Infringing a Fantasy: Future Obstacles Arise for the United States Patent Office and Software Manufacturers Utilizing Artificial Intelligence

Eric J. Schaal

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INFRINGING A FANTASY: FUTURE OBSTACLES ARISE FOR THE UNITED STATES PATENT OFFICE AND SOFTWARE MANUFACTURERS UTILIZING ARTIFICIAL INTELLIGENCE

The future of the nation depends in no small part on the efficiency of industry, and the efficiency of industry depends in no small part on the protection of intellectual property.¹

I. INTRODUCTION

The development of the Internet and revolutionary advances in personal computers and gaming software were considered some of the most significant advances in the technology of the twentieth century.² The Internet enables people around the world to experience events and cultures in a way never before imaginable.³ With the click of a mouse, a single mother can share with her children an adventure in the pyramids of Egypt from her personal computer.⁴ In a single keystroke, a man in a wheelchair can explore, at the speed of light, the solar system, the galaxy, and beyond.⁵ Likewise, people can play fantasy games on the Internet, linking them to worlds only imaginable in the minds of children.⁶

1. Rockwell Graphic Sys., Inc. v. DEV Indus., Inc., 925 F.2d 174, 180 (7th Cir. 1991).
2. See 20th Century Technology, at http://www.time.com/time/time100/builder/tech_supp/tech_supp/ai.html (on file with author) (last visited Oct. 6, 2003) (selecting personal computer and Internet as leading innovations of twentieth century). Also included on the list of top twenty advances of the twentieth century were: automobiles, radio, television, transistors, lasers, airplanes, plastics, and artificial intelligence. See id. (listing selected inventions).
5. See http://wwwospace.com (last visited Jan. 6, 2004) (enabling users to view photographs and learn more about galaxies, solar systems, comets, and asteroids).
Fantasy sports leagues are one of a variety of outlets available to users who want the experience of managing a professional sports team. The popularity of fantasy sports increased tremendously upon being introduced online. Today, managing fantasy sports teams has never been more efficient because of computers, software, and the Internet. In fact, fantasy sports have even expanded to pay-per-view television due to popularity online. An estimated fifteen million people currently play fantasy sports, offering enormous economic opportunity for fantasy sports providers.

Recently, in Fantasy Sports Properties, Inc. v. SportsLine.com, Inc. ("Fantasy"), major fantasy sports providers came under fire in a

Leagues Grows Easier Thanks to Web, SCRIBPS HOWARD NEWS SERVICE, Aug. 31, 2001, at 3 (listing various Internet sites offering fantasy sports). Some Internet sites that provide fantasy sports games include: AllStar Stats (allstarstats.com), Fantasy Commissioner Web (webleaguemanager.com), Fantasy Sports LLC (fantasysportsllc.com), My Fantasy League.com (myfantasyleague.com), National Football League (fantasy.nfl.com), MVP Fantasy Sports (fantasympv.com), RealTime Fantasy Sports (rtsports.com), CBS SportsLine.com (fantasy.sportsline.com), Super Spuds Fun Fantasy Football Manager (ffbmanager.com) and Yahoo! (fantasysports.yahoo.com).

7. See Mike Spofford, More than Just a Game: They're Fantasy Sports, GREEN BAY PRESS-GAZETTE, Feb. 11, 2002, at 2C (stating fantasy sports leagues are national phenomenon). The advent of fantasy sports on the Internet created markets for fantasy sports magazines and numerous Internet sites. See id. (commenting Internet expanded to markets outside of Internet). The explosion in popularity in the 1980s and 1990s now encompasses sports from baseball to auto racing. See Michael J. Thompson, Give Me $25 on Red and Derek Jeter for $26: Do Fantasy Sports Leagues Constitute Gambling?, 8 SPORTS LAW. J. 21, 22 (2001) (discussing rise in popularity of fantasy sports on Internet).


9. See Sbranti, supra note 6, at 3 (explaining before fantasy sports enthusiasts used computers, league commissioners worked many hours each week to tally points by hand). Today, the Internet and fantasy Web sites provide an "endless flow of customized statistics." Id.


11. See Thompson, supra note 7, at 23 (citing estimate of Carl Foster, President of Fantasy Sports Players Association). SportsLine.com, one of the many providers of Internet fantasy sports, reported that its revenues from advertising in one quarter alone were $20.9 million. See Christine Winter, Sticky Situations: To Attract Advertising and Improve Their Chances for Survival, Web Sites Must Make Sure Visitors Stay Longer and Keep Coming Back, SUN-SENTINEL (FORT LAUDERDALE), Jan. 1, 2001, at 12 (announcing SportsLine.com's fantasy participants increased from 150,000 to 1.7 million in one year). Many providers create revenue by selling subscriptions to their leagues. See Sbranti, supra note 6, at 3 (listing entrance fees for online providers of fantasy sports).

12. 287 F.3d 1108 (Fed. Cir. 2002).
lawsuit alleging patent infringement. In an analysis of whether competitors' Internet sites and computer programs infringed the plaintiff's patent, the Federal Circuit addressed whether a computer program infringes if the software has the capability to infringe.

Following a direct infringement analysis, the court, in accordance with its decision in Intel Corp. v. United States International Trade Commission ("Intel"), held that, in order to find infringement, "the code underlying an accused fantasy football game must be written in such a way as to enable a user of that software to utilize [the software in an infringing manner], without having to modify [the] code." To the contrary, the Federal Circuit, in High Tech Medical Instrumentation, Inc. v. New Image Industries, Inc. ("High Tech"), ruled a device does not infringe "simply because it is possible to alter it in a way that would satisfy all the limitations of a patent claim."
Thus, *Fantasy*, *Intel*, and *High Tech* represent opposing rules of law that mark each end of the spectrum in a direct infringement analysis. Importantly, though, the more difficult case ("Hard Case") lies in between these rules of law where not the programmer, but rather an advanced computer program and its user, create the capability to infringe. 19 How would the Federal Circuit rule if the computer program, rather than the programmer, caused the product to infringe? 20

This Comment examines the situation where a "Choose Your Own Adventure" program and the user stumble upon a scenario that infringes a protected patent. 21 Section II introduces the theory behind artificial intelligence and patents, discussing the seminal patent decisions of the courts and reviewing the facts of the "Hard Case." 22 Section III analyzes how courts should decide a situation that falls between the decisions of *Intel*, *Fantasy*, and *High Tech* because a software program incorporates artificial intelligence. 23 Section IV delineates the possible repercussions of a court ruling for or against a software program enabled with artificial intelligence. 24 Finally, Section V concludes with a discussion concerning the future growth of technology and the patent system. 25

19. For a discussion of a more difficult case [hereinafter "Hard Case"] concerning an advanced software program that incorporates artificial intelligence, see infra notes 134-83 and accompanying text.

20. See, e.g., ROBERT C. DORR & CHRISTOPHER H. MUNCH, PROTECTING TRADE SECRETS, PATENTS, COPYRIGHTS, AND TRADEMARKS §§ 8.10-13 (2d ed. 1995) (indicating future litigation will determine whether material created by creative software will be protected by courts). For a discussion of the "Hard Case" concerning an advanced software program enabled with artificial intelligence, see infra notes 134-83 and accompanying text.

21. For a discussion of the hypothetical "Hard Case," see infra notes 134-83 and accompanying text.

22. For a discussion of artificial intelligence, patent infringement, or the seminal cases concerning patent infringement in computer software, see infra notes 26-133 and accompanying text.

23. For an analysis of the "Hard Case," see infra notes 134-83 and accompanying text.

24. For a discussion of the possible impact concerning a patent infringement decision of a computer program enabled with artificial intelligence, see infra notes 184-97 and accompanying text.

25. For a conclusion concerning the current law and its relation to future technology, see infra notes 198-200 and accompanying text.
II. BACKGROUND

A. Introduction to Artificial Intelligence

The creation of computers revolutionized invention. The technology contained within a small microchip allowed for new and previously unimaginable worlds to be discovered and conquered. The advancement of the Internet sparked the interest of a new generation of computer users. As computer technology grew, advances in programming and circuitry not only enabled the programmer, but also the computer, to advance the machine's utility.

