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Vista IP Law Group, LLP (Oracle)
2160 Lundy Avenue
Suite 230
San Jose, CA 95131

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EYERS, DUSTIN D

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte MANISH SRIVASTAVA, GERMAN BERTOT, YU LUNG NG, SUMAN GUHA, LEE HIAN QUEK, and JEFF GLANVILLE

Appeal 2018-003930
Application 13/237,865
Technology Center 2100

Before CARL W. WHITEHEAD JR., IRVIN E. BRANCH, and JOSEPH P. LENTIVECH, *Administrative Patent Judges*.

LENTIVECH, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellants appeal from the Examiner's decision to reject claims 1–20, the only claims pending in the application on appeal.[1] We have jurisdiction over the pending claims under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] According to Appellants, the real party in interest is Oracle International Corporation. App. Br. 2.

STATEMENT OF THE CASE

Appellants' Invention

Appellants' invention generally relates to "data management in an electronic business intelligence system and more particularly to systems for integration of historical data with online transactional data." Spec. ¶ 1. Claim 1, which is illustrative, reads as follows:

> 1. A computer-implemented method for performing integrated transactional and data warehouse business intelligence analysis, the method comprising:
>
> selecting, based at least in part on user input, a business intelligence attribute to analyze;
>
> determining, for the business intelligence attribute, whether to retrieve data records only from an online transactional processing (OLTP) system, only from a data warehouse, or from both the OLTP and the data warehouse;
>
> extracting and pre-computing at least some data stored in the data warehouse into precomputed data and storing the pre-computed data in a memory for subsequent retrievals based in part or in whole upon likelihood of subsequent repeated retrievals of the at least some data;
>
> when it is determined to retrieve the data records from both the OLTP and the data warehouse:
>
> retrieving a transactional data record from the OLTP system when it is determined to retrieve the data records for the business intelligence attribute from the OLTP system, the transactional data record comprising at least one OLTP business intelligence value of the selected business intelligence attribute;
>
> receiving, from the data warehouse that is different than the OLTP system, a result set of a query to the data warehouse when it is determined to retrieve the data records for the business intelligence attribute from the data warehouse, the result set comprising a historical business

> intelligence value of the selected business intelligence attribute;
>
> analyzing the selected business intelligence attribute using the at least one OLTP business intelligence value and the historical business intelligence value at least by comparing the at least one OLTP business intelligence value with the historical business intelligence value in a context of each other when the data records are retrieved from both the OLTP system and the data warehouse; and
>
> processing, in an application server, a business intelligence application, the business intelligence application combining the at least one OL TP business intelligence value from the OLTP system with the historical business intelligence value from the data warehouse and at least some of the pre-computed data from the memory to form a correlated report when the data records are retrieved from both the OLTP system and the data warehouse, wherein the correlated report relates the at least one OLTP business intelligence value to the historical business intelligence value; and
>
> displaying the correlated report on a single surface.

References and Rejections

Claims 1, 5, 6, 8, 12, 13, 15, and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Hossfeld et al. (US 2007/0156718 A1; published July 5, 2007) ("Hossfeld") and Zadorozhny (US 2008/0250058 A1; published Oct. 9, 2008). Final Act. 2–8.

Claims 2, 9, and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Hossfeld, Zadorozhny, and Kalenius (US 2005/0216846 A1; published Sept. 29, 2005). Final Act. 8–10.

Claims 3, 4, 10, 11, 17, and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Hossfeld,

Zadorozhny, and Delurgio et al. (US 2008/0221949 A1; published Sept. 11, 2008) ("Delurgio"). Final Act. 10–15.

Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Hossfeld, Zadorozhny, Delurgio, and Kalenius. Final Act. 15–19.

Claim 14 and 20 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Hossfeld, Zadorozhny, and Kalenius. Final Act. 19–23.

ANALYSIS

Claim 1

Appellants contend the combination of Hossfeld and Zadorozhny fails to teach or suggest "determining, for the business intelligence attribute, whether to retrieve data records only from an online transactional processing (OLTP) system, only from a data warehouse, or from both the OLTP and the data warehouse," as recited in claim 1. App. Br. 21–28; Reply Br. 2–9. Appellants argue "Hossfeld merely describes a single source of data — database 17 — and thus never needs to perform a 'determining' step to determine whether to retrieve data records from among multiple choices of sources (either an OLTP system or a data warehouse as claimed where '*. . . the data warehouse . . . is different than the OLTP system . . .*')." App. Br. 21.

