

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MMODAL LLC,
Petitioner,

v.

NUANCE COMMUNICATIONS, INC.,
Patent Owner.

IPR2018-01355
Patent 7,379,946 B2

Before KEN B. BARRETT, NEIL T. POWELL, and
CHRISTA P. ZADO, *Administrative Patent Judges*.

POWELL, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

MModal LLC (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 1–6 of U.S. Patent No. 7,379,946 B2 (Ex. 1001, “the ’946 patent”). Nuance Communications, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 6. In view of those submissions, we instituted an *inter partes* review of claims 1–6 of the ’946 patent. Paper 7. Subsequent filings include a Patent Owner Response (Paper 19, “PO Resp.”), a Petitioner Reply (Paper 26, “Pet. Reply”), and a Patent Owner Surreply (Paper 33, “PO Surreply”). An oral hearing was held on November 13, 2019, and a copy of the transcript was entered into the record.¹ Paper 44.

We have jurisdiction over this proceeding under 35 U.S.C. § 6(b). After considering the evidence and arguments of the parties, we determine that Petitioner has not proven by a preponderance of the evidence that claims 1–6 of the ’946 patent are unpatentable. *See* 35 U.S.C. § 316(e). We issue this Final Written Decision pursuant to 35 U.S.C. § 318(a).

II. BACKGROUND

A. *Related Matters*

According to the parties, the ’946 patent is asserted in *Nuance Communications, Inc., v. MModal LLC*, Case No. 1:17-cv-1484-JFB (SRF) (D. Del.). Pet. 8; Paper 3, 2.

¹ Prior to the oral hearing, the parties filed Joint Objections to Demonstrative Exhibits (Paper 41), in which Patent Owner objected to certain slides in Petitioner’s demonstrative exhibits for the hearing. Patent Owner’s objections are overruled. Demonstrative exhibits are not evidence. In deciding the merits of this case, we considered all arguments and evidence set forth in the parties’ briefs.

B. The Asserted Grounds of Unpatentability

Petitioner contends that claims 1–6 of the '946 patent are unpatentable based on the following grounds:

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1–6	103(a) ²	Taira, ³ Buchanan ⁴
1, 5	103(a)	Heinze, ⁵ Taira

Petitioner also relies on Declarations of Homayoon Beigi, Ph.D. (Exs. 1003, 1025). Patent Owner relies on the Declaration of Girija Yegnanarayanan. (Ex. 2005).

C. The '946 Patent

The '946 patent relates to language processing. See Ex. 1001, code (57), 2:10–15. The '946 patent notes prior attempts to use natural language processing (i.e., “NLP”) software to extract important information from free-form language, such as free-form, dictated reports of physicians. *Id.* at 2:10–59. According to the '946 patent, this endeavor had proven difficult, such that “NLP software tends to be large and complex, difficult to develop and maintain, and demands significant processing power, working memory, and time to run.” *Id.* at 2:20–26.

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287 (2011), amended 35 U.S.C. § 103. Because the application from which the '946 patent issued was filed before March 16, 2013, the effective date of the relevant amendment, the pre-AIA version of § 103 applies.

³ Ricky K. Taira et al., *Automatic Structuring of Radiology Free-Text Reports*, (2001) (Ex. 1005).

⁴ U.S. Patent No. 5,267,155, iss. Nov. 30, 1993 (Ex. 1007).

⁵ U.S. Patent No. 6,915,254 B1, iss. July 5, 2005 (Ex. 1004).

The '946 patent also explains that “traditional systems are not fully capable of extracting all relevant information from, for example, a medical report.” *Id.* at 2:27–29. According to the '946 patent, tasks such as billing, accreditation with a standard body, compliance, and government/Medicare reporting may require back-end reporting. *Id.* at 2:33–36. The '946 patent observes that

in the medical field, there are a number of different purposes for which records may be kept, such as, for example, the ORYX quality reporting initiative that the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) has incorporated into its accreditation process for hospitals, CPT-4 (Current Procedural Terminology—4th Edition) billing codes, ICD-9-CM (International Classification of Diseases—9th Revision--Clinical Modification), and Medicare E&M (Evaluation and Management) codes.

Id. at 2:45–54. The '946 patent expresses concerns about capturing “key pieces of data which are required for these back end reporting processes,” lamenting that the existing approach “results in reduced efficiency, increased expenses and time-on-task, and also contributes to increased error and omission rates.” *Id.* at 4:12–21.

The '946 patent describes methods of generating a report based on an input stream of data. *See, e.g., id.* at 4:52–62. The input stream of data may include “latent information.” *Id.* at 4:54–55. According to the '946 patent, “latent information may be associated with a predetermined class of information. The latent information may be, for example, information relating to a particular medical problem. Alternatively, latent information may be, for example, information related to an allergy, a treatment, or a medication.” *Id.* at 7:11–16. Additionally, with respect to a report of a

surgical procedure, “the latent information may include, for example, the identification of the surgical procedure.” *Id.* at 8:52–57.

The '946 patent discloses processing an input stream of data to identify latent information. *Id.* at 4:55–56. Additionally, “[a] template associated with the identified latent information may be activated. Based on this template, template-specific data may be received.” *Id.* at 4:56–59. A report is generated with the input stream of data and the template-specific data. *Id.* at 4:59–62.

The '946 patent discloses details of one exemplary method in connection with Figure 2, reproduced below.