Artificial intelligence is "the study of mental faculties through the use of computational models." Potential applications are widespread; from military operations to the entertainment industry to computer games. Consequently, computers utilizing artificial intelligence can create virtual worlds and characters that dynamically interact with the user. In particular, computer games with


28. See Campbell, supra note 3, at 280-81 (discussing history and use of Internet). The Internet first came into existence in 1969 when the government tested its Advanced Research Projects Agency Network ("ARPANET"), a network linking military defense contractors and university computers for research purposes. See id. at 280 (discussing origins of current Internet). The Internet, a derivative of ARPANET, later became popular with household computer users when domain names, servers, the World Wide Web ("WWW"), and graphical interfaces came into existence. See id. at 280-81 (stating increase in use of Internet based on utilities making Internet more user-friendly). According to the latest census from August 2000, forty-four million households have at least one member using the Internet. See id. at 281 (citing Eric C. Newburger, Home Computers and the Internet in the United States: August 2000, United States Census Bureau, at http://www.census.gov). E-mail, research, reading news, weather, sports and performing job-related tasks are some of the reported uses of the Internet. See id. (listing various uses of Internet).


30. Eugene Charniak & Drew McDermott, Introduction to Artificial Intelligence 6 (Mark S. Dalton et al. ed., 1987); see also Patrick Henry Winston, Artificial Intelligence 1 (2d ed. 1984) (defining artificial intelligence as "the study of ideas that enable computers to be intelligent").


32. See John E. Laird & Michael van Lent, Human-Level AI's Killer Application: Interactive Computer Games, AI Mag., Summer 2001, at 15 (introducing capability of
artificial intelligence capabilities can expand the length and entertainment value of a game. One commentator posits, "[o]ne of the Holy Grails of interactive fiction is to have a computer director who can dynamically adjust the story and plot based on the actions of the human." Games like Midway's NFL Blitz and Valve Software's Half-Life are beginning to incorporate artificial intelligence into their programming.

Because of the incorporation of artificial intelligence into software and the relatively recent ruling by the United States Patent and Trademark Office ("USPTO") permitting patents on computer software, significant changes are occurring throughout the software industry. In the 1950s and early 1960s, the growth of the computer industry prompted software manufacturers to seek out patents for their products. The Patent Office, however, uniformly

33. See id. (revealing games with artificial intelligence may introduce new characters that have knowledge and think independently).

34. Id. at 20. Currently, most games have fixed scripts and fixed endings, however, games, such as Blade Runner, incorporated autonomy into the program. See id. at 23 (noting advances in computer games).

35. See James Hansen & Scott Susslin, Artificial Intelligence in Computer Games, at http://shakti.trincoll.edu/~susslin/gameAI.html (last visited Jan. 6, 2004) (introducing scope and possible future of artificial intelligence). "In Midway's NFL Blitz, computer opponents" use artificial intelligence to learn from human inputs and counteract through the use of different defenses. Id. (describing some uses of artificial intelligence in current computer software). "If [the computer program] notices that you use certain plays or certain types of plays fairly regularly, [the program] will start to employ the corresponding defensive sets to stop you." Id. Additionally, in Valve Software's Half-Life, enemies exhibit flanking maneuvers regularly used by animals and are concerned for their self-preservation, meaning the creature may retreat to gain strength or help. See id. (describing capability of artificial intelligence to create simulated animal and human characteristics in game characters).


reached attempts by manufacturers to gain patents for software, claiming software was not patentable subject material. Nevertheless, despite a large wave of protest, the Supreme Court opened the floodgates for software manufacturers to obtain patents with its ruling in *Diamond v. Diehr* ("Diamond"). As a result of *Diamond* and subsequent decisions, Computers Systems Class 395, a unique type of patent application class, rose from 3,829 filings in 1988 to 7,552 filings in 1992 with United States patents issued in this class doubling over a five-year period.

Manufacturers of software technology increasingly attempt to obtain patent protection for their products. Software programs must still be useful, novel, non-obvious, and clearly described in a patent application before a patent is granted. With manufacturers attempting to gain patents for their software, many scholars believe that a flood of litigation involving software patents is on the horizon.

**B. Introduction to Patent Infringement**

The Founding Fathers created the United States patent system in an effort to promote invention while giving an inventor the "intrinsic right... to profit from [an] invention[ that was] recognized..."
by law." The grant of a patent by the USPTO confers to the patent holder the right to exclude others from the use and practice of the invention for a specified number of years. Patent infringement is an outgrowth of tort law, where a violation occurs even though it is innocently performed or performed without knowledge of the violation. A patentee may bring a civil action to remedy

44. Creation of the U.S. Patent System, at http://www.ideafinder.com/history/inventions/story096.htm (last modified Apr. 16, 2002) [hereinafter Creation] (reviewing history of United States Patent System). The United States first issued a patent in 1790 to Samuel Hopkins for an improved process for making potash. See Frank H. Foster & Robert L. Shook, Patents, Copyrights, and Trademarks: The Total Guide to Protecting the Rights to Your Invention, Product, or Trademark . . . Now Better than Ever 227 (2d ed. 1993) (summarizing history of patent system). Initially, all United States patents were reviewed by the Secretary of State (Thomas Jefferson), the Secretary of War, the Attorney General, and then approved by the President of the United States (George Washington). See Creation, supra. Upon recognizing the review of patents was too much work for high ranking officers, the administration delegated the examining of patents to state department clerks before it was reassigned to the U.S. Patent Office in 1802. See id. (reviewing history of United States patent system). Because preserving the historical advances found in patents is so important to the United States government and the American society, a special vault was constructed in Pennsylvania's limestone mines to store a second copy of every patent ever issued in the United States. See Peter Jennings & Todd Brewster, In Search of America 129-30 (Elisabeth King & Peter Meyer, eds. 2002) (indicating vault was created in reaction to 1836 fire that destroyed contents of original patent office). The limestone caves of the records center are kept at a constant sixty-five degrees Fahrenheit, providing the necessary atmospheric conditions and security. See id. at 129 (describing atmospheric conditions of vault). The vault is located in western Pennsylvania, 200 feet below the surface of the terrain. See id. (discussing depth of tomb). Because of the location and characteristics of the records center, the facility can survive a nuclear attack, and therefore, "the raw materials to reconstruct American society" are safe from destruction. See id. (indicating purpose of vault).


infringement of a protected patent.\textsuperscript{47} Patent infringement occurs when one interferes with the exclusive rights of the patent owner.\textsuperscript{48} When infringement occurs, one may be liable for direct infringement, inducement, or contributory infringement.\textsuperscript{49} For an individual, infringement is determined by the application of the invention.\textsuperscript{50} In contrast, a manufacturer’s liability for infringement is determined by examining how the device may reasonably be used or is reasonably capable of being used.\textsuperscript{51}

1. \textit{Direct Infringement}

Direct infringement occurs when an individual makes, uses, offers to sell, or sells an invention defined by the claims of a patent without the permission of the patent holder.\textsuperscript{52} The claims of the


\textsuperscript{48} See 35 U.S.C. § 271 (a) (2000) (“[W]hoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor, infringes the patent.”). Patent infringement is “[t]he unauthorized making, using, offering to sell, selling, or importing into the United States any patented invention.” \textsc{Black’s Law Dictionary} 785 (7th ed. 1999) (defining patent infringement).

\textsuperscript{49} See \textsc{Hildreth}, \textit{supra} note 45, at § 9:2 (listing various infringement categories). For a general discussion on direct infringement, see \textit{infra} notes 52-70 and accompanying text. Direct infringement is additionally broken up into literal infringement and infringement under the doctrine of equivalents. For a discussion on literal infringement and the doctrine of equivalents, see \textit{infra} notes 64-70 and accompanying text. For a discussion on inducement, see \textit{infra} notes 113-22 and accompanying text. For a discussion on contributory infringement, see \textit{infra} notes 123-33 and accompanying text.