Appellants further contend:

> [B]ecause Hossfeld only describes organizing database 17 (whether singular or plural) to process real-time transactions and to support a business intelligence analysis, Hossfeld thus not only does not and need not "*determin[e] . . . whether to retrieve data*

> *records only from an online transactional processing (OLTP) system, only from a data warehouse, or from both the OLTP and the data warehouse*" but also fails to disclose or suggest "*retrieving a transactional data record from the OLTP system*" and "*receiving, from the data warehouse . . . , a result set of a query*" "*when it is determined to retrieve the data records from both the OLTP and the data warehouse*" "*that is different than the OLTP system*".

App. Br. 23. Appellants argue Hossfeld fails to teach the disputed limitations because Hossfeld does not teach or suggest determining a source for data retrieval from three choices—an OLTP system, a data warehouse, both the OLTP system and the data warehouse, as required by claim 1. App. Br. 24–28 (citing Hossfeld ¶¶ 20, 25, 55). Appellants argue Hossfeld, instead, teaches retrieving data from a single data source—Hossfeld's multi-dimensional database. *Id.*

Appellants' arguments are not persuasive. The Examiner finds, and we agree, that "Hossfeld discloses that business data is stored in a central repository containing a multi-dimensional database and that multiple business data sets are stored together as multi-dimensional data cubes within the database." Ans. 3 (citing Hossfeld ¶ 24). We also agree with the Examiner that Hossfeld teaches the multi-dimensional database "may be organized both to process real-time transactions as in online transaction processing systems ('OLTP'), and to support business intelligence analysis." Ans 3 (citing Hossfeld ¶ 25). Hossfeld further teaches that "[d]ata cubes may be used to associate and store any number of discrete data sets" and "discrete data sets may be stored separately within database **17** and associated with other data sets thereafter by various reporting software applications." Hossfeld ¶ 24. As such, we find Hossfeld teaches, or at least suggests, that the database is organized into a first section composed of data

cubes storing discrete data sets for processing real-time transactions (e.g., an OLTP system) and a second, different section composed of data cubes storing discrete data sets for supporting business intelligence analysis (e.g., a data warehouse).

Appellants further contend the combination of Hossfeld and Zadorozhny fails to teach or suggest "extracting and pre-computing at least some data stored in the data warehouse into pre-computed data and storing the pre-computed data in a memory for subsequent retrievals based in part or in whole upon likelihood of subsequent repeated retrievals of the at least some data," as recited in claim 1. App. Br. 28–30; Reply Br. 9–11.

Regarding these disputed limitations, the Examiner finds:

> Zadorozhny discloses "a forward table that can contain information representing pre-computed combined probabilities" and "the combined probability of transitioning from state 81 to state 82" (Paragraph [0027]). This shows that Zadorozhny discloses pre-computing information and storing the information inside of a forward table. The probability of transitioning from one state to another is considered the likelihood of subsequent repeated retrievals. Appellant emphasizes that there is no bearing on any "likelihood" however, a probability of occurrence as disclosed in Zadorozhny is an obvious variant of a "likelihood". Zadorozhny further discloses that "summarization component can employ mapping rules to map received data into specified states" (Abstract). This shows that transitioning from one state to another as described in Paragraph [0027] would be a form of data retrieval as each state corresponds to a set of data. Furthermore, the claim limitation only requires that "at least some data stored" is pre-computed, this would mean that any data stored in the respective source that is precomputed would meet this limitation.

Ans. 7.

Appellants argue Zadorozhny teaches that the summarization component "can generate a forward table that contains computed combined probabilities of transitioning from state S1 to state S2" and "utilizing the information in the forward table to generate tables that contain information of combined probabilities and determining the probabilities and de-reification of observations" but these teachings "ha[ve] no bearing on any 'likelihood of subsequent repeated retrievals of the at least some data,'" as required by claim 1. App. Br. 30–31 (citing Zadorozhny ¶ 27). Appellants further argue Zadorozhny does not teach or suggest "that the precomputed 'probabilities' have any bearing on subsequent repeated retrievals," as required by claim 1. Reply Br. 11.

