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EXAMINER	
CHOY, PAN G	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 18/822,013	Applicant(s) MUTHU et al.	
	Examiner PAN CHOY	Art Unit 3624	AIA (First Inventor to File) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 30 August 2024.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-20 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-20 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 30 August 2024 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date 20240830.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Introduction

2. The following is a **non-final** Office Action in response to Applicant's submission filed on August 30, 2024.

Currently claims 1-20 are pending, claims 1, 9 and 17 are independent.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 08/30/2024 appears to be in compliance with the previsions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the Examiner.

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. **Claims 1-20** are rejected under 35 U.S.C. 101 because the claimed invention is directed to an abstract idea without significantly more.

As per Step 1 of the subject matter eligibility analysis, it is to determine whether the claim is directed to one of the four statutory categories of invention, i.e., process, machine, manufacture, or composition of matter.

In this case, claims 1-8 and 17-20 are directed to methods of training a neural database without tied to a particular machine for performing the steps, which falls outside of the four statutory categories. However, claims 1-8 and 17-20 will be included in Step 2 Analysis for the purpose of compact prosecution. Claims 9-16 are directed to a system comprising a memory and a processor, which falls within the statutory category of a machine.

With respect to claims 1-8 and 17-20, the claims are directed to non-statutory subject matter because the claims are directed to methods **without tied to a particular machine** in the body of the claims for performing the steps. One factor to consider when determining whether a claim recites a §101 patent eligible process is to determine if the claimed process (1) is tied to a particular machine or; (2) transforms a particular article to a different state or thing. See *In re Bilski*, 545 F.3d 943, 88 USPQ2d 1385 (Fed. Cir. 2008) (en banc) *aff'd, Bilski v. Kappos*, 561 U.S. ___, 130 S.Ct. 3218, 95 USPQ2d 1001 (U.S. 2010). (Machine-or-Transformation Test).

In Step 2A of the subject matter eligibility analysis, it is to "determine whether the claim at issue is directed to a judicial exception (i.e., an abstract idea, a law of nature, or a natural phenomenon). Under this step, a two-prong inquiry will be performed to determine if the claim recites a judicial exception (an abstract idea enumerated in the 2019 Guidance), then determine if the claim recites additional elements that integrate the exception into a practical application of the exception. *See* 2019 Revised Patent Subject Matter Eligibility Guidance (2019 Guidance), 84 Fed. Reg. 50, 54-55 (January 7, 2019).

In Prong One, it is to determine if the claim recites a judicial exception (an abstract idea enumerated in the 2019 Guidance, a law of nature, or a natural phenomenon).

Taking claim 1 as representative, the claim recites the limitations of "extracting entity data related to a first entity that provides a good or a service, transforming the entity data into structured entity data, processing the structured entity data with the machine learning model to generate metadata associated with the structured entity data, augmenting the structured entity data with the metadata, training the neural database based on the augmented structured entity data to predict one or more second entities that supply material for the first entity"; dependent claims 2-8 further characterizing the limitations of claim 1 and recite the functions "determining a weighted sum of a frequency score and a criticality score for each material, performing reinforcement learning to refine the neural database, and processing a user query with the trained neural database to generate one or more query results". None of the limitations recites technological implementation details for any of these steps, but instead recite only results desired by any and all possible means. The limitations, as drafted, are methods that allow user to manage sales activities (e.g., procurement transactions) and manage interactions (e.g., one or more second entities that supply materials to the first entity), which falls in the certain method of organizing human activity grouping (including fundamental economic practices, commercial interaction and managing interactions between people). Even through claim 1 recites "processed by a machine learning model, but this machine learning model merely provides a technological environment and/or field of use for implementing the abstract idea. "The Supreme Court has repeatedly made clear that merely limiting the field of use of the abstract idea to a particular existing technological environment does not render the claims any less abstract." *Affinity Labs of Texas, LLC v. DirecTV, LLC,* 838 F.3d 1253, 1258 (Fed. Cir. 2016). As to learning/training per se, such an argument overlooks the entire education system. Reciting machine learning is placing such learning in a computer context, offering no technological implementation details beyond the conceptual idea to use a machine for learning. Thus, the mere nominal recitation of "by a machine learning model" and "a neural database" do not take the claim out of the certain methods of organizing human activity grouping. See Under the 2019 Guidance, 84 Fed. Reg. 52. Accordingly, the claims recite an abstract idea, and the analysis is proceeding to Prong Two.

