Internal distribution code:
(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [X] To Chairmen
(D) [-] No distribution

Datasheet for the decision
of 28 February 2013

Case Number:	T 0042/10 - 3.5.01
Application Number:	06270014.1
Publication Number:	1862955
IPC:	G06Q10/00
Language of the proceedings:	EN

Title of invention:
Determining relative skills of players

Applicant:
Microsoft Corporation

Headword:
Determining relative skills/MICROSOFT

Relevant legal provisions:
EPC 1973 Art. 56

Keyword:
Inventive step - (no)

Decisions cited:
T 1173/97, T 0619/02, T 0717/05, T 1281/10
Gale's Application [1991] RPC 305

Catchword:
See points 2.13.2 and 2.14.

Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 0042/10 - 3.5.01

D E C I S I O N
of Technical Board of Appeal 3.5.01
of 28 February 2013

Appellant: (Applicant)	Microsoft Corporation One Microsoft Way Redmond, WA 98052 (US)
Representative:	Free, Rachel Alder Olswang LLP 90 High Holborn London WC1V 6XX (GB)
Decision under appeal:	Decision of the Examining Division of the European Patent Office posted on 11 November 2009 refusing European patent application No. 06270014.1 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman:	S. Wibergh
Members:	P. Scriven
	P. Schmitz

Summary of Facts and Submissions

I.   The appeal is against the Examining Division's decision
      to refuse European patent application 06270014.1. They
      found that there was a lack of inventive step, because
      the skilled person had the task of implementing a
      mathematical method, and because an implementation using
      factor graphs would have been obvious.

II.   In the statement setting out its grounds of appeal, the
      appellant requested that the Examining Division's
      decision be set aside and that a patent be granted on the
      basis of the main request or the first or second
      auxiliary requests which had been filed as the third,
      fourth and fifth auxiliary requests before the Examining
      Division on 6 August 2009. The appellant also requested
      that oral proceedings be held, if none of those were
      accepted as being patentable on the basis of its written
      statements.

III. The Board arranged for oral proceedings to be held, at
      which both this case and the related case T 1281/10 would
      be considered. In an annex to the summons, the Board
      presented its provisional opinion.

IV.   Oral proceedings were held as scheduled. The appellant's
      final requests were identical to those set out above.

V.   Claim 1 according to the main request reads as follows.

      *A computer—implemented method of determining an
      indication of the relative skill (205) of at
      least a first player and a second player of a
      game based on the outcome of one or more such
      games involving those players said method
      comprising the steps of:*

(i) arranging a processor (204) to, for each player, set statistics (200) describing a probability distribution associated with skill of that player to default values;

(ii) at the processor (204) receiving information about the outcome (201) of one of the games;

(iii) arranging the processor (204) to form and store a factor graph comprising variable nodes and factor nodes, the factor nodes having associated calculation rules, said graph being formed using the received information about the outcome, and arranging the processor (204) to instantiate at least some of the variable nodes with the statistics; and arranging the processor to form and store the factor graph such that it comprises a plurality of first groups of nodes, each first group being associated with a particular player and comprising nodes linked in series; and

(iv) arranging the processor (204) to update the statistics associated with each player by applying message passing to the factor graph using the calculation rules;

(v) arranging the processor to repeat the process of updating the statistics as further game outcomes are received

VI.   Claim 1 according to the first auxiliary request reads identically, except for the following, added after "comprising nodes linked in series" at the end of step (iii).

[... comprising nodes linked in series] and wherein said first groups of nodes are linked

with edges such that the order of the linking
reflects the outcome of the game; [and ...]

VII. Claim 1 according to the second auxiliary request reads
      as in auxiliary request 1, except that steps (ii) and
      (iii) read as follows.

      (ii) at the processor (204) receiving information
      about the outcome (201) of one of the games
      comprising a partial ranking of players said
      partial ranking comprising order information for
      at least one player as compared to a plurality of
      other players and no order information among the
      plurality of said other players;
      (iii) arranging the processor (204) to form and
      store a factor graph comprising variable nodes
      and factor nodes, the factor nodes having
      associated calculation rules, said graph being
      formed using the received information about the
      outcome, and arranging the processor (204) to
      instantiate at least some of the variable nodes
      with the statistics; and arranging the processor
      to form the factor graph such that it comprises a
      plurality of first groups of nodes, each first
      group being associated with a particular player
      and comprising nodes linked in series and wherein
      said first groups of nodes are linked with edges
      such that the order of the linking reflects the
      outcome of the game; and wherein a link is
      created between a node associated with said at
      least one player and a node associated with each
      of the said other players;

VIII. The appellant's arguments, as far as they are relevant to
      this decision, can be summarised as follows.

The invention addressed and solved the technical problem
of controlling an online gaming system so as to keep
players interested. It did that by tracking their
performance so that suitable opponents could be found.
According to T 717/05, *Auxiliary game/LABTRONIX CONCEPT
INC.*, not published in the OJ EPO, using technical means
to keep a player's interest was technical.

