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**Datasheet for the decision
of 7 October 2021**

Case Number: T 2021/17 - 3.5.01

Application Number: 10775848.4

Publication Number: 2488996

IPC: G06Q10/00

Language of the proceedings: EN

Title of invention:
CONDITION MONITORING SYSTEM

Applicant:
University of Strathclyde

Headword:
Intelligent agents/UNIVERSITY of STRATHCLYDE

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - user assistants interacting with data managers and service managers to configure the system to provide better data (no - not technical)

Decisions cited:

T 0641/00, T 1928/06, T 0520/13, T 1776/13, T 0115/85,
T 0528/07, T 1173/97, T 0049/99, T 1171/06, T 1755/10,
G 0003/08, T 2049/12



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Case Number: T 2021/17 - 3.5.01

D E C I S I O N
of Technical Board of Appeal 3.5.01
of 7 October 2021

Appellant: University of Strathclyde
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 11 April 2017
refusing European patent application No.
10775848.4 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman W. Chandler
Members: A. Wahrenberg
E. Mille

Summary of Facts and Submissions

I. This case concerns the appeal against the examining division's decision to refuse European patent application No. 10775848.4 (published as WO 2011/045571 A1) *inter alia* for lack of novelty (Article 54(1) and (2) EPC) over each of the disclosures:

D1: McArthur S. D. J. et al: "Multi-Agent Systems for Power Engineering Applications - Part I: Concepts, Approaches, and Technical Challenges", IEEE Transactions on Power Systems Vol. 22 No. 4, November 2007; and

D4: Jahn G. et al: "The Design of a Multi-Agent Transformer Condition Monitoring System", IEEE Transactions on Power Systems Vol. 19, No 4, November 2004.

II. The appellant requested that the decision to refuse the application be set aside and that a patent be granted on the basis of the main request or one of the first to third auxiliary requests, all submitted with the statement setting out the grounds of appeal. In the grounds of appeal, the appellant furthermore requested that, if the Board disagreed with the appellant's arguments on novelty, inventive step, and/or the technical advantage provided by the invention, the appellant be allowed to have one or more expert witnesses provide testimony.

III. In the communication accompanying the summons to oral proceedings, the Board tended to consider that, insofar

as the claimed invention differed from the prior art, it did not provide a technical effect that could support the presence of an inventive step. The Board was furthermore inclined to refuse the appellant's request to hear experts/witnesses. The appellant was however informed that the experts could participate in the hearing as accompanying persons.

IV. In a letter dated 30 September 2021, the appellant requested that two experts be allowed to attend the oral proceedings and make spoken contributions under the supervision of the professional representative.

V. Early on the day of the oral proceedings, 7 October 2021, the appellant submitted a document describing the product "Lumen" that was based on the invention.

VI. Oral proceedings were held as a videoconference on 7 October 2021. The appellant's final requests were those submitted with the grounds of appeal without the request to hear witnesses.

VII. Claim 1 of the main request reads:

A computer based conditioning monitoring system configured to monitor the condition of physical hardware and/or at least one machine, the system comprising:

a plurality of condition data sources adapted to provide condition data relating to the machine and/or physical hardware;

a user interface for presenting condition data to a user;

a conditioning monitoring platform operable to communicate with the plurality of data sources and the user interface, the conditioning monitoring platform comprising:

a plurality of user assistants, each user assistant being operable to determine condition data of interest to a user; and build and store a user profile based on the condition data of interest;

a plurality of data managers, at least one associated with each condition data source, each data manager adapted to provide access to its associated data source; to identify when new data is added to its associated data source; and to communicate data to user assistants that have a user profile that indicates the data is of interest, wherein when a new condition data source becomes available a new associated data manager is added; and

a plurality of service managers operable to access data made available by the data managers, each service manager operable to provide an analysis of data using one or more data analysis functions, each service manager having knowledge of the type of data required to perform its analysis function, and being operable to communicate with user assistants that have that data in their user profile.

VIII. Claim 1 of the first auxiliary request amends or adds to the main request as follows (additions underlined, deletions struck through):

a plurality of user assistants, ~~one for each user,~~
implemented by a first class of software agents, each

user assistant being operable to determine condition data of interest to a user by presenting to the user a plurality of user selectable options based on available data, and receiving one or more user selections; and build and store a user profile based on the condition data of interest; each user assistant being configured to change the user profile by up-dating the user profile in response to receipt of information on a new user interest and/or in response to at least one user input;

a plurality of data managers implemented by a second class of software agents, ...

a plurality of service managers implemented by a third class of software ...

the system is configured to allow the addition of one or more new data analysis functions and an associated service manager; and

the user assistant is adapted to search for and match the service managers that provide data analysis functions with its associated user based on the user profile, and/or the plurality of service managers being adapted to search for and match with one or more user assistants based on the user profiles.

