Potential Theories of Legal Liability for Defective Expert System Software

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Abstract

Expert systems have rapidly been incorporated into many commercial and professional activities. They are used as diagnostic tools for such diverse areas as medicine and helicopter maintenance, as well as financial forecasting, tax planning and drafting legal documents.

If an expert system is defective, serious consequences can arise. When a person believes they have been injured, whether economically or personally, as a result of defective expert system software, they will seek redress through the legal system. Due to the changing role of software applications represented by expert systems, traditional legal theories of liability may be inadequate.

This paper reviews current legal theories of liability for defective software as well as other emerging theories which may be applied to expert system software’s new roles in American society. The purpose of this paper is to allow expert system developers to understand in advance the performance standards to which they potentially may be held.

Introduction

Before any theory of liability for defective software can be explored a threshold determination must be made of whether the software in question is a “good” or a “service.” Distinct legal theories arise as a direct result of this determination. If the software is considered a good, two sets of principles must be considered, strict liability in tort (products liability) and contract-related provisions of Article 2 of the Uniform Commercial Code. If, however, the software is deemed to be a service, recovery may be obtained under the principle of negligence, and possibly under a theory of malpractice.

Software as a Good vs. a Service

The U.S. courts have not been consistent in determining whether software is a good or a service. Although the trend appears to be leading to a doctrine that if a contract for software (which is generally in the form of a license) results in leaving with the licensee installed software, however unique or tailored to the requirements of the licensee, it will be considered a transaction involving a good. Some courts have ruled, however, that where the primary purpose of the contract is to receive the skill and talents of a programmer or developer to meet the licensee’s specific needs, the contract will be deemed one for services.

If a contract to acquire an expert system is deemed to be a contract for services and a negligence action is brought on the basis of that system being defectively designed or implemented, the programmer or developer would be held to an ordinary standard of care. In other words, did the programmer or developer exercise reasonable care in the design or implementation of the system. If reasonable care was exercised, then a negligence action cannot be sustained.

While this initially appears to be a fair standard to apply to the programmer or developer, the result may be that someone has sustained significant economic or personal injuries as a result of apparently defective software—despite the reasonable care of the programmer or developer. Some may view this as an unfair result and search for new legal theories to apply. This gives rise to the potential application of two alternative theories which alter the standard of care or level of proof required to be established by a licensee who has suffered damages.

The Doctrine of Res Ipsa Loquitur

The doctrine of "res ipsa loquitur" (roughly translated, meaning "the thing speaks for itself") holds that it may be inferred that harm suffered by the plaintiff (i.e., the person bringing the lawsuit) is caused by the negligence of the defendant (the person defending the lawsuit) when: (1) the event is the kind which ordinarily does not occur in the absence of negligence; (2) other responsible causes, including the conduct of the plaintiff and third persons, are sufficiently eliminated by the evidence; and (3) the indicated negligence is within the scope of the defendant’s duty to the plaintiff.1

The doctrine of res ipsa loquitur may be most applicable to a situation where the software in question is quite complex, containing hundreds of thousands of lines of
code (or thousands of rules). Although an exact programming error cannot be determined, the first threshold of liability under this doctrine would be met if the established facts reasonably permit the conclusion that negligence is the more probable explanation for the harm.

There is, of course, end-user intervention in the form of input and interpretation of the system's output. Use, and possibly misuse, of the system by the end-user would not, however, be a complete defense. In states which have enacted a comparative negligence statute, the doctrine of res ipsa loquitur may apply even though the plaintiff's negligent acts or omissions may also have contributed to the injury, provided the plaintiff's conduct contributed to less than 50% of the harm.\(^2\)

The final element under the doctrine of res ipsa loquitur (which is also an important element under a traditional negligence action) concerns whether the defendant owed a duty of care to the plaintiff. To make this determination, it must first be established what level of care the defendant (i.e., the programmer or developer) owed to the plaintiff (the end-user). As noted previously, the current standard of care is one of an ordinary person\(^i\) though there have been recent attempts (one partially successful) to elevate this standard of care -- meaning the programmer or developer must exercise greater care.

**Computer Malpractice**

In two cases in which a "computer malpractice" theory was asserted, the courts declined to invent such a tort (i.e., wrong) on the basis that simply because an activity is technically complex and important does not mean that greater potential liability must attach.\(^i\) Recently, however, the accounting firm of Ernst & Whinney (E & W), which was retained by Diversified Graphics, Ltd. (D.G.) to assist D.G. in selecting a new computer system, was found to have breached a professional standard of care when the computer system was found to be totally inadequate.