In Prong Two, it is to determine if the claim recites *additional elements* that integrate the exception into a practical application of the exception.

Beyond the abstract idea, claim 1 recites no additional element for performing the steps, when given the broadest reasonable interpretation, a machine is not required in the claim. Even if claim 1 recites the additional elements of "a memory" and "a processor" as recited in claim 9 for performing the steps. The specification discloses these additional elements at a high level of generality and merely invoked as tools to perform the generic computer functions including receive interaction data over a network. For example, the specification discloses "Process(s) 702 are generally configured to retrieve and execute instructions stored in one or more memories, including local memories like computer-readable medium 712, as well as remote memories and data stores. Similarly, processor(s) 702 are configured to store application date residing in local memories; configured to transmit programming instructions and application data among the processor(s)." See ¶ 88. When given the broadest reasonable interpretation and in light of the Specification, these additional elements are no more than generic computer components and amount to no more than adding the words "apply it" or using "a particular machine" with an abstract idea, or mere instructions to implement the abstract idea on a computer. Thus, merely adding a generic computer, generic computer components, or programmed computer to perform generic computer functions does not automatically overcome an eligibility rejection. *Alice Corp. Pty. Ltd. V. CLS Bank Int'l,* 134 S. Ct. 2347, 2358-59, 110 USPQ2d 1976, 1983-84 (2014); *see also Bancorp Servs., L.L.C. v. Sun Life Assurance Co. of Canada (U.S.)*, 687 F.3d 1266, 1278 (Fed. Cir. 2012) (A computer "employed only for its most basic function . . . does not impose meaningful limits on the scope of those claims."). The Federal Circuit has also indicated that mere automation of manual processes or increasing the speed of a process where these purported improvements come solely from the capabilities of a general-purpose computer are not sufficient to show an improvement in computer-functionality. *FairWarning IP, LLC v. Iatric Sys.*, 839 F.3d 1089, 1095, 120 USPQ2d 1293, 1296 (Fed. Cir. 2016). However, simply implementing the abstract idea on a generic computer does not integrate the abstract idea into a practical application because it does not impose any meaningful limits on practicing the abstract idea. Further, nothing in the claims that reflects an improvement to the functioning of a computer itself or another technology. Therefore, the additional elements do not integrate the judicial exception into a practical application. The claims are directed to an abstract idea, the analysis is proceeding to Step 2B.

In Step 2B of *Alice,* it is "a search for an 'inventive concept'—i.e., an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept' itself.'" *Id.* (alternation in original) (*quoting Mayo Collaborative Servs. v. Prometheus Labs., Inc.,* 132 S. Ct. 1289, 1294 (2012)).

The claims as described in Prong Two above, nothing in the claims that integrates the abstract idea into a practical application. The same analysis applies here in Step 2B.

