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**Datasheet for the decision
of 3 March 2026**

Case Number: T 0439/25 - 3.5.07

Application Number: 19817813.9

Publication Number: 3881197

IPC: G06F16/901

Language of the proceedings: EN

Title of invention:

Systems and method for scoring entities and networks in a knowledge graph

Applicant:

Financial & Risk Organisation Limited

Headword:

Knowledge graph/FINANCIAL & RISK ORGANISATION

Relevant legal provisions:

EPC Art. 56

RPBA 2020 Art. 13(1), 13(2)

Keyword:

Late-filed request - main request - admitted (no)

Inventive step - auxiliary requests 1 to 5 (no)



Beschwerdekammern
Boards of Appeal
Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0

Case Number: T 0439/25 - 3.5.07

D E C I S I O N
of Technical Board of Appeal 3.5.07
of 3 March 2026

Appellant: Financial & Risk Organisation Limited
(Applicant) Five Canada Square, Canary Wharf
London, E14 5AQ (GB)

Representative: IPrime Rentsch Kaelin AG
Hirschengraben 1
8001 Zürich (CH)

Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 21 October 2024
refusing European patent application
No. 19817813.9 pursuant to Article 97(2) EPC**

Composition of the Board:

Chairwoman C. Barel-Faucheux
Members: R. de Man
E. Mille

Summary of Facts and Submissions

- I. The applicant appealed against the decision of the examining division refusing European patent application No. 19817813.9.
- II. The examining division decided that the subject-matter of claims 1 and 10 of the main request and of claim 1 of auxiliary requests 1 to 5 lacked an inventive step over the following document:

D4: R. Ghosh, "Rethinking centrality: the role of dynamical processes in social network analysis", 27 March 2014, retrieved from: <https://arxiv.org/pdf/1209.4616.pdf>.
- III. With its statement of grounds of appeal, the appellant filed an auxiliary request 6.
- IV. In a communication accompanying a summons to oral proceedings, the board expressed the preliminary view that the subject-matter of claim 1 of the main request lacked an inventive step both over a general-purpose computer and over the disclosure of document D4. The subject-matter of claim 1 of each of auxiliary requests 1 to 5 likewise lacked an inventive step. The board was not inclined to admit auxiliary request 6 into the appeal proceedings.
- V. In a letter dated 9 January 2026, the appellant indicated that it maintained its main request and auxiliary requests 1 to 5 and that it withdrew auxiliary request 6. Moreover, it amended the main

request in accordance with a set of claims labelled "Main request", which was annexed to the letter.

VI. In response to a communication of the board asking for clarification of the appellant's requests, the appellant confirmed in writing that it requested that the decision under appeal be set aside and that a patent be granted on the basis of the claims of "Main request" or of one of auxiliary requests 1 to 5. It further indicated that it would not participate in the oral proceedings.

VII. The board cancelled the oral proceedings.

VIII. Claim 1 of "Main request" reads as follows:

"A system (100) for determining network-based feature propagation in a network of entities stored in a graph database (104), the system comprising:
a processor programmed with one or more instructions to:

 identify an entity that is associated with a feature of interest, the feature of interest being assigned with a quantitative feature value;

 extract a subgraph from the graph database (104) based on the identified entity, the subgraph comprising a plurality of entities including the identified entity and one or more neighbors of the identified entity;

 generate an adjacency list that describes relationships between the plurality of entities in the subgraph;

 generate a plurality of centrality metrics based on the adjacency list, each centrality metric corresponding to an entity in the subgraph;

 generate an association score, which indicates a network effect of the identified entity on the one or

more neighbors based on the plurality of centrality metrics and types of relationships between the plurality of entities in the subgraph; and
generate a respective quantitative feature value for each neighbor based on the determined network effects and the quantitative feature value, wherein the extraction of the subgraph and the generation of the adjacency list enable the processor to perform the generation of the centrality metrics and the association score without repeated traversal of the graph database."

IX. Claim 1 of auxiliary request 1 reads as follows:

"A system (100) for determining network-based feature propagation in a network of entities stored in a graph database (104), the system comprising:
a processor programmed with one or more instructions to:

identify an entity that is associated with a feature of interest, the feature of interest being assigned with a quantitative feature value;

extract by a scoring engine (120) a subgraph from the graph database (104) based on the identified entity, the subgraph stored in a data mart (106) comprising a plurality of entities including the identified entity and one or more neighbors of the identified entity;

generate an adjacency list that describes relationships between the plurality of entities in the subgraph;

generate a plurality of centrality metrics based on the adjacency list, each centrality metric corresponding to an entity in the subgraph;

generate an association score, which indicates a network effect of the identified entity on the one or

more neighbors based on the plurality of centrality metrics and types of relationships between the plurality of entities in the subgraph; and

generate a respective quantitative feature value for each neighbor based on the determined network effects and the quantitative feature value."