Moreover, methods of measuring were patentable and were a
special subcategory of methods mentioned in T 619/02,
Odour selection/QUEST INTERNATIONAL, OJ EPO 2007, 63, at
2.4.1.

In the present case, there was no psychological
assessment, but simply observations of game
outcomes and the mathematics involved were not
abstract but applied to a real-world situation,
which might depend, for example, on reaction times
or hand - eye coordination. As a result, the
arguments against technicality did not apply. The
measurement of skill, in the present case, was
technical irrespective of the implementation on a
computer.

The invention carried out the updating of the
probability distributions that represent the
players' performance by forming a factor graph and
passing messages. Factor graphs were technical,
because, by allowing message passing algorithms,
computation time can be reduced, while accuracy is
maintained, and this was an effect produced by
interaction with the processor. That effect would
not be obtained if the same calculations were
carried out by hand. In that case, they would take
longer. The speed of processing was important,
because it allowed the system to cope with millions

of players. It was irrelevant that Article 52(2)
EPC excluded all mathematical methods, because the
mathematics here were not purely abstract, but were
applied to measurement and to the use of a
particular data structure. That was different from
the situation in the decision of the Court of
Appeal of England and Wales in *Re Gale's
Application [1991] RPC 305*, which concerned a
particular method of calculating a square root.
While the calculation of a square root was an
abstract mathematical method, the application of a
mathematical method to the measurement of a
player's skill was not abstract at all. The data
involved was also not abstract data; nor was it
cognitive or administrative. It was functional
data, because it was used for the function of
measuring players' skills.

A further technical effect, was a reduction in
traffic on the network, because a player could
quickly find suitable opponents and would not need
to scroll through a long list with many unsuitable
opponents first, and because the same accuracy
could be obtained with observations from fewer
matches. The latter effect was stronger in the
second auxiliary request, because the use of
partial ranking information allowed more matches to
contribute to the measurement of a player's
performance.

Reasons for the Decision

1.   *Background*

1.1   This case is related to T 1281/10. In T 1281/10, the
        invention concerned the representation of how well game
        players performed, the use of that representation in
        tracking performance, and the use of the outcomes to
        find suitable opponents. The present case is concerned
        with a particular way of carrying out the calculations
        involved in tracking performance.

1.2   The basic idea in tracking performance is to represent
        performance not simply as a score, but as a probability
        distribution. In practice, Gaussian distributions are
        used, each represented by its mean and variance.
        Intuitively, a player with a high mean tends to perform
        well; a player with high variance will have a large
        spread of results about the mean, while a player with
        low variance consistently gets results close to the
   mean.

1.3   The tracking of performance can be applied to teams, as
        well as to individual players.

1.4   As games are played, results are collected and the
        distributions that represent the players' performances
        are updated. When the distributions are Gaussian and
        represented by their means and variances, a
        straightforward set of update equations results.
        However, the computational complexity increases as the
        cube of the number of teams.

1.5   The invention deals with that rise in complexity by
        using "factor graphs". A factor graph is a way of
        representing a calculation as a bi-partite graph (the

application suggests, in paragraph [0045] as published,
that it need not be bipartite, but that seems to be an
incautious use of the word "preferably," and nothing in
this decision depends on the precise definition.) It
has one set of nodes, each of which represents a
variable, and another distinct set of nodes, each of
which represents an operation. There is an edge between
a node in the first set and a node in the second
exactly when the variable represented by the first node
is used in, or is produced by, the operation
represented by the second. As an example, the equation
z = x + y would be represented by three variable nodes,
one for each of x, y, and z; and one operation node for
+. The latter is connected to each of the former, and
there are no other connections.
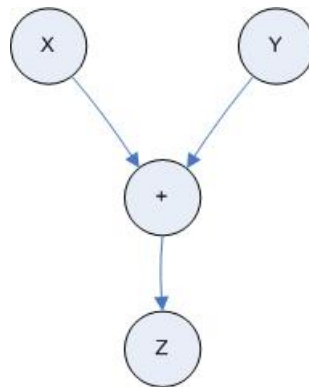
A factor graph performs calculations by passing
messages between nodes. Those variable nodes that form
the input to an operation pass their values to the
operation node. Operation nodes pass their results to
output nodes. In the example of z = x + y, the x and y
nodes pass the values of x and y to the + node; the +
node passes the result of its operation to the z node.
The graphs will generally be much more complicated than
this.