\textsuperscript{50} See Huck Mfg. v. Textron, Inc., No. 35956, 1975 U.S. Dist. LEXIS 12539, at *76 n.24 (E.D. Mich. May 2, 1975) (illustrating different theories for manufacturer and user). Huck was the assignee and manufacturer of a patent for blind rivets. \textit{See id.} at *1-2 (reviewing history of patent). Blind rivets are “mechanical device[s] which can be used to connect an assembly of two or more parts together where access for fastener installation can be had to only one side of the assembly.” \textit{Id.} at *7-8. Textron allegedly infringed Huck’s patent by manufacturing blind rivets. \textit{See id.} at *2 (commenting on Textron’s products). The court determined that the blind rivets sold by Textron infringed Huck’s patent, and even though Textron’s blind rivets were capable of non-infringing use, Textron could not escape liability by warning customers not to use blind rivets in an infringing manner. \textit{See id.} at *77 n.26 (holding warning for customers not to infringe does not prevent liability for infringement).

\textsuperscript{51} See \textit{id.} at *76 n.24 (defining different liability for user than for manufacturer).

\textsuperscript{52} See § 271 (a) (defining direct infringement); \textit{see also} 5 \textsc{Chisum}, \textit{supra} note 45, § 16.01, at 16-5 (outlining patent infringement); \textsc{Robert L. Harmon}, \textsc{Patents and the Federal Circuit} 298 (5th ed. 2001) (explaining patent infringement).
patent are what the "applicant believes is patentable." In a U.S. patent, the claims of the invention define the boundaries of the patent's protection. Thus, infringement occurs on the claims of the patent.

Direct infringement is an unintentional tort. For infringement to occur, there must first be a valid patent. The determination of whether the accused device falls within the claims of a patent is a question of fact. The courts use a two-step analysis to determine whether infringement has occurred.

53. See 5 Chisum, supra note 45, § 16.01, at 16-5 (asserting Patent Act of 1836 introduced term "claims" to identify what patent protects). Specifically, patent claims:

54. See U.S. Patent No. 4,918,603 (issued Apr. 17, 1990) (showing example of patent claims section).

55. See Lipscomb, supra note 45, § 22:2, at 410 (noting patent claims are protected, not "four corners" of patent); see also CTS Corp. v. Piher Int'l Corp., 527 F.2d 95, 100 (7th Cir. 1975) ("The question of infringement . . . is answered by comparing the accused device with the claims of the patent.").

56. See Harmon, supra note 52, at 297 (stating infringement does not require intent).

57. See Lipscomb, supra note 45, § 22:3, at 418 (asserting patent must be valid before court can find infringement); see also Gleick, supra note 36, at 46 (criticizing United States Patent and Trademark Office’s authorization of software patents).

58. See Davies v. U.S., 31 Fed. Cl. 769, 778 (1994) (citing S.R.I. Int'l v. Matsushita Elec. Corp., 775 F.2d 1107, 1116 (Fed. Cir. 1985)). In Davies, the plaintiff owned a patent on a remote monitoring and weapon control system that allowed a user to simultaneously track a target and trigger a weapon system. See id. at 770-71 (reviewing capability of Davis's patent). The defendant, the United States government, used a similar device, called PAVE TACK, on their F-4E, RF-4C and F-111F aircraft that allowed a weapons officer on board the aircraft to illuminate a target using a laser and view the target for destruction. See id. at 772 (stating capability of PAVE TACK). The court found PAVE TACK did not infringe Davis's patent because the military device could not simultaneously track the target and trigger the weapon. See id. at 778 (distinguishing PAVE TACK from Davis's product). Only through human manipulation of the PAVE TACK device was the system capable of infringing the claims of Davis's patent. See id. at 778-79 (illustrating human intervention required to perform same function as Davis's device).

cuit stated, "[t]he first step is determining the meaning and scope of the patent claims [alleged] to be infringed. The second step is comparing the properly construed claims to the device accused of infringing." The first step is a question of law determined by the court; the second step is ascertained by the fact-finder. A court may refer to the "specification, the prosecution history, and the other claims in the patent" to resolve claim interpretation.

The burden is on the patentee to bring forth evidence showing direct infringement. The patentee may prove infringement either by showing literal infringement or infringement under the

265 F.3d 1336, 1341 (Fed. Cir. 2001) ("[P]atent infringement analysis requires two steps."); Bell Communications Research, Inc. v. Vitalink Communications Corp., 55 F.3d 615, 620 (Fed. Cir. 1995) (showing court used two-step analysis); Mannesmann Demag Corp. v. Engineered Metal Prods. Co., Inc., 793 F.2d 1279, 1282 (Fed. Cir. 1986) (stating patent infringement requires two-step process). Stryker obtained a patent for Stryke-Flow, a battery-powered suction irrigator used in surgical procedures. See Stryker, 234 F.3d at 1255 (reviewing history of patent). Prior to issuance of Stryker's patent, Davol developed a similar battery-powered suction irrigator called the Hydro-Surg after examining the Stryke-Flow device. See id. (commenting on Davol's product). After the court issued a permanent injunction against Davol for its continued use of the Hydro-Surg, Davol began selling a modified version of the Hydro-Surg. See id. at 1256 (reviewing history between Davol and Stryke-Flow). The Federal Circuit found the modified Hydro-Surg did infringe Stryker's patent because, after determination by the district court that the modified Hydro-Surg infringed the Stryke-Flow patent, Davol failed to prove that the district court committed error by clear and convincing evidence. See id. at 1259 (commenting on why court found infringement). 60. Stryker, 234 F.3d at 1258 (citing Markman v. Westview Instruments, Inc., 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc)). Markman represents an important case because it established that in a trial by jury, the court has the obligation to determine the meaning of the patent claims. See 5A DONALD S. CHISUM, CHISUM ON PATENTS: A TREATISE ON THE LAW OF PATENTABILITY, VALIDITY AND INFRINGEMENT § 18.06(2)(a)(iv), at 18-1073 to 18-1082 (2002) [hereinafter 5A CHISUM] (explaining Markman decision).


doctrine of equivalents. Literal infringement occurs when properly construed claims "read on" the accused device. There is no infringement, despite a finding of literal infringement, if the product performs the function in a substantially different way. Infringement occurs under the doctrine of equivalents when there is no literal infringement, but the claims are met equivalently. Under the doctrine of equivalents, a one-to-one correlation between the accused device and the valid patent is not required. Rather, "the differences between the claimed device and the accused device must be insubstantial." Liability is found if a single claim is infringed.

64. See Harmon, supra note 52, at 301 (commenting Federal Circuit has adopted "All Limitations Rule" for patent infringement). In the "All Limitations Rule," every limitation set forth in the claim must be found in the accused device or process either exactly or in equivalents. See Corning Glass Works v. Sumitomo Elec. U.S.A., Inc., 868 F.2d 1251, 1259-60 (Fed. Cir. 1989).

65. See Corning, 868 F.2d at 1258 (finding literal infringement occurs when accused device embodies claims); see also Conner Peripherals, Inc. v. W. Digital Corp., No. C-93-20117-RMW-EAI, 1993 U.S. Dist. LEXIS 20148, at *20-21 (N.D. Cal. Aug. 16, 1993) ("In the determination of infringement, the words of a claim must first be construed, and, as properly interpreted, then 'read on' the accused structure to determine whether each of the limitations recited in the claim is present in the accused structure."); Louis S. Sorell, A Comparative Analysis of Selected Aspects of Patent Law in China and the United States, 11 Pac. Rim L. & Pol'y J. 319, 329-30 (2002) (reviewing United States court procedure for patent claims).

66. See SRI, 775 F.2d at 1125 ("Equivalence and non-equivalence, as the terms indicate, are but opposite sides of the same coin. In determining each, a court must say whether an accused device operates in substantially the same way (equivalence) or in a substantially different way (non-equivalence). "). The issue in SRI was whether defendant's camera and filter infringed upon SRI's protected claims. See id. at 1118 (reviewing facts of case).