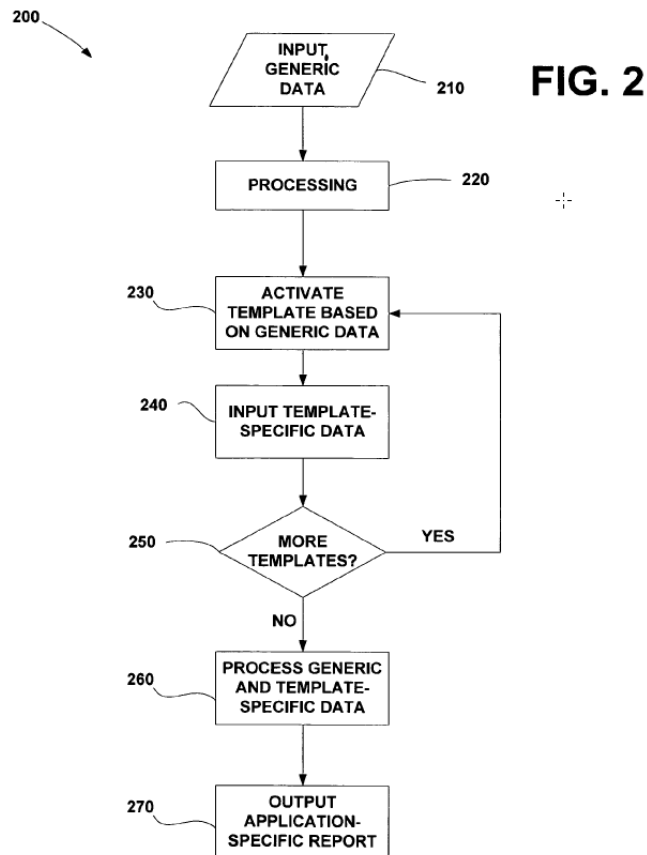


Figure 2 presents a logic flow-diagram of a method of outputting an application-specific report based on generic input data. *Id.* at 6:27–28, 8:10–

10:3, Fig. 2. At step 210, generic input data is input. *Id.* at 8:11–14. At step 220, “the data may be processed,” which may include NLP processing of the input data. *Id.* at 8:16–19. This may include bounding relevant data to enable recognition of latent information. *Id.* at 8:23–26. Additionally, the NLP processing may classify the relevant part of the data. *Id.* at 8:26–28. In step 230, “a template may be activated based on the processed generic data,” such as “based on the classification of the relevant portion of the data.” *Id.* In step 240, a user (such as a physician) presented with the activated template may enter template specific data. *Id.* at 8:42–50. The template can serve “to remind the physician that additional data . . . may be required” (*id.* at 9:4–8), thereby promoting more accurate and complete record keeping (*id.* at 9:16–19). At step 250, it may be determined whether any additional templates need to be presented. *Id.* at 9:21–26. In step 260, the template-specific data and the generic data may be processed, which may involve entering both types of data into fields of predefined databases. *Id.* at 9:35–57. At step 270, “an application-specific report or other structured or machine-readable outputs may be output.” *Id.* at 9:56–59.

D. Illustrative Claim

Claim 1 is independent, and each of claims 2–6 depends, directly or indirectly, from claim 1. Claim 1 is illustrative of the challenged claims and recites:

1. A computer implemented method for generating a report that includes latent information, comprising;
 - receiving an input data stream;
 - performing one of normalization, validation, and extraction of the input data stream;

processing the input data stream to identify latent information within the data stream that is required for generation of a particular report, wherein said processing of the input data stream to identify latent information comprises of identifying a relevant portion of the input data stream, bounding the relevant portion of the input data stream, identifying a predetermined class of information, and normalizing the relevant portion of the input data stream;

activating a relevant report template based on the said identified latent information;

populating said template with template-specified data;

processing the template-specified data to generate a report.

Ex. 1001, 16:10–29.

III. ANALYSIS

A. Claim Construction

In an *inter partes* review filed before November 13, 2018, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent. 37 C.F.R. § 42.100(b) (2018).⁶ Consistent with that standard, we assign claim terms their ordinary and

⁶ The Office recently changed the claim construction standard used in *inter partes* review proceedings. See Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018). As stated in the Federal Register notice, however, the new rule applies only to petitions filed on or after November 13, 2018, and, therefore, does not affect this *inter partes* review. See *id.* at 51,340 (stating “[t]his rule is effective on November 13, 2018 and applies to all IPR, PGR and CBM petitions filed on or after the effective date”).

customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention, in the context of the entire patent disclosure. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Only those terms that are in controversy need be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

The Petition asserts that the claims should be given their “plain and ordinary meaning.” Pet. 16. Patent Owner’s Response does not propose expressly any claim constructions. *See generally* PO Resp. In response to Patent Owner’s arguments that Petitioner has not demonstrated the cited prior art teaches certain claim elements, Petitioner’s Reply proposes constructions of certain claim language, including “information . . . required for generation of a particular report,” “report template,” and “processing the template-specified data to generate a report.” Pet. Reply 1–11.

For the reasons explained below, we need not address the claim constructions proposed by Petitioner to determine that Petitioner has not adequately supported its obviousness assertions. For example, as discussed below in Section III.B.3, regardless of the Reply’s newly proposed claim constructions, the Petition’s challenge based on Taira alone or in combination with Buchanan fails to adequately address the claim language “information . . . required for generation of a particular report.” Additionally, however, we deem it warranted to explain that, even if we consider Petitioner’s newly-made arguments and evidence regarding the interpretation of this claim language, we do not find them persuasive.

The Reply asserts that “the broadest reasonable interpretation of ‘information . . . required for generation of a particular report’ is ‘information used to generate any particular report.’” Pet. Reply 6. Petitioner asserts that the report need not “fully comply with regulatory or other guidelines.” *Id.* at 2. Petitioner argues that the claim language does not convey any limits on the “report,” such that a person of ordinary skill in the art would understand the claim as referring to any report. *Id.* at 2–3. Petitioner asserts that the Specification and prosecution history comport with such an interpretation. *Id.* at 3–4. Petitioner contends that Dr. Yegnanarayanan agrees. *Id.* at 4. Additionally, Petitioner asserts that the ’946 patent indicates considerable flexibility in what latent information triggers template activation, what templates are used, and what reports are generated. *Id.* at 5–6.

In response, Patent Owner alleges procedural and substantive problems with the Reply’s claim construction arguments. PO Surreply 3–9. Procedurally, Patent Owner faults the Reply for “belatedly present[ing] a new primary theory based entirely on a new claim construction.” *Id.* at 3. Substantively, Patent Owner argues that the Reply’s proposed construction of “information . . . required for generation of a particular report” reads “required” out of the claim. *Id.* at 7–9.

Petitioner does not persuade us that its proposed construction of “information . . . required for generation of a particular report” is the broadest reasonable interpretation. In particular, as explained further below, Petitioner does not offer persuasive evidence to support its proposed interpretation of the claim language “required for generation of.”

Petitioner's Reply extensively explains why Petitioner believes the claim language "a particular report" means "any particular report," asserting that a person of ordinary skill in the art "would conclude that the method recites generating *any* report." Pet. Reply 3–4. Petitioner contends that the Specification, prosecution history, and Dr. Yegnanarayanan all support this conclusion. *Id.*

In addition to interpreting "a particular report" as "any particular report," Petitioner's proposed construction substitutes "used to generate" for the claim language "required for generation of." Pet. Reply 6. Petitioner does not cite persuasive evidence that the claim language "required for generation of" means "used to generate." Petitioner argues that the '946 patent describes the possibility of using any templates to generate any reports, without "claim[ing] or describ[ing] 'activating a relevant report template based on' *all* of the latent information required for Nuance's regulatory reports." *Id.* at 5. Petitioner then asserts that "because there are no restrictions on the report that is ultimately generated (or the templates used to specify data for that particular report), the information 'required for generation of a particular report' includes the information used to generate the report." *Id.* at 6. Petitioner's observations tend to support the position that the claim language "a particular report" does not mean that the report "must fully comply with regulatory or other guidelines." *Id.* at 2. But Petitioner's arguments and evidence do not provide a persuasive basis for concluding that the broadest reasonable interpretation of the claim language "required for generation of" is "used to generate." We agree with Patent Owner that Petitioner's construction effectively reads out the claim's recitation of the information being "required," and would result in an

unreasonably broad interpretation of the claim language as it would cover any information used in generating a report, even if that information was not required. Accordingly, Petitioner does not persuade us that the construction newly proposed in the Reply is the broadest reasonable interpretation of “information . . . required for generation of a particular report.”

B. Alleged Obviousness over Taira Alone or in Combination with Buchanan

1. Overview of Taira

Taira discusses a natural language processor that structures automatically medical information from a free-text document “as a formal information model that can be interpreted by a computer program.” Ex. 1005, 237. As input, the system receives a radiologic study’s free-text report. *Id.* “The system outputs a formalized representation of the important information contained within the free-text document in the form of a structured report.” *Id.* at 239.

Taira’s system includes a number of collaborative modules. *Id.* Figure 2 of Taira is reproduced below.

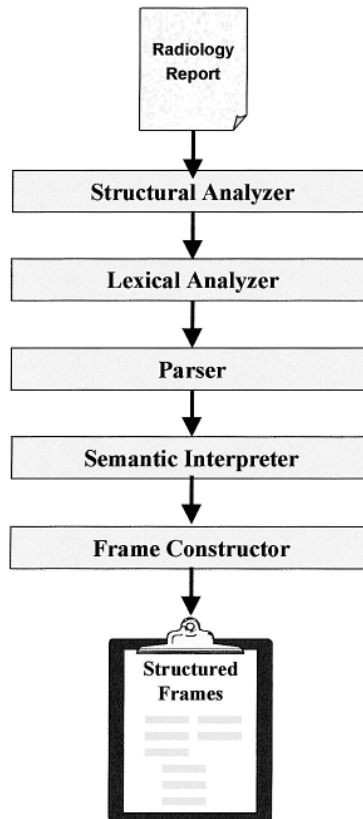


Figure 2. Diagram illustrates the processing architecture of our natural language processing system.

Figure 2 shows Taira’s system, which includes a structural analyzer, a lexical analyzer, a parser, a semantic interpreter, and a frame constructor.

The structural analyzer preprocesses the received free-text report by standardizing character representation and removing custom text formatting. *Id.* at 240. Subsequently, the structural analyzer identifies the sections of the report, as well as the sentences within each section. *Id.*

The lexical analyzer receives a single sentence and “outputs the semantic and syntactic features of each word or phrase in the sentence,” using various resources. *Id.* After this process, any words that are still unknown are placed in a database of unknown words, with a medical

language expert having responsibility to later address these unknown words.
Id.

The parser receives the semantic and syntactic features of words or phrases and produces a dependency diagram, which shows relationships between the words in the sentence. *Id.* at 241. The parser does so based on statistical analysis using “(a) the ‘affinity’ between words A and B, and (b) the ‘valence’ preferences of each word in the sentence.” *Id.* An example of the parser’s output is shown in Figure 3, reproduced below.

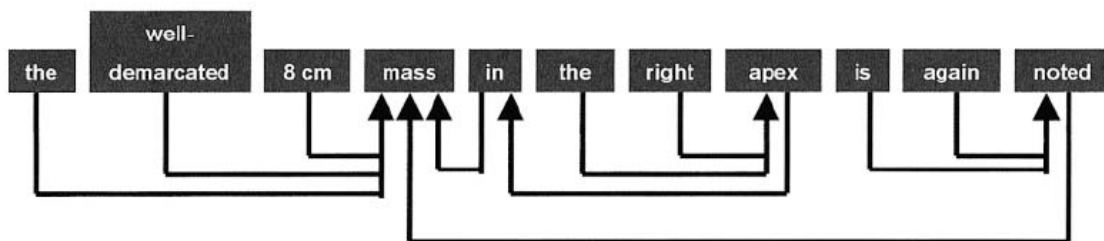


Figure 3. Dependency diagram generated by the parser shows modifier-head relations between words. The tail of an arc represents the modifier, whereas the tip represents the head.

Figure 3 shows the words of a sentence with arrows extending between the words to illustrate relationships between those words. *Id.* at 240, Fig. 3.

