

CHAPTER 26

**COMPUTER IMPLEMENTED INVENTIONS AND
BUSINESS METHODS**

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CHAPTER 26

COMPUTER IMPLEMENTED INVENTIONS AND BUSINESS METHODS

26.01

SCOPE OF THIS CHAPTER

This chapter relates to inventions which utilize the processing function of a computer. These inventions are implemented, at least in part, by means of a computer program and computer hardware.

The intellectual property regime provides complementary protection for the dual nature of computer programs. While the literary form of a computer program is protected under the *Copyright Act*, the *Patent Act* protects the active functionality of a computer implemented invention.

A computer implemented invention is examined in a manner equivalent to inventions in other fields of technology. Business computer-implemented inventions or business methods are considered as a subgroup of computer implemented inventions when data processing functions are involved. These inventions may include financial, marketing and other commercial activities.

26.02

GUIDELINES

Guidelines have been established reflecting the view of the Federal Court and consistent with the trend established by Commissioner's Decisions. A joint Patent Office/Patent Profession Committee agreed on a set of three guidelines in 1994. The guidelines have been retained with explanations and amendments including a fourth guideline.

1. Un-applied mathematical formulae are considered equivalent to mere scientific principles or abstract theorems which are not patentable under subsection 27(8) of the *Patent Act*. Claims to inventions, which include a solution to mathematical formulae must, as a whole, be drawn to patentable subject matter. A system or process for the conversion of data into more meaningful data does not

automatically relate to patentable subject matter. The question to be asked is what according to the application has been discovered.

Examples

The first two examples comprise a mathematical formula of a discovery while the last two examples comprise a mathematical formula in an inventive application of the discovery. Discoveries represent a truth that has always existed in the public domain even if the discovery has been described in the application for the first time.

- a) The equation $f=a^y$ has applications in physics, engineering, biology and economics, where the letters f , a and y represent numbers of entities of the base a raised to the power y . The process and the programmed computer for solving the exponential equation is directed to a discovery rather than to patentable subject matter; the process and the implementing apparatus are similar to a scientific principle or abstract theorem which is excluded from patentability according to subsection 27(8) of the *Patent Act*.
- b) The nature of the invention has not been changed by arbitrarily limiting the field of use of the equation in example a), by adding input steps and post solution steps to the equation in a claim. To arbitrarily narrow the context of the intended scope of the discovery does not transform the discovery into an invention. A discovery is applied in an invention if it has an integral relationship with the invention's purpose in the execution of the process or the operation of the apparatus, as illustrated in the next two examples.
- c) An industrially applied ^{method} algorithm for evaluating the exponential equation $f=a^y$ may be directed to patentable subject matter if the ^{method} algorithm allows the computer to operate more quickly and takes up less computer space. The novel configuration of the computer, as a result of the computer program, embodies a new tool for solving the equation. Such apparatus has traditionally been considered to be in a field of patentable subject matter.
- d) If the result of any equation is applied to a process, product or machine, and if the equation has been integrated with a practical application, the new and inventive discovery in a traditional patentable field will be considered to be directed to patentable subject matter. The integration of an invention is to be understood in the context of the *Schlumberger* case, MOPOP 26.03.

2. The presence of a programmed general purpose computer neither lends patentability to, nor subtracts patentability from, an apparatus. A loaded computer program reconfigures the logic circuits of the computer in a particular way through its instructions and commands; the reconfiguration is equivalent to differently wired circuits in the computer. But reconfiguration of the computer with the computer program does not change the nature of the invention.

Similarly, the presence of a program for a general purpose computer neither lends patentability to, nor subtracts patentability from, a process. Nevertheless, claims must define the machine implemented process if the invention is directed to a computer implemented process.

The following example shows an adaptation of a known method for use by electronic means which is not considered to be directed to patentable subject matter.

Example

It is well known to analyze stereo-chemical features of large molecules by drawing the structure of the molecule, analyzing its structure from the drawing, choosing precursors and predicting utility. A chemist would use mental skills to draw the molecule, to visualize its 3-D embodiment and to correlate its structure to other molecules and possible precursors. The mere substitution of the calculating power of a computer would not transform the process into one that is patentable.

3. It follows, from guideline no. 2, that new and useful processes incorporating a computer program, and apparatus incorporating a programmed computer, are directed to patentable subject matter if the computer-related matter has been integrated in a practical system that falls within an area which is traditionally patentable. This principle is illustrative of what types of computer-related inventions may be patentable and is not intended to exclude other computer-related inventions from patentability.
4. Processes involving professional skill, or patented processes, which would hinder in the exercise of the skill that professionals would normally be expected to exercise, do not belong to the realm of patentable subject matter. Professional skill may be connected with either a particular step of a process or comprise the

entire process as illustrated in parts I) and II).