- IX. The second auxiliary request adds to claim 1 of the first auxiliary request as the fifth feature "a user translator for translating information received from the user into a form interpretable by the computer based system and translating information received from the computer based system into a form interpretable by the user;".

- X. Claim 1 third auxiliary request amends the fourth feature of the second auxiliary request as follows:

"a plurality of user assistants ... receiving one or more user selections by presenting a plurality of high level options to a user, each option being associated with a plurality of related, more specific options, wherein on selection of one of the high level options the other more specific options are presented; and each user assistant being further operable to ..."

Reasons for the Decision

1. *Background*

- 1.1 The invention concerns monitoring the condition of hardware and/or machines, such as transformers in a power station (see Figure 17 of the published application).

Data from e.g. vibration or temperature sensors ("condition data sources") is processed in a "conditioning monitoring platform" and displayed via a user interface. The objective is to dynamically adapt to new data sources and processing capabilities without the user having to search for new features (paragraph bridging pages 25 and 26).

This is achieved by using "intelligent agents", which are software entities that act autonomously to achieve goals based on the environment (see e.g. page 8, lines 20ff.). Such agents are said to react to changes in the environment (reactivity - R), work without external prompting (pro-activity - P) and interact with other

agents (social ability - S).

2. *Third auxiliary request*

2.1 The third auxiliary request has the most limited scope among the requests on file.

2.2 Claim 1 of the third auxiliary request has three types or classes of software agents defined as follows and having the following functionality (with the Board's classification of the agent's above-mentioned property in square brackets):

"user assistants ... interact with the user to determine condition data of interest [R/P] ... by presenting the user a plurality of user selectable options based on available data, and receiving one or more user selections by presenting a plurality of high level options to a user, each option being associated with a plurality of related, more specific options, wherein on selection of one of the high level options the other more specific options are presented; and build and store a user profile based on the condition data of interest [R/P]; change the user profile by updating [it] ... in response to receipt of information on a new user interest and/or in response to at least one user input [R/P]";

"data managers ... associated with each condition data source ... provide access to its associated data source; identify when new data is added ...; communicate [new] data to [interested] user assistants [R/P/S], wherein when a new condition data source becomes available a new associated data manager is added [R/P]";

"service managers ... access data made available by the data managers [R/P/S] ... provide an analysis of the data ... having knowledge of the type of data required to perform its analysis function [R/P], and ... communicate with user assistants that have that data in the user profile [R/P/S]";

There is also a "user translator" for translating information received from the user into a form interpretable by the computer based system and vice versa. However, the user translator is not defined as a class of software agent.

The claimed system is further "configured to allow the addition of one or more new data analyses functions and an associated service manager [R/P], and the user assistant is adapted to search for and match the service managers that provide data analysis functions with its associated user based on the user profile [R/P/S], and/or the plurality of service managers being adapted to search for and match with one or more user assistants based on the user profiles [R/P/S]".

2.3 In the oral proceedings before the Board, the discussion on novelty and inventive step focused on the disclosure of D1. It is common ground that D1 is the most promising starting point among the prior art cited in the decision under appeal.

2.4 D1 discloses (see in particular section IV.A.1) a condition monitoring system for monitoring power system equipment including transformers. The system has multiple sensors (corresponding to the "condition data sources" in claim 1) for providing data relating to the condition of the transformers, and an agent-based system (a "condition monitoring platform") for

interpreting data from the multiple sensors and for delivering diagnostics information to the user. Each agent in D1 is responsible for monitoring data from one data source (section IV.A.1, lines 20 to 23: "...delegating the task of monitoring each source to an autonomous agent"). It follows from this that when a new data source is added (lines 31 to 33: "New sensors ... can also be introduced seamlessly ..."), a new agent responsible for monitoring that source is added. The autonomy of the agent allows it to detect when new information becomes available and determine what information to communicate to whom (lines 21 to 29).

Although not mentioned in D1, virtually every computer system translates user input into a form (code) interpretable by the system and adapts system output such that it is intelligible to the user. This is the very purpose of a user interface. The claim does not define the "user translator" beyond this, and therefore, the entity itself is not distinguishable from a conventional user interface. Therefore, the Board considers that the "user translator" is implicitly disclosed in or at least obvious from D1.

- 2.5 The agents in D1 perform many of the same functions as the agents in claim 1.

They each provide access to their associated data source [R/P], identify when new data is added to the data source [R/P], and communicate the data to the user [R/P]. They also provide an analysis of the data using one or more data analysis (diagnostics) functions [R/P].

2.6 In the Board's view, D1 does not disclose dynamically building a user profile based on the interests of the user. There is no mechanism for interacting with the user by presenting user selectable options and receiving user selections. The agent in D1 seems to be able to determine to whom to send the diagnostics data and this might imply storing some information about at least one user in a "user profile", but there is no disclosure in D1 of a user profile that is built and updated in response to user input.

Another difference is that, while in D1 the different functions are all preformed by the same agent, the tasks are in claim 1 divided between "user assistants", "data managers", "service managers" which communicate with each other. The user assistants build the user profiles and search for and match with service managers. The data managers each provide access to a data source and communicate data to user assistants. The service managers provide data analysis functions; they access data from the data managers, and match and communicate with user assistants.

In D1, when a new data source is added, a new agent is added to handle it. In claim 1 of the third auxiliary request, when a new data source is added, an associated data manger is added. The claimed system also allows the addition of one or more data analysis functions and an associated service manager. Although this feature is not strictly limiting since it refers to allowed and not actual additions, it emphasises that there is one service manager for each data analysis function.

The subject-matter of claim 1 is therefore novel (Article 54(1) and (2) EPC).

2.7 The question is what technical effect, if any, is provided by the user profile and the division of tasks and interaction between the various agents.

In the Board's view, presenting information of interest to the user based on a user profile is not technical, and cannot therefore contribute to inventive step under the "Comvik approach" (see T 641/00 - *Two identities/COMVIK*). Other decisions, notably T 1928/06 - *Profile management/BRITISH TELECOMMUNICATIONS*, T 520/13 - *Advertisement selection/MICROSOFT*, and T 1776/13 - *Improving personalization of advertising/SAMSUNG*, have made similar assessments concerning user profiles and the provision of personalised information.

Although the presentation of information relating to a technical condition in an apparatus or system may arguably be regarded as technical (see e.g. T 115/85 - *Computer-related invention* and T 528/07 - *Portal system/ACCENTURE*), the Board does not consider that the technical character extends to the customisation of such information. The customisation is not based on any technical criteria, but merely on the interest of the user.

2.8 The appellant argued that the claimed invention went beyond presenting information to the user. The user profile did not simply determine what the user saw, but controlled communication between the data managers, service managers, and user assistants, dynamically configuring the system to provide better data.

2.9 The Board does not see that this is a technical effect that could support the presence of an inventive step. In any personalised information system, the user profile determines how the system responds. The

particular organisation of tasks, and the interaction between the various agents is, in the Board's view a matter of software implementation.

The Board notes that there is no definition for what an agent is in terms of technical properties either in the application or even generally in the art (see D1, II.A). Thus, the agents in claim 1 cannot be distinguished from software modules suitable for implementing the desired functions. In the Board's view, the internal structure of a computer program, for example the particular configuration of software modules, objects, or, indeed, "agents", does not provide a further technical effect in the sense of T 1173/97 - *Computer program product/IBM*, i.e. an effect that goes beyond the normal effects of running software on a computer. This is in line with the Boards' case law on computer software. Information modelling in the framework of object-oriented programming has been held to lack technical character (T 49/99 - *Information modelling/INTERNATIONAL COMPUTERS*, T 1171/06 - *Objekt-orientierte Modellierung/BOSCH*). In T 1755/10 - *Software structure/TRILOGY*, pure software concepts such as separating rules form an engine, were considered not to be technical unless there was a further technical effect. In G 03/08, the activity of programming was held to be a mental act (point 13.2). Structuring a program in terms of software components belongs to the mental activity of programming.

Furthermore, in a modular program, the modules typically "interact" with each other e.g. by passing data between each other. The Board does not see that the interaction between the agents in claim 1 goes

beyond this.

2.10 Concerning the system's ability to self configure after the installation of new data sources and/or analyses, the Board notes that the claim does not contain any details of how this is achieved apart from the apparently self-evident feature of providing a new associated data manager or service manager. Moreover, software flexibility in the sense of providing a structure that can easily be modified is not on its own a technical effect that counts towards inventive step, because this falls under the computer program exclusion in Article 52(2)(c) EPC (see T 2049/12 - *Data structure for defining transformations/MICROSOFT*).

2.11 For these reasons, the Board does not see that the invention in claim 1 provides a technical effect that goes beyond the implementation of a personalised information system. The implementation would have been obvious to the skilled person using routine programming. The skilled person would have provided suitable software means for receiving user input and a suitable program structure.

2.12 In conclusion, the subject-matter of claim 1 of the third auxiliary request does not involve an inventive step (Article 56 EPC).

3. *Main request and first and second auxiliary requests*

3.1 Claim 1 of the main and the first and second auxiliary requests covers the subject-matter of claim 1 of the third auxiliary request and must fail for the same reason (Article 56 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



T. Buschek

W. Chandler

Decision electronically authenticated