67. See Pennwalt Corp. v. Durand-Wayland, Inc., 833 F.2d 931, 934-35 (Fed. Cir. 1987) (discussing doctrine of equivalents). Chisum states: [The] doctrine prevents a person from practicing a fraud on a patent by substituting obvious equivalents for elements in the claims in order to avoid their literal language. An accused product or process will infringe a claim, though outside its literal terms, if it does the same work in substantially the same way to accomplish substantially the same result as the patented product or process. Pioneer inventions are entitled to a greater range of equivalents than a lesser improvement. The doctrine can work in reverse, excluding an accused device that falls within the literal language of a claim but operates in an essentially different manner.

1 Chisum, supra note 53, at GI-6.1.

68. See Intel Corp. v. United States Int'l Trade Comm'n, 946 F.2d 821, 832 (Fed. Cir. 1991). For a further discussion of the facts in Intel, see infra notes 75-82 and accompanying text.


70. See Panduit Corp. v. Dennison Mfg. Co., Inc., 836 F.2d 1329, 1330 n.1 (Fed. Cir. 1987). Panduit sued Dennison for infringement of twenty-eight patent claims. See id. at 1330 (reviewing facts of case). Dennison countered it was at most liable for four of the claims. See id. at 1330 (commenting Dennison did not dis-
2. **Literal Infringement**

To prove literal infringement, "each limitation of the claim must be met by the accused device exactly, any deviation from the claim preclud[es] a finding of infringement." The Federal Circuit recently stated, "in determining whether a product claim is infringed, . . . an accused device may be found to infringe if it is reasonably capable of satisfying the claim limitations, even though it may also be capable of non-infringing modes of operation." A product that "sometimes, but not always, embodies a claimed method nonetheless infringes." Infringement, however, does not occur "simply because it is possible to alter [a device] in a way that would satisfy all the limitations of a patent claim."

a. *Intel* Becomes the Goal Line: A Look at One End of the Spectrum

In *Intel Corp. v. United States International Trade Commission* ("*Intel"), the Federal Circuit held intent to infringe is not a prerequisite in proving direct infringement. The capability of a device to infringe is sufficient to find direct infringement. *Intel* provides the analytical framework for cases involving patents that allegedly have the capability to infringe.

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71. HARMON, supra note 52, at 308 (citing Lantech, Inc. v. Keip Mach. Co., 32 F.3d 542 (Fed. Cir. 1994)).


73. Bell Communications Research, Inc. v. Vitalink Communications Corp., 55 F.3d 615, 623 (Fed. Cir. 1995) (revealing device infringes even though infringing use was not always present).


75. 946 F.2d 821 (Fed. Cir. 1991).

76. See id. at 832 (holding accused device need only be capable of operating in page mode to find infringement).

77. See id. ("[A]ctual [infringing] operation in the accused device is not required.").

Specifically, Intel Corporation alleged Atmel Corporation, General Instrument Corporation, and Microchip Technology Incorporated violated § 337 of the Tariff Act of 1930 by importing Erasable Programmable Read Only Memories ("EPROM's") and associated components.\textsuperscript{79} Intel stated the EPROM's infringed six of their U.S. product patents and two of their U.S. process patents.\textsuperscript{80} The defendants challenged Intel's patents and the allegations of infringement.\textsuperscript{81} The Federal Circuit held that for "the accused device to be infringing, [it] need only be capable of operating in the [infringing manner]. Contrary to [the defendant's] argument, actual [infringing] operation in the accused device is not required."\textsuperscript{82}

Recently, in \textit{Fantasy Sports Properties, Inc. v. SportsLine.com, Inc.} ("Fantasy"),\textsuperscript{83} the Federal Circuit reviewed the \textit{Intel} decision. In 1990, Michael and Patrick Hughes received a patent for a computerized statistical football game.\textsuperscript{84} U.S. Patent Number 4,918,603 comprised an apparatus and method for playing fantasy football on a computer.\textsuperscript{85} The '603 patent contained a claim limitation for awarding "bonus points."\textsuperscript{86} SportsLine.com, Yahoo!, and ESPN/
Starwave Partners ("ESPN") all developed and offered products similar to those described in the ‘603 patent. Additionally, SportsLine.com sold a software package, called Commissioner.com, which enabled users to modify and manage their own fantasy leagues. Fantasy sued SportsLine.com, Yahoo!, and ESPN alleging their fantasy games infringed Fantasy’s patent. In Fantasy Sports Properties, Inc. v. SportsLine.com, Inc. ("Fantasy I"), the district court granted summary judgment in favor of Yahoo!. Accordingly, in Fantasy Sports Properties v. SportsLine.com ("Fantasy II"), the district court granted summary judgment in favor of SportsLine.com and ESPN based on the court’s decision in Fantasy I.

On appeal, the Federal Circuit found that there was a factual dispute precluding the court from determining whether Commis-

87. See Fantasy, 287 F.3d at 1116-17 (describing Yahoo!’s, ESPN’s, and SportsLine’s products). The Yahoo! product awards “miscellaneous points” when players other than the offense score points. See id. at 1116 (noting product by Yahoo! awarded points other than those given out during normal course of football game). The ESPN product grants points to offensive players based on how they score in the game (i.e., a quarterback would receive four points for completing a passing touchdown and six points for rushing or receiving a touchdown). See id. (showing ESPN product did not follow standard scoring of football game). Finally, the SportsLine.com product does not award “bonus points” unless the user enables the program. See id. at 1117 (showing product enabled users to choose whether bonus points were awarded).

88. See id. (suggesting Commissioner.com software package includes similar scoring system to one found in ‘603 patent).

89. See id. at 1112 (revealing Fantasy filed suit against defendants based on alleged infringement by Yahoo! Sports Fantasy Football, ESPN Fantasy Football, and three SportsLine games including: Fantasy Football, Football Challenge, and Commissioner.com). Fantasy argued the “bonus point” element of its patent was infringed upon by defendants’ fantasy games. See id. (suggesting SportsLine.com, Yahoo!, and ESPN infringed ‘603 patent).


91. See Fantasy, 287 F.3d at 1111 (revealing Yahoo! filed motion for summary judgment, arguing game did not infringe because game did not satisfy “bonus point” limitation).

92. Fantasy I, 103 F. Supp. 2d at 887.

93. See Fantasy, 287 F.3d at 1112 (discussing how subsequent to decision in Fantasy I, SportsLine.com and ESPN filed motions for summary judgment based on district court’s decision regarding Yahoo! game). The district court concluded both SportsLine.com’s and ESPN’s games did not infringe the ‘603 patent. See id. (holding SportsLine.com and ESPN’s products did not infringe because they did not award bonus points for “out-of-position” scoring). The district court also determined SportsLine.com’s Commissioner.com product did not directly infringe because it was not a game, but a “‘software tool by which [subscribers] operate their own fantasy football leagues on customized internet web pages.’” Id. (quoting Fantasy Sports Props., Inc. v. SportsLine.com, Inc., No. 2:99 Civ. 2131 (E.D. Va. Jan. 25, 2001)).
visoner.com infringed Fantasy's patent. As a result, the court vacated the district court's grant of summary judgment and remanded to allow the district court to determine, under a direct infringement analysis, whether the software was capable of infringement. The Fantasy court reaffirmed its holding in Intel and found that if a computer program has the means present in the software to infringe, then the device infringes.

b. The Opposite End Zone: High Tech and the Other Side of the Spectrum

In High Tech Medical Instrumentation, Inc. v. New Image Industries, Inc. ("High Tech"), the Federal Circuit ruled a handheld endoscope did not infringe a valid patent even when it had the capability to infringe. In 1989, Miles Milbank and Perry Williams were issued a patent for a modular endoscopic apparatus with image rotation. New Image also manufactured a similar intraoral endoscope. The Milbank and Williams patented device differed from the New Image device ("AcuCam") because the Milbank and Williams endoscopic camera rotated within its housing.