I) Human intervention is common for the input and output of a process. When a human step is necessary within a process, the examiner must determine whether the step has been fully integrated with the process and whether human judgement or human skill is required in order for the process to proceed. Data processing and communication are designed to be communicative and mobile. When processes include steps for human intervention, it must be clear from the claim whether the invention is directed to an integrated system or whether the elements of the claim function as a series of calculating tools.

Example

The appearance of an icon on a computer screen for displaying information is associated with an additional icon to indicate that certain additional information is to be associated with the icon. Since the association of additional information with the information requires a mental step by the user, the process is not directed to patentable subject matter.

II) Processes that would infringe on practices that are in the public domain are not directed to patentable subject matter when the process would impose limitations upon the practice of the skilled professional.

Examples

a) The practice of configuring a building lot belongs to the skill of a surveyor or planner rather than to an art or manufacture within the meaning of those words of section 2 of the *Patent Act* as held in *Lawson*. The Court stated that professional skills may be exercised by experts in other professions, such as surgeons and barristers. In the field of business methods and computer implemented inventions certain skills belong to economists, investment counselors, accountants, computer programmers and other professions.

b) A computer technician retrieves information on a replacement part from a database, such as the cost of the part and the estimated cost of repair, after diagnosing the breakdown of an object. This method and system for providing

the information relate to functions that are within the skills of a service technician.

- c) A further example involving professional skills relates to the implementation of a practical financial strategy or scheme by means of a conventional computer system. In *Atkins* (see MOPOP 26.06), the Board held that a computer-based system for operating a financial account was nothing more than a computer which was programmed to carry out a set of calculations.

26.03

SCHLUMBERGER CASE

The only court decision on computer implemented software established that such subject matter may be patentable. The Court prescribed a two-step test to determine patentability.

- a) What has been discovered according to the patent application?

As in any inventive field, this first step is for understanding the discovery as a whole including the claim limitations.

- b) Is that discovery patentable regardless of whether a computer is or should be used to implement discovery?

In order to determine whether the discovery relates to patentable subject matter, the use of a computer to implement the discovery shall not change the determination of the subject matter of the invention.

The seismic exploration system claimed in *Schlumberger* generated data from soil characteristic measurements. In carrying out the process, input data derived from measurements in boreholes was recorded on magnetic tapes and subsequently fed into a computer. The computer was programmed according to prescribed mathematical formulae, and the information was converted by the computer into more useful information such as graphs and figures of tables which could be read by geologists. The Court did not refer to the claims and held that the invention was in the discovery of making various calculations according to mathematical formulae which, like a scientific

principle and an abstract theorem of subsection 27(8) of the *Patent Act*, is not patentable subject matter. This has been interpreted in the *Schlumberger* case to prohibit patent protection for an invention that consists only of mathematical formulae and the calculations made therewith.

The Office's view is that the *Schlumberger* subject matter showed a lack of integration of the computer implemented system. The basic defect of the application was in the description. Redrafted claims could not have remedied the defect. According to the description, the result of the various calculations was displayed on a log and required human judgement and the skill of a geologist for interpretation¹. A lesser dependence on human judgement through more integration of the data processing system could have moved the discovery from the realm of calculations and mathematical formulae to a patentable invention.

26.04

DESCRIBING THE INVENTION

The specification must describe the invention in normal language as in other technical fields. Computer program listings alone do not fully describe the invention, but may be useful in illustrating specific embodiments. The specification must describe the hardware, the computer program with its functional modules as well as the interrelationship between the modules and the hardware. The following three entities of the computing system must be described in relation to what has been invented.

1) Hardware:

Are the important elements of the computer system described such as processors, primary and secondary memories, buses, interfaces, displays, external hardware? Has the interrelationship between the computer elements and network been described to provide the desired functionality of the invention?

¹ For claim 1, see W.L Hayhurst, *Industrial Property Part 1* (1983),
15 *Ottawa Law Review*, No.1, p.38 at p.49.

The family patent members are FR 2,080,945, GB 1,344,194 and US 4,495,604.