In reviewing the jury verdict against E & W, the Eighth Circuit Court of Appeals ruled:

> ... D.G. presented sufficient evidence to support the jury's finding of lack of professional care. D.G.'s theory for recovery based on negligence encompasses the notion of a consultant-client relationship and therefore the existence of a professional standard of care: E & W failed to act reasonably in light of its superior knowledge and expertise in the area of computer systems.\(^6\)

As end-users depend more and more upon superior knowledge and expertise of those who develop expert systems, the theory of "computer malpractice" may become more accepted in determining the level of care which must be exercised by such professionals. This is a higher level of care which matches the higher expectations of the end-users.

**The Uniform Commercial Code**

If, as is more likely, an expert system is considered a good, the contract under which it is acquired will be subject to the provisions contained in Article 2 of the Uniform Commercial Code (U.C.C.). The U.C.C. allows a programmer or developer to potentially limit their liability for defective software through the elimination of liability for consequential damages, limitation of other remedies that would otherwise be available to the licensee, as well as through a disclaimer of warranties.

The contract under which the expert system is acquired may provide a limitation of liability, generally by eliminating liability for consequential or incidental damages. Consequential damages are those damages which are not a direct result of the defect, but are a consequence of it. A programmer or developer is generally permitted to eliminate any liability for consequential damages in the contract.

A limitation of remedies provision in a contract means that a licensee's recourse is limited to a specific remedy such as repair or replacement of the software. For example, if the software, after numerous attempts, cannot be repaired, the remedy "fails of its essential purpose" (namely, to provide the licensee with an operating program). The licensee would then be permitted to sue for damages rather than resort only to the limited remedy in the contract.\(^8\)

These limitations of liability and remedies are generally enforceable. A limitation of liability will not be enforced by a court, however, if it would be unconscionable to do so (i.e., it would be so unfair to the injured party that the court, in good conscious, could not enforce such a provision). Unconscionability is easier to establish where the software is acquired for personal, household use and is very difficult to establish in a commercial transaction.

The U.C.C. also provides for express warranties and implied warranties of merchantability. That is, that the software does what it purports to do. Express warranties are those actually stated by the manufacturer, either in writing or orally, while implied warranties are those which arise by the nature of the product (e.g., an accounting program is expected to prepare financial reports; an inventory control system is expected to keep track of inventory). Implied warranties also include the implied warranty of fitness for a particular purpose which is an implied warranty that the software will fit the specific needs of the licensee (e.g., that an inventory control system will specifically operate for a car dealership).
These warranties, however, can be, and usually are, disclaimed by the manufacturer or vendor. If consequential damages have been eliminated and implied warranties disclaimed, the licensee is then generally limited to contract damages (i.e., those damages which the contract permits the plaintiff to pursue; those damages which are not limited by the contract). In order to pursue additional remedies in the event damages are sustained due to defective software and for which a remedy is not provided under the contract, other tort theories will have to be used.

**Product Liability**

Those who engage in the manufacturing of products are subject to strict liability when a product reaches the consumer in a defective condition which is unreasonably dangerous. Therefore, if an expert system is considered a good (i.e., a product as opposed to a service), the principles of product liability would apply. Product liability only applies, however, where there has been injury to person or property. Purely economic damages generally cannot be recovered under a product liability action. In other words, if a business suffers lost profits, or is driven out of business, or must expend additional sums to correct problems, all due to defective software, those losses cannot be recovered under a product liability action.

For example:

Plaintiff commenced [an] ... action against defendants ... for ... strict products liability ... and negligence ... after a computer system ... broke down causing erasure of stored bookkeeping, inventory and financial data. [These counts were properly dismissed] ... since recovery is sought not for physical damage to person or property resulting from an accidental cause, but for "economic damages" only [citation omitted]. "[W]hen damage suffered by a plaintiff is the result of a nonaccidental cause, such as deterioration or breakdown of the product itself, the injury is properly characterized as 'economic loss' and plaintiff is relegated to contractual remedies." [Citations omitted.]

The law will not hold a manufacturer liable for the level of performance of his products in the consumer's business unless he agrees that the product was designed to meet the consumer's demands (e.g., through a warranty). In other words, product liability is not available to situations where plaintiffs are seeking the fulfillment of their expectations in the bargain but only where they are seeking traditional tort damages to compensate for the injuries suffered.

There is a trend, however, to look beyond just the economic damages analysis to determine if there is an underlying risk of injury to person or property. As stated by one court: "We believe that tort law supports recovery of damages that could be characterized as economic loss when, because of a negligently manufactured product, plaintiff is subjected to an unreasonable risk of injury to his person or property."

For example, a cheesemaking concern was allowed to recover lost profits resulting from the installation of defective pasteurizing equipment when they were used as a measure of property damage:

... [A]ppellee's [LeSueur's] claim is not based solely on lost profits. LeSueur also suffered property damage to its milk. ...