We find Appellants' arguments unpersuasive. Zadorozhny teaches "using information for the PADB [process analytical database], the summarization component 102 can generate a forward table that can contain information representing pre-computed combined probabilities." Zadorozhny ¶ 27. As such, we find Zadorozhny teaches "extracting and pre-computing at least some data stored in the data warehouse into pre-computed data and storing the pre-computed data in a memory for subsequent retrievals." Zadorozhny further teaches "[i]t is desirable to be able to quickly and efficiently derive pertinent information from large collections of data" and that "it is desirable to discover trends in dynamic data associated with complex processes." Zadorozhny ¶ 19. As such, we find Zadorozhny teaches or suggests that the pre-computed combined probabilities are stored in the forward table based in part or in whole upon likelihood of subsequent repeated retrievals of the pre-computed combined probabilities (e.g., "at least some data"), as required by claim 1.

Appellants' arguments (*see e.g.*, App. Br. 29–30) regarding Zadorozhny failing to teach or suggest the disputed limitations because Zadorozhny does not teach "the claimed 'extracting and pre-computing at least some data . . . based in part or in whole upon likelihood of subsequent repeated retrievals of the at least some data'" are not persuasive because they are not commensurate with the scope of the claim. Claim 1 does not require that the data be extracted and pre-computed based in part or in whole upon likelihood of subsequent repeated retrievals of the at least some data. Instead, claim 1 requires storing the pre-computed data in a memory for subsequent retrievals based in part or in whole upon likelihood of subsequent repeated retrievals of the at least some data.

For the foregoing reasons, we are not persuaded the Examiner erred in rejecting claim 1; and claims 5, 6, 8, 12, 13, 15, and 19, which are not separately argued with particularity.

Claims 2, 9–11, 14, 16–18, and 20

Claims 2, 9–11, 14, 16–18, and 20 stand rejected under 35 U.S.C. § 103(a) based on Hossfeld, Zadorozhny, and various additional references. Final Act. 8–19. Appellants argue the additional references cited in the rejection of these claims do not cure the deficiencies in the teachings of Hossfeld and Zadorozhny discussed above with respect to claim 1. App. Br. 32. Accordingly, we are not persuaded the Examiner erred in rejecting claims 2, 4, 7, 9–11, 14, 16–18, and 20 for the reasons discussed above regarding claim 1.

Claim 3

Claim 3 depends from claim 1 and recites that the method further comprises:

> selecting a performance metric for analysis;
>
> extracting the data records only from the OLTP system for the analysis in the first time period;
>
> identifying a second time period for the analysis;
>
> extracting the data records only from the data warehouse for the analysis in the second time period;
>
> identifying a third time period that represents an overlap between the first time period and the second time period;
>
> extracting the data records from only the data warehouse, from only the OLTP system, or from both the data warehouse and the OLTP system based in part or in whole upon correlated nature of the data records in the data ware house and the OLTP system during the third time period; and
>
> performing the analysis for the first time period, the second period, and the third time period with the data records.

App. Br. 40–41 (Claims App'x).

Appellants contend the combination of Hossfeld, Zadorozhny, and Delurgio fails to teach or suggest the limitations recited in claim 3. App. Br. 33–37; Reply Br. 13–18. Appellants argue the cited references fail to teach the limitations recited in claim 3 because "Delurgio never even remotely suggests retrieving data from different sources in the three claimed 'time periods'" and "this deficiency is especially pronounced given the fact that Hossfeld merely describes a single database (17) that processes real-time transactions as in OLTP systems and supports a business intelligence analysis." App. Br. 35. Appellants further argue the combination of Hossfeld, Zadorozhny, and Delrugio "simply fails to disclose any

mechanisms store data records on different systems (the claimed OLTP system and data warehouse) for two different time periods (the claimed "first time period" and the "second time period"). *Id.*

Appellants also argue:

> [A]lthough Delrugio recites that "actual historical dependent data 102 and historical causal data 104 can be for any past time period and of varying length, such as a days, weeks, months, years, etc." in ¶ [0025], Delrugio NEVER even remotely suggests retrieving any specific data in three different time periods with some overlapping relationship (the claimed "first time period", "second time period", and "third time period that represents an overlap . . . "), much less extracting data records from different sources for different time periods (e.g., only from OLTP for the first time period and only from the data warehouse for the second time period).