Beyond the abstract idea, claim 1 recites no additional element for performing the steps, when given the broadest reasonable interpretation, a machine is not required in the claim. Even if claim 1 recites the additional elements of "a memory" and "a processor" as recited in claim 9 for performing the steps. The specification discloses these additional elements at a high level of generality and merely invoked as tools to perform the generic computer functions including receive interaction data over a network. For example, the specification discloses "Process(s) 702 are generally configured to retrieve and execute instructions stored in one or more memories, including local memories like computer-readable medium 712, as well as remote memories and data stores. Similarly, processor(s) 702 are configured to store application date residing in local memories; configured to transmit programming instructions and application data among the processor(s)." See ¶ 88. When given the broadest reasonable interpretation and in light of the Specification, these additional elements are no more than generic computer components for performing generic computer functions including receiving, manipulating, and transmitting information over a network. However, generic computer for performing generic computer functions have been recognized by the courts as merely well-understood, routine, and conventional functions of generic computers. See MPEP 2106.05 (d) (II) (Receiving or transmitting data over a network, e.g., using the Internet to gather data, *Symantec,* 838 F.3d at 1321, 120 USPQ2d at 1362 (utilizing an intermediary computer to forward information); *buySAFE, Inc. v. Google, Inc.,* 765 F.3d 1350, 1355, 112 USPQ2d 1093, 1096 (Fed. Cir. 2014) (computer receives and sends information over a network); Storing and retrieving information in memory, *Versata Dev. Group, Inc. v. SAP Am., Inc.,* 793 F.3d 1306, 1334, 115 USPQ2d 1681, 1701 (Fed. Cir. 2015); *OIP Techs.,* 788 F.3d at 1363, 115 USPQ2d at 1092-93). Thus, simply implementing the abstract idea on a generic computer for performing generic computer functions do not amount to significantly more than the abstract idea. (MPEP 2106.05(a)-(c), (e-f) & (h)).

For the foregoing reasons, claims 1-8 cover subject matter that is judicially-excepted from patent eligibility under § 101 as discussed above, the other claims 9-16 and 17-20 parallel claims 1-8—similarly cover claimed subject matter that is judicially excepted from patent eligibility under § 101.

Therefore, the claims as a whole, viewed individually and as a combination, do not provide meaningful limitations to transform the abstract idea into a patent eligible application of the abstract idea such that the claims amount to significantly more than the abstract idea itself. The claims are not patent eligible.

Claim Rejections - 35 USC § 103

6. In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

7. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102 of this title, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

8. **Claims 1-5, 7-13 and 15-20** are rejected under 35 U.S.C. 103 as being unpatentable over Miller et al., (US 2022/0253871, hereinafter: Miller), and in view of Noyes et al., (US 2018/0096365, hereinafter: Noyes), and further in view of Jackson, (US 2019/0259041).

Regarding claim 1, Miller discloses a method of training a neural database for entity matching, comprising:

extracting, from an electronic data repository, entity data related to a first entity that provides a good or a service (see ¶ 210, ¶ 354, ¶ 415);

transforming the entity data into structured entity data configured to be processed by a machine learning model (see ¶ 54, ¶ 273);

processing the structured entity data with the machine learning model to generate metadata associated with the structured entity data (see ¶ 54, ¶ 160-161, ¶ 167); and

training the neural database based on the augmented structured entity data to predict one or more second entities that supply materials for the first entity and associated with the good or the service (see ¶ 11-12, ¶ 166).

Miller discloses processing the large amounts of data associated with a worldwide collection of product-related records associated with different entities (see ¶ 13).

Miller does not explicitly disclose a first entity and a second entity; however, Noyes in an analogous for identifying consumers associated with behavior data discloses

data includes first data received from a first plurality of entities of a first community and second data received from a second plurality of entities of a second community (see ¶ 14).

It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller to include teaching of Noyes in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more specific data analysis, resulting in more focused solution, enabling better decision making. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Miller discloses augmenting DOCI information via data augmentation algorithm(s) (see ¶ 203, ¶ 267).

Miller does not explicitly disclose the following limitations; however, Jackson in an analogous art for managing dataset relationships discloses

augmenting the structured entity data with the metadata associated with the structured entity data (see ¶ 11-13, ¶ 55, ¶ 124).

It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller and in view of Noyes to include teaching of Jackson in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more optimal solution, in turn of operational efficiency. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 2, Miller discloses the element set comprises one or more expected attribute-value pairs based on document structure (see ¶ 121, ¶ 208).