The semantic interpreter processes the dependency diagram of the parser. *Id.* at 242–243. The semantic interpreter “verifies that the arcs of the dependency diagram make medical sense and creates logical relationships that indicate the type of conceptual dependency between pairs of words.” *Id.* at 242. In doing so, the semantic interpreter uses symbolic rules learned from “hand-tagged training examples.” *Id.* at 243. Additionally, “[i]n the second technique used by the semantic interpreter, a maximum entropy classifier is constructed for each logical relation.” *Id.*

Taira explains that its processing culminates as follows:

The final processing step is to bundle all the logical relations that were found into appropriate frames (23). Each frame represents

knowledge about a specific topic (eg, ‘mass’), together with descriptions of select properties. There are three classes of topics: (a) abnormal findings, (b) anatomy, and (c) medical procedures. For abnormal findings there exists 11 types of properties: existence, location, quantity, size, severity, trend, normalcy, external architecture, interpretation, association, and ‘other.’ Each property subframe has relevant context modifiers such as time, evidence, certainty, degree, and dimension. The anatomy topic class includes subframes for normalcy, sub-parts, direction, and distribution modifiers. The medical procedures topic class includes subframes for reason for procedure, technical description, and anatomic site. Figure 5 shows a sample frame output along with intermediate parser results.

Id. at 243. Figure 5 is reproduced below.

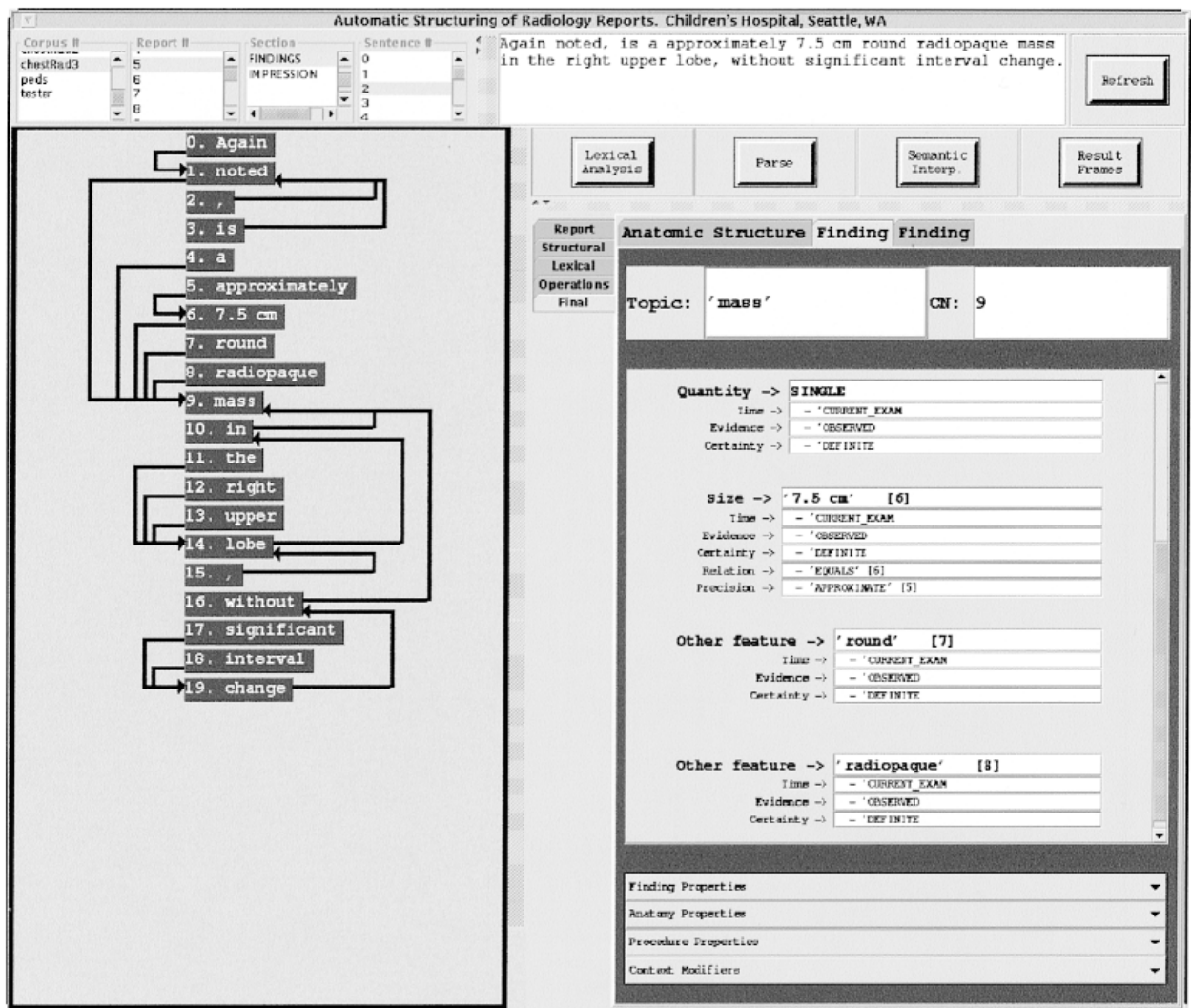


Figure 5. Screen shows a sample frame output (right) with intermediate parser results (left).

Figure 5 shows intermediate parser results with an example of a frame output. *Id.* at 242, Fig. 5. Specifically, Figure 5 shows intermediate parser results on the left and an example frame output on the right.

2. Overview of Buchanan

Buchanan discloses a computer-based documentation system for improving or supplanting the dictation and transcription of documents. Ex. 1007, code (57). Figure 1 of Buchanan is reproduced below.