App. Br. 35–36. Additionally, Appellants argue "to the [extent] that Delrugio's comparison between its predicted historical dependent data 110 and actual historical dependent data 102 is considered as allegedly disclosing the claimed 'analysis', Delrugio nevertheless fails to disclose extracting the alleged 'data records' from different sources for different time periods." App. Br. 36.

Appellants further argue:

> Delrugio's "predicted historical dependent data 110" is derived from the "historical causal data 104[.]" Delrugio then compares the derived "predicted historical dependent data 110" to the "actual historical dependent data 102" to determine the reliability of its forecast model. Although Delrugio does describe that its "actual historical dependent data 102" and historical causal data 104 may be for any time period and of varying length and may or may not end at a specified time (108), Appellant respectfully asserts that in order for Delrugio's comparison between the actual historical dependent data 102 and

> predicted historical dependent data 110 to be meaningful, the same time period must be selected for the following reason.
>
> That is, if different time periods were to be selected, the driver in the historical causal data 104 would NOT "affect" the actual historical dependent data because the driver events do not even occur in the same time period. The predicted historical dependent data 110 derived from such historical causal data 104 will also involve the driver event information in a time period and thus does not "affect" the "actual historical dependent data 110" in a different time period. As a result, the comparison between the predicted historical dependent data 110 and the actual historical dependent data 102 will not provide meaningful results, not to mention determining the reliability of Delrugio's forecast models. Therefore, the only way that such comparisons may yield meaningful results is to have Delrugio's actual historical dependent data 102 and historical causal data 104 in the same time period, instead of the claimed "first time period" and "second time period".

App. Br. 36–37.

Appellants' arguments are not persuasive. As discussed *supra* with respect to claim 1, the Examiner finds, and we agree, Hossfeld teaches or suggests the claimed OLTP system and data warehouse. Ans. 3 (citing Hossfeld ¶ 24). The Examiner finds Delrugio teaches extracting data associated with first, second and third time periods. Ans. 10–11 (citing Delrugio ¶¶ 27, 40, and Fig. 4). As such, the Examiner relies on the combined teachings of Hossfeld and Delrugio for teaching or suggesting the disputed limitations. Appellants' arguments do not persuasively address the combined teachings of the references and, therefore, are unpersuasive of error.

Delrugio describes actual dependent data 102 and historical causal data 104 as being associated with a time period ending at time 402. Delrugio ¶ 40, Fig. 4. Delrugio describes predicted dependent data 306 and

predicted causal data 302 as being associated with a time period beginning at time 402 and ending at time (future) 406. *Id.* Delrugio further describes incremental actual dependent data 408 and incremental historical causal data 410 as being associated with a time period beginning at time 402 and ending at updated time 404, which is prior to time (future) 406. Delrugio ¶ 40, Fig. 4. The Examiner finds, and we agree, Delrugio teaches that as time evolves from 402 to updated time 404, the actual/historical data will overlap with the predicted data. Ans. 9 (citing Delrugio ¶ 40). As such, we agree with the Examiner (Ans. 9–10) that Delrugio teaches or suggests a first time period ending at the updated time 404, a second time period beginning at time 402 and ending at time (future) 406, and a third time period beginning at time 402 and ending at updated time 404 that overlaps a portion of the first time period and the second time period.

Delrugio teaches using the historical dependent and causal data to estimate a forecast model. Delrugio ¶ 28. Delrugio further teaches "[i]ncremental actual dependent data 408 is compared with the same portion of the predicted dependent data 306 to determine if forecast model 308 is reliable." Delrugio ¶ 40. Because the incremental actual dependent data 408 is associated with the first and third time periods and the predicted dependent data is associated with the second and third time periods, we agree with the Examiner that Delrugio teaches or suggests extracting data in the first, second and third time periods. Ans. 10–11 (citing Delrugio ¶¶ 27, 40, and Fig. 4). As discussed *supra* with respect to claim 1, the Examiner finds, and we agree, Hossfeld teaches or suggests the claimed OLTP system and data warehouse (Ans. 3 (citing Hossfeld ¶ 24)) and concludes the

combination of Hossfeld and Delrugio teaches or suggests the limitations recited in claim 3 (Final Act. 10–13).

Accordingly, we are not persuaded the Examiner erred in rejecting claim 3, and claims 4 and 7, which depend from claim 3 and are not separately argued with particularity. *See* App. Br. 33–37.

DECISION

We affirm the Examiner's rejections of claims 1–20 under 35 U.S.C. § 103(a).

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED