than the matter being dropped, the Manhattan District Attorney then brought charges based on the same conduct. The state charges were remarkable for several reasons. First, the Manhattan District Attorney offered a plea agreement under which Mr. Aleynikov would suffer no punishment beyond the time he had already served in his Federal case. But more incredibly, even after bringing charges, the District Attorney had opined that the relevant laws did not cover Mr. Aleynikov’s actions:

Another example illustrates the shortcomings of current law with respect to computer data. Suppose a bank’s computer programmer develops and maintains its proprietary trading system. The bank spent several million dollars to build, improve and maintain this extremely valuable system. Eventually, a competitor lures the programmer away from the bank with the promise of riches in exchange for a copy of the trading program’s source code. The programmer has taken from his employer — any layperson would say “stole” — property worth well over \$1 million, the threshold for Grand Larceny in the First Degree, a Class B felony. But because the deprivation was not permanent — the programmer, by definition, only copied the code, leaving the original on the bank’s network — *he cannot be charged with Larceny. . . . [H]e would face only Class E felony charges of Unlawful Duplication of Computer Related Material [of which Aleynikov was acquitted] or Computer Trespass.*

Now, despite the District Attorney’s statement, his office secured Mr. Aleynikov’s conviction on state charges despite his having not permanently deprived Goldman Sachs of access to its source code.

Mr. Aleynikov was convicted on one count of Unlawful Use of Secret Scientific Material, an offense enacted into law in 1967 after a notorious Federal case in which scientific information had been photocopied and taken, which would not have been covered by New York’s criminal laws at the time. The law states:

A person is guilty of unlawful use of secret scientific material when, *with intent to appropriate to himself or another* the use of secret scientific material, and having no right to do so and no reasonable ground to believe that he has such right, he makes *a tangible reproduction or representation* of such secret scientific material by means of writing, photographing, drawing, mechanically or electronically reproducing or recording such secret scientific material.

The two emphasized portions highlight the issues presented on appeal. First, is computer code that is only saved, never printed, a “tangible reproduction or representation”? Second, does the intent to “appropriate” focus on whether the defendant intends to keep the information permanently, or does it focus on whether the victim would lose use of the information? Finally, is the meaning of those provisions so clear that the rule of lenity — which dictates that a defendant should be convicted only if no reasonable interpretation of the statute would lead to an acquittal — would not apply?

First, with regard to whether source code is a “tangible reproduction or representation,” the parties’ dispute really boiled down to which of Black’s Law Dictionary’s definitions of “tangible” applies: the State urged a meaning based on the first definition (“having or possessing physical form”), whereas Mr. Aleynikov argued for the second definition (capable of being touched and seen; perceptible to the touch; capable of being possessed or realized”). The District Attorney argued that saved source code takes up space on a hard drive, meaning that it has physical form. Mr. Aleynikov responded that source code has no physical form, even when stored on a hard drive; the medium of the hard drive has physical form, the data does not. The majority of courts — including the Second Circuit in Mr. Aleynikov’s Federal prosecution — agreed with Mr. Aleynikov and construed source code to be intangible.

The parties both struggled to support their positions during oral argument. The court asked Mr. Aleynikov why source code printed so small as to be illegible without the assistance of a magnifying glass (such as in a one-point

font) should be criminalized by the statute, but an electronic version of the same code should not be. As the court asserted, both forms of reproduction require assistance of a device to see and understand. On the other hand, the State was unable to identify a single example of an intangible reproduction or representation, which would suggest its proposed definition would leave the term “tangible” without meaning.

Unfortunately, neither side addressed the fundamental difference between printed source code and electronically-stored source code. The former is in a programming language that can be read and understood by at least some programmers. The latter is merely a series of electrical charges representing ones and zeros that is not readily comprehensible to even the most skilled programmer.

The Court of Appeals rejected Mr. Aleynikov’s proposed definition of “tangible reproduction or representation” in two steps. First, it asserted that, if construed that way, “the term does not apply to ink printed on paper any more readily than to source code, and provides no workable criterion.” Second, it indicated that the question was not whether source code was tangible (and, to conform with prior cases, the court was constrained to agree that source code is intangible), but whether a copy of that source code would be tangible when downloaded. Thus, the court sought to distinguish between source code generally and a copy of source code taking up physical space on a hard drive or CD.

The court’s position is curious, and appears to be based on a limited computer literacy. The court’s first statement is odd, as there is no doubt that paper with printed indicia can be touched by hand. On the other hand, virtual (that is, not printed) source code is not stored in the same format as it is printed; it is saved in binary. Therefore, it cannot be touched as compiled source code, even on a microscopic level. There is a clear distinction that, while perhaps intellectually unsatisfying, is easy to police. Second, even before it is saved, computer code takes up physical space (whether in memory or saved on media). That is, the Court of Appeals makes a distinction where there is no difference.

