Computer-implemented inventions at the European Patent Office

the presentation reflects the personal opinion of the author

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Director Dir2211

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Overview

1. History of computer-implemented inventions

2. The EPO

3. Substantive patent law at the EPO

4. Patentability of computer-implemented inventions

5. Pros and cons of patents

6. Patents as source of information
Calculating machines in the 1930s

**PATENT SPECIFICATION**

**Convention Date (United States):** March 3, 1931.

**Application Date (in United Kingdom):** June 22, 1931. No. 18,001/31.

**Complete Accepted: Dec. 22, 1932.**

**COMPLETE SPECIFICATION.**

**Improvements in Calculating Machines.**

We, **Sunderland Corporation,** a corporation organized and existing under the laws of the State of Delaware, United States of America, located at the corner of Harrison and 11th Streets, Rockford, State of Illinois, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to that type of calculating machine in which the values of the set elements are advanced differentially according to the values of the set elements, and one of the objects of the invention is to enable the operator to effect a relative adjustment between the field of elements and the group of actuators, whereby to enable the elements, set, it will be remembered, according to the actual value of the amount to be registered, to control the excursions of the elements, according to the complement of such amount.

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History

one of the first "software patent" applications
submitted by Konrad Use on 16.6.1941 at German Patent Office

Konrad Zuse Internet Archive http://www.zib.de/zuse
Legal History 1

• **1940s**: patent applications for first digital computers in Germany, USA, GB

• **1950s/1960s**: patent offices very often deny eligibility of functional features implemented by means of a computer program to patent law

• applicants interested in patents disguise software as hardware

• **end 1960s**: discussion on possibilities for the protection of computer programs

• **1970**: Patent Cooperation Treaty (PCT), list of excluded subject-matter in the regulations, Rule 39 search (Rule 67 examination)

"No International Searching Authority shall be required to search an international application if, and to the extent to which, its subject matter is any of the following:

....

(vi) computer programs to the extent that the International Searching Authority is not equipped to search prior art concerning such programs."
Legal History II

- **1973** European Patent Convention (EPC) was signed by 16 European states; EPC is partly based on PCT regulations

- **1977** EPC comes into force;

- **1970s** sui generis law for protection of computer programs under the guidance of WIPO is not successful;

- **1980** USA: amendment of copyright for the protection of computer programs and first positive decisions for patents for inventions comprising features implemented by means of a computer program at USPTO;

- **1980s** more liberal positions at many patent offices; traditionally patentable inventions should not be excluded just because they are implemented in software;
Legal History III

- **1990s** World Trade Organisation: TRIPS - protection of source code and object code by copyright; patents shall be available for inventions in all fields of technology;

- **EPC 2000**: Art. 52(1) "European patents shall be granted for any inventions, in all fields of technology,..."

- **2005** European Union: Directive on computer implemented inventions is rejected by European Parliament;

- **2008**
  - USA: In re Bilski decision of Federal Circuit
  - EPO: referral of the President to the Enlarged Board of Appeal; 2009: about 100 amicus curiae briefs from companies, institutions, ...

- **2010**
  - EPO G3/08: referral is not admissible; confirmation of legal practice at the EPO
  - USA In re Bilski: Supreme Court rejects decision of FC
The European Patent Convention
(EPC)
– provides the legal framework for the
granting of European patents
via a centralised procedure
– establishes the European Patent
Organisation

1973 – Diplomatic Conference in Munich ► signature of the EPC by 16
countries

1977 – Entry into force of the EPC in 7
countries
Autonomy

- Second largest intergovernmental institution in Europe
- Not an EU institution
- Self-financing, i.e. revenue from fees covers operating and capital expenditure
Structure of the European Patent Organisation

European Patent Organisation

European Patent Office
- The executive body
  - responsible for examining European patent applications

Administrative Council
- The legislative body
  - made up of delegates from the member states
  - supervises the activities of the Office
  - has a specific legislative function
Technical fields with the most filings (2009)

- Medical or veterinary science; hygiene: 16,400
- Electric communication technique: 13,753
- Computing: 8,508
- Basic electric elements: 7,639
- Organic chemistry: 7,402
- Measuring; testing: 7,290
- Biochemistry; genetic engineering: 3,853
- Vehicles in general: 3,809
- Organic macromolecular compounds: 3,681
- Engineering elements: 3,254
- Others: 58,953

Number of applications
Applications by residence of applicant (2009)

main applicants last three years

G06F9/40-9/50  
(system software, middleware, ...)