LeSueur argues that the property damage it has suffered can be measured by the difference between the volume of the cheese as produced by the defective [pasteurizing equipment] and the volume of the cheese that would have been produced if the pasteurizer was operating properly, with the difference being measured by market value. Although [appellant] properly argues that this measure is in form a lost profits measure, on the instant facts, it is a satisfactory method of calculating property damage because of the special nature of the harm to LeSueur's milk. ...

Property damage, including damage to the defective property itself and to other property as a result of the defect, is recoverable. Moreover, to the extent that some of LeSueur's claim is for lost profits in addition to property damage, an action can be maintained for economic loss when personal injury or property damage are also present.

**Information As Property**

In most instances the output created by an expert system is information. Rather than an end-user suffering personal injury, the damages suffered as a result of a defective expert system would be in the form of faulty information.

For a product liability theory to prevail based upon faulty information produced by a defective expert system, it must first be determined whether that faulty information is "property." Although property concepts have always involved both tangible and intangible property (information, particularly that which is entered into, stored, retrieved, and generated by a computer, being generally regarded as intangible), until recently legal theories regarding information (i.e., intellectual property law) have not regarded information as something which is subject to the rights traditionally associated with property.

Intellectual property law protection is provided in three basic forms, with its principal interest on how the
information is used or the form it takes. U.S. copyright laws provide protection to the owner of an original expression of ideas, namely the right to restrict copying of that expression. U.S. patent laws provide the creator of a new and useful invention temporary, exclusive rights to the use of that invention. Trade secret laws allow the owner of information (such as a mailing list, a formula, or even a computer program) to protect it from being used by or disclosed to others.

These three intellectual property rights all recognize that information can constitute a limited form of property. Their recognition of this property right is, however, limited in scope based upon the protections they provide -- mostly the unauthorized use or disclosure of information. They have not, historically, recognized information as property which, in and of itself, can be damaged or destroyed. Legal commentators have generally not been able to overcome the economic loss barrier when dealing with damages in the form of lost, damaged or destroyed information.

Recent U.S. Supreme Court cases have, however, altered that historic perception regarding information as property and may provide the basis for an expansion of the measure of damages when information is damaged or destroyed due to defective software.\textsuperscript{13} Ruckelshaus \textit{v. Monsanto Co.}\textsuperscript{14} and \textit{Carpenter v. U.S.}\textsuperscript{11} both classified information as private property.

The Supreme Court determined in \textit{Ruckelshaus} that research information submitted to a federal agency could be considered property for purposes of applying the fifth amendment prohibition against taking of property without paying just compensation.\textsuperscript{16} The \textit{Carpenter} case involved the use of a reporter's knowledge of information to be placed in his column in a scheme to trade in the securities which would be affected by that information. The Supreme Court viewed this as a misappropriation of the employer's property resulting in a violation of the federal mail and wire fraud statutes.\textsuperscript{17}

Information derives its value from the time, labor, and capital which is required to develop it. Conceptually, there are many issues which the use of information in our society shares with other forms of property. These include the right to exclusive use, the right to possess, use and enjoy the benefits of, and finally the right to transfer information from one person or entity to another. The traditional view of trade secrets appears to come the closest of the intellectual property laws to designate information as property. Even trade secrets have not, however, gone that far. Trade secret law has traditionally governed the breach of a confidential relationship rather than creating a property right.\textsuperscript{18}

The taking of trade secrets could not, historically, be prosecuted as larceny. This historical perspective has been breaking down, however, as some cases expressly define trade secrets as property. The \textit{Carpenter} case, as well as the Uniform Trade Secrets Act, make it clear that taking information or trade secrets can in fact be punishable as a misappropriation or theft.

Where software is designed to analyze a company for possible acquisition and it miscalculates, either by improperly applying accounting rules or by simply failing to compute accurately, it is not difficult to extend this perception of information to conclude that this defective software has damaged property. If this argument is accepted, it makes available a whole new range of damages in cases involving faulty software under a theory of product liability on the basis of damage to property. Although the initial measure of damages may fall under a traditional view of economic loss, based on lost profits or lost opportunities, under the theories expressed in the \textit{LeSueur} case, above, those economic losses would be used as a measure of damage to the information property.

\textbf{Freedom of Speech}

A defense which may be raised when damages are sought under a product liability theory due to a defective expert system is that the defect may be a result of faulty expert knowledge incorporated into the system and not a programming error per se. Such a situation may be analogous to publishing cases involving damages caused for publishing information which is incorrect. Traditionally, publishers of manuals and self-help books have been immune from liability for injuries suffered as a result of the use of their publications. This immunity is based upon the fear that such potential liability would have a chilling effect on the freedom of speech protected under the First Amendment of the U.S. Constitution.