Notably, the court struggled to provide any meaning to the term “tangible” in the phrase “tangible reproduction or representation.” It posited the example of memorization of source code, but noted that such memorization would

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# User Interfaces: Navigating the Patent-Eligibility Landscape

By Lawrence H. Aaronson and James L. Korenchan

User interface technology at its core enables user interaction with underlying digital systems or other technology. Whether through use of visual elements, speech interaction, touch, or other mechanisms, a well-designed user interface will make the user interaction smooth, efficient, intuitive, and productive, providing user-friendly and seamless communication between the user and the underlying technology.

Advances in user interface design can also provide key competitive differentiation and advantage, helping to distinguish otherwise commoditized products and services such as computers, web services, wearables, appliances, and the like. Given this advantage, protecting advances in user interface design can also be critically important from a business perspective.

Intellectual property law provides various forms of protection for user interface design, ranging from trademark and copyright for protecting brand identity and original creative expression in the design, to design patent for protecting innovative ornamental design features (including both static and animated features), to utility patent for protecting utilitarian, functional aspects of the user interface.

As to utility patent protection, recent developments in the law have raised issues regarding the patenting of inventions that include what might be considered “abstract” features, broadly interpreted as encompassing longstanding, fundamentally known technology. Arguably, at some level, many user interface designs include or make use of what is now fundamentally known technology, such as basic touch-screen and voice interaction mechanisms. At issue under the law is then whether there is sufficiently more to such a user interface design to make it patent-eligible.

Claims must routinely survive the Supreme Court’s two-step *Alice Corp.* framework to be found patent-eligible under 35 U.S.C. § 101. Under this two-step framework, one must first determine whether the claim as a whole is directed to one of three judicial exceptions: a law of nature, a natural phenomenon, or an abstract idea. Then, if the claim is directed to one of the judicial exceptions, one must

determine whether any element or combination of elements in the claim recites significantly more than the judicial exception.

When determining whether the claim is directed to a judicial exception, one must identify any claim elements that go beyond the judicial exception, and determine whether those elements are well-understood, routine, and conventional activities. For instance, while a claim may contain an abstract idea, and may contain other known components or features, the claim as a whole may still contain a non-routine or unconventional combination of elements and may thus be found to be patent-eligible.

But the *Alice* battle is typically won or lost based on step two. Courts have found that claims recite “significantly more” than a judicial exception, and are thus patent-eligible, when the claimed invention improves a computer or technological process and does so in an innovative manner. On the other hand, a generic, computer-based implementation of an abstract process is not enough to elevate a claim to a level of patent-eligibility.

These principles apply to advances in user interface technology and may parallel some of the design goals noted above. From a design perspective, user interfaces should be useful and technologically innovative. So too from a patent-eligibility standpoint, the focus should be on key, innovative, technological advances of the user interface, rather than fundamental user interface design elements.

In seeking patent protection for a user interface invention, it is important to emphasize the technological problem addressed by the user interface and the innovative technological solution that the user interface provides. Key factors here include establishing that the user interface advance is rooted in technology and establishing that the advance is innovative.

For example, in *DDR Holdings, LLC v. Hotels.com, L.P.*, the invention related to generating a composite webpage by combining elements of a host website with third-party merchant content. The invention helped prevent a host web provider from losing its interaction with a user when the user clicks on a third party’s ad. To achieve this, the invention

presented the third party’s content but retained the host’s look and feel based on stored indications of user interface components such as logos, colors, frame, mouse-over events, and so forth.

The *DDR* court found that, even though the claims involved both a computer and the Internet, they did not merely recite a pre-Internet business process with a requirement to perform the process on the Internet, but rather that the claimed solution was “necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer networks” (where a user would be instantly transported away from the host upon clicking on a third-party ad). As such, the court noted that the invention “overrides the routine and conventional sequence of events ordinarily triggered by the click of a hyperlink.”

Going beyond mere mouse clicks, hyperlinks, and other fundamentally known computer and Internet features, the user interface in *DDR* is a good example of non-abstract focus on overcoming a specific technological problem and achieving a specific technological result in an innovative manner, to help establish patent-eligibility.

In contrast, in *West View Research, LLC v. Audi AG*, the invention in question was directed to a computerized apparatus for interactive information exchange with a human user through conventional user interface components and an apparatus for receiving user input, tailoring keys based on user selection, and presenting selected content to the user. The *West View* court found that the claims were directed to an abstract idea with generic computer implementation, involving use of conventional elements at a high level of generality. Therefore, the court found that there was not a sufficient inventive concept. Had the inventions in *West View* focused more on innovative technological advances that went beyond fundamentally known user interface features, the result might have been different.

