



From the Editor in Chief...

## Patent Pending

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Judging a decision's quality by its result is called *result mongering*. In the game of contract bridge, for example, it is result mongering when partner complains of the declarer's moral failings when the finesse didn't work — even though that play had been the most likely avenue toward success. The technique can also be applied to other things. For example, result mongering in finance asserts that a lottery winner is a shrewder investor than Warren Buffett.

As I write this, two legal cases in this week's news have also raised the theme of result mongering. In the Terry Schiavo situation, some people weren't pleased with the result of a process that led to withholding food from a brain-dead woman. Despite the fact that some of these very people were responsible for appointing the judges and manipulating the procedures that led to that result, various result mongers expended considerable effort attempting to change the rules post hoc to fit their desired outcome. In bridge, result mongering is often not about the actual play; rather, it's a small skirmish in a larger battle between partners (particularly if they're married). At best, we can understand the Schiavo case's display of "legislative emergency" not as an event about a particular quasidead woman, but rather as a skirmish in a larger war.

As those events were unfolding, across the street from Capitol Hill the US Supreme Court was hearing arguments in the case between Metro-Goldwyn-Mayer Studios (MGM) and the makers of Grokster and StreamCast. We can characterize this as a battle in the war between those who hold copyright to popular materials and those whose activities simplify the royalty-free transfer of such materials. MGM argues that these companies' peer-to-peer software are primarily designed to facilitate the sharing of copyrighted music, and thus should be banned. Grokster and StreamCast respond that their software has substantial non-infringing uses, and unlike the previously banned

Napster, they don't control or index what's exchanged. The Supreme Court had held, in the 1984 Betamax case, that technology that has substantial legal uses (like time-shifting) is legal to sell. The major studios hated this result (all the way to the bank, given that half their revenues now come from DVDs and the like) and would hate to see it applied to music file sharing. The common theme in these battles is the participants' attempts to have the rules defined not by general principles or to achieve some global optimums, but rather to produce results that most narrowly favor them.

### Intellectual Property

This debate is one over the rights to intellectual property. IP takes several forms, the most important of which are patents, copyrights, trade and service marks, and trade secrets.

### Patents

Patents protect *inventions*. You can patent artifacts, compositions of matter, methods and processes, new varieties of plants, and (more weakly) designs. You cannot, in general, patent things that are obvious to someone with ordinary skill in the subject art, functionality without mechanism (that is, "a system to do *X*," without describing how it gets done), perpetual motion machines, people, things appearing naturally, or laws of nature.

For a long time, the courts and patent office seemed to interpret the prohibition on patenting laws of nature as barring patents on computer algorithms, unless the patent writer was clever enough to describe the algorithm as a machine to accomplish a particular task. A decade ago, considerable controversy swirled around whether software ought to be patentable,<sup>1,2</sup> but there is currently little question that it can be patented — often to the surprise of those who naively apply the natural (rather than legal) meaning of the word "obvious." We are also witnessing the evolution of patent law to include "business processes," such as "one-click

shopping on the Internet,” and organisms created by engineering recombinant DNA. One of these years, the prohibition on patenting people will collide with advances in mammalian bioengineering to provide considerable employment opportunities for lawyers and ethicists to debate the exact meaning of “person.”

In return for teaching the public how a particular invention works, the patent holder gets a monopoly (currently 20 years from patent filing) in which he or she can prohibit others from using the patented device or process.

### Copyright

Copyright governs artistic expression, not ideas. It prohibits, for a finite time, the copying of artistic works. In the US, a copyright currently lasts for the life of the author plus 70 years, but national laws vary – for example, the United Kingdom has assigned a perpetual copyright to *Peter Pan* to the Great Ormond Street Hospital. (Coin-

identally, the length of US copyrights has repeatedly been extended just before the rights to *Steamboat Willie* – the first Mickey Mouse cartoon – were about to expire.)

Copyright is about copying expression, not ideas – if never having heard your song, I create the same melody, I haven’t violated your copyright. Patents are about ideas. Even if I have no knowledge of your patented invention, you can go to court to prohibit my independently developed device that uses it. In a philosophical sense, you can never be “surprised” to discover that you’ve violated a copyright, but you can be surprised by a patent-infringement claim.

