The Federal Circuit's *Post-Bilski* Jurisprudence: The Patentability of Internet- and Computer-Based Inventions

*Editor’s note: This article was the second-place finisher in the Pennsylvania Bar Association Intellectual Property Law Section’s 2012 writing competition. The contest, established in 2004, provides an opportunity for law students to express in writing their insight and knowledge in the areas of patents, copyrights, trademarks, trade secrets and trade dress.*

By Alan Leung

**Introduction**

During the 1980s and ‘90s there was much concern over whether patents would severely damage the software industry.1 While patent law appears to have only played a minor role in affecting the general shape and direction of the software industry,2 there is still much to be concerned about from the perspective of those who practice in this industry. Unlike many other industries where a single patent covers a whole product, “a [single] software product could easily involve hundreds of patents.”3

At least “one hundred thousand software or software-related patents are now in force in the United States, and several thousand more are being issued every year.”4 Moreover, there is currently billions of dollars at stake in litigation each year over software patents.5 Combined with the continuing uncertainty of where the patentability boundaries lie in this field, the topic is still very significant today.6

In establishing the governmental framework for our patent system, our founding fathers were keenly aware that the protection of intellectual property rights was important to the growth and prosperity of our nation.7 Section 101 of the United States Patent Act provides that “[w]hoever 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 thereof, subject to the conditions and requirements of this title.”8 With limited exceptions, §101 provides generally broad patent eligibility principles.9 Other statutorily codified requirements from the Patent Act,10 which are not addressed in this paper, including novelty,11 obviousness12 and enablement,13 must additionally be satisfied for patent eligibility.

“Process” as defined in the Patent Act “includes a new use of a known process, machine, manufacture, composition of matter, or material.”14 Typically patent claims for processes are directed toward a method or series of steps for producing some end product.15 With rapid advances in the field of computer technology and biological sciences, new lines of discovery are challenging the boundaries that define what patentable processes are, particularly when there is not an apparent machine or manufacture at play.16

This [article] proceeds in two parts. Part I briefly summarizes the role of the Federal Circuit and its attempt in creating a less ambiguous patentability test. Part II analyzes four recent Federal Circuit opinions that address patentability of Internet- and computer-based inventions in the wake of the Supreme Court's *Bilski* decision.

I. The Federal Circuit and the Machine-or-Transformation Test

The U.S Court of Appeals for the Federal Circuit (the “Federal Circuit”) has exclusive nationwide jurisdiction over appeals that include causes of action arising under U.S. patent laws.17 Prior to the creation of the Federal Circuit in 1982, regional circuit courts of appeals had jurisdiction over such appellate matter.18 However, with concerns over forum shopping and a lack of uniformity in the nation's patent law,19 the Federal Circuit was created by the Federal Courts Improvement Act of 1982 to help establish a more coherent body of law.20

Although the U.S. Supreme Court maintains ultimate appellate jurisdiction and its decisions are binding on the Federal Circuit,21 the Supreme Court's role in patent law has been characterized as one of a “non-custodial parent.”22 Much of the daily developments in patent law are largely left with the Federal Circuit.23 On the occasions that the Supreme Court intervenes, it has largely ignored Federal Circuit decisions.24 Professor Rebecca S. Eisenberg of the University of Michigan Law School posits that this
has “[s]et the stage for the Federal Circuit to read Supreme Court decisions narrowly in the future,” and as a result, they are unlikely to craft any broad tests for fear they will be deemed too restrictive.25

In Bilski, the invention at issue dealt with a method of hedging risks against energy price and volume changes caused by bad weather.26 In essence the claimed method hedges risk in the field of commodities trading and enables consumers to pay a fixed rate regardless of future fluctuations in weather, fuel prices, etc.27 Confronted with this seemingly fundamental principle, the Federal Circuit struggled with applying its previous “useful, concrete and tangible result” established in Alappat28 and State Street Bank.29 The court ultimately deemed the test to be insufficient.30

The Federal Circuit went on to articulate a new "machine-or-transformation test" as the sole test for patent-eligibility under §101.31 Citing to Benson,32 Flook33 and Diehr,34 the Federal Circuit articulated that, “[a] claimed process is surely patent-eligible under §101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing.”35 In rendering the Bilski decision, the court recognized that the Supreme Court might ultimately alter or set aside the test to accommodate new and emerging technologies.36 However, direction from the Supreme Court would arrive much more promptly than expected.