2) Computer program:

The functional representation of the computer program must be described. What are the computer program functional modules which are called into play, the interfaces, steps to be performed, sequences, timing, location of the modules in the system, process algorithms, internal and external logical files and the number and kind of interactive inquiries? Do segments of the program function separately from the remainder of the computer program in particular components?

3) Data:

What is the source and the form of input data to be processed, output data, the structure and storage of data in memory, the flow and transformation of data and the interaction of the software modules with the data?

Hardware and functional interrelationships between computing processes and data are correlated with claim limitations by the examiner to ensure that the claimed features are fully disclosed and integrated with the elements of the invention in accordance with subsection 27(4) of the *Patent Act*. The interaction of the three entities determines the configuration of the computing system and the manner in which the desired effect of the process is obtained.

26.05

CLAIM CATEGORIES

Three categories of claims are possible for computer implemented inventions in accordance with section 2: process (method) claims, machine (apparatus and systems) claims and manufacture, device (computer media including signal and data structure) claims.

26.05.1

Claiming the process

Claims in this category define the process which takes place in the computer when the computer program is run. The claim defines the data and the processing steps which are to be performed on the data. The following process claim defines a way of

encrypting data for storage on a card.

Example

Claim 1. A method of enrolling signature information of an authorized user onto an identification card comprising the steps of:

- a) sampling a first signal at a rate of at least n times a frequency component of said first signal which is to be preserved, where n is an integer greater than four;
- b) digitally filtering said samples representing said first signal to remove high frequencies;
- c) storing the filtered samples on said card.

26.05.2

Claiming the programmed computer

A computer which has been configured with a novel computer program is considered to be a different machine from the same computer when programmed in another way. The actions performed in the computer are directed by the computer program. The functional steps in the method claim have been replaced by functional components such as "means for" expressions to define the structural elements of the computer.

Example

Claim 2. An apparatus for compressing signature information signals of an authorized user onto an identification card comprising:

- a) means for sampling a first signal at a rate of at least n times a frequency component of said first signal which is to be preserved, where n is an integer greater than four;
- b) filter for digitally filtering said samples representing said first signal to remove high frequencies;
- c) means for storing the filtered samples on said card.

26.05.3

Claiming the computer program

The third category of claims define a computer readable memory storing statements and instructions for execution by a data processing system to direct the system to function in a particular manner. This type of claim is variously referred to as a computer readable medium claim, software claim, computer product or article of manufacture.

26.05.3.a

Computer program on a carrier

Claims comprising computer programs must be directed to the medium embodying the program in a material or physical form. The medium carrying the program code imparts to the code, which is stored on the medium, with the attribute of a *product or manufacture* under section 2 of the *Patent Act*. The claim must recite the material or physical medium in a positive manner, storing or embodying the computer readable code of the computer program.

Example

Claim 3. A computer readable memory having recorded thereon statements and instructions for execution by a computer to carry out the method of claim 1.

To avoid repetition, Claim 3 has been made dependent on the preceding method claim 1. Claim 3 is not a product-by-process claim as defined in MOPOP 11.08.01. An alternate form of claim defines a computer readable medium for use in configuring the computer, where the stored statements and instructions are recited in a code-means-plus-function format. Either form of media claims 3 and 4 are acceptable.

Example

Claim 4. A computer program product, comprising:
a memory having computer readable code embodied therein, for execution by a CPU, for compressing signature information signals of an authorized user onto an identification card, said code comprising:

- a) code means for sampling a first signal at a rate of at least n times a frequency component of said first signal which is to be preserved, where n is an integer greater than four;
- b) code means for digitally filtering said samples representing said first signal to remove high frequencies;
- c) code means for storing the filtered samples on said card.

A computer medium claim may not store information which is not encodable and storable in a memory or carrier.

Example

Claim 5. A computer program for compressing signature information signals of an authorized user onto an identification card comprising:

- a) means for sampling a first signal at a rate of at least n times a frequency component of said first signal which is to be preserved, where n is an integer greater than four;
- b) means for digitally filtering said samples representing said first signal to remove high frequencies;
- c) means for storing the filtered samples on said card.

The above claim is not a *manufacture*, since no storage medium has been defined having recorded thereon the computer program. Furthermore, the claim does not specify or imply that the computer program is computer-readable. Examiners will object to this claim for non-compliance with section 2, and for being informal under section 27(4) of the *Patent Act*.

26.05.3.b

Computer program on a signal medium

The computer medium may exist in a transitory state of a propagated signal. The carrier of the computer program is a transmissible carrier in the following acceptable example.