X. Claim 1 of auxiliary request 2 differs from claim 1 of auxiliary request 1 in that the text "a subgraph from the graph database (104) based on the identified entity" has been replaced with "a subgraph from the graph database (104) for each identified entity".

XI. Claim 1 of auxiliary request 3 differs from claim 1 of auxiliary request 2 in that the text "generate a plurality of centrality metrics based on the adjacency list, each centrality metric corresponding to an entity in the subgraph;" has been replaced with:

"generate by the scoring engine (120) a plurality of centrality metrics based on the adjacency list, each centrality metric corresponding to an entity in the subgraph, the scoring engine (120) conducting a Principle Component Analysis ("PCA") to determine a metric weight for each of the plurality of centrality metrics;"

XII. Claim 1 of auxiliary request 4 differs from claim 1 of auxiliary request 2 in that the text "generate an association score, which ... between the plurality of entities in the subgraph;" has been replaced with:

"generate an association score A by

$$(A) = \tanh\left(\sum_i \left(\log\left(1 + \sum_j \left(1 - \tanh\left(\frac{\text{path_length}_{j+1} - \frac{\sum_k \text{centrality}_k}{\text{path_length}_j}}{10}\right)\right)\right)\right)\right),$$

wherein:

i = reachable entities that have the feature of interest,

j = simple paths to a reachable entity, and

k = entities along path *j*,

which indicates a network effect of the identified entity on the one or more neighbors based on the plurality of centrality metrics and types of relationships between the plurality of entities in the subgraph;"

- XIII. Claim 1 of auxiliary request 5 differs from claim 1 of auxiliary request 2 in that the text "the subgraph stored in a data mart (106)" has been replaced with "the subgraph cached in a data mart (106)".

Reasons for the Decision

1. The application relates to assessing and analysing network effects of entities in a knowledge graph.

Main request'

2. *Admission into the appeal proceedings*

- 2.1 Claim 1 of the new main request ("Main request'") adds the following feature to claim 1 of the main request refused by the examining division:

"wherein the extraction of the subgraph and the generation of the adjacency list enable the processor to perform the generation of the centrality metrics and the association score without repeated traversal of the graph database".

2.2 The appellant filed the new main request after the notification of the board's communication under Article 15(1) RPBA. Its admission into the appeal proceedings is therefore to be assessed under Article 13(1) and (2) RPBA.

2.3 Under Article 13(1), fourth sentence, RPBA, the board is to exercise its discretion in view of, *inter alia*, whether the appellant has demonstrated that the amendment, *prima facie*, overcomes the issues raised by the board and does not give rise to new objections.

As explained below, the appellant has demonstrated neither that the amendment overcomes the inventive-step objection raised in the board's communication nor that the amendment does not give rise to a new objection under Article 123(2) EPC.

2.3.1 As for compliance of the amendment with Article 123(2) EPC, the appellant did not indicate a basis in the application as filed for the added feature. Instead, the appellant argued that the amendment served to clarify the technical contribution of the claimed subject-matter. The newly added "wherein" clause did not introduce any new processing steps, system components or purposes but merely made explicit the technical effect already inherent in the claimed sequence of operations. The clause explained the technical effect of existing steps rather than adding new behaviour. The feature reflected a data-flow constraint in that processing steps subsequent to the extraction of the subgraph operated on an in-memory structure rather than on the persistent graph database.

However, in the board's view such a data-flow constraint is not present in claim 1 of the previous

main request, as that claim does not rule out that generating the adjacency list, the centrality metrics, the association score and the quantitative feature values involves a further access of the graph database. Moreover, *prima facie*, neither the application as filed nor claim 1 of the previous main request expresses any limitation on the number of traversals of the graph database.

Hence, at least *prima facie*, the amendment of claim 1 raises an issue under Article 123(2) EPC.

2.3.2 In view of the appellant's argument that the newly added feature does not change the claimed subject-matter compared to claim 1 of the previous main request, it also cannot be seen how the amendment could overcome the board's objection of lack of inventive step.

2.4 In addition, the board does not see any exceptional circumstances justified by the appellant for the admittance of the new main request, as required by Article 13(2) RPBA.

In this respect, the appellant argued that the amendment was a direct response to the observations in points 5.2 to 5.5 of the board's communication. However, it did not explain why those observations, which concerned the lack of a technical effect achieved by the computer program underlying the method of claim 1 of the previous main request, represented an exceptional circumstance. The board notes that the lack of a technical effect had already been discussed in considerable detail in the decision under appeal (see points 3.3 to 3.6 and 5 of the reasons for the decision).

2.5 For these reasons, the board does not admit the new main request into the appeal proceedings (Article 13(1) and (2) RPBA).

Auxiliary request 1

3. *Inventive step*

3.1 The board considers a conventional general-purpose computer comprising a processor and one or more storage media such as hard disk drives or solid state drives to be a suitable starting point for assessing inventive step in the present case.