IBM
Microsoft
Siemens
RIM
SAP

H04L29 networks

Telefonaktiebolaget Ericsson
Alcatel Lucent
Qualcomm
RIM
Nokia
Overview of European patent grant procedure (I)

- Applicant
  - European patent application
    - Filing and formalities examination
      - Search and search report together with preliminary opinion on patentability
        - Publication of application and search report
          - Online access to application file and legal status information
            - Observations by third parties possible
        - Publication of patent specification
          - Grant of European patent
            - Refusal or withdrawal of application
              - Validation in designated states

EPO

Public domain
Overview of European patent grant procedure (II)

- Applicant
  - Refusal of application
  - Substantive examination
  - Grant of European patent
  - Opposition by third parties possible
  - Opposition proceedings
  - Limitation or revocation proceedings
  - Appeal proceedings

- EPO

- Public domain
Final actions - grant, refusal, withdrawal

EPO
2008 granted patents: 59,809
2009 granted patents: 51,969
Layered model for a computer/computer network

- **HARDWARE**
  - 50s to 60s mainframe
  - 70s to 80s microprocessor, PC
  - Intern...
Distributed systems

distributed software
software as a service
internet of things
n-tier systems
Digitization of information triggers new technologies
Basic Hardware/Software Analogy

1. Algorithm

- Implementation
  - Program for a standard computer
  - Partly program/partially specific circuits 'embedded systems'
  - Program for a standard computer with specific circuits
Basic steps of professional software development

1. Requirements
   - Basic user requirements, analysis

2. Detailed concepts
   - UML, use cases, detailed algorithm or method of application domain, ...

3. Programming
   - Programming, testing

4. Maintenance
   - Adaptation, debugging
Classification of software

Software

- system software
  - operating system
  - development tools
  - network
  - database

- application software
  - technical
  - business
  - games
  - others
European Patent convention

Non-Inventions under Article 52 (2) and (3):

The following, in particular, shall not be regarded as inventions

- discoveries, scientific theories, mathematical methods
- aesthetic creations
- schemes, rules and methods for performing mental acts playing games or doing business
- programs for computers
- presentations of information

Only to the extent to which a European patent application relates to such subject matter or activities as such.
Computer program 'as such'

- #include <stdio.h>

```c
int main(void) {
    printf("hello world");
    return 0;
}
```

Sourcecode

Objectcode

is not patentable!
Not all computer-implemented inventions are patentable

A further technical effect is necessary for patentability. Such a further technical effect can be a technical effect in the area of application software or in the area of system software/middleware, i.e. from the internal working of the computer.

The normal technical effect (electric currents) is not sufficient to make inventions implemented by means of a computer program patentable.
## Computer Program based on a 'technical algorithm'

<table>
<thead>
<tr>
<th>technical application domain features</th>
<th>program features</th>
<th>patentable? EPO</th>
<th>patentable? US</th>
</tr>
</thead>
<tbody>
<tr>
<td>well-known method e.g. for a clock</td>
<td>normal implementation</td>
<td>🙁</td>
<td>🙁</td>
</tr>
<tr>
<td>temperature measurement</td>
<td>new memory access method</td>
<td>🙁</td>
<td>🙁</td>
</tr>
<tr>
<td>new and inventive method for blood analysis</td>
<td>normal implementation</td>
<td>🙆</td>
<td>🙆</td>
</tr>
<tr>
<td>chemical process</td>
<td>features for very fast real time data processing</td>
<td>🙆</td>
<td>🙆</td>
</tr>
</tbody>
</table>
Computer Program based on a 'non-technical algorithm'