Likewise, in *Affinity Labs of Texas, LLC v. Amazon.com Inc.*, the invention was directed to communicating targeted information to a user, or more particularly to “a network-based media system with a customized user interface, in which the system delivers streaming content from a network-based resource upon demand to a handheld wireless electronic device having a graphical user interface.” In seeking to establish that the invention was technologically

concrete, the patent owner in *Affinity Labs* argued that the claimed invention embodied technological features of wireless streaming of media and of a customized user interface. But the court found that both of those features were very well known and that such fundamental technologies were insufficient to establish that the invention was not directed to an abstract idea.

Similarly, in *Apple, Inc. v. Ameranth, Inc.*, the claims were directed to generating and transmitting menus, where menus are stored and displayable on a graphical user interface and where an application program allows generation and transmitting of a new menu based on user selections from the displayed menus. On appeal from a decision of the Patent Trial and Appeal Board, the court found that the claims were directed to an abstract idea, on grounds that “[t]hey do not claim a particular way of programming or designing the software to create menus that have these features, but instead merely claim the resulting systems.” Further, the court found that the claims do not transform the abstract idea into patent-eligible subject matter, as the claims merely add conventional computer components to well-known business practices.

Along these lines, the Federal Circuit has also emphasized the importance of both claiming and describing in the patent application sufficient technological details, to help establish and support how the invention is rooted in technology and provides a sufficiently specific, innovative advance to be patent-eligible.

For instance, in *DDR*, the court reviewed various earlier cases and noted that in many of those cases the “claims were recited too broadly and generically to be considered sufficiently specific and meaningful applications of their underlying abstract ideas.” Against that background, the *DDR* court then found that the claims at issue recited sufficiently detailed features, supporting a conclusion that claimed solution was necessarily rooted in computer technology to overcome a specific technological problem.

Similarly, in *Affinity Labs*, the court found that the claim was written in largely functional terms, claiming a “a collection of instructions” that perform the functions of displaying a selection of available content on a graphical user interface and allowing the user to request streaming of that content. Further, the court noted that the patent did not disclose any *particular* mechanism to achieve a particular

solution to the identified problem, but that the patent rather provided just a high-level functional description. Such high-level description and claiming, the court held, were insufficient to convert the abstract idea of delivering media content to a handheld device into a concrete solution to a problem. Therefore, the court held the claimed invention to be patent-ineligible.

As yet another example, in *Move, Inc. v. Real Estate Alliance*, the Federal Circuit struck down claims relating to a user interface for geographically searching for real estate properties on a computer. This invention, which included a zoom feature for zooming in on a displayed map in order to identify available real estate located within the zoomed-in area, was viewed by the court as merely using computers to serve a conventional purpose. The claim steps were recited at a high level as performed by generic hardware components and, as in *Affinity Labs*, the court found that the claims were too general and that the specification did not provide sufficient details about the technical advance. No doubt more detailed claims and descriptions would have given the invention a fighting chance.

And similarly, in *Internet Patents Corp. v. Active Network, Inc.*, the Federal Circuit found that the patent at issue lacked a sufficient description of the claimed improvement, thus supporting a conclusion that the invention was patent-ineligible. The invention was directed to a web browser that retains information that a user has typed into form, so that the user can navigate away from and back to the form without needing to retype the information. After concluding that the invention is directed to an abstract idea including the known concept of navigation back and forth between web pages, the court found that the patent did not describe *how* to achieve the recited and apparently essential feature of saving page state. Therefore, the court concluded that the claimed invention was really just directed to “the idea itself—the abstract idea of avoiding loss of data.” Here too, had the patent owner described or claimed more technological details about structure and operation of the user interface, the result may have been different.

Most recently, the Federal Circuit has highlighted *efficiency* of the user interface invention as a representative, sufficient technological advance. For example, in *Core Wireless Licensing S.A.R.L. v. LG Electronics, Inc.*, the Federal Circuit emphasized how the

claimed user interface makes information easier to access on computing devices. The invention was directed to a manner of summarizing and presenting information on computing devices by requiring a particular access window and restraining the type of information that is presented. The Federal Circuit noted how generic, conventional, and inefficient prior art user-interface methods diminished the user experience by requiring scrolling, drilling down, and/or switching views to find information, whereas the claimed user interface improved on the prior art by providing a specific manner of displaying a limited set of information to the user. The Federal Circuit particularly liked a description in the patents explaining how the claimed interface improved the functioning of computers with small screens.

Likewise, in *Trading Technologies Int’l, Inc. v. CQG, Inc.*, the claims were directed to displaying information relating to and facilitating trading of commodity, with bid and ask regions each adjacent to a common static price axis in a manner that facilitated more accurate order placing. Applying the *Alice* analysis, the court found that the claimed invention was directed to a specific improvement in the way computers operate, as the user-interface method imparted a specific functionality to a trading system “directed to a specific implementation of a solution to a problem in the software arts.”

Based on these recent cases, a reasonable approach in seeking to patent user interface innovations would be to focus on interface features and functionality that improve technological efficiency. Further, as the other cases above suggest, it would be best to tie otherwise abstract (*e.g.*, well-known) user interface features to solving an identified problem, and to describe and recite sufficient details to establish how the user interface design provides a non-abstract, innovative technological advance.