For example, a court recently refused to regard a diet book as a product for purposes of product liability after a woman died from cardiac arrest after losing 100 pounds by following the diet instructions contained in the book. The court noted, however, that the information contained in the diet book was different than that contained in aviation and navigation charts:

\textit{... [C]ases ... imposing liability under [a theory of strict product liability] upon publishers of aviation and navigation charts is not akin to the problem involved herein, especially since no first amendment concerns are present in those cases. In those cases, extremely technical and detailed materials were involved, upon which a limited class of persons imposed absolute trust having reason to believe in their unqualified reliability. As such they took on the attributes of a product and are not protected by the first amendment.}\textsuperscript{19}
A slightly different conclusion was reached by the United States District Court in Illinois. Sears was sued by an individual who had been injured by a Sears saw for negligence in preparing a manual containing instructions on the maintenance and operation of its saw. Sears then filed suit against its insurance carrier for a court order that the insurance company must defend Sears in the suit based upon an insurance policy Sears had with the insurance company. In determining whether such a negligence suit was covered under the insurance policy the court stated:

Giving the ordinary, plain, meaning to the term "named insured's product" as defined in the policy, [the]... product plainly is the manual, and the policy makes no distinction between the physical manual and the intellectual content of the manual.20

While this case does not determine, as a matter of law, whether Sears was liable for negligence in the preparation of the manual, it indicates a trend to regard certain published materials as products. Particularly where personal injuries are suffered and the material is highly technical, distributed to a select class of persons, and upon which great trust is placed -- materials which are ideally suited for expert system applications -- the likelihood of a finding that the material is a product is becoming greater. If the material (the expert system) is determined to be a product, strict product liability theories can apply.

Conclusion

Although no reported case has directly dealt with the level of liability which should be imposed due to defective expert system software, as expert systems become more ingrained in the operation of day-to-day procedures the likelihood of such an action is increasing. As the cases presented in this paper indicate, current legal theories will have to be expanded in order to directly establish tort liability due to defects in the software.

While the purpose of this paper is not to discourage expert system development or encourage lawsuits by disgruntled end-users, expert system programmers and developers should be aware of the risks involved in developing such software due to the heavy dependance placed upon such systems by end-users. By understanding the standards to which they may someday be held, such programmers and developers can better appreciate the level of care which may be required of them.

Notes

[2] Traditionally, if a plaintiff contributed to their injury through their own negligence, they were barred from pursuing a negligence claim against the defendant. Most states have now enacted "comparative negligence" laws under which a comparison is made of the relative degrees of negligence of the plaintiff and the defendant. Under these statutes, a plaintiff will not be barred from recovery, even if their own negligence contributed to their injury, as long as such negligence was not as great as the negligence of the person against whom recovery is sought (i.e., the defendant).
[4] For example, a computer programmer who represented himself as possessing the skill and qualifications necessary to design and develop a computer program for an oil company impliedly represented possession of the skill and diligence ordinarily possessed by well-informed members of the computer programming trade and breached an implied promise of having reasonable skill and ability when he failed to design the computer program needed. Data Processing Services, Inc. v. L.H. Smith Oil Corp., 492 N.E.2d 314, 320 (Ind. Ct. App. 1986).
[7] The U.C.C. is a set of uniform provisions adopted by all the states (except Louisiana). The specific provisions contained in Article 2 of the U.C.C., pertinent to this paper, concern transactions involving goods.
[8] As another example, the seller of a software system was liable to the buyer for consequential damages, even though there was a clause in the contract eliminating such liability, where the seller's default was total and fundamental -- the seller completely failed to provide a workable system, to remedy defects in the system, or to adequately train the buyer's personnel. RBX Industries, Inc. v. Lab-Con, Inc., 772 F.2d 543, 547 (9th Cir. 1985). See also, Hawaiian Tel. Co. v. Microform Data Systems, 829 F.2d 919 (9th Cir. 1987).
[9] Generally, strict liability is established when: (1) the product is defective; (2) the defect caused the plaintiff's injury; (3) the product reached the consumer without substantial change in its condition from the time it was made and sold; and (4) the defective product was a producing cause of the plaintiff's injuries. A product is unreasonably dangerous when its usefulness does not outweigh the magnitude of the risk posed by its defect. Moorhead...


[13] This analysis assumes that faulty information produced by defective software is equivalent to damaged information on the basis that its usefulness, and therefore its value, is diminished.


[16] 104 S.Ct. at 2873.


[18] The usual scenario is that employees enter a confidential relationship with their employer in which confidential information is disclosed to the employees in order that they may use it in their work, to the benefit of the employer, but that they retain the confidentiality of that information.