<table>
<thead>
<tr>
<th>non-technical application domain features</th>
<th>program features</th>
<th>patentable ? EPO</th>
<th>patentable ? US</th>
</tr>
</thead>
<tbody>
<tr>
<td>photos</td>
<td>well-known implementation</td>
<td>☠️</td>
<td>☠️</td>
</tr>
<tr>
<td>well-known symphonies of Beethoven</td>
<td>new and inventive data compression</td>
<td>☠️</td>
<td>☠️</td>
</tr>
<tr>
<td>new and inventive pension calculation method</td>
<td>normal implementation</td>
<td>☠️</td>
<td>☠️</td>
</tr>
<tr>
<td>new and inventive stock trading method</td>
<td>new and inventive data transmission</td>
<td>☠️</td>
<td>☠️</td>
</tr>
</tbody>
</table>
Further technical effect can result from the internal working of the computer:
more efficient memory management

Software Patent? Lane recognition for a vehicle

Claims

1. Method for detecting lanes for a vehicle which is equipped with an adaptive cruise controller (12) with inter-vehicle distance control facility, the relative velocity (vrel) of detected objects, the lateral offset (q) of the detected objects with respect to the longitudinal axis (3, 3a, 3b, 3c) of the vehicle and the velocity (v) of the driver’s own vehicle being fed into the adaptive cruise controller (12) with inter-vehicle distance control facility by means of an object detection system (2), it being determined from the relative velocity of the objects (vrel) and of the velocity (v) of the driver’s own vehicle whether the object (5, 6, 7, 8) is an oncoming one, a stationary one or one which is moving in the same direction as the driver’s own vehicle, characterized in that the number of existing lanes and the lane which is being travelled on by the driver’s own vehicle at that particular time are determined in conjunction with the calculated lateral offset (q) of the object with respect to the longitudinal axis (3, 3a, 3b, 3c) of the vehicle, and the detection range (9, 10, 11) of the object detection system (2) is changed as a function of the detected lane.

EP-B1- 1671196

The claim does not comprise any details concerning the computational implementation but the method (algorithm) which is basis for the implementation by means of a computer program. The description mentions a microprocessor.
Not patentable - legal practise

- source code, object code;
- organisational rules for software development;
- programming languages;
- an abstract data structure for a computer program (array, record, ...);
- object-oriented models of real systems;
- pure aesthetic features of GUIs, computer games, web pages;
- theoretical concepts of computer science (e.g. Chomsky Hierarchy)
- ...

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Advantages and disadvantages of patenting

**Advantages**

- exclusivity enables investment and higher returns on investment
- strong, enforceable legal right
- makes invention tradable (licensing)

**Disadvantages**

- reveals invention to competitors (generally 18 months after first filing)
- however, not in every country
- can be expensive
- procedure may be long (up to 4 - 5 years)
Cost of a European patent up to grant

4 types of cost:

- **translators**: 3000 EUR
- **attorney fees**: 10000 EUR
- **patent office fees**: 5000 EUR
- **renewal fees**: from 3rd year on, max. 20 years

* estimated cost

Actual cost depends very much on the specifics of the individual case.

100 EUR ~ 127 USD
What happens if I do not patent my innovative products or processes?

- Somebody else might patent it!

- Competitors will take advantage of your invention!

- Possibilities of licensing, selling or transferring technology will be severely hampered!
## Alternatives to patenting

### Information disclosure ("defensive" publishing)

- **cheap**
- prevents others from patenting the same invention
- **does not offer exclusivity**
- reveals the invention to competitors

### Secrecy (creating a trade secret)

- **cheap** (but there is the cost of maintaining secrecy)
- does not reveal the invention
- **no protection against reverse-engineering/ duplication of invention**
- difficult to enforce
- "secrets" often leak quite fast

### Do nothing

- **no effort required**
- **does not offer exclusivity**
- competitors will often learn details
Most commonly made IP mistakes

- Believing that IP protection is universal
- Assuming that laws and procedures for the protection of IP rights are the same worldwide
- Not considering the regional or international protection systems
- Applying too late for IP protection abroad
- Disclosing information too early, e.g. at conferences or without a confidentiality agreement
- Infringing the IP rights of others
- Not defining issues of ownership of IP rights when outsourcing manufacturing

SEEK LEGAL ADVICE!
What is patent information?