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# Using Patent Data Analytics in Patent Valuation

By David R. Grosby and Adnan “Eddie” M. Obissi

Valuation of patents is a practice influenced by commonly adopted theories and approaches. Most patent valuation theories are similar to those used in the valuation of any tangible property, such as a car or a house. One common approach is comparing the asset in question to other similar assets. For example, an individual may be shopping for a new car and see that a particular car has a list price of \$40,000. To determine that the car is offered at a fair price, the individual might compare that car with commensurately priced cars having similar attributes. This concept is the bedrock of the “market approach” to patent valuation—deriving the value of a patent by comparing the patent to comparable patents that have been recently sold or licensed.

Another common approach to patent valuation is referred to as the “cost approach,” which focuses on the theory that the maximum a purchaser will pay for an asset is the cost to create or replace that asset. For example, a company that desires to sell or license its patent may ask “what is the cost of research, development, equipment, and implementation of an equally effective technology?” The company may then offer to sell or license the patent at approximately the amount derived from this inquiry. One potential issue with the cost approach is that certain technology fields may not have alternate technologies (*e.g.*, pharmaceutical technologies). This lack of alternatives may foreclose the use of the cost approach when determining a patent’s value.

The final common approach to patent valuation is the “income approach.” The income approach centers on the future income flow the patent will generate. For example, if a patent is expected to generate \$5 million in future royalties, the patent could be reasonably valued at \$5 million. One problem with this method is it can be difficult to calculate future income generation unless there are already executed licenses in place for the patent in question.

The combination of the market, cost, and income approaches drives much of the patent valuation landscape. However, due to the problems of each approach discussed above,

there has been a trend to use patent data analytic techniques as a supplement to the traditional valuation approaches to provide a more accurate representation of a patent’s value. These data analytic techniques may include evaluating the legal status of the patent (*e.g.*, potential challenges under 35 U.S.C. § 101, etc.), the prior art cited during prosecution of the patent, the existence and outcome of any oppositions and litigations involving the patent, the technological scope of the patent, the breadth of the patent’s claims, and the patent filing strategy (*e.g.*, overall number of continuations, divisionals, etc.).

While these data analytic techniques may provide meaningful information when combined with the traditional valuation approaches, they are almost wholly inapplicable to a particular class of patents—newly issued patents that do not have any of the aforementioned data points associated with them.

This article focuses on how patent prosecution data analytics can be applied to the valuation of patents. Because there are a variety of methodologies for such valuations, and each method uses multiple metrics for establishing patent value, the scope of this discussion will be limited to a base case scenario involving a newly-issued patent associated with little or no relevant litigation data. Further, it is assumed that the patent can be evaluated relative to a statistically significant data set of patents in the same or similar technology spaces. Finally, the patent is assumed to be valid. With this context in mind, throughout this article multiple patent prosecution statistics will be evaluated for use in valuing the patent, including allowance rate, number of office actions, and Patent Trademark and Appeal Board (PTAB) review disposition.

## Allowance rate

As described above, comparing an allowed patent to others in similar technology spaces may provide insight into the patent’s relative value. For instance, in a particular art unit having a low allowance rate, any patent allowed by that art unit might have a disproportionately high value in the market. By way of example, the most allowance adverse

art unit at the United States Patent and Trademark Office (USPTO) is a data processing unit, 3689, most commonly associated with business methods. As of April 2018, that art unit’s allowance rate was 8.6%, and only 78 applications have been allowed in the last three years. Accordingly, a patent prosecuted and allowed by art unit 3689 may have a higher value relative to patents issued by more allowance friendly art units.

Similarly, allowed patents that were prosecuted before particularly discerning examiners might have relatively high values. There is a wide variance in patent examining practice, and allowance rates for individual examiners reflect this. While the average allowance rate at the USPTO is about 70%, some examiners have allowance rates lower than 5%. Accordingly, patents that are ultimately allowed by these examiners might be vetted more thoroughly than their counterparts. To the extent that likelihood of validity plays a role in valuing a patent, the allowance rate of the examiner can be indicative of the allowed patent’s value. However, practitioners should note that examiners with low allowance rates may have undesirable statistics in other relevant metrics, so the allowance rate of the reviewing examiner for a patent should be weighed in view of other patent prosecution statistics, as discussed below.

## Number of office actions and amendments to the claims

Comparing the number of office actions in an allowed patent to patent prosecution statistics can also be effective in determining the value of the patent. Because patent applicants often make amendments to claims when responding to office actions, the number of office actions also correlates to the breadth of issued claims. Additionally, because patent applicants provide remarks in each office action response, increasing the number of received office actions also increases the likelihood of explicit disclaimer of claim scope during prosecution. Each of these factors will generally weigh against the value of an issued patent.