Soon after the Federal Circuit opinion, the Supreme Court granted writ of certiorari to evaluate the use of the "machine-or-transformation" test as the exclusive test for determining patentability under §101.37 In declining to adopt the overly restrictive “machine-or-transformation test” as the exclusive test governing §101, the Supreme Court relied solely on its prior precedents38 – Benson, Flook and Diehr. The Supreme Court noted that the machine-or-transformation test "may be a useful and important clue or investigative tool, it is not the sole test for deciding whether an invention is a patent-eligible 'process' under §101."39 Although the decision by no means "foreclose[d] the Federal Circuit's development of other limiting criteria that further the purposes of the Patent Act."40

Justice Stevens foreshadows the challenge that lay ahead stating that, "[t]he Court, in sum, never provides a satisfying account of what constitutes an unpatentable abstract idea."41 A review of recent Federal Circuit decisions following Bilski illustrates that the court has since been treading carefully and has not developed any new broad tests for patent eligibility under §101. Instead they have scrutinized the Supreme Court’s precedents for new clues that may factor into the patentability consideration.

II. The Federal Circuit's Post-Bilski Jurisprudence

Shortly after the Supreme Court's Bilski decision was rendered in 2009, the Federal Circuit began tackling cases without the benefit of having the machine-or-transformation test to use as the sole test for determining patentability under §101. Without being provided "even a hint of guidance" to lower courts, the Federal Circuit must now carefully revisit Supreme Court precedents to address new patentability issues on a case-by-case basis.42 The Federal Circuit faces a particularly challenging responsibility of providing patentees and litigants some level of predictability43 as to what is patent eligible without overstepping the broad eligibility principles of §101.44 The following quartet of cases recently decided by the Federal Circuit, Research Corp.,45 CyberSource,46 Ultramercial47 and Dealertrack,48 provide a glimpse of where the current boundaries are and what the relevant issues are in determining patentability under §101.49

In Research Corp., the patents at issue were directed toward digital image halftoning.50 Digital images are comprised of thousands of pixels arranged on a grid and may include shades of gray and a spectrum of colors.51 Oftentimes, computer displays and printers are capable of displaying or printing a limited number of primary colors.52 In order to provide the illusion of more shades and more colors, a halftoning technique is employed to provide an approximation of the image with fewer shades of gray or colors.53 As depicted below in Figure 1, a variation in the size and arrangement of black pixels or dots provides a range of gray shades.

INSERT GRAPH

Likewise, a variation of size and arrangement of primary colored and black pixels can be used to create a range of colors and shades.

INSERT GRAPH
To generate these halftoned images, a thresholding technique is applied where a "mask" with a two-
dimensional array of predetermined threshold numbers is generated. Next, the gray level at each pixel
of an image is compared against the corresponding threshold at the same pixel location and if the gray
level exceeds the threshold it is assigned a "1" (signifying it is turned on) and if not it is assigned a "0"
(signifying it is turned off).

The inventors in Research Corp. developed an improved blue noise mask that compares the gray
level at each pixel against a blue noise mask that ultimately "produces higher quality halftone images
while using less processor power and memory space." The asserted claims at issue in U.S. Patent No.
5,111,310 recite:

1. A method for the halftoning of gray scale images by utilizing a pixel-by-pixel comparison of the
image against a blue noise mask in which the blue noise mask is comprised of a random non-
deterministic, non-white noise single valued function which is designed to produce visually pleasing
dot profiles when thresholded at any level of said gray scale images.