2.   *Main request, claim 1, inventive step*

2.1   Claim 1 according to the main request defines a method
        that, based on outcomes of games, calculates
        indications of the skills of the players, by passing
        messages between nodes of a factor graph. It is
        necessary to determine in how far the features of the
        claim have technical character and so could contribute
        to inventive step.

2.2   The appellant, relying on paragraph 2.4.1 of T 619/02,
        argues that the method of assessing player performance
        is technical by virtue of being a method of measuring.

2.3   The board notes that T 619/02 does not say that all
        methods of measuring are technical. It must therefore
        be assessed whether the measurement can be accepted as
        technical in the present case.

2.4   The term "measurement" is rather broad. It encompasses
        finding the spectrum of the hydrogen atom, or the
        salinity of sea water; but also whether one political
        party is more or less popular than another. In
        T 619/02, the measurement was of reactions to odours,
        and it was found to be non-technical. The appellant
        seeks to distinguish the present case, arguing that the
        reasons for rejecting the method in T 619/02 do not
        apply to the present case, because there are no
        psychological assessments involved.

2.5   In the Board's view, the lack of psychological
        assessments cannot, alone, be determinative. What is
        needed is a technical problem and a technical solution
        to it, i.e. a technical effect. However, judging the
        skill of a game player does not seem to involve a

physical change at all, still less a technical effect.

2.6   In this context, the appellant argues that the
        measurement of player performance might involve the
        measurement of hand-eye coordination or of reaction
        times. However, the claimed method does not measure
        reaction times, or use it to deduce information on
        performance. Nor does it take the information on
        performance and deduce anything about reaction times.
        The reaction time is never known. The same goes for
        hand-eye coordination. In fact, the claimed method is
        in no way limited to games in which reaction time or
        hand-eye coordination are important. It applies to
        chess as much as to football, and to poker as much as
        to pinball.

2.7   The Board, therefore, sees clear reasons for
        considering the measurement of performance in games as
        non-technical.

2.8   The appellant's second argument is based on paragraph
        5.9 of T 717/05, in which it is stated that "amusement
        is the psychological purpose of a gaming apparatus and
        is the relevant objective technical problem to the
        extent that the enhanced amusement is achieved by
        technical features of the claim."

2.9   In T 717/05, the deciding Board did indeed hold that
        the step of monitoring outcomes of games was a
        technical feature, but only in combination with the
        step of displaying them (paragraph 5.6 with paragraph
        4.5). The displaying step was necessary, since it
        permitted the player to be informed about the
        development of the game, thus addressing the problem of
        maintaining interest (paragraph 5.1). The present
        claim, however, does not require the players' scores to

be displayed, but only to be calculated. For this
reason alone, T 717/05 does not appear to be relevant.
A more basic reason is that the Board has strong doubts
that amusement, even if achieved by technical (in
particular, computing and displaying) means, really is
a technical problem. If it were, any dull computer game
could be regarded a posing a technical problem that
could be solved by any less dull game. The difficulties
involved in such a view are evident (the skilled person
need not be skilled in a technical art; the effect
would be subjective), and the decision has been largely
ignored in the jurisprudence of the Boards of Appeal.
T 528/07, *Portal system/ACCENTURE*, not published in the
OJ EPO, expressly declined to follow the approach taken
in T 717/05.

2.10   The appellant's third argument is that factor graphs,
        and the associated message passing algorithm, are
        technical. They address the technical problem of
        speeding up computation.

2.11   In its full generality, speed of computation is a
        mathematical problem. It may be the case that a
        computer has a particular processor that is
        particularly good, or particularly poor, at some (class
        of) operations. Recasting a mathematical method so as
        to take advantage of what the processor does quickly,
        or to avoid what it does slowly, might involve
        technical considerations. In such a case, the recast
        method, when performed on that particular processor,
        might not be "just" mathematical but also be technical.
        However, not all recasting of mathematical methods in
        order to increase speed are technical. In the days when
        people looked up trigonometric functions in tables,
        recasting a method so as to reduce the number of times
        the tables had to be consulted might speed up

computation, but nothing technical was happening.