Given that the number of office actions issued for a given patent application generally weighs against the value of that patent, a newly-issued patent can be compared to those in relevant art units. For example, receiving a first action allowance in an art unit where applications typically receive three or more

office actions may indicate that the claimed invention is particularly novel. Such a conclusion may be bolstered if the application was evaluated by a particularly difficult examiner. In contrast, receiving a first action allowance from a particularly lenient examiner is less compelling, even though the allowed application did not require any amendments or remarks.

Practitioners can also compare changes to the claims of the allowed patent with those of other patent applications. Amendments to patent applications in different technology spaces can range from concise to verbose depending on what is required to overcome prior art rejections. For example, amendments to applications in the Data Processing class, on average, have lengthier amendments than applications in the Drug, Bio-affecting, and Body Treating Compositions class. An allowed patent whose independent claims stay substantially the same might be worth more than typical patents in an art unit where the average independent claim grows by 100 words or more. As an illustration, the average change in claim length for patents examined in art unit 3689 between publication and disposition hovers around 150 words. Accordingly, a patent that escapes this art unit with little to no amendment may be more valuable relative to those that required substantial change throughout prosecution.

## PTAB statistics

PTAB statistics for a particular examiner or art unit may also be effective during the valuation of a patent. As discussed above, obtaining a granted patent from an examiner with a low allowance rate does not alone indicate that the patent has a high value. This is due in part to the PTAB's ability to reverse examiners on appeal. For example, an examiner may have a low allowance rate (*e.g.*, 25%), but may get reversed by the PTAB 75% of the time. This high reversal rate may indicate the examiner lacks technical understanding within the art unit, is inexperienced, or exhibits stubbornness during patent prosecution. Any of these factors may result in a less valuable patent because the patent may be vulnerable to a validity challenge via an IPR or during district court litigation. In contrast, obtaining a granted patent from an examiner with a low allowance rate and a low reversal rate may be particularly valuable. Because the examiner correctly allows a low percentage of patents, the patent

can be said to be more likely to withstand validity challenges.

Further, a low reversal rate may increase a patent evaluator's confidence in other metrics. For example, a low reversal rate may indicate that a particular examiner's average number of office actions is the optimal amount of prosecution necessary to grant a high quality patent. A low reversal rate may also increase confidence in the granted patent's claim breadth because the claims are less likely to be amended due to unnecessary office actions. Conversely, a high reversal rate may indicate the examiner causes unnecessary prosecution that can result in a higher average number of office actions or unnecessarily narrow claim breadth.

Utilizing these PTAB statistics, patent valuation experts can feel confident relying on the other metrics including allowance rate, number of office actions, and amendments to the claims.

Using prosecution data analytic techniques also allows an evaluator to independently analyze the patent's value instead of having to use a comparative approach (*e.g.*, comparable patents' claim scope, litigation history, etc.). While the comparisons contemplated in this article focus on using entire art units or classes to perform this evaluation, more targeted analysis can be performed. For example, patent prosecution statistics are readily applicable to the market approach of patent valuation. In this context, rather than comparing the patent to an art unit as a whole, a patent landscape review can be performed using keywords found in the patent, and each patent prosecution metric can be compared between the patent and others that fall in the patent landscape. Alternatively, the

*(continued from page 5)*

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### Endnotes

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- 5 773 F.3d 1245 (Fed. Cir. 2014).
- 6 *Id.* at 1257.
- 7 *Id.* at 1258.
- 8 685 F. App'x 923 (Fed. Cir. 2017).
- 9 *Id.* at 927.
- 10 *Id.*

patent can be compared to others within the same portfolio, or with patents that contracting parties consider particularly valuable.

## Conclusion

In sum, if used together to paint the whole picture, data analytic techniques remain a reliable means for evaluating patents, even where litigation data is not available for a given patent. In scenarios where a patent has just issued, patent prosecution analytics can indicate the likelihood that the patent is valid, and generally inform the relative value of the patent compared to others in its technology space. And, while each metric may only incrementally further a practitioner's understanding of the patent, patent prosecution data can collectively provide robust insight into the patent's value.

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- 12 *Id.* at 1269.
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- 15 *Id.* at 1241.
- 16 *Id.* at 1242.
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- 19 *Affinity Labs*, 838 F.3d at 1271.
- 20 *Id.*
- 21 *Id.* at 1272.
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- 23 *Id.* at \*4.
- 24 *Id.*
- 25 790 F.3d 1343 (Fed. Cir. 2015).
- 26 *Id.* at 1344-45.
- 27 *Id.* at 1348.
- 28 *Id.*
- 29 880 F.3d 1356 (Fed. Cir. 2018).
- 30 *Id.* at 1359.
- 31 *Id.* at 1363.
- 32 *Id.*
- 33 675 F. App'x 1001 (Fed. Cir. 2017).
- 34 *Id.* at 1006 (quoting *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1339 (Fed. Cir. 2016)).