2. The method of claim 1, wherein said blue noise mask is used to halftone a color image.

The asserted claim at issue in U.S. Patent No. 5,341,228 recites:

11. A method for the halftoning of color images, comprising the steps of utilizing, in turn, a pixel-by-
pixel comparison of each of a plurality of color planes of said color image against a blue noise
mask in which the blue noise mask is comprised of a random nondeterministic, non-white noise
single valued function which is designed to provide visually pleasing dot profiles when thresholded
at any level of said color images, wherein a plurality of blue noise masks are separately utilized to
perform said pixel-by-pixel comparison and in which at least one of said blue noise masks is
independent and uncorrelated with the other blue noise masks.

On remand from a prior grant of summary judgment of invalidity and noninfringement, the district court
rejected the above claims as invalid under 35 U.S.C. §101 using the Federal Circuit's then exclusive
machine-or-transformation test. The district court held that they were "primarily mathematical in nature,
not limited to a specific machine or apparatus, and do not transform a specific article into a different state
or thing." As a result, neither the machine nor the transformation prongs of the test were satisfied.

In light of the Supreme Court Bilski decision, the Federal Circuit held that the claims at issue were
in fact patentable under §101. The Federal Circuit noted that "[t]he Supreme Court has already made
abundantly clear that inventions incorporating and relying upon even a well-known mathematical equation
do not lose eligibility because several steps of the process [use that] mathematical equation." Moreover,
the §101 inquiry was meant to be only a threshold test and the Supreme Court "did not presume to
provide a rigid formula or definition for abstractness." Applying these concepts to the case at issue, the Federal Circuit held that "[t]he invention presents a functional and palpable application in the field of computer technology." Referencing Diehr,
the court observed that the patentees in this case were not seeking to patent a mathematical formula but
rather a process of halftoning in computer applications. As a result, where a software invention has a
specific application or improvement to a particular technology, that invention will likely be more than just
an unpatentable abstract idea.

Turning to CyberSource, the invention at issue was directed toward "a process of verifying the
validity of credit card transactions over the Internet." Many prior and existing fraud systems operated by
checking billing addresses and other personal identification information to detect fraud. With a shift
toward mobile and Internet commerce where products are simply downloaded and billing information may
be electronically stored by merchants, traditional fraud detection means may no longer be adequate. The inventors in CyberSource sought to address this issue by utilizing Internet address information (e.g.
IP address, MAC address, e-mail addresses, etc.) as a means to determine whether a particular
transaction is consistent with prior transactions.

Analyzing the broader of the two claims at issue first, claim 3 of U.S. Patent No. 6,029,154
recites:

1. A method for verifying the validity of a credit card transaction over the Internet comprising the
steps of:
a) obtaining information about other transactions that have utilized an Internet address that is identified with the credit card transaction;
b) constructing a map of credit card numbers based upon the other transactions and;
c) utilizing the map of credit.

The Federal Circuit confirmed that the district court had correctly concluded that the claim failed to meet either prong of the machine-or-transformation test. In light of the Bilski Supreme Court decision, the Federal Circuit continued on and stated that "the Supreme Court [in Benson] appeared to endorse the view that methods which can be performed mentally, or which are the equivalent of human mental work, are unpatentable abstract ideas – the 'basic tools of scientific and technological work' that are open to all." The Supreme Court in Flook similarly held that calculations "while primarily useful for computerized applications, could still be made using a pencil and paper" and that the recitation of a practical application of a calculation alone could not make an invention patentable.

Applying these principles to CyberSource, the Federal Circuit found that all of claim 3’s steps could be performed in the human mind or by a human using pencil and paper. The Federal Circuit further observed that claim 3 was not limited to a particular detection algorithm and that no such algorithm was disclosed in the patent disclosure. Moreover, the claim would have the effect of precluding all methods of detecting fraud based on transactions identified with an "Internet address." As a result, claim 3 was found not to be patentable. As a result, methods that involve only steps that can be performed mentally by a human are insufficient for patentability under §101.

CyberSource also included a Beauregard claim in claim 2 of the patent, which recites inter alia, "[a] computer readable medium containing program instructions” in addition to the steps of claim 3 above. In effect, the claims recited "nothing more than a computer readable medium containing program instructions for executing the method of claim 3." Although CyberSource argues that its invention in claim 3 was directed toward a “manufacture” rather than a “process” under §101, the court "look[ed] to the underlying invention for patent-eligibility purposes" and found that it was directed toward a method for detecting credit card fraud. Here the recitation of a computer to execute an algorithm does not create a new machine and cannot unless the computer is "programmed to perform particular functions pursuant to instructions from program software." Moreover, the incidental use of a computer does not provide a meaningful limitation to claim 3.