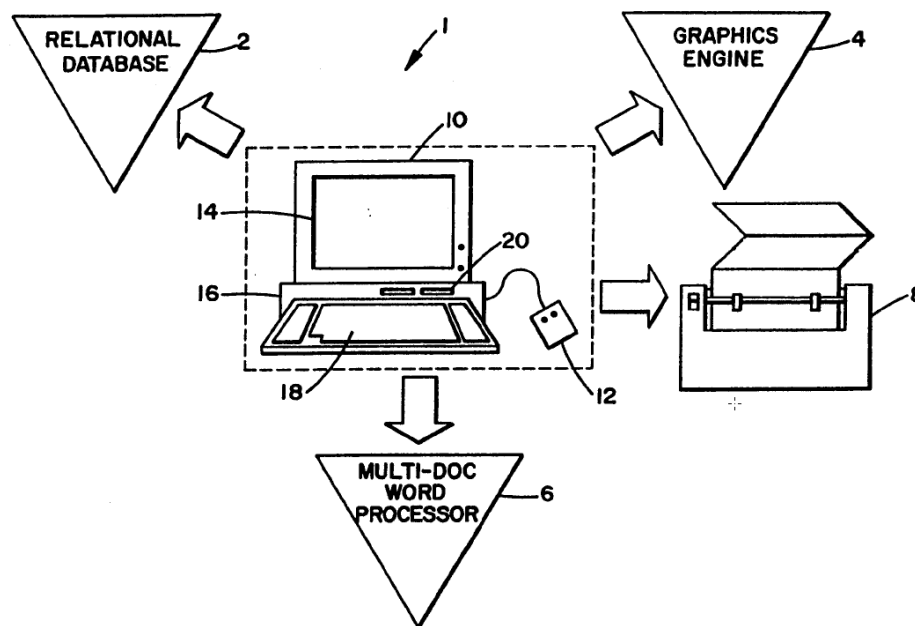


FIG. 1

Figure 1 shows an embodiment of document generation system 1, which includes computing device 10, relational database 2, and multi-document word processor 6. *Id.* at 4:4–6.

Document generation system 1 combines the editing capability of multi-document word processor 6 with the flexible storage in relational database 2 to automate the documentation process. *Id.* at 4:33–36. To manage patient reporting, document generation system 1 uses predefined document templates with “boiler plate” text, as well as information “holes.” *Id.* at 4:37–40. Document generation system 1 has a user interface used for selecting phrases to insert into the template “holes.” *Id.* at 4:37–42. A user can create document templates by designing a document and assessing which text to make static and which text will change from document to document. *Id.* at 4:43–48. Static text becomes the document template’s

boiler plate, and varying text gets replaced with “option-text variables or ‘holes.’” *Id.* at 4:48–50.

To use Buchanan’s system to create a document, a user first selects a patient for whom a report will be generated. *Id.* at 12:42–44. An exemplary menu for this is shown in Figure 8, reproduced below.

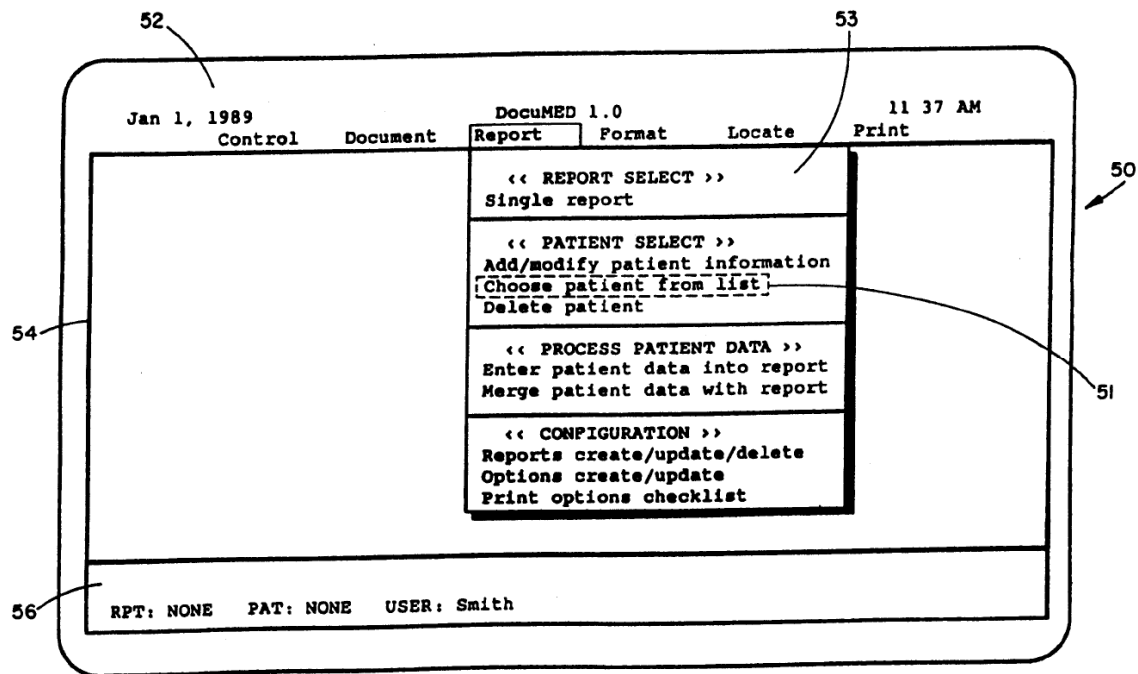


FIG. 8

Figure 8 shows a graphical window environment with a menu that a user may use to select a patient for whom a report is to be generated. *Id.* at 3:33–34, 12:44–46. After a patient is selected,

the user typically will select a “single report” selection 51 within pop-up window 53 in order to designate a particular report document which is to be generated for this particular patient. Upon selecting “single report”, a window including a menu of possible document templates 48 which can be used to generate a document will be shown. A user will then typically select the particular document template 48 which is to be used in conjunction with the selected patient.

Id. at 12:52–61. The user may select “replacement strings for all of the option-text variables within a document template 48” (*id.* at 13:36–38), and may opt to generate a document that includes the user’s selections (*id.* at 13:40–54).

3. Discussion

Petitioner asserts that claims 1–6 would have been obvious over “Taira alone, or in view of Buchanan.” Pet. 23, 28–65. For many limitations of claims 1–6, Petitioner relies on Taira alone. *Id.* at 28–65. In some instances, Petitioner argues that Taira teaches a limitation and that, in the alternative, the limitation would have been obvious over Taira and Buchanan.

Petitioner does so, for example, with respect to the claim language “processing the input data stream to identify latent information within the data stream that is required for generation of a particular report.” Petitioner explains that “[t]o the extent Patent Owner argues that the structured frames generated by Taira are not ‘reports,’ it would have been obvious to a [person of ordinary skill in the art] that Taira’s structured frames could themselves be used to populate a document template, such as those disclosed by Buchanan.” Pet. 41.