# Intelligent Machines — Engines of Intellectual Property Creation?

By Aaron V. Gin, Ph.D. and Diego F. Freire

Recently, artificial intelligence (AI) has become an increasing part of our daily lives. Many of us utilize virtual assistants such as Apple's Siri and Amazon's Alexa, we interact with customer support through chat bots, and we receive individualized content curated by Netflix, Facebook, and Spotify. These services are increasingly powered by artificial intelligence, which some define as any artificial system that can perform tasks under varying and unpredictable circumstances, without significant human oversight, or that can learn from their experience and improve their performance. Such intelligent machines can include computing systems that apply machine learning or deep learning architectures that mimic the neural networks of the human brain.

Although the term artificial intelligence and the first AI programs were developed in the 1950s, the development of AI-based systems is now accelerating at a pace surpassing even experts' expectations. This strongly suggests that in the near future, AI-enabled systems will become even more deeply engrained in our society. Within a few years, self-driving cars, AI-powered health care (*e.g.*, diagnosis, personalized drug development, and treatment), and personal assistants (that can do much more than merely set timers and control household appliances) will be commonplace. Additionally, improvements in artificial *general* intelligence (AGI) systems may eventually challenge human intelligence in terms of creativity and inventive talent. With this context, intellectual property practitioners should reexamine the fundamental aspects of IP creation when artificially-intelligent systems are involved.

This article explores how current trademark, copyright, and patent law may apply to scenarios in which an AI, without significant human oversight, might place goods and services in commerce, "create" works, or "invent" novel and non-obvious innovations.

## AI and Trademark Law

Trademark law serves multiple purposes including to: a) assure a potential customer that goods or services with a distinguishing mark are made by the same producer as other

similarly marked goods or services; and b) assure a producer that an imitating competitor will not be able to benefit from financial or reputation-related rewards associated with a desirable good or service. The Lanham Act accomplishes these purposes by allowing a person who is an owner of a trademark used in commerce to register that trademark on a Federal principal register. Under the Act's definitions, the term "person" need not include

**Under current patent law, AI-based systems cannot be "inventors" because they are not "persons." Furthermore, if no human can be said to have been involved in, or conceived of, any element of any claim, such a patent would be seemingly invalid for lacking an inventor, as defined by the AIA.**

a "natural person," but could also include "a juristic person" such as a legal entity "capable of suing and being sued in a court of law."

Today, AI-based services predict purchases, recommend products to customers, and place specific products in commerce through online shopping. Assuming the services act substantially without human intervention and are placing goods and services into the stream of commerce (*e.g.*, by offering them for sale in an advertisement), the relevant inquiry is whether a trademark right could inure from such AI behavior, and if so, to what entity would the right inure.

Here, if the AI is considered a juristic person, it could apply for, and eventually obtain the trademark. If the AI is not a juristic person

for the purposes of the Lanham Act, it could not *itself* apply for a trademark. However, the Act does not require the specific entity that places the goods or services in commerce to apply for the trademark. Accordingly, under current law, an operator or an owner of the AI could apply for trademarks on behalf of the AI-based service.

## AI and Copyright Law

The "IP Clause" of the United States Constitution grants Congress the power to secure for "authors" an exclusive right to their respective works. The Copyright Act later codified the Constitution to provide protections for "original" works of "authorship" fixed in any tangible medium of expression. However, neither the Constitution nor the Copyright Act defines "author" or authorship.

For the purposes of copyright, Supreme Court jurisprudence has defined an author as "the party who actually creates the work, that is, the person who translates an idea into a fixed, tangible expression entitled to copyright protection." Recently, this arguably ambiguous definition of author has been tested by advocates for non-human authors. For example in *Naruto v. Slater*, legal representatives for a photo-taking crested macaque asked a district court to recognize the animal as author (and rightful owner) of copyrighted photographs (dubbed the Monkey Selfies). In its analysis, the court stated that the Copyright Act does not have any "mention of animals anywhere . . . [and that] the Supreme Court and Ninth Circuit have repeatedly referred to 'persons' or 'human beings' when analyzing authorship under the Act." Without deciding the merits of authorship or ownership, the district court dismissed, stating that the Copyright Act does not confer standing to non-human animals to sue for copyright infringement.

By rule, the United States Copyright Office enforces a "Human Authorship Requirement" and "will refuse to register a claim if it determines that a human being did not create the work." Furthermore, the Copyright Office will not register works produced by "a machine or mere mechanical process that operates randomly or automatically without any creative



input or intervention from a human author.”

Today, AI-based applications are regularly creating works without significant human oversight that would normally qualify for copyright protection. For example, the Associated Press has been using AI to write and publish articles. Furthermore, an AI bot created an entire screenplay, which was subsequently made into a short sci-fi film called *Sunspring*.