The Federal Circuit held that the mere manipulation or reorganization of data does not satisfy the transformation prong. The court also found that the machine prong was not met since the recited computer did not perform any significant role in the method performed. In particular, a computer in this case was not required to perform the claimed method. Unlike Benson above, the claimed processes could "be performed entirely in a human's mind." As a result, the incidental use of a computer does not provide a meaningful limitation to claim 3.

Next in Ultracímerial, the claims at issue involved a method of monetizing and distributing copyrighted products (e.g. movies, songs, books) such that the consumers would receive the copyrighted product for free in exchange for viewing an advertisement. Citing to Diehr, Flook and Benson, the Federal Circuit again highlighted that, “[a]lthough abstract principles are not eligible for patent protection, an application of an abstract idea may well be deserving of patent protection.” Unlike Research Corp. above, the claimed processes could "be performed entirely in a human's mind." As a result, the incidental use of a computer for methods that may otherwise be performed mentally by a human does not satisfy the patentability requirement under §101.

Unlike in Bilski where a general unapplied concept was being claimed, here the patentees were providing a practical application of the idea that advertising could be used as a form of currency. The court noted that the claimed steps in Ultracímerial would likely "require intricate and complex computer programming ... and clearly require specific application to the Internet and a cyber-market environment." The court cautioned that it was "not defin[ing] the level of programming complexity required before a computer-implemented method can be patent-eligible" nor was it "hold[ing] that the use of an Internet website to practice such a method is either necessary or sufficient in every case to satisfy §101." Ultimately, the court concluded that Ultracímerial’s claims were not abstract, provided a practical application and was therefore patent eligible under §101. Thus where an invention invokes the use of computers and requires a "specific application to the Internet and cyber-market environment, it will likely implicate the use of an extensive computer interface and these factors are likely to weigh in favor of patentability under §101."
Lastly in Dealertrack, U.S. Patent No. 7,181,427 ("the '427 patent") directed toward a computer-aided method for managing a credit application.103 As described in the '427 patent, the process for obtaining credit and financing for major consumer purchases was previously performed manually.101 With the invention of the '427 patent, the process would enable “the entire indirect loan application processing, routing, and funding” steps to be placed in a graphical user interface environment.102 Claim 1, the sale independent claim of the '427 patent, recites:

1. A computer-aided method of managing a credit application, the method comprising the steps of:
   - receiving credit application data from a remote application entry and display device;
   - selectively forwarding the credit application data to remote funding source terminal devices:
     - forwarding funding decision data from at least one of the remote funding source terminal devices to the remote application entry and display device;
     - wherein the selectively forwarding the credit application data step further comprises: sending at least a portion of a credit application to more than one of said remote funding sources substantially at the same time;
     - sending at least a portion of a credit application to more than one of said remote funding sources sequentially until a finding source returns a positive funding decision;
     - sending at least a portion of a credit application to a first one of said remote funding sources, and then, after a predetermined time, sending to at least one other remote funding source, until one of the finding sources returns a positive funding decision or until all funding sources have been exhausted; or:
     - sending the credit application from a first remote funding source to a second remote finding source if the first funding source declines to approve the credit application.103

The Federal Circuit, in examining the above claim, found that in its most basic form that it included three steps: “receiving data from one source, selectively forwarding the data and forwarding reply data to the first source.”104 These steps amounted to no more than explaining the basic concept of processing information through a clearinghouse just like Bilski had explained the basic concept of hedging.105 The court found that the claims were silent as to how a computer aided the method and what significance the computer has in the performance of the method.106

The court found that the computer present did not “play a significant part in permitting the claimed method to be performed.”107 Unlike Ultramercial where there were “concrete steps requiring an extensive computer interface,” the court found that the claims here do not specify the level of involvement that the computer in the "computer-aided method" provides.108 Without any specific application, the computer claimed by Dealertrack could cover “a clearinghouse process using any existing or future-devised machinery” and thus pre-empt an entire field much like the patent ineligible claims addressed by the Supreme Court in Benson.109 Although Dealertrack further argued that Claim 3 further limited the invention to only the car loan application process, the court held that an abstract idea could not be made patentable simply by limiting it to a particular field of use.110 As such, the inclusion of a “computer-aided” limitation to an abstract idea, without more, does not create patent eligible subject matter.