Traditional copyright law also provides the idea that some copying is okay. Such “fair use” includes making a single copy for personal use or repeating a fragment of a larger work as part of a critical examination. Thus, you can take this paragraph and quote it in your essay on copyrights (giving me appro-

priate acknowledgment, of course) or take it down the hall and make a copy of it. However, you violate both IEEE’s copyright and common sense if you make 100 copies and try to sell them.

Fair use is a legal defense against copyright-infringement claims – courts decide whether the use is indeed fair. Most artistic innovation builds on the works of others. Copyright law and fair use exemptions thus delimit the boundaries of this creative process.

### Trade Rights

Trade and service marks are about preventing confusion to the public about who is selling a particular product. In general, this seems like a good idea – we don’t want the consumers of brown sugar-water to mistakenly believe that a can with a red-script “Koka-Kola” is the real thing. We’ve seen controversy in trademark law on the Internet regarding domain name ownership, as companies have squashed critical sites for names such as “X-sucks.” The legal

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rulings in such cases have been based on the presumption that the public might think those sites were genuinely from the “X” company (even when the X company didn’t make anything resembling pumps).

Trademarks are also in the current legal news, with US courts hearing arguments about whether it’s okay for companies such as Google to sell advertisements associated with trademarked words to the trademark owners’ competitors. (That is, is it okay for Google to present users searching for

declares itself a business and seeks trade secret protection for its actions. After all, commerce in votes is a central government activity.

### Social Fictions

The critical thing to keep in mind about this issue is that IP is a social fiction. (Property is itself a social fiction, but that’s another column.) The Schiavo case was about life and death (and the nature of both), and whether or not you believe in posting the Decalogue in every courtroom, there is considerable

people will be inclined to put energy into inventing things, and society will be better off with these new inventions. If artists can control the economic value of their efforts for a while, they will be more inclined to create art. This notion of temporary monopoly in exchange for improvement was evident in even the earliest Venetian patent law (dating to the 1200s), which protected not only inventors but also those who introduced foreign inventions to the local economy.

US patent and copyright law is based on Article 1, Section 8, Clause 8 of the Constitution, which provides that Congress has the power “To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.” In contrast to other countries, US patents are thus granted only to people who are the original inventors. In most of the rest of the world, the race is simply to be the first to file a patent, and corporations can enter the race, too. Patent law has also seen varying interpretations of patentability with respect to the process of inventing (for a while, the courts held that only inventions that arose in a flash of inspiration, as opposed to long experimentation, were patentable – until Congress revised the law in 1952 to equally reward sweat-based invention) and to how much of an improvement over the existing art was required for a patent.

### Defining the Rules

IP laws are attempts to optimize results. In an ethical sense, there’s also a social feeling that people who create new things deserve to be rewarded. However, there’s a long distance between such sentiments and the actual rules of the game.

### Patent Law

Most societies want new inventions, though this isn’t universally true. For example, in 1721, the Japanese Shogunate issued the “Prohibition of Novel-

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“American Blinds” with a separate column of links to companies that are competitors to American Blinds?) In general, trademark owners want their trademarks to be well known, but not too common – if the word descends into the general vocabulary, the trademark owner loses its rights. If I had suggested that you go down the hall to xerox this article, IEEE would hear from the lawyers of the Xerox Corporation, who fear their trademark might become as generic as aspirin.

Trade secret law is, in some sense, the opposite of patent law. Trade secrets provide legal protection for companies that want to keep information from the public. An interesting legal ruling recently sidestepped the question of whether bloggers are journalists to conclude that Apple’s marketing plans are trade secrets and that no one has the right to publish them. The moral of that ruling is that if something embarrassing happens to your company, declare it a trade secret to keep it quiet. Given its experience with things like the Pentagon Papers and Abu Ghraib, I won’t be surprised when the US government

ethical unanimity that (with varying exceptions) killing people is a bad idea. However, while the commandments prohibited stealing, the text is more cleanly understood as prohibiting the theft of physical property, such as asses and wives, than more abstract things, like copyrights and patents.

The notion of IP is one that has evolved, as opposed to being obvious. For example, society doesn’t recognize every intellectual invention as worthy of legal ownership – you can invent a scrumptious recipe, and I can freely cook the same dish. Similarly, we don’t accord ownership of IP the same unequivocal status as physical property: If you buy a physical book, you and the closure of your inheritors own that book into the indefinite future, but if you’ve written anything besides *Peter Pan*, you and your inheritors will eventually lose your ownership.