94. See id. at 1119 (remanding case back to district court for evidentiary inquiry). The Federal Circuit was unclear whether the Commissioner.com product, manufactured by SportsLine.com, awarded bonus points to kickers when they scored out of position. See id. (questioning capability to award additional points for out-of-position scoring).

95. See id. (remanding case back to district court). The court also affirmed the district court's holdings that Yahoo!'s, ESPN's, and SportsLine's fantasy football games did not infringe Fantasy's '603 patent. See id. at 1120 (discussing holding of Federal Circuit).

96. 946 F.2d 821 (Fed. Cir. 1991).
97. See Fantasy, 287 F.3d at 1119 (illustrating court followed decision of Intel).
98. 49 F.3d 1551 (Fed. Cir. 1995).
99. See id. at 1556 (holding handheld endoscope did not infringe even after manipulation).
100. See U.S. Patent No. 4,858,001 (issued Aug. 15, 1989) (describing protected patent). High Tech, a San Francisco company, is the assignee of the handheld endoscope. See id. (describing history and ownership of patent). An endoscope is "[a] lighted viewing instrument that is inserted into a body cavity for the purpose of investigating and treating disorders." The American Medical Ass'n Encyclopedia of Medicine 405 (Charles B. Clayman, MD ed., 1989).
101. See High Tech, 49 F.3d at 1553 (explaining in early 1991, New Image bought company manufacturing intraoral endoscopes and began selling device under "AcuCam").
102. See id. (indicating AcuCam camera does not rotate because two set screws prohibit movement of camera within housing). The court determined the AcuCam utilized software to rotate images on a viewing screen. See id. (illustrating difference between AcuCam and patented device). Compare with U.S. Patent No. 4,858,001 (issued Aug. 15, 1989) (describing patented device as "rotatable relative to the target area").
district court granted High Tech preliminary injunctive relief because High Tech proved AcuCam infringed the U.S. 4,858,001 patent and High Tech would suffer irreparable harm in the absence of a preliminary injunction. On appeal, the Federal Circuit determined the district court committed legal error and reversed the preliminary injunction. Specifically, the Federal Circuit determined the district court's interpretation of Intel did not lead to a conclusion that a device infringes if, after manipulation, it has the capability to infringe. The Federal Circuit, in distinguishing the Intel case, stated:

*Intel* does not support so broad a holding. All that was required by the limitation at issue in *Intel* was that the claimed invention, an integrated circuit memory device, was "programmable" to operate in a certain manner. The accused device, although not specifically designed or sold to operate in that manner, could be programmed to do so; that is, it was "programmable" to operate in the designated mode. The claim at issue in *Intel* therefore read on the accused device, as made and sold.

Similarly, in *Chem-Tainer Industries, Inc.* v. Wilkin ("Chem-Tainer"), a California district court determined the manipulation of a bait tank by a user to configure it to perform like the patented tank did not constitute infringement. The district court further suggested, that in determining whether a device infringes, "[t]he question is not what [a device] might have been made to do, but what it was intended to do and did do."

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103. See *High Tech*, 49 F.3d at 1553-54 (reviewing district court's analysis under four-part test for granting preliminary injunctions).

104. See id. at 1558 (finding district court committed legal errors in determining High Tech's likelihood of success on infringement claim and that High Tech would suffer irreparable harm).

105. See id. at 1555-56 (arguing *Intel* does not support district court's broad holding).

106. Id. (italics added) (differentiating *High Tech* from *Intel*). The court concluded the manipulation of the AcuCam was not sufficient to finding direct infringement. See id. at 1556 (indicating manipulation of device to infringe not sufficient to warrant infringement).


108. See id. at *16 n.9 (holding plaintiff failed to demonstrate likelihood of literal infringement). A bait tank is used to keep bait alive for fishing. See id. at *3 (defining use of bait tank). Bait tanks have a fluid inlet at the bottom of the tank and fluid outlet at the top of the tank. See id. at *16 n.9 (describing structure of bait tank).

109. Id. (citing Hap Corp. v. Heyman Mfr., 311 F.2d 839, 843 (1st Cir. 1962), cert. denied, 373 U.S. 903 (1963)). *Hap Corp.* was decided before the Federal Circuit
The Federal Circuit possibly narrowed the manipulation exception in *Bionx Implants, Inc. v. Linvatec Corp.* ("Bionx"). In *Bionx*, the Federal Circuit held the manipulation of a device on a videotape to prove infringement was valid when the patent contemplated use with other devices. Thus, if a patented device contemplates use with other devices, the manipulation exception may not be useful in defending against infringement.

3. **Inducement**

One may be liable under 35 U.S.C. § 271(b) for inducement if purposeful intent is proven, even if the device has a non-infringing use. Section 271(b) states, "whoever actively induces infringement of a patent shall be liable as an infringer." Robert L. Harmon, a distinguished legal scholar, stated, "[a] person infringes by actively and knowingly aiding and abetting another's direct infringement." For a court to find inducement, there must be actual intent to induce infringement and direct infringement.

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110. 299 F.3d 1378 (Fed. Cir. 2002).
111. See id. at 1382-83 (noting use of cannula to aid BioStinger in penetrating uncut tissue was valid because written description of patent described two ways for inserting claimed suture).
112. See id. (indicating possible exception to Federal Circuit's holding in *High Tech*).
115. HARMON, *supra* note 52, at 382 (defining active inducement). It is crucial that the inducer has actual or constructive knowledge of the patent. See id. (stating inducement by mistake not infringement); see also Manville Sales Corp. v. Paramount Sys., Inc., 917 F.2d 544, 553 (Fed. Cir. 1990) ("The plaintiff has the burden of showing that the alleged infringer's actions induced infringing acts and that he knew or should have known his actions would induce actual infringements.").
116. See Snuba Int'l, Inc. v. Dolphin World, Inc., No. 99-1357, 2000 U.S. App. LEXIS 16946, at *17 (Fed. Cir. July 11, 2000) (citing Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469 (Fed. Cir. 1990)); Met-Coil Sys. Corp. v. Korners Unlimited, Inc., 803 F.2d 684, 687 (Fed. Cir. 1986)). Met-Coil was the assignee of a patent for a device that connected metal ductwork used for heating and air conditioning. See id. at 685 (reviewing history of patent). Met-Coil owned and sold the patented machines that manipulated the metal ductwork for easy connecting. See id. (describing how device configured ductwork). Met-Coil also sold specially created corner pieces that connected with the manipulated ductwork. See id. (indicating Met-Coil also sold separate products for use with patented device). Korners Unlimited also sold specially created corner pieces that could connect with the Met-Coil ductwork. See id. (stating Korners was in competition with Met-Coil). The Federal Circuit found no infringement, inducement, or
Only circumstantial evidence is required to prove intent to induce infringement. Designing an infringing device for another may constitute inducement. Equally, advertising or instructing a buyer to use a device in an infringing manner may be considered inducement.

In *Minnesota Mining and Manufacturing Co. (3M) v. Chemque, Inc. ("3M")*, the Federal Circuit ruled Chemque had induced its customers to infringe 3M's patents. The court noted Chemque supplied infringing products to customers with instructions on how to use the products in an infringing manner, thus establishing inducement.

4. Contributory Infringement

Under 35 U.S.C. § 271(c), an individual is guilty of contributory infringement if:

[The person] sells . . . a component of a patented machine, manufacture, combination or composition, or a material or apparatus for use in practicing a patented process, constituting a material part of the invention, knowing contributory infringement because there was an implied license to sell the corner sections, and thus no direct infringement. See id. at 687 (holding because of implied license, device did not infringe patent). Accordingly, because the court found there was no direct infringement, they also found there was no inducement of the product or contributory infringement. See id. at 687 (reviewing that without showing of direct infringement, no inducement or contributory infringement exists). For a discussion on why contributory infringement was not found based on a finding of no direct infringement, see infra notes 123-33 and accompanying text.