Such real-world examples raise the issue of whether an original and fixed work created solely by AI could obtain copyright protection. However, current Copyright Office rules and copyright jurisprudence indicate that solely-AI-created works cannot obtain copyright protections.

In 1979, shortly after the most recent Copyright Act, a National Commission concluded that there was “no reasonable basis for considering that a computer in any way contributes authorship to a work produced through its use.” However, in 1986, a Congressional Advisory Panel questioned such a restrictive interpretation of computer operations:

It is still an open question whether the programmed computer is unlike other tools of creation. Authorities in the field of artificial intelligence (AI), although disagreeing on AI nature and purpose, do agree that its aim is to produce a pattern of output that would be considered intelligent if it were displayed by a human being. One must ask, therefore, whether machines or interactions with machines might produce a pattern of output that would be considered creative or original if done by a human being. If machines are in any sense co-creators, the rights of programmers and users of programs may not be easily determined within the present copyright system.

For this reason, some argue that AI-based applications should be treated under the work made for hire doctrine, which considers a corporate entity as a legal author of a work for which it is not the author-in-fact. Other jurisdictions such as Hong Kong, India, Ireland, New Zealand, and United Kingdom have interpreted or amended their copyright laws under similar doctrinal theories. For example, in the UK, the author of computer-generated artistic works is assumed to be “the person by whom the arrangements necessary for the creation of the work are undertaken.”

## AI and Patent Law

In addition to copyright, the IP Clause of the Constitution provides Congress the power to secure to inventors a limited exclusive right to their respective discoveries – a patent. Like “authors,” the Constitution does not define “inventors.” However, “inventor” is defined in the Leahy-Smith America Invents Act (AIA) as “the individual or, if a joint invention, the individuals collectively who invented or discovered the subject matter of the invention.” The AIA also requires that “a person shall be entitled to a patent unless . . .,” suggesting that only a person can be an inventor. Additionally, pre-AIA law requires that a person contribute to the conception of an invention. Accordingly, patent law requires an inventor to be a person.

AI-based applications are currently developing products ranging from car components to drug molecules that would normally qualify for patent protection. One example is the cross-bristle design for the Oral-B Cross Action toothbrush created by the Creativity Machine, an AI-based construct.

Such real-world examples raise the issue of whether a novel invention created solely by AI can obtain patent protection. Under current patent law, AI-based systems cannot be “inventors” because they are not “persons.” Furthermore, if no human can be said to have been involved in, or conceived of, any element of any claim, such a patent would be seemingly invalid for lacking an inventor, as defined by the AIA.

## Conclusion

Today, artificial intelligence-based computing systems are routinely outperforming humans in a variety of narrow tasks due to advances in fields such as machine learning and neural networks. These breakthroughs should cause practitioners, and society at large, to seriously consider whether solely-AI-created works and inventions should garner IP protection. While an AI “operator” or owner can currently seek federal rights under trademark law, existing US copyright and patent laws require a human creator of a copyright work and a human inventor for each patent claim. As more generalized forms of artificial intelligence begin to match and surpass human cognitive abilities, it will be interesting to see whether and how Congress might expand intellectual property law to accommodate AI-authorship and invention.

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- 21 U.S. CONG. OFFICE OF TECHNOLOGY ASSESSMENT, INTELLECTUAL PROPERTY RIGHTS IN AN AGE OF ELECTRONICS AND INFORMATION, 72 (1986).
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- 23 Andrews Guadamuz, *Artificial Intelligence and Copyright*, WIPO MAGAZINE (Oct. 2017), [http://www.wipo.int/wipo\\_magazine/en/2017/05/article\\_0003.html](http://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html).
- 24 UK Copyright Law, § 9(3) of the Copyright, Designs and Patents Act (CDPA) (1988).
- 25 Constitution, *supra* note 10.
- 26 35 U.S.C. § 100(f) (2015).
- 27 35 U.S.C. § 102(a) (2015) (emphasis added).
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(continued from page 3)

not fall under the statute anyway because the reproduction or representation must be “by means of writing, photographing, drawing, mechanically or electronically reproducing or recording.” It avoided that inconsistency by stating, “the word ‘tangible,’ as we interpret it, does not introduce redundancy; it adds a modest element to ‘reproduction,’ serving to emphasize that the crime consists in making a physical, not a mental, copy of secret scientific material.” But that “emphasis,” in light of the requirement of certain means for making the reproduction, is redundancy.

Second, with regard to the term “appropriate,” the larceny provisions of the New York penal code actually have a definition of the term “appropriation”; including to exercise control over property “permanently or for so extended a period or under such circumstances as to acquire the major portion of its economic value or benefit.” Traditionally, that has meant that the malefactor has deprived the victim of control of the appropriated goods or services. But the State suggested an example in which that would not be the case, when someone “steals” cable service. In that example, the subscriber continues to receive cable service undiminished by the thief’s actions but the cable company has lost revenue. It was unclear, however, if that would fall within the scope of “appropriation,” for the cable company is the real victim, not the subscriber.