So how does it come to pass that we have any IP law? Such law is an attempt to engineer a more productive society – to achieve a particular set of results. The belief is that if inventors can profit from their inventions, more

ty” decree banning all new things. Such a ban produces greater social stability, which might suit you well if you’re on the top of the social pyramid. Japan remained hostile to new things until the 1850s, when Occidentals with better weapons showed up and pointed out some of the political disadvantages of technical stagnation. The Japanese set out to rectify this situation, carefully observing what about Western societies had led to their technological advantage. One of the conclusions was the key value of Western patent systems.<sup>3</sup>

Even if societies want to reward invention, there are alternatives to allowing inventors to extract monopoly profits. Governments have awarded prizes for particular inventive achievements (for example, Napoleon’s grant of 12,000 francs to Nicholas Appert in 1795 for inventing canning or DARPA’s current grand challenge prize for a fast, durable robotic vehicle [www.darpa.mil/grandchallenge/]). A commission could reward every patent as appropriate, or rather than granting monopolies, could consider the invention’s novelty and importance to determine a licensing fee for each patent.

Venice codified its patent law in 1474, which granted a 10-year monopoly for useful, physical inventions that were novel to Venice. British patent law evolved from treating monopolies as a royal privilege, to be granted to the crown’s favorites, to allowing monopolies only for inventions that were new to the kingdom. England’s 1623 Statute of Monopolies recognized patents as a right of inventors and fixed the patent term to 14 years.

Before the US Constitution’s adoption, some colonies granted patents, whereas others had official bans on monopolies. Those that did grant patents varied on whether they considered them to be something for which all inventors had the right to apply or whether each patent was to be granted by a specific law.

Federal patent law began in the US

with the Patent Act of 1790, which created an examination system (patents were checked for their appropriateness) and allowed patents only to US citizens. The examination system lasted until 1793, when it was replaced by a registration system through which anyone could register an invention; the courts would then decide which patents were valid and what they covered. Congress created the modern patent office in 1836, which reintroduced patent examination and defined a format for patent applications, including specific *claims*.

### Copyright Law

Copyright law has evolved from the Statute of Queen Anne in 1709, which gave authors a 14-year monopoly on publishing their work, with the possibility of renewing for an additional 14 years if the author lived that long. The first US copyright law, enacted in 1790, provided a nonrenewable, 14-year copyright on books, charts, and maps. Prompted by new technologies and politics, the US Congress has since extended copyright law to other media (prints, musical compositions, dramatic works, photographs, compact disks, and so on), provided various notions of fair use, and progressively extended its duration to (at this point) the life of the longest-living author plus 70 years.

### Optimizing the Economy

What is the correct form for IP law? Even a close reading of the scripture finds it silent on the appropriate length of copyright protection before a work falls into the public domain, not to mention more contentious issues such as whether a business process should be subject to patent protection. IP law has evolved in the scrum of the political process. The justification for IP law, and especially the details of it, is primarily the result it produces. Copyright law is, for example, about encouraging artistic creation. As currently written, it has encouraged the production of Britney Spears and Harlequin

Romances, while clearly the lack of copyright protection inhibited Bach and Shakespeare from producing their best work.

Finding the rules fair but being unhappy with the effect is result mongering, though much of the legal fighting over IP seems more about achieving particular results than optimizing the overall economy. The details of IP law are worked out in the political process, a space in which those who have the most to gain from changes often exert the most influence and where local optimization (becoming a rock star) might not give the best overall results (too many teenagers wasting time trying to become rock stars, instead of studying engineering).

I’ve always believed that one of the keys to success is knowing the rules of the game. If you want to play the IP game (or believe, like the third law of thermodynamics, that you don’t have any way out of the IP game), I recommend Rockman<sup>4</sup> as a good overview of the regulations. He provides an interesting mix of the dry legal details and inspiring stories of famous inventors. Until I read Rockman, I hadn’t known that Hedy Lamarr invented spread-spectrum radio communications based on frequency-hopping. So maybe there’s hope for Britney yet.

In closing, I’d like to note that Xerox is a trademark of the Xerox Corporation. Now please get those lawyers off of me. □

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