With respect to the claim language “activating a relevant report template based on the said identified latent information,” as recited in claim 1, Petitioner argues that “Taira discloses activating a frame (*report template*) based on the characteristics of the information embedded in latent form and extracted via NLP (*identified latent information*), specifically the class, topic or property of the information gleaned from the reports.” *Id.* at 49–50. Petitioner further argues that to the extent Taira does not teach the claim

limitation regarding activating a report template, “[i]t would have been obvious to a [person of ordinary skill in the art] to modify Taira to select a template based upon the type of structured report to be generated as taught by Buchanan.” *Id.* at 52. Petitioner asserts that a person of ordinary skill in the art “would have been motivated to make the combination in order to generate a structured report relevant to information being processed.” *Id.*

Petitioner also argues in the alternative with respect to the claim language “processing the template-specified data to generate a report,” as recited in claim 1. *Id.* at 55–61. Petitioner argues that Taira discloses identifying information from a free-text document and structuring the information into a formal information model. *Id.* at 40. Petitioner further argues that Taira discloses creating structured reports. *Id.* at 55. Petitioner asserts “[f]or example, Figure 1 . . . illustrates the output knowledge frame (*report*) for the sentence ‘A mass is seen in the right lower lobe that measures 5 cm in maximum diameter and is unchanged from the previous examination.’” *Id.* at 55.

Petitioner further argues that even if Taira does not teach generating a report, it would have been obvious to do so. *Id.* at 41–42, 57–61. Petitioner argues that it was well known in the art to generate a report by processing template data. *Id.* at 57. As an example, Petitioner asserts that Taira demonstrates that data in a template frequently was processed and stored in a database, which could be utilized to generate reports. *Id.* In view of this, Petitioner asserts that it would have been obvious to use the information in Taira’s frame and subframes to generate a report “to achieve the benefits as described in Taira, including the organization and presentation of medical data.” *Id.* at 58.

Additionally, Petitioner argues that even if Taira itself does not teach or render obvious using template specified data to generate a report, it would have been obvious in view of Taira in combination with Buchanan. *Id.* at 41, 58. More specifically, Petitioner asserts that “[i]t would have been obvious to a [person of ordinary skill in the art] to use the methods described for generating structured reports including the identification and classification of important medical information from an input stream, as taught by Taira, to generate a report from that important medical information as taught by Buchanan.” *Id.* at 60.

Petitioner suggests that there would have been motivation to so combine the teachings of the references to reduce certain problems and achieve certain advantages in processing medical information. For example, Petitioner asserts that Buchanan notes certain disadvantages with manual record keeping. *Id.* at 59–60. Additionally, Petitioner asserts that a person of ordinary skill in the art would have been motivated to combine the references’ teachings “to reduce the burden, time and monotony with respect to manual report generation; to increase the efficiency, accuracy and profitability of the business; and to ensure compliance with insurance regulatory requirements.” *Id.* at 61. Petitioner also argues that a person of ordinary skill in the art would “be confident of the success of the combinations as each reference describes systems that are directed to the same problem of automation in the generation of medical reports using conventional approaches.” *Id.*

Patent Owner alleges a number of reasons that the Petition fails to show obviousness of claims 1–6 over Taira alone or in combination with Buchanan. Patent Owner argues that the Petition fails to demonstrate that

Taira discloses claim 1's limitations of "processing the template-specified data to generate a report," identifying latent information "required for generation of a particular report," "activating a relevant report template based on the said identified latent information," and "populating said template." PO Resp. 18–36. Patent Owner also contends that Petitioner's assertions that it would have been obvious to modify Taira based on the state of the art and Buchanan fail to demonstrate obviousness of the challenged claims for a number of reasons. *Id.* at 36–51.

The parties' arguments raise disputes regarding various aspects of Petitioner's challenge of claims 1–6 as allegedly obvious over Taira alone or in combination with Buchanan. Considered in view of the arguments and evidence submitted during trial, the Petition fails to explain adequately its position that claim 1 allegedly would have been obvious over Taira alone or in combination with Buchanan. The dispositive issue is the parties' dispute regarding claim 1's recitation of "processing the input data stream to identify latent information with the data stream that is required for generation of a particular report."

The Petition "proposes that each claim term in the Challenged Claims be given its plain and ordinary meaning in this proceeding, and that no specific construction of any claim term is required because the prior art relied on in this Petition meets each of the claim terms under any reasonable construction." Pet. 16. The Petition does not, however, explain adequately how Taira and Buchanan meets "any reasonable construction" of claim 1's recitation of "processing the input data stream to identify latent information within the data stream that is required for generation of a particular report." The Petition asserts that "Taira discloses the use of expert-defined models to

target specific information contained within the radiology free-text document in latent form (the claimed latent information)” (Pet. 40), as well as structuring that information to generate a particular report (*id.* at 40–41). The Petition, however, does not assert that (much less explain why) any latent information targeted by expert-defined data models and used in a particular report by Taira is information “required for generation of” that particular report, as specified by claim 1. *See, e.g., id.*

Asserting that it would have been obvious that “Taira’s structured frames could themselves be used to populate a document template, such as those disclosed by Buchanan,” the Petition argues that

a [person of ordinary skill in the art] would have been motivated to combine Taira and Buchanan to identify information, including latent information required for generating a particular report because both references acknowledged that unstructured dictation or reports could not be submitted to insurance companies or regulatory agencies. *MM-1007* 1:25-43; *MM-1003* ¶ 104. Thus, by processing the unstructured reports into structure frames, the information in the frames could be stored in a relational database and inserted into any number of report, including a billing report. *MM-1007* 5:66-6:8, 6:61-7:46, 15:4-13; *MM-1003* ¶ 104.

Pet. 41–42.

This discussion presents a reason that it allegedly would have been obvious to take the latent information Taira identifies and include it in a report, given Buchanan’s teaching of generating reports. It also suggests that a structured report would have been required. It, however, does not explain adequately a basis for asserting that it would have been obvious to modify Taira to perform the claimed approach of “processing the input data stream to identify latent information within the data stream that is *required*

for generation of a particular report,” which is not alleged to be disclosed by Buchanan. *See id.* at 41–42.