2.12   The appellant has not provided any evidence that there
        really is an increase in speed of computation. There is
        no analysis of the complexity of any prior art method
        of performing the same sort of calculation, and there
        is none of the complexity using factor graphs. Nor has
        the appellant provided any evidence for its assertion
        that the increase in speed would only be obtained on a
        computer, whereas calculations by hand would be slower.
        However, the Board also considers that, even if the
        increase in speed were established, it would not be an
        increase which solved a technical problem, and that is
        enough to reject the argument. According to the
        application (paragraph [0068] as published), it does
        not matter what sort of technical apparatus is used to
        perform the calculations. What matters is only the
        ability to carry out the necessary steps. It follows
        from that, that any improvement in speed is inherent in
        the method of calculation. It does not result from
        exploiting ability or avoiding some lack in the
        computer. At best, if the appellant is correct, and
        there is an increase in speed which only occurs on
        computers, it is a matter of abstract computer science.

2.13   During oral proceedings before the board, *Re Gale's
        Application* (*supra*) was briefly discussed, and the
        Board finds it useful to comment on it.

2.13.1 Mr Gale had found an algorithm for calculating square
        roots, which he had implemented as a computer
        program.The court was concerned with the question of
        whether that was excluded under Section 1(2) of the
        Patents Act 1977. That provision gives effect, in UK
        law, to Article 52(2) EPC. Lord Justice Nicholls
        delivered the lead judgment. He found that the program

did not "embody a technical process which [existed] outside the computer," and that although the computer "will be a better computer when programmed with Mr Gale's instructions," it did not "solve a 'technical' problem lying within the computer."

2.13.2   The Board's approach to assessing questions of what is and what is not technical about a computer-implemented method, in this case, asks the same questions as Nicholls LJ in *Re Gale's Application.* The first is: what does the method as a whole do, and does it produce an overall technical result? The second is: if there is no overall technical result, does the method at least have a technical effect within the computer? If both questions are answered in the negative, no technical problem has been solved and there can be no inventive step.

2.14   The Board's view regarding technicality can be summarized as follows.

2.14.1   The overall aim of keeping players interested is not technical.

2.14.2   The intermediary aim of assessing and comparing playing performance is not technical.

2.14.3   The representation of performance by probability distributions, and the updating of them, are mathematical methods.

2.14.4   The use of factor graphs with message passing is a matter of mathematics or abstract computer science.

2.15   Given the Board's conclusions regarding technicality, the only technical feature defined in this claim is the

(computer) processor. The subject matter of claim 1, therefore, does not involve an inventive step if it would have been obvious to the skilled person, who has the task of implementing the method, to use a computer processor.

2.16   It is not disputed that suitable computer processors were well known at the filing date (10 February 2006). The skilled person would have been aware that they would be able to carry out the mathematical operations involved in forming a factor graph and passing messages between nodes. Indeed, the method involves the collection of data, possibly large amounts of data, and the carrying out of calculations on it. That is just what computer processors were designed to be good at. It would, then, have been obvious to use them.

2.17   The appellant's argument that online Bayesian learning was not (well) known at the filing date does not affect the conclusion, even if correct. That is because the Bayesian learning is already part of the non-technical method the skilled person is required to automate.

2.18   The appellant's other argument, that there is a reduction in network traffic also fails to affect the Board's conclusion. Firstly, there is no evidence of a reduction. Secondly, if there is an effect on network traffic, it is an effect that is obtained in any technical implementation that uses a communication network at all, rather than one that belongs to some particular (claimed) such implementation but not to others.

2.19   The main request, therefore, cannot be allowed, because the method defined in claim 1 does not involve an inventive step.

3.   *Auxiliary requests 1 and 2, claim 1, inventive step*

3.1   These two version of claim 1 differ from that according
        to the main request by features of the factor graph.
        That means there are no additional technical features.

3.2   It must be noted, that the differences in the factor
        graphs do not introduce any technical effect outside
        the computer, and do not affect the arguments given
        above regarding the lack of technical effect inside the
        computer.

3.3   The conclusions on inventive step must, therefore, be
        the same as for the main request. As a result, neither
        request can be allowed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

T. Buschek   S. Wibergh