Taking these four recently decided Federal Circuit cases together, it is clear that the court has refrained from creating any new broad tests for determining patentability in computer and Internet implicated methods. In observing that the "Supreme Court did not presume to provide a rigid formula or definition for abstractness."111 the Federal Circuit was careful to ensure that their considerations did not create any overarching rules.112 However, relevant clues common in these four cases include whether the claimed steps involve a specific application or improvement to technologies in the marketplace and whether performance of the claimed method requires more than incidental use a computer.114 These clues may assist in determining what qualifies for patent eligibility under §101.

Conclusion
In the wake of technological advances in the past century, the boundary for patentability under §101 has had its ebbs and flows. The Federal Circuit, in its mission to establish a coherent body of law and provide a greater certainty in the patent system, attempted to establish an exclusive machine-or-transformation test to delineate clearer boundaries for patent eligibility. Although the Supreme Court later
held in *Bilski* that such an exclusive application of the test was contrary to statutory interpretation, this test nevertheless still provides an important clue for determining patentability. However, that test is not without its limits as the Supreme Court recently concluded in *Prometheus*\(^\text{115}\) that “trivial noninventive transformations” are insufficient for patentability under §101.\(^\text{116}\) As a result of the Supreme Court’s *Prometheus* decision, the patentability clues that the Federal Circuit began developing in the biotechnology area have been cast aside. For the time being, the patentability clues that the court has drawn for Internet- and computer-based inventions are still sound and very much pertinent.

Without any bright line rules or established factors to rely on, the issue of patentability under §101 will continue to be a tedious and contentious endeavor for the Federal Circuit. Absent any legislative changes to §101 or more definitive guidance from the Supreme Court, the Federal Circuit must continue examining new patentability issues on a case-by-case basis. The Federal Circuit will need to continue uncovering clues to add to this patentability calculus, particularly as other new technological fields begin to emerge. Among all this uncertainty, what is certain are the challenges that inventors and their patent counsel will face in securing and defending patents in these vague patentability areas.