3.2 The subject-matter of claim 1 of auxiliary request 1 differs from this prior art in that the storage media contain a "graph database" and a "data mart" and in that the processor is programmed to carry out the following operations:

- identify an entity associated with a "feature of interest", with the feature being assigned a "quantitative feature value";
- extract, by a "scoring engine" from the graph database, a subgraph which includes the entity and one or more of its neighbours, the subgraph being stored in the "data mart";
- generate an adjacency list describing the relationships between the entities in the subgraph;
- generate a "centrality metric" for each entity on the basis of the adjacency list;
- generate an "association score" which indicates a "network effect" of the identified entity on the one or more neighbours based on the centrality metrics and the types of relationships between the entities in the subgraph";

- generate a "quantitative feature value" for each neighbour based on the determined network effects (i.e. based on the generated association score) and the quantitative feature value corresponding to the identified entity.

The board notes that the skilled person understands that graph nodes represent entities and graph edges represent relationships between the entities (see also paragraph [4] of the description as filed).

- 3.3 The terms "graph database" and "data mart" do not imply any technical features other than an underlying storage medium.
- 3.4 The remaining features characterise the functionality of a computer program, a part of which is referred to as a "scoring engine". Such features contribute to an inventive step only to the extent that the computer program contributes to a technical effect going beyond the normal functioning of a conventional computer system.
- 3.5 In the present case, the computer program analyses and performs certain calculations on graph data which includes nodes representing "entities" and edges representing "relationships". The entities are associated with a "feature of interest" such as risk behaviour (see paragraphs [3] and [23] of the application). The results of these calculations are values, apparently intended to reflect (social) "network effects".

However, the analysis of a graph data structure and the calculation of values from a data structure are not technical effects.

3.6 In its statement of grounds of appeal, the appellant argued that the invention achieved technical effects in the form of "determinable network effects of an entity on one or more neighbor entities with a quantitative feature value that propagates through the graph and subgraph". According to the appellant, it was computationally difficult to quantify network effects in complex graphs.

However, the board considers that calculated values representing "network effects" do not constitute technical effects. Indeed, even if the calculated values had reflected physical properties, they could not be treated as technical effects (see decision G 1/19, OJ EPO 2021, A77, points 97 and 98: calculated values can at most contribute to a technical effect achieved through an implied further use of the values). The alleged difficulty of calculating them does not change this.

3.7 In its letter of 9 January 2026, the appellant agreed that calculated values representing "network effects" were not technical effects, irrespective of the computational complexity involved. Instead, the appellant argued - albeit with respect to claim 1 of the new main request, i.e. "Main request'" - that the technical contribution of the invention lied in the internal data processing architecture of the computer, in particular the confinement of processing steps to the extracted subgraph "held in working memory".

3.7.1 However, nothing in claim 1 of auxiliary request 1 (nor in claim 1 of the new main request) implies that the extracted subgraph, "stored in a data mart", is held in working memory (i.e. in RAM). For example, the "data

mart" may be stored on the same storage medium as the graph database.

3.7.2 Moreover, even if the "data mart" of claim 1 were interpreted as being stored in RAM (or, in line with paragraph [27] of the application, in a smaller but more efficient storage medium than the graph database), this could not support an inventive step, as the use of a smaller and faster memory as a cache to speed up the processing of frequently accessed information is well known in the art.

3.8 Since the features distinguishing the claimed system from the prior art do not provide a non-obvious technical contribution, the subject-matter of claim 1 of auxiliary request 1 lacks an inventive step (Article 56 EPC).

Auxiliary requests 2 to 5

4. Auxiliary requests 2 to 5 introduce the following amendments to claim 1:
- (a) the subgraph is "for each identified entry" rather than "based on the identified entry" (auxiliary requests 2 to 5);
 - (b) the centrality metrics are generated "by the scoring engine", which conducts "a Principle Component Analysis ('PCA') to determine a metric weight for each of the plurality of centrality metrics" (auxiliary request 3);
 - (c) a specification of a formula for the "association score" (auxiliary request 4);
 - (d) the extracted subgraph is "cached" in a data mart (auxiliary request 5).

- 4.1 None of these amendments is suitable to overcome the objection of lack of inventive step raised in point 3. above. The amendments (a), (b) and (c) do not make a technical contribution for the same reasons as given in points 3.4 to 3.6 above. Amendment (d) arguably implies that the "data mart" is located in a faster level of the memory hierarchy but cannot support an inventive step for the reasons given in point 3.7.2 above.
- 4.2 Hence, the subject-matter of claim 1 of auxiliary requests 2 to 5 lacks an inventive step (Article 56 EPC).
5. Since none of the requests admitted into the appeal proceedings is allowable, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairwoman:



S. Lichtenvort

C. Barel-Faucheux

Decision electronically authenticated