117. See HARMON, supra note 52, at 378 (indicating circumstantial evidence is sufficient to prove intent to induce).

118. See Baut v. Pethick Constr. Co., 262 F. Supp. 350, 360-61 (M.D. Pa. 1966) (holding creators of infringing stained glass window liable for inducement because all participated in design decisions); see also 5 CHISUM, supra note 45, § 17.04[4], at 17-80 (defining scenarios of inducement).

119. See 5 CHISUM, supra note 45, § 17.04[4], at 17-82 n.19 (citing, as example, Honeywell, Inc. v. Metz Apparatwerke, 509 F.2d 1137 (7th Cir. 1975)).

120. 303 F.3d 1294 (Fed. Cir. 2002).

121. See id. at 1305 (referencing recent Federal Circuit inducement decision). 3M held rights to an encapsulants patent. See id. at 1298 (describing patent held by 3M). Encapsulants are used to protect signal transmission devices, such as electrical or optical cables. See id. (indicating uses of encapsulants). First, the Federal Circuit determined Chemque was aware of the patents held by 3M. See id. at 1305 (stating Chemque fulfilled first element of inducement). Second, the court found Chemque supplied the infringing products to its customers with instructions on how they were to be used, including an infringing use. See id. (declaring Chemque possessed intent to infringe 3M’s patent). Therefore, the Federal Circuit determined Chemque had induced the infringement of 3M’s patent. See id. at 1309 (holding Chemque infringed 3M’s patent).

122. See id. (holding Chemque induced infringement of 3M’s patent).
the same to be especially made or especially adapted for use in an infringement of such patent, and not a staple article or commodity of commerce suitable for substantial non-infringing use.\textsuperscript{123}

Under § 271(c), infringement will likely occur when an individual sells "a component that was itself not technically covered by the claims of a product or process patent but that had no other use except with the claimed product or process."\textsuperscript{124} In order for contributory infringement to occur, direct infringement must be present.\textsuperscript{125} Thus, contributory infringement "imposes liability on one who aids or abets another in an act of direct infringement."\textsuperscript{126} Interpreted by the Supreme Court, § 271(c) requires that a person guilty of contributory infringement have knowledge that the device was made or adapted for use in an infringing manner.\textsuperscript{127} The Federal Circuit stated, "there can be no contributory infringement without knowledge that the component made or sold was especially adapted for a particular use prescribed by a known patent."\textsuperscript{128} Courts decline to find contributory infringement in cases where a device is capable of both infringing and non-infringing uses.\textsuperscript{129}

In \textit{Pollock v. Thunderline-Z, Inc.} ("Pollock"),\textsuperscript{130} the Federal Circuit ruled Thunderline-Z infringed Pollock's patent because: (1) its

\begin{itemize}
\item 124. \textit{HARMON}, supra note 52, at 378 (describing when contributory infringement is likely to occur); \textit{see also}, e.g., \textit{Aro Mfg. Co., Inc. v. Convertible Top Replacement Co., Inc.}, 377 U.S. 476, 488 n.7 (1964) (declaring fabric replacements for Ford convertibles not capable of other non-infringing use and were designed specifically for Ford convertible cars because they did not fit any other models).
\item 126. \textit{LIPSCOMB}, supra note 45, § 22-7, at 429 (footnote omitted) (providing additional definition for contributory infringement).
\item 127. \textit{See Aro}, 377 U.S. at 488 (indicating knowledge required for contributory infringement); \textit{see also} \textit{HARMON}, supra note 52, at 378 (explaining intent is not required).
\item 129. \textit{See 5 CHISUM}, supra note 45, § 17.03[3], at 17-60 to 17-61 (commenting prior decisions codified in § 271(c)); \textit{see also} 35 U.S.C. § 271(c) (2000) (codifying prior court decisions). \textit{But see} \textit{LIPSCOMB}, supra note 45, at 434 (explaining if seller knew or intended device to be capable of both infringing and non-infringing use, and such was used in infringing manner, then seller may not argue non-infringing use as defense).
\end{itemize}
product directly infringed Pollock’s patent, (2) it had knowledge of customers using its device to infringe the protected patent, and (3) its product was not a staple article capable of other non-infringing uses.\footnote{131} In \textit{Pollock}, the defendants attempted to claim ignorance of the infringing use because the defendants stamped on their feed-through product a disclaimer that the product could infringe if used in an improper way.\footnote{132} The court rejected the defense and stated intent is not necessary in finding contributory infringement.\footnote{133}

5. \textit{The Hypothetical “Hard Case”}

Suppose “Manufacturer A” creates and receives a patent on “Software Program A.” Software Program A is a computer game where “bonus points” are awarded based on the difficulty of play.\footnote{134} Now assume “Manufacturer B” creates “Software Program B.” The software is placed on the open market. “User C” purchases the product and uses Software Program B in a non-infringing manner.

\footnote{131. See \textit{id}. at *9-12 (commenting on why court found contributory infringement).}
\footnote{132. See \textit{id}. at *10 (stating defendant’s claim). A feedthrough, described in United States Patent 4,841,101, is a device that allows a high expansion metal, like aluminum, to gain uniform radial thickness in its solder joint. See U.S. Patent No. 4,841,101 (issued June 20, 1989) (defining feedthrough). The feedthrough helps maintain the spacing and thickness of the solder joint. See \textit{id}. (defining use of feedthrough). Without a feedthrough, high expansion metals often fatigue and fail, especially in military operations, because the solder creeps under high stress and fails. See \textit{id}. (indicating potential problems with high expansion metals without use of feedthrough). Feedthroughs are not necessary in low expansion materials such as steel because there is less expansion of the steel under stress. See \textit{id}. (commenting on properties of low expansion metals).}
\footnote{133. See \textit{Pollock}, 1999 U.S. App. LEXIS 20883, at *10 (commenting “Thunderline-Z confuses intent to infringe with knowledge of infringement”).}
\footnote{134. See Fantasy Sports Props., Inc. v. SportsLine.com, Inc., 287 F.3d 1108, 1111 (Fed. Cir. 2002) (illustrating Fantasy’s game awarded bonus points for more difficult scoring scenarios). For hypothetical Software Program A, we assume the independent claims are identical to the claims of Fantasy’s patent. See \textit{id}. at 1111-12 (defining claims of \textit{Fantasy}). The defining claim is as follows: A computer for playing football based upon actual football games, comprising means for setting up individual football franchises; means for drafting actual football players into said franchises; means for selecting starting player rosters from said actual football players; means for trading said actual football players; means for scoring performances of said actual football players based upon actual game scores such that franchises automatically calculate a composite win or loss score from a total of said individual actual football players’ scores; said players’ scores are for quarterbacks, running backs and pass receivers in a first group and kickers in a second group; and wherein said players in said first and second groups receive bonus points. \textit{Id}. at 1111 (italics omitted) (listing claim at issue in Fantasy’s patent); \textit{see also} U.S. Patent No. 4,918,603 (issued Apr. 17, 1990).}
Software Program B, however, has the ability to evolve through the use of artificial intelligence based on the performance of User C. Consequently, due to random acts of User C, Software Program B evolves into a game where bonus points are awarded in a manner identical to that of Software Program A. Manufacturer B did not intend or know Software Program B was capable of infringing Software Program A. Does Manufacturer A, the creator and holder of the patent for Software Program A, have a cause of action for infringement against Manufacturer B because Software Program B has the capability to infringe?

III. ANALYSIS OF THE "HARD CASE"

To determine whether Manufacturer A has a valid cause of action against Manufacturer B for patent infringement, one must first determine whether Manufacturer A's patent is valid and enforceable. Here, the facts indicate Manufacturer A received a patent for Software Program A. Therefore, Manufacturer A possesses an exclusive right to use and practice the invention for a specified number of years. Manufacturer B, however, may still attempt to prove the patent is invalid using one of many defenses, including: expiration of the patent, lack of utility, anticipation by prior art, abandonment, or obviousness over the prior art. Here, for purposes of this Comment, it is assumed Manufacturer A's patent is valid against all defenses posed by Manufacturer B.