Miller does not explicitly disclose the following limitations; however, Noyes discloses the method of Claim 1, wherein:

the structured entity data comprises a plurality of key and value pairs associated with the first entity, at least one of the plurality of key and value pairs comprises an entity name, and at least one of the plurality of key and value pairs comprises the good or the service provided by the first entity (see ¶ 87, ¶ 165-166). It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller to include teaching of Noyes in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more specific data analysis, resulting in more focused solution, enabling better decision making. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 3, Miller does not explicitly disclose the following limitations; however, Noyes discloses the method of Claim 2, wherein the metadata associated with the structured entity data comprises a plurality of key and value pairs associated with the materials associated with the good or the service provided by the first entity (see ¶ 15, ¶ 87). It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller to include teaching of Noyes in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more specific data analysis, resulting in more focused solution, enabling better decision making. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 4, Miller discloses ranking the results based on the number of matching terms, frequency of matching terms and the assigned weight of the matching term; and a weighting factor applied for frequency of occurrences (see ¶ 187, ¶ 289, ¶ 414).

Miller does not explicitly disclose the following limitations; however, Noyes discloses the method of Claim 3, further comprising scoring each respective key and value pair of the plurality of key and value pairs associated with the materials based on one or more of:

a frequency with which the first entity obtains each material of the materials (see ¶ 60-61, ¶ 166-168, ¶ 174-175); or

a criticality of each material of the materials to the first entity for providing the good or the service.

It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller to include teaching of Noyes in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more specific data analysis, resulting in more focused solution, enabling better decision making. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 5, Miller does not explicitly disclose the following limitations; however, Noyes discloses the method of Claim 4, wherein scoring each respective key and value pair is further based on a preference derived from one or more of historical data or user settings (see ¶ 40, ¶ 51-52, ¶ 181). It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller to include teaching of Noyes in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more specific data analysis, resulting in more focused solution, enabling better decision making. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 7, Miller discloses the method of Claim 1, further comprising: performing reinforcement learning to refine the neural database, wherein the reinforcement learning is based on a user interaction with a query result generated by the neural database (see ¶ 161-162, ¶ 383).

Regarding claim 8, Miller discloses the method of Claim 1, further comprising: processing a user query with the trained neural database to generate one or more query results, wherein the one or more query results relate to the one or more second entities that supply the materials associated with the good or the service provided by the first entity (see Abstract; ¶ 84, ¶ 118, ¶ 121, ¶ 124).

Regarding claim 9, Miller discloses a processing system, comprising:

a memory comprising computer-executable instructions (see ¶ 45, ¶ 63, claim 1); and

a processor configured to execute the computer-executable instructions and cause the processing system (see ¶ 45, ¶ 63, claim 1) to:

extract, from an electronic data repository, entity data related to a first entity that provides a good or a service (see ¶ 210, ¶ 354, ¶ 415);

transform the entity data into structured entity data configured to be processed by a machine learning model (see ¶ 54, ¶ 273);

process the structured entity data with the machine learning model to generate metadata associated with the structured entity data (see ¶ 54, ¶ 160-161, ¶ 167); and

train a neural database based on the augmented structured entity data to predict one or more second entities that supply materials for the first entity and associated with the good or the service (see ¶ 11-12, ¶ 166).

Miller discloses processing the large amounts of data associated with a worldwide collection of product-related records associated with different entities (see ¶ 13).

Miller does not explicitly disclose a first entity and a second entity; however, Noyes in an analogous for identifying consumers associated with behavior data discloses

data includes first data received from a first plurality of entities of a first community and second data received from a second plurality of entities of a second community (see ¶ 14).

It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller to include teaching of Noyes in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more specific data analysis, resulting in more focused solution, enabling better decision making. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Miller discloses augmenting DOCI information via data augmentation algorithm(s) (see ¶ 203, ¶ 267).

Miller does not explicitly disclose the following limitations; however, Jackson in an analogous art for managing dataset relationships discloses

augment the structured entity data with the metadata associated with the structured entity data (see ¶ 11-13, ¶ 55, ¶ 124).

It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller and in view of Noyes to include teaching of Jackson in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more optimal solution, in turn of operational efficiency. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 10, Miller discloses the element set comprises one or more expected attribute-value pairs based on document structure (see ¶ 121, ¶ 208).