The Petition’s failure to address adequately claim 1’s recitation of “processing the input data stream to identify latent information within the data stream that is *required for* generation of a particular report” is fatal. A petition must include “[a] full statement of the reasons for the relief requested, including a detailed explanation of the significance of the evidence including material facts, and governing law, rules, and precedent.” 37 C.F.R. § 42.22(a)(2). Additionally, we require a petition to identify “[h]ow the challenged claim is to be construed” (37 C.F.R. § 42.104(b)(3)), as well as “[h]ow the construed claim is unpatentable” (37 C.F.R. § 42.104(b)(4)). Because the Petition does not explain coherently how Taira and/or Buchanan discloses the claim limitation “processing the input data stream to identify latent information within the data stream that is *required for* generation of a particular report,” the Petition fails to comply with our rules. This is dispositive, obviating consideration of the arguments and evidence presented in Petitioner’s Reply.

Additionally, even if we consider the newly-presented arguments and evidence presented in Petitioner’s Reply, Petitioner has not shown obviousness by a preponderance of the evidence. The Reply argues that Taira’s alleged disclosure of generating reports with identified latent information meets the construction of the disputed claim language newly proposed in the Reply. Pet. Reply 12–13. This argument is unavailing because, as explained above in Section III.A, the Reply does not persuade us that its broad interpretation of the disputed claim language is reasonable.

The Reply also argues that

Further, Taira expressly states that this same latent information is also included in other reports (each of which is itself a “particular report”), such as a list of cases with “spiculated masses greater than 5 cm in diameter in the left upper lobe.” Taira 238; Pet. 57-58. There can be no reasonable dispute that Taira’s latent information (*e.g.*, identified masses and their properties) are required for that particular report. Beigi Suppl. ¶¶ 60-64, 80-84. It is also undisputed that a particular report can be generated by repeatedly applying the same template to data from different patients, as done here. Yegnanarayanan Tr. 95-97 (“The template that I’m filling is the same template. The information that I put into the template will be, of course, different from different patients”); Beigi Suppl. ¶ 51.

Id. at 13 (footnote omitted). Petitioner also argues that the claims do not require finding all latent information that could potentially be included in any possible report, that a fully populated template is not required for a particular report. *Id.* at 13–14. Petitioner summarizes that “Taira processes all of the free text, extracting findings, structures, and procedures. Once the entire free-text report is processed, extracted latent information will be in Taira’s frames and thus the report.” *Id.* at 15.

These arguments about the flexibility with which the same or different latent information may be included in or omitted from different reports also fail to persuade us that Taira teaches the disputed claim limitation. Here again, Petitioner focuses on what information gets used in various reports, without explaining why any of that information is required for generation of any of those reports. Therefore, here again, these arguments would only be persuasive if we adopted Petitioner’s unsupported construction of the claim language “required for generation of” as meaning “used to generate.”

Moreover, we agree with Patent Owner's assertion that the Reply's reliance on "a list of cases with 'spiculated masses greater than 5 cm in diameter in the left upper lobe'" is procedurally improper new argument. PO Surreply 4–6. The Petition does not cite this disclosure when addressing the claim limitation "processing the input data stream to identify latent information within the data stream that is required for generation of a particular report." See Pet. 40–42; 37 C.F.R. §§ 42.22(a)(2), 42.104(b)(4), (5).

For the foregoing reasons, Petitioner fails to support adequately its assertion that claims 1–6 would have been obvious over Taira alone or in combination with Buchanan.

C. Alleged Obviousness over Heinze Alone or in Combination with Taira

1. Overview of Heinze

Heinze relates to using NLP to assign medical codes to computer readable notes of physicians. Ex. 1004, code (57). Figure 1 of Heinze is reproduced below.

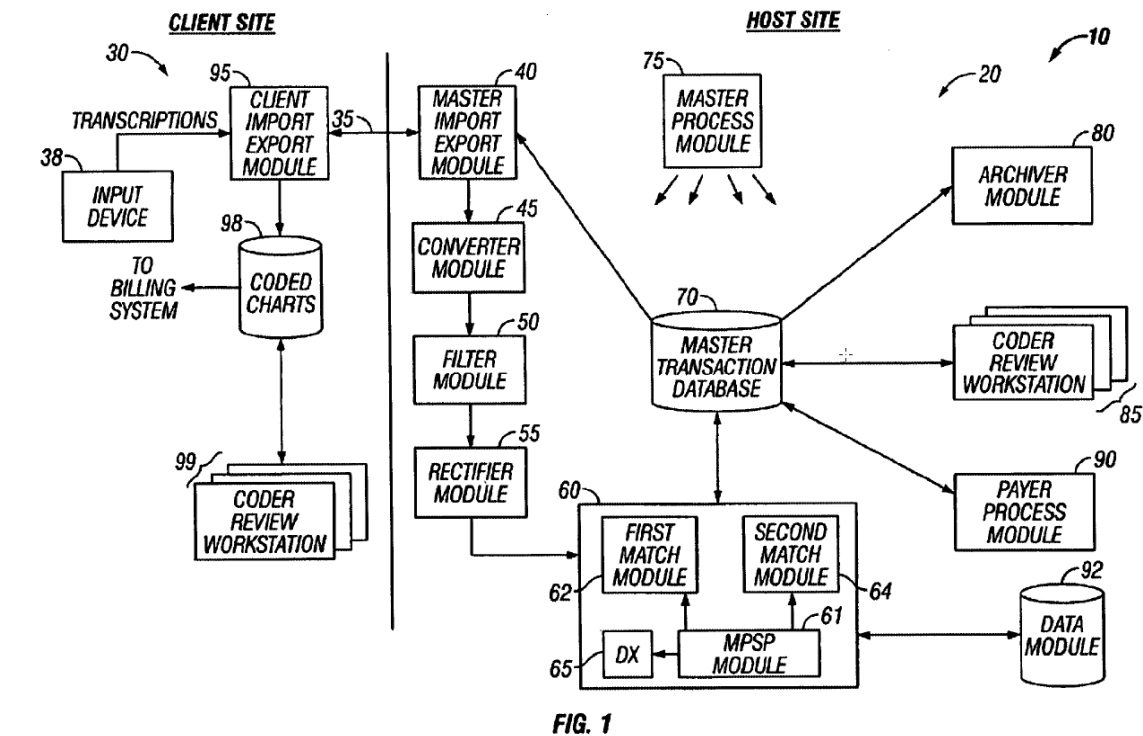


Figure 1 of Heinze provides a high-level overview of a medical coding system. Ex. 1004, 5:40–41. Medical coding system 10 includes host site 20 and client site 30. *Id.* at 5:40–44.