The second determination is whether Software Program B infringes the patent for Software Program A either directly, through inducement, or through contributory infringement.

135. See, e.g., supra note 33 and accompanying text.
136. See LIPSCOMB, supra note 45, at 418 (noting court must first inquire into validity of patent).
137. See supra pp. 70-72 for facts concerning hypothetical.
138. See 5 CHISUM, supra note 45, § 16.02, at 16-9 (describing rights conferred to patent holder); see also HARMON, supra note 52, at 4 (citing Arachnid, Inc. v. Merit Indus. Inc., 939 F.2d 1574 (Fed. Cir. 1991) to explain how rights of patent holders expanded through patents).
139. See HILDRETH, supra note 45, at 231-32 (listing various defenses to patent infringement).
140. See id. at 119-20 (commenting court must determine whether accused device falls under any of the three infringement categories). Inducement and contributory infringement require a showing of direct infringement. See Met-Coil Sys. Corp. v. Korners Unlimited, Inc., 803 F.2d 684, 687 (Fed. Cir. 1986) ("Absent direct infringement of the patent claims, there can be neither contributory infringement, nor inducement of infringement.") (citations omitted).
A. Did Software Program B Draw a Flag for Direct Infringement?

To determine whether Manufacturer B infringes the patent of Manufacturer A, one must apply § 271(a). First, according to the facts presented, Manufacturer B developed and sold Software Program B without the intent or knowledge of its infringing capability. Second, there is no evidence Manufacturer B contacted Manufacturer A concerning its product. Thus, it is established that Manufacturer B never gained authority to make, use, offer to sell, or sell a device that infringed Manufacturer A’s patent.

Under § 271(a), an infringing device must be made, used, offered for sale, or sold. Manufacturer B created and sold Software Program B to User C. Additionally, as already established, the patent term for Software Program A has not expired. In establishing direct infringement under § 271(a), further analysis is required before a court can find patent infringement.

The key analysis under § 271(a) emerges from determining whether the alleged device “reads on” the claims of the valid protected patent. A device infringes on the claims of a patent, not the protected device itself. Courts, using the two-step patent in-

142. See id. (showing language of statute does not require showing of intent or knowledge under direct infringement); see also 5 CHISUM, supra note 45, § 16.02[2], at 16-31 (stating direct infringement occurs regardless of knowledge or intent).
143. See § 271(a) (requiring individual to gain authority before making, using, or selling infringing device).
144. See id. (compelling individual to gain authority).
145. See id. (illustrating alleged infringer must make, use, offer for sale, or sell infringing item).
146. See id. (indicating infringement occurs when infringing device is sold).
147. See id. (requiring valid patent). For a discussion on patent protection term, see supra note 45.
148. See 35 U.S.C. § 271(a); see also Sorell, supra note 65, at 330.
149. See generally Davies v. United States, 31 Fed. Cl. 769 (1994) (noting each accused device must meet each limitation of claim in direct infringement suit).
150. See LIPSCOMB, supra note 45, at 410 (illustrating claims define protection afforded by patent).
In determining whether Software Program B infringes Manufacturer A's patent claims, either literal infringement or infringement based on the doctrine of equivalents must be proven.154

Under a literal infringement theory, Manufacturer A must prove Software Program B "reads on" the claims of Manufacturer A's patent.155 Here, Software Program B is performing identically to Software Program A and embodies the claims of Manufacturer A's patent.156 Consequently, because Software Program B "reads on" Manufacturer A's patent claims, no further analysis is necessary under the doctrine of equivalents.157 As established previously, a final determination of literal infringement must be reconciled with the decisions in Fantasy158 and High Tech.159


152. *See* Fantasy Sports Props., Inc. v. SportsLine.com, Inc., 287 F.3d 1108, 1111 (Fed. Cir. 2002) (defining Fantasy's patent claim). For the purposes of this Comment, the claims of the hypothetical Software Program A are the same as the claim of U.S. Patent 4,918,603 held by Fantasy Sports Properties, Inc. *See id.* (listing claims); *see also* U.S. Patent No. 4,918,603 (issued Apr. 17, 1990) (citing claims).

153. *See* U.S. Patent No. 4,918,603 (issued Apr. 17, 1990) (stating claims of Fantasy's patent); *see also* Fantasy, 287 F.3d at 1113-16 (discussing "bonus points" limitation in Fantasy's product).


155. *See* Corning Glass Works v. Sumitomo Elec. U.S.A. Inc., 868 F.2d 1251, 1258 (Fed. Cir. 1989) ("[The claims] must be 'read on' the accused structure to determine whether each of the limitations recited in the claim is present in the accused structure.").

156. *See id.* (finding literal infringement where device embodies claims).

157. *See* Sorell, *supra* note 65, at 390 (stating infringement based on equivalence sought after determining device does not infringe literally).

158. Fantasy, 287 F.3d at 1108.

B. Intel & Fantasy vs. High Tech

To establish literal infringement under Fantasy, Manufacturer A must prove that Software Program B was programmed with the capability to infringe. Manufacturer A need not establish an intent to infringe or even that the device has infringed. Rather, Manufacturer A must establish the program had the capability to infringe the protected patent. In the hypothetical scenario, User C bought Software Program B and used the device in an infringing manner. Manufacturer A’s argument will be that the program, at the time of sale, had the capability to infringe. Manufacturer A will argue that through the use of the program and artificial intelligence, the program had the capability to infringe.

At odds with the Fantasy argument posed by the Manufacturer A, Manufacturer B’s argument will rely on High Tech. Manufacturer B will argue User C manipulated the device in causing the infringement and, therefore, it should not be held liable. Further, Manufacturer B will argue Software Program B was not programmed with the capability of infringement, but rather, it was the randomness of the artificial intelligence reacting to User C’s input that caused Software Program B to “read on” the claims of the protected patent.

160. See Fantasy, 287 F.3d at 1118 (declaring software must have capability of infringing process programmed into software before use).

161. See Intel Corp. v. United States Int’l Trade Comm’n, 946 F.2d 821, 832 (holding accused device need only be capable of operating in page mode to find infringement); see also 35 U.S.C. § 271(a) (2000) (lacking intent requirement).

162. See Huck Mfg. v. Textron, Inc., No. 35956, 1975 U.S. Dist. LEXIS 12539, at *76 (E.D. Mich. May 2, 1975) (“For a person who uses a[n infringing] device, infringement is determined by the use to which the invention is actually put, but for the manufacturer, infringement is determined by the use to which the device may reasonably be put or of which it is reasonably capable.”).

163. See Intel, 946 F.2d at 832 (holding accused device need only be capable of infringing use to find infringement).

164. See High Tech, 49 F.3d at 1556 (holding manipulation of device to create infringing capabilities not infringement). For a discussion of the facts of High Tech, see supra notes 98-106 and accompanying text.

165. See High Tech, 49 F.3d at 1556 (holding manipulation of device to infringe not infringement).

166. See id. (stating manipulation of device by user to make device infringe does not trigger infringement liability for manufacturer). This scenario differs from the Fantasy case because the software package did not have the capability to infringe when it left the manufacturer’s place of business. See Fantasy Sports Props., Inc. v. SportsLine.com, Inc., 287 F.3d 1108 (Fed. Cir. 2002) (stating Commissioner.com product possibly had capability to infringe when sold to user). In this case, the program only achieved the capability to infringe after use of the program, manipulation by the artificial intelligence, and the random evolution of the software program.
The alleged infringer and the patentee's arguments turn on whether the "product" software incorporated with artificial intelligence is considered "means that are already present in the underlying software" or simply a manipulation of software by the user.

C. Inducement?

Pending a decision by the court on whether direct infringement is found under the literal infringement analysis, Manufacturer A may also attempt to bring suit against Manufacturer B for inducement. Under § 271(b), one is liable for inducement if there is intent to cause infringement. Here, Manufacturer B lacked the intent or even the knowledge that Software Program B was capable of an infringing use. There is no evidence that Manufacturer B advertised the program's capability of infringement or that Manufacturer B instructed User C to use the product in an infringing manner. Therefore, courts may not find inducement because software packages with advanced artificial intelligence, like Software Program B, evolve and are based on each individual user's inputs. The lack of foresight to what each and every software package will become precludes a finding of inducement.