Miller does not explicitly disclose the following limitations; however, Noyes discloses the processing system of Claim 9, wherein: the structured entity data comprises a plurality of key and value pairs associated with the first entity, at least one of the plurality of key and value pairs comprises an entity name, and at least one of the plurality of key and value pairs comprises the good or the service provided by the first entity (see ¶ 87, ¶ 165-168). It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller to include teaching of Noyes in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more specific data analysis, resulting in more focused solution, enabling better decision making. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 11, Miller does not explicitly disclose the following limitations; however, Noyes discloses the processing system of Claim 10, wherein the metadata associated with the structured entity data comprises a plurality of key and value pairs associated with the materials associated with the good or the service provided by the first entity (see ¶ 15, ¶ 87). It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller to include teaching of Noyes in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more specific data analysis, resulting in more focused solution, enabling better decision making. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 12, Miller does not explicitly disclose the following limitations, however, Noyes discloses the processing system of Claim 11, wherein the processor is further

configured to cause the processing system to score each respective key and value pair of the plurality of key and value pairs associated with the materials based on one or more of:

a frequency with which the first entity obtains each material of the materials (see ¶ 60-61, ¶ 166-168, ¶ 174-175), or

a criticality of each material of the materials to the first entity for providing the good or the service.

It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller to include teaching of Noyes in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more specific data analysis, resulting in more focused solution, enabling better decision making. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 13, Miller does not explicitly disclose the following limitations, however, Noyes discloses the processing system of Claim 12, wherein to score each respective key and value pair is further based on a preference derived from one or more of historical data or user settings (see ¶ 40, ¶ 51-52, ¶ 181). It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller to include teaching of Noyes in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more specific data analysis, resulting in more focused solution, enabling better decision making. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 15, Miller discloses the processing system of Claim 9, wherein the processor is further configured to cause the processing system to:

perform reinforcement learning to refine the neural database, wherein the reinforcement learning is based on a user interaction with a query result generated by the neural database (see ¶ 161-162, ¶ 383).

Regarding claim 16, Miller discloses the processing system of Claim 9, wherein the processor is further configured to cause the processing system to: process a user query with the trained neural database to generate one or more query results, wherein the one or more query results relate to the one or more second entities that supply the materials associated with the good or the service provided by the first entity (see Abstract; ¶ 84, ¶ 118, ¶ 121, ¶ 124).

Regarding claim 17, Miller discloses a method, comprising:

receiving, via a user interface, a user query to determine one or more second entities that supply materials associated with a good or a service provided by a first entity (see ¶ 201-203, ¶ 230-231)

processing the user query with a trained neural database trained to predict the one or more second entities that supply the materials associated with the good or the service provided by the first entity (see ¶ 54, ¶ 160-161, ¶ 167);

receiving, from the trained neural database, an output comprising the one or more second entities (see ¶ 57, ¶ 231); and

sending the output to the user interface to cause an action via the user interface (see ¶ 201-202, ¶ 312, ¶ 366).

Miller discloses processing the large amounts of data associated with a worldwide collection of product-related records associated with different entities (see ¶ 13).

Miller does not explicitly disclose a first entity and a second entity; however, Noyes in an analogous for identifying consumers associated with behavior data discloses

data includes first data received from a first plurality of entities of a first community and second data received from a second plurality of entities of a second community (see ¶ 14).

It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller to include teaching of Noyes in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more specific data analysis, resulting in more focused solution, enabling better decision making. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 18, Miller discloses the element set comprises one or more expected attribute-value pairs based on document structure (see ¶ 121, ¶ 208).

Miller does not explicitly disclose the following limitations; however, Noyes discloses the method of Claim 17, wherein the trained neural database is trained based on augmented structured entity data comprising:

structured entity data comprising a plurality of key and value pairs associated with the first entity (see ¶ 87), wherein:

at least one of the plurality of key and value pairs comprises an entity name, and at least one of the plurality of key and value pairs comprises the good or the service provided by the first entity (see ¶ 165-166); and

metadata associated with the structured entity data (see ¶ 15, ¶ 87).