- patent documents are public information
- they disclose how inventions work
- access to the information is (often) free of charge

Four good reasons to use patent information

1. find out what already exists and build on it
2. keep track of who's doing what
3. avoid infringing other people's patent rights
4. improve the quality of your patent application
Technical Information

Example: EPO esp@cenet:

- worldwide patent database
- search 60 million patents documents online
- one of the world's biggest technology databases
- data from 1836 to today
- free of charge

You can use esp@cenet to:

- watch new technologies emerge
- find solutions to your technical problems
- discover what your competitors are developing
- find business partners
EPO: Register Plus = online file inspection

- gives access to all the public documents in the file of a European patent application
- procedural information on all European patent applications
- alert service
- free of charge

What can Register Plus do for you?

- find out what stage in the procedure a European patent application has reached
- see if a European patent application has been granted, or will be granted soon
- check whether any oppositions to a European patent have been filed
- read the correspondence between the EPO and the patent applicant/attorney.
Business information

It can support decision-making:
- monitor trends in technology which will influence your products
- see which markets your competitors are active in
- identify business opportunities
- co-ordinate your business decisions

Patent statistics and patent mapping:
- Tools on the market can analyse large amounts of patent data and present results graphically, such as
  - increased patent activity in certain technical fields
  - areas in which competitors' patents are clustered
  - geographical distribution of patents over time.
Business information

Evaluating patents and patent portfolios:

- Licensing:
  knowing the value of your patents puts you in a better position to negotiate licensing agreements.

- Investment decisions:
  a detailed analysis of the patents held by a company may be a critical factor for investors in the company, or for obtaining public funding.

The EPO’s patent evaluation software: IPscore

- examine your company’s patent portfolio
- analyse the value of individual patents
- align your company’s patent strategy with your overall business strategy
- make the best use of patents as a business tool
- identify opportunities and risks

- free of charge:
  http://www.epo.org/ipscore.html
Patent information from East Asia at the EPO

- More than half the patent applications filed worldwide every year are written in Japanese, Chinese or Korean.

- Asia Helpdesk: staffed with experts in the Japanese, Chinese and Korean patent systems who can answer your queries.

- Search Services
- Translation Services

Virtual helpdesk:
- gives answers to FAQ on industrial property in Japan, India, China and Korea
- provides background information on filing trends, the granting procedures, the numbering systems and terminology of patents in Asia.
Further Information (download)

**EPO: Guide for beginners to the esp@cenet service.** In six easy steps it shows newcomers to esp@cenet how to perform simple searches.

**WIPO: Inventing the future - An introduction to patents for SMEs**


**EPO: Patent information: Adding certainty to your patent, legal and business decisions**

**EPO: These guides explain how to use online European patent register, online public file inspection, alert service.**
Further information (download)

Patent teaching kit

Designed for use by university lecturers, it contains presentations, teachers' notes, background information, real-world examples and case studies - everything lecturers need to provide students with a comprehensive introduction to the patent system, including information on how to file patent applications and search for existing patents.

free of charge (download or hard copy)
http://www.epo.org/patents/learning/teaching.html

core modules:
- an introduction for students of science, engineering and business administration
- an introduction for law students

sub-modules:
- searching for existing patents - how to use the esp@cenet database
- the use of patents by a university spin off
- understanding patent claims: 7 case studies
Summary

Basic components for the grant of a patent for an invention:
- Novelty (Art. 54)
- Technical character (Art. 52 (2)(3))
- Inventive step (Art. 56)
- Further EPC requirements
THANK YOU!

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