Patent law changes spell problems and opportunities

Sir— Software can now be patented in the United States, and earlier this year a court decision lifted the ban on patenting 'methods of doing business'. These moves could have an important impact on scientists — many programs and protocols routinely used in laboratories may now qualify for patent protection.

Over the past 20 years, the US courts have gradually lifted the constraints against patenting software. The argument against patentability was that software is an arrangement of algorithms, similar to any mathematical formula or abstract idea, that cannot be removed from the public domain. But there existed a recognition that software could embody novel and non-obvious inventions which should be the protectable fruit of an inventor's labour.

To try to clear up the confusion, legal tests were established that allowed one to claim a patent for the application of a mathematical algorithm or abstract idea if it brought 'a useful, concrete and tangible result'. There was general feeling that the application of an algorithm had to be in the context of a machine or similar transformation of physical quantities. One could claim a machine, or method of operating a machine, that applied a mathematical algorithm, formula, or calculation with the practical result of generating an electrical signal or image on a display. It was also acceptable to claim software when reduced to a fixed medium, such as a computer disk. But these tests were cumbersome and confusing, especially where the application of a program produced a pseudo-abstract result such as a set of numbers.

Any question as to the patentability of software was eliminated by the decision in *State Street Bank v. Signature Financial Group, Inc.*¹. That decision was re-emphasized in *AT&T Corporation v. Excel Communications, Inc.*².

At issue in the *State Street* case was the patentability of a system for pooling mutual fund assets in an investment portfolio. The court confirmed that the system was patentable and held that the "transformation of data by a machine through calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces 'a useful, concrete and tangible result' — a final share price momentarily fixed for recording". One can surmise from this that the requisite useful result of the application of an algorithm by a machine running software need only be a number in electronic form.

The courts did not stop there. There had been a general understanding that methods of doing business were not patentable. It appears now that these are as patentable as other processes or methods, subject to the requirements of novelty and non-obviousness. Arguably, such methods could include a host of laboratory protocols and data manipulation routines run on computers.

In the *Excel* case, even the requirement that a machine be implicated in a data processing operation was essentially eliminated. The issue was the patentability of a process using Boolean logic to create data structures for telecommunications switching applications. The court found that the bare process of using Boolean principles to produce useful, concrete and tangible results, without pre-empting other uses of these mathematical principles, was patentable. The need to claim a process involving a mathematical principle within the constraints of the operation of a machine was discarded.

To the scientific researcher, the *State Street* and *Excel* decisions present a two-edged sword. On the one hand, novel and non-obvious software test protocols, data reduction programs, calculation schemes, and numerous other computer-based manipulations of formulas, which once were not thought patentable, arguably now qualify for patent protection. On the other hand, one must now be wary of infringement of the patent rights of others in inventions that may apply well-known algorithms or calculations.

Businesses are becoming aware of the possible impact of these decisions. A deluge of patent applications, for such diverse business methods as Internet advertising and invoicing systems, is arriving at the US Patent and Trademark Office. I fear that the patent office will be ill-equipped to examine such applications, especially for inventions in fields where algorithms are widely used and accepted as conventional, and therefore not regularly described in print.

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1. 149 F.3d 1368, 47 USPQ2d 1596 (Fed. Cir., 1998).

2. 172 F.3d 1353, 50 USPQ2d 1447 (Fed. Cir., 1999).

Latecomers welcome?

Sir— Your supplement "Career choices for scientists" describes some of the interesting moves out of the lab that researchers make from necessity or choice (*Nature* 402 (Suppl.), 11 November 1999). Does anyone do the reverse? Are there scientists who acquired a science degree after their mid-twenties, say, but who made it into full-time research? With the

huge growth in education for mature students in the past 30 years there are many thousands with degrees acquired later rather than earlier. Do significant numbers of them reach the research lab?

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Threat to research in Spanish universities

Sir— To help solve their chronic funding deficit, Spanish public universities are encouraging staff to bring in resources by collaborating with the private sector. This was made possible in 1983 by article 11 of the University Reform Law, which permits faculty members to sign contracts with private institutions. As an incentive, such contracts may include personal remuneration. The aim of article 11 is to promote collaboration between universities and industry through scientific and technical research projects. But illegitimate application of the law is eroding this philosophy, to the detriment of the scientific objectives of universities.

Article 11 is increasingly being used to conceal contracts offering ordinary services of low technical complexity, that have nothing to do with research and fall within the scope of private companies. These activities largely use infrastructure and staff paid for by public funds. In this way, the university is stealing employment opportunities and competing with the private sector. So universities may be undermining one of their main functions: the integration of qualified young people into the labour market.

The provision of these services by universities is also opposed to their primary objective as institutions dedicated to basic science. Such contracts, often given priority because they help line the pockets of the staff, take up precious time that would be better spent on research of wider scope and scientific value. The incorrect application of article 11 is leading to an illicit trade in which unscrupulous companies transfer routine activities to university labs, thereby reducing production costs, and academic staff obtain easy money without having to compete for funds with other researchers on the basis of proper scientific evaluation.

This will slow down scientific progress.

It would be intolerable if universities became no more than vulgar enterprises supplying everyday technical services. Article 11 contracts must be regulated to ensure that they promote scientific excellence.

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