It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller to include teaching of Noyes in order to gain the commonly understood benefit of such adaption, such as providing the benefit of a more specific data analysis, resulting in more focused solution, enabling better decision making. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 19, Miller discloses the method of Claim 17, wherein: the received output further comprises priority data associated with the one or more second entities, and causing the action via the user interface comprises:

determining a subset of the one or more second entities based on the priority data; and

generating one or more personalized messages to contact the subset of the one or more second entities (see ¶ 12, ¶ 54, ¶ 202).

Regarding claim 20, Miller discloses the method of Claim 19, wherein generating the one or more personalized messages comprises generating the one or more personalized messages by prompting a machine learning model to generate the one or more personalized messages (see ¶ 12, ¶ 46, ¶ 261).

9. **Claims 6 and 14** are rejected under 35 U.S.C. 103 as being unpatentable over Miller and in view of Noyes and Jackson as applied to claims 1-5, 7-13 and 15-20 above, and further in view of Patel et al., (US 2022/0382785, hereinafter: Patel).

Regarding claim 6, Miller discloses a weighted sum and a weighting factor applied for frequency of occurrences (see Fig. 24, # 1460; ¶ 164, ¶ 414).

Miller, Noyes and Jackson do not explicitly disclose the following limitations; however, Patel discloses the method of Claim 4, wherein scoring each respective key and value pair comprises determining a weighted sum of a frequency score and a criticality score for each material (see ¶ 32, ¶ 88), wherein:

the frequency score is based on a number of procurement transactions for the material within a configured time period (see ¶ 26, ¶ 93, ¶ 111), and

the criticality score is based on one or more of historical data or user settings (see Abstract; ¶ 4, ¶ 25-32, ¶ 93).

It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller and in view of Noyes and Jackson to include teaching of Patel in order to gain the commonly understood benefit of such adaption, such as providing the benefit of enhancing computational efficiency, and in turn operational efficiency. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Regarding claim 14, Miller, Noyes and Jackson do not explicitly disclose the following limitations, however, Patel discloses the processing system of Claim 12, wherein to score each respective key and value pair comprises to determine a weighted sum of a frequency score and a criticality score for each material, wherein:

the frequency score is based on a number of procurement transactions for the material within a configured time period (see ¶ 26, ¶ 93, ¶ 111), and

the criticality score is based on one or more of historical data or user settings (see Abstract; ¶ 4, ¶ 25-32, ¶ 93).

It would have been obvious to one of ordinary skill in the art before the effective filing date of the claimed invention to modify the system of Miller and in view of Noyes and Jackson to include teaching of Patel in order to gain the commonly understood benefit of such adaption, such as providing the benefit of enhancing computational efficiency, and in turn operational efficiency. Since the combination of each element merely would have performed the same function as it did separately, and one of ordinary skill in the art would have recognized that the results of the combination were predictable.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Deshpande et al., (WO 2021244657) discloses a system for acquiring target entity information by extracting from a data source of an associated entity information corresponding to the target entity and relationship information between the target entity information and the associated entity information.

- Li et al., (US 2021/0004431) discloses a method for automatically detecting and extracting entity data from a web page and transforming extracted entity data into a semi-structured form.

- Yu et al., (12135740 B1) discloses a method for reducing data retrieval time when accessing siloed data across disparate location by generating a unified metadata graph vis a Retrieval-augmented Generation framework.

- Soori et al., " Artificial Neural Networks in Supply Chain Management, A Review", Journal of Economy and Technology 1 (2023) 179-196.

- Wichmann et al., "Extracting Supply Chain maps from news articles using deep neural networks", Institute for Manufacturing, University of Cambridge, UK. September 7, 2019.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAN CHOY whose telephone number is (571)270-7038. The examiner can normally be reached 5/4/9 compressed work schedule.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry O'Connor can be reached on 571-272-6787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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