The Court of Appeals dealt quickly with Mr. Aleynikov’s argument that he did not intend to appropriate the relevant source code because he did not intend to deprive Goldman Sachs of the source code. In doing so, it disaggregated the definition of “appropriate.” Under the New York Penal Law, “[t]o ‘appropriate’ property of another to oneself or a third person means (a) to exercise control over it, or to aid a third person to exercise control over it, permanently or for so extended a period or under such circumstances as to acquire the major portion of its economic value or benefit, or (b) to dispose of the property for the benefit of oneself or a third person.” Although the statute did not indicate as much, the court asserted that the definition was intended to indicate that control could be exercised (i) permanently or (ii) for so extended a period or under such circumstances as to acquire the major portion of its economic value or benefit. From that, it surmised that exercising permanent control over another’s property would be sufficient, and asserted that Mr. Aleynikov intended to exercise control over the source code permanently, since he admittedly did not intend to

return the copy of source code in his possession.

The court then noted that “appropriate” cannot mean “deprive” because the two terms are defined separately. But the two definitions are parallel: deprivation relates to possession of property, appropriation relates to control over property. The court also focused on the statute’s requirement that the intent to appropriate relate to “the use of secret scientific material,” not the material itself. From that, without any further reasoning or citation, the court concluded, “[i]n focusing on the appropriation of the use of scientific material, rather than appropriation of the material itself, the statute necessarily contemplates the simultaneous exercise of control by the rightful possessor of the scientific material.”

The court’s resolution of the appropriation issue is a bit odd, as it elided the distinction between the source code and the copy of the source code it made so carefully in relation to “tangible reproduction or representation.” That is, Mr. Aleynikov certainly intended to keep the copy of source code he had made, but had no intent to control Goldman Sachs’s use of its own copy of the source code. Further, it does not necessarily follow from inclusion of the term “use of” that the statute intended to cover simultaneous exercise of control. To the contrary, that interpretation creates a tension between the definition of “appropriate” and the unlawful use statute. But the court did not address the inconsistency between the two interpretations.

Given the lack of clarity over whether the criminal laws cover Mr. Aleynikov’s actions, it would have seemed to be most appropriate for the Court of Appeals to acquit him, despite his bad acts, under the rule of lenity. However, the Court of Appeals dismissed that possibility with a brief statement that “[d]efendant’s remaining contentions lack merit.”

Mr. Aleynikov’s two cases have illuminated many of the weaknesses of the existing laws in relation to high tech crimes. For all of the foresight that the drafters of the criminal laws may have had in the 1960s, they could not have foreseen all of the possibilities for Internet-based misconduct. As a result, prosecutors and the courts are put in the awkward position of determining how to deal with charges for actions unforeseen at the time of enactment. The best practice would be to continually amend the laws to ensure they are up to date, but the legislative process moves very slowly. These are difficult problems that create unforeseen complications and ramifications. In any event, in amending the New York penal

laws, today’s drafters would be well-served to consult and consider lessons learned from the *Waymo v. Uber* and *Aleynikov* cases.

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## Endnotes

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Whoever, with intent to convert a trade secret, that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit of anyone other than the owner thereof, and intending or knowing that the offense will, injure any owner of that trade secret, knowingly—  
(1) steals, or without authorization appropriates, takes, carries away, or conceals, or by fraud, artifice, or deception obtains such information;  
(2) without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information;  
(3) receives, buys, or possesses such information, knowing the same to have been stolen or appropriated, obtained, or converted without authorization;  
(4) attempts to commit any offense described in paragraphs (1) through (3); or  
(5) conspires with one or more other persons to commit any offense described in paragraphs (1) through (3), and one or more of such persons do any act to effect the object of the conspiracy, shall, except as provided in subsection (b), be fined under this title or imprisoned not more than 10 years, or both.
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- 40 Oral Argument Transcript, *supra* note 36, at 10-14.
- 41 *Id.* at 18 (“In this context, it’s hard to think what an intangible reproduction would be.”).
- 42 *People v. Aleynikov*, No. 47, 2018 WL 2048707, at \*8 (N.Y. May 3, 2018).
- 43 *Id.* (quoting N.Y. Penal Law § 165.07).
- 44 *Id.*
- 45 N.Y. Penal Law § 155.00(4).
- 46 Brief for Defendant-Appellant, *supra* note 31, at 46-50.
- 47 Brief for Respondent, *supra* note 37, at 52-53; Oral Argument Transcript, *supra* note 36 at 15-16.
- 48 N.Y. Penal Law § 155.00(4).
- 49 See N.Y. Penal Law § 155.00(3).
- 50 *Aleynikov*, 2018 WL 2048707, at \*13.
- 51 *Id.*



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