2 Id. at 1676.
3 Id. at 1631.
8 35 U.S.C. §101; The language used in §101 finds its roots in Section 1 of first patent statute in 1790. Act of April 10, 1790, ch.7, 1 Stat. 109 (reciting “any person or persons … (who) hath or have invented or discovered any useful art, manufacture, engine, machine, or device, or any improvement therein not before known or used”).
14 35 U.S.C. § 100(b).
19 Id.
22 Id.
23 See id.
24 See id. at 31.
25 See id.; Edward Van Gieson & Paul Stellman, supra note 6, at 414 (“In at least two recent post-Bilski Federal Circuit decisions, the court interpreted the abstract ideas doctrine rather narrowly”); see also, KSR International Co. v. Teleflex, Inc., 550 U.S. 398 (2007) (holding that “teaching, suggestion, or motivation” test had been applied too narrowly).
28 In re Alappat, 33 F.3d 1526, 1544 (Fed. Cir. 1994) (“This is not a disembodied mathematical concept which may be characterized as an 'abstract idea,' but rather a specific machine to produce a useful, concrete, and tangible result.”).
29 State Street Bank & Trust Co. v. Signature Financial Group, Inc., 149 F.3d 1373, 1373 (Fed. Cir. 1998) (“Today, we hold that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a [patent-eligible invention] because it produces 'a useful, concrete and tangible result ... .' ”).
30 In re Bilski, 545 F.3d at 959.
31 Id. at 955.
32 Gottschalk v. Benson, 409 U.S. 63 (1972) (the invention at issue was directed toward a method of converting binary-code decimal to purely binary numerals; the Court held that processes directed toward a numerical algorithm was unpatentable since it would wholly pre-empt the use of that mathematical formula).  
33 Parker v. Flook, 437 U.S. 584 (1978) (the invention al issue was directed toward a method of updating a numerical alarm limit in a catalytic conversion application where the only novel feature was a mathematical formula; the Court held that post-solution applications of mathematical formulas are not patent eligible where the mathematical formula is already well known and there is not any other inventive concept involved in its application).
34 Diamond v. Diehr. 450 U.S. 175, 192 (1981) (the invention at issue was directed toward a computer program that calculates when to open a press during a synthetic rubber curing process; the Court held that a physical machine or process which utilizes a mathematical algorithm and involves “transforming or reducing an article to a different state or thing” satisfies the patentability requirements of §101).  
35 In re Bilski, 545 F.3d at 954.
36 Id. at 956.
39 Id. at 3221 (emphasis added).
40 Id. at 3231.
41 Id. at 3236 (Stevens, J. concurring).
43 One of the underlying purposes of Federal Circuit's implementation of the machine-or-transformation test was to provide clarity and predictability as to what constitutes a patentable process. See William Michael Schuster, Predictability and Patentable Processes: The Federal Circuit's in Re Bilski Decision and Its Effect on the Incentive to Invent, 11 Colum. Sci. & Tech. L. Rev. 1, 27 (2009).
44 Chakrabarty, 447 U.S. at 309.
45 Research Corp. Technologies, Inc. v. Microsoft Corp. ("Research Corp. II"), 627 F.3d 859 (Fed. Cir. 2010).
46 CyberSource Corp. v. Retail Decisions, Inc., 654 F.3d at 1373 (Fed. Cir. 2011).
47 Ultramercial LLC v. Hulu, LLC, 657 F.3d 1323 (Fed. Cir. 2011).
49 Note that Fuzzysharp Technologies Inc. v. 3DLabs Inc., Ltd., 447 F. App’x. 182 (Fed. Cir. 2011). reh’g denied (Dec. 20, 2011), which was decided after Bilski, also implicates §101 patentability issues. However the Federal Circuit vacated and remanded the case since patent eligibility turns on the question of claim construction which was not addressed in the court below.
50 Research Corp. II, 627 F.3d at 862.
Id. at 862-63.


Research Corp. II, 627 F.3d at 863.

Id. at 865.

Id.


Id.

Id.

Research Corp. II, 627 F.3d at 869.

Id. (citing to Diehr; internal quotations omitted).

Id. at 868.

Id.

Id. at 869.

See id.

CyberSource, 654 F.3d at 1367.

Id.

Id.

Id. at 1367–68.

Id. at 1370 (emphasis added).

Id. at 1371 (internal quotations omitted).

Id.

Id. at 1372.

Id.

Id.

Id. at 1373.

A Beauregard claim finds its roots in In re Beauregard, 53 F.3d 1583 (Fed. Cir. 1995), where a computer readable medium (e.g. a disk, hard drive, or other computer storage device) is recited in the claim in attempt to claim software instructions as an article of manufacture rather than a pure process. CyberSource, 654 F.3d at 1373.

Id.

Id. at 1374.

Id. at 1375.

Id.

Id. (citing to In re Alappat, 33 F.3d 1526, 1545 (Fed. Cir. 1994)).

Id.

Id. at 1376.

Id. at 1375.

Id. at 1376.

Id. at 1376.

Ultrapercial, 657 F.3d at 1324.

Id. at 1327.

Id. at 1328.

Id.

Id.

Id. at 1328–30.

Id.


Id.
Alan Leung, a 2012 graduate of University of Pittsburgh School of Law, participated in Pitt Law’s “Semester in D.C. Program,” completing an internship with the U.S. Department of Justice (Commercial Litigation Branch, Intellectual Property Law Section) in Washington, D.C. This article was his seminar paper for the program. Leung is now a patent attorney at a Washington, D.C.-area intellectual property law firm, Oblon Spivak McClelland Maier and Neustadt LLP.