Example

Claim 6. A carrier wave embodying a computer data signal representing sequences of statements and instructions which, when executed by a processor cause the processor to enroll signature information of an authorized user onto an

identification card, the statements and instructions comprising the steps of:

- a) sampling a first signal at a rate of at least n times a frequency component of said first signal which is to be preserved, where n is an integer greater than four;
- b) digitally filtering said samples representing said first signal to remove high frequencies;
- c) storing the remaining of the filtered samples on said card.

26.05.3.c

Data structures

Data structures represent the physical implementation of a data model for organizing and representing information which is used by a computer program. The data structure imposes a physical organization on the data. Claims to data structures are inoperative unless they have been integrated with a specific program for imposing a physical organization on the data.

Example

Claim 7. A memory for storing data for access by an application program being executed on a data processing system, comprising:

a data structure stored in said memory, said data structure including information resident in a database used by said application program and including:

compressed video data stored in said memory having a plurality of frames including a plurality of reference frames, said compressed video data representing video footage in compressed form; and

a table stored in said memory associating an identifier for each portion of the video footage to be accessed with a pointer corresponding to the closest reference frame to a first frame of the portion of the video footage to be accessed such that said table may subsequently be displayed to allow a user to select one of the identifiers stored in said table using an input device and to thereby access and view the portion of the video footage corresponding to the selected identifier.

26.05.3.d

Non-patentable media claims

A computer program stored on a computer readable medium does not render the program patentable if the subject matter is otherwise not patentable. For example, data or information such as a molecular structure or music does not possess the processing functionality which is required for patentability. These media claims carry only *non-functional descriptive material* which are not patentable.

Example

Claim 8. A computer readable storage medium having recorded thereon music or a literary work.

The descriptive material on the storage medium has information for presentation on a display or for creating sound. The descriptive material stored on the medium does not provide the functionality for reconfiguring the computer to process input data. The claim is neither an *art* nor a *manufacture* under section 2 of the *Patent Act*.

Example

Claim 9. Computer readable medium having recorded thereon the nucleotide sequence depicted in SEQ ID NO:5, a representative fragment thereof or a nucleotide sequence at least 99% identical to the nucleotide sequence in SEQ ID NO:5.

Processing of the descriptive material in the computer does not alter or reconfigure the function of the computer nor transform the computer into a new machine. The claim is neither an *art* nor a *manufacture* under section 2 of the *Patent Act*.

26.06

EXAMPLE OF AN UNPATENTABLE INVENTION

In *re Application 564,175 to Atkins*² the Board considered an application entitled *System for the Operation of a Financial Account*. The financial scheme related to diverting the principal part of mortgage payments to financial products, from the blended periodic

interest and principal payments. Monies which would have been used to pay down the principal of a conventional mortgage were invested instead in other assets (financial products). As the result of the client to investing monies in other assets, which monies would normally have amortized a conventional mortgage, the client is expected to increase his investment income and net worth after payment of taxes.

The mortgagor's financial objectives were achieved by a mathematical programming function which suggested investments and credit limits. Additionally, the mathematical programming function presented a means of managing the mortgage account by the lender. As well, collateral and marketing fee revenues were generated for the lender. The financial management scheme was carried out by means of common data processing operations and did not go beyond the basic functions of computer systems.

Claim 1 follows. The text in parenthesis describes the means according to the specification.

A computer-based system for operating a plurality of client accounts comprising:

- processing means (*a central computer*);
- memory means (*a disk storage*) connected to said processing means for storing information pertaining to the account(s);
- means (*a central processing unit, CPU*) for maintaining on said computer system a database comprising for each client account at least one investment asset account which receives funds for investment purposes and has an account balance that is periodically updated and at least one liability account including a loan;
- means (*computer programs for implementing the desired functions*) cooperating with said processing means for generating for each client account an optimized allocation of received funds to said investment asset account(s) and said liability account(s) by utilizing a computerized financial optimization function;
- means (*the CPU configured for storing information*) for storing in said memory means for each client account the optimized allocation of received funds; and
- means (*computer programs for implementing the desired functions*) cooperating with said processing means for allocating funds received for the benefit of a client account to pay interest on the loan, and using the remaining portion of said funds according to said optimized allocation of said funds.

The Board stated that there is no indication that the fund allocation is carried out automatically. Fund allocation decisions are made by the central computer on the same basis as if made by a financial advisor in a traditional, non-computer investment situation. As a result of this substitution, professional skills practice is provided via a computer which has been programmed to make use of the same input information to arrive at the same decisions.

26.07

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