D. Contributory Infringement?

Again, pending a decision by the court finding direct infringement, Manufacturer A may also bring suit against Manufacturer B

167. Fantasy, 287 F.3d at 1118. The Federal Circuit in Fantasy remanded the case to the district court to determine whether kickers could receive "bonus points" when scoring out of position. See id. at 1119 (noting Federal Circuit remanded case for further analysis of Commissioner.com product). The court indicated that if the software package was programmed to allow "bonus points" to kickers, then the Commissioner.com program would infringe Fantasy's patent. See id. (illustrating holding based on further analysis of Commissioner.com product).

168. See High Tech, 49 F.3d at 1555 (citing facts of case).

169. See Harmon, supra note 52, at 378 (asserting without direct infringement, alleged infringer not held liable for inducement).


171. See Manville Sales Corp. v. Paramount Sys., Inc., 917 F.2d 544, 553 (Fed. Cir. 1990) ("It must be established that the defendant possessed specific intent to encourage another's infringement and not merely that the defendant had knowledge of the acts alleged to constitute inducement.").

172. See Minnesota Mining & Mfg. Co. v. Chemque, Inc., 303 F.3d 1294, 1305 (Fed. Cir. 2002) (showing advertising and instructing user how to use device to infringe is proof of intent to induce infringement).


174. See id. (requiring active inducement).
for contributory infringement. The court, under a § 271(c) analysis, must determine whether Manufacturer B sold Software Program B knowing the program was "especially made or especially adapted" for infringing use of a patent and without other substantial non-infringing capabilities.

Even if the court finds direct infringement, Manufacturer B cannot be held to have contributorily infringed Manufacturer A's patent. First, Manufacturer B did not know Software Program B could infringe Software Program A's patent. As stated in Pollock, Manufacturer B must have knowledge that a device will infringe or be used to infringe for a court to find contributory infringement. Accordingly, because Manufacturer B did not know that Software Program B could infringe Manufacturer A's patent, Manufacturer B cannot be held to contributorily infringe the protected patent. Second, Software Program B is a staple article possessing non-infringing capabilities. Conversely, in Pollock, the Federal Circuit determined the feedthroughs had only infringing capability and were not staple articles of commerce. Therefore, because the court could determine Software Program B to be a staple article of commerce with non-infringing capability, Manufacturer B may not be found to contributorily infringe the software patent.

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177. See id. (requiring knowledge of article made especially for infringing patent and item not staple article of commerce suitable for substantial non-infringing use).


181. See Pollock, 1999 U.S. App. LEXIS 20883, at *11-12 (commenting alleged device need not be staple article of commerce to find contributory infringement).

182. See id. at *11-12 (finding feedthroughs have no other non-infringing use).

183. See Snuba, 2000 U.S. App. LEXIS 16946, at *20 (noting Dolphin Diver pod not staple article because device had no non-infringing use). In this case, Software Program B has a non-infringing use, its original use, and therefore is a staple article of commerce. See 5 CHISUM, supra note 45, § 17.08[3], at 17-61 to 17-63 n.5-6 (defining staple article of commerce).
IV. POSSIBLE IMPACT OF THE "HARD CASE"

The impact of a judicial decision concerning whether artificial intelligence should be considered pre-programming, thereby giving a software program the capability to infringe, could have a widespread effect on technological advancement in the software design industry.\(^{184}\) Because the software and computer industries change rapidly in both technology and scope, a twenty-year monopoly provided by a software patent, along with a ruling by a court that artificial intelligence programming infringes, could devastate software and computer advancement utilizing artificial intelligence.\(^{185}\) A cessation in the development of artificial intelligence in software and computers would undermine the fundamental goal of the United States patent system.\(^{186}\)

A court's decision on whether the scenario between Manufacturer A and Manufacturer B is infringement, therefore, ultimately affects the future use of artificial intelligence in computers and software.\(^{187}\) If a court takes the position that products derived from a user and artificial intelligence in a software program constitute a capability already present in the program, then all programs utilizing artificial intelligence run the risk of incurring liability for direct infringement.\(^{188}\) Conceivably, all advanced programs with the ability to be manipulated based on the acts of the user and artificial intelligence could infringe other protected patents.\(^{189}\) Under the direct infringement analysis, only the capability of infringing use, and not actual use, is necessary in establishing infringement, and any patent holder could threaten suit against these device manufacturers.\(^{190}\)


185. See Bajarin, supra note 36 (discussing rapid evolution of computer industry).

186. See U.S. CONST. art. I, § 8, cl. 8; see also Hildreth, supra note 45, at 2 (noting grant of patents encourages invention and disclosure). New products introduced into society spark new development and interest in the area of the patented device. See id.

187. See § 271(a) (showing patent holder's right to exclude others from use).

188. See Fantasy Sports Props., Inc. v. SportsLine.com, Inc., 287 F.3d 1108, 1118 (Fed. Cir. 2002) (holding computer program infringes if program has capability to infringe (i.e., if software program was programmed by manufacturer with capability to infringe)).

189. See § 271(a) (enumerating elements of direct infringement).

190. See Intel Corp. v. United States Int'l Trade Comm'n, 946 F.2d 821, 892 (finding accused device need only be capable of operating in infringing manner); see also Fantasy, 287 F.3d at 1119 (remanding to determine if software program has...
The threat of an infringement suit could cause irreparable harm to the advancement of artificial intelligence in computers and software. Inventors and manufacturers, fearful of infringement suits based on their development and manufacture of products incorporating artificial intelligence, may stop their advancement of artificial intelligence, thus countering the fundamental goals of patent protection.  

Conversely, if a court determines that using artificial intelligence to create an infringing product is a mere manipulation of the software, then manufacturers will not be held liable for direct infringement. Inventors and manufacturers of artificially intelligent software will then be free to continue their development and production, thus conforming with the original goals of the patent protection theory. There still may be harm, however, because advanced software may consequently injure holders of patented software applications through infringement. Injury to the patent holders after receiving patent protection also violates the original intent of providing patents: protection from infringement.

This perceived weakening of patent protection, which was created to safeguard intellectual property, would threaten future de-
development and efficiency throughout the software industry. Possible injury to the advancement of artificial intelligence or injury to the patent holder invites a renewed inquiry into whether patent protection should be afforded to software. Consequently, future advancement of artificial intelligence in software and computers poses potential problems with both developers of artificially intelligent devices and those who own patents. The potential implications of a judicial decision concerning artificial intelligence and infringement go well beyond the fantasy football field.

V. CONCLUSION

The Federal Circuit’s infringement analysis of computer programs containing artificial intelligence will transform either the computer industry and/or future views of the USPTO regarding patent infringement in software applications. In light of future artificial intelligence applications and the significant influence of software technologies, a decision that destroys or even disrupts a portion of the computer industry will likely lead to review by the Supreme Court of the United States. With the intent of our Founding Fathers in mind, a decision allowing use of artificial intelligence to infringe may be the only practical way to adhere to the principles of the United States Constitution in promoting the advancement of technology.

Eric J. Schaal

196. See Rockwell Graphic Sys., Inc. v. DEV Indus., Inc., 925 F.2d 174, 180 (7th Cir. 1991) (stating nation’s future depends on efficiency of industry (capitalism) and protection of intellectual property).

197. See Gleick, supra note 36, at 49 ("The great bursts of technological innovation of the past two decades . . . took place in a free-wheeling and competitive climate . . . The greatest successes, like Microsoft and America Online, had nothing to do with patent protection. Amazon did not need patents to grow . . . to its current pre-eminence.").

198. For a discussion concerning the impact of a court’s decision on the “Hard Case,” see supra notes 184-98 and accompanying text.


200. See Creation, supra note 44 (reviewing history of United States patent system).