Input data 35 moves from client site 30 to host site 20, where it is processed. *Id.* at 6:19–27. Input data 35 comprises “transcribed notes including clinical and demographic information.” *Id.* at 6:19–21. Master Import/Export Module 40 receives input data 35. *Id.* at 6:25–27. Converter Module 45 converts files to plain text. *Id.* at 6:28–30. Filter Module 50 cleans up the data, after which availability of records for processing by Rectifier Module 55 is indicated. *Id.* 6:46–50. Rectifier Module 55 polls Master Transaction Database 70, retrieves certain records, and then “attempts to put certain partial, updated or addendum records together and re-insert them in the Master Transaction Database 70 as one record.” *Id.* at

6:51–58. “An indication is then made that records are available for processing by appropriate medical coding algorithms generally hosted by NLP Engine 60.” *Id.* at 6:58–60.

NLP Engine 60 includes Morphological, Parse and Semantic Processing Module 61 connected to first and second vector matching modules 62, 64. *Id.* at 5:50–52. “MPSP module 61 and vector matching modules 62, 64 execute appropriate medical language processing and medical coding algorithms to generate processed records.” *Id.* at 7:6–8. When payer information is available, final transformations are performed on the processed records by Payer Process Module 90. *Id.* at 7:17–18. “Records that have undergone medical coding and require no additional attention are stamped complete and archived.” *Id.* at 7:22–23. For records needing additional attention, a staff member using one of host Coder Review Workstations 85 accesses a list of records needing processing, selects a record, edits the record, and sends it back to Master Transaction Database 70, “where the record is stored until follow-up medical coding processing is taken.” *Id.* at 7:27–34. “After either the medical coding process or the quality assurance staff processes all the records, the Master Import/Export Module 40 fetches them from the Master Transaction Database 70 and downloads them to the client site 30.” *Id.* at 7:40–43.

Heinze discusses more details of medical coding in connection with Figure 2, which is reproduced below. *Id.* at 7:63–65.

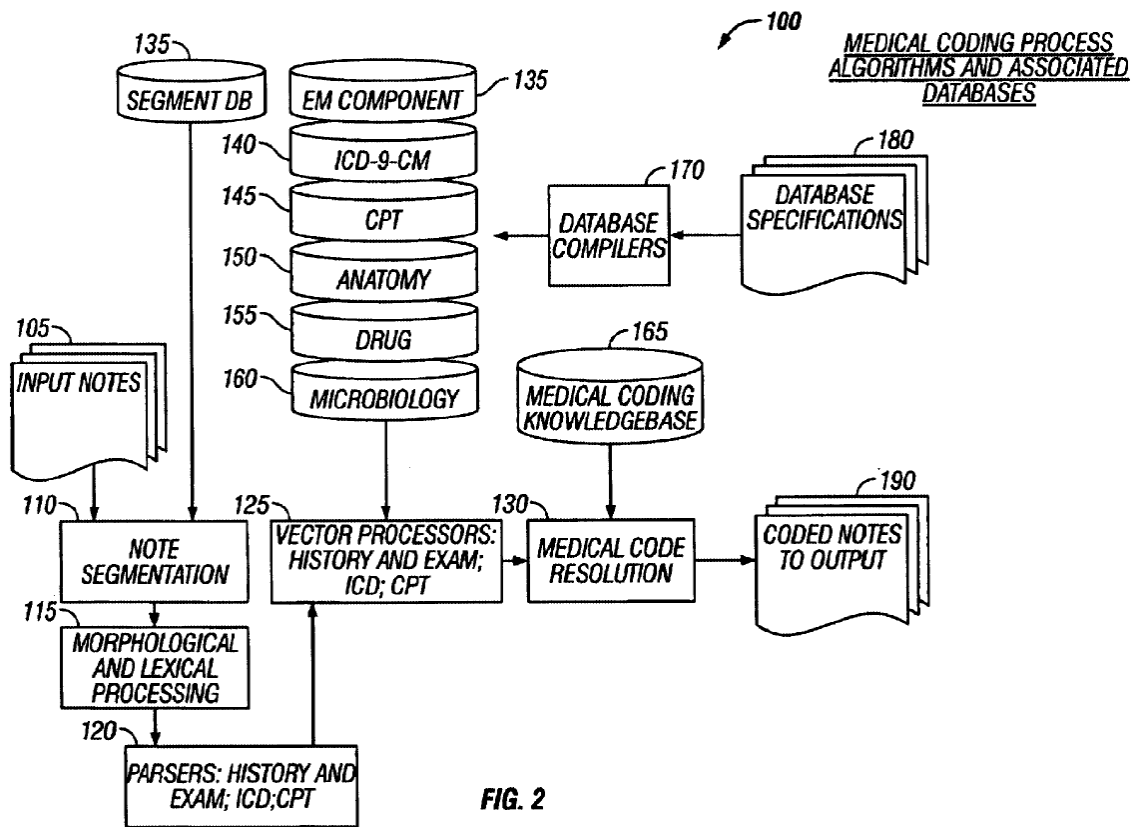


FIG. 2

Figure 2 provides a flow diagram of medical coding process 100, which includes “algorithms for performing note segmentation 110, morphological and lexical processing 115, parser processing 120, vector processing 125, and code resolution processing 130.” *Id.* at 7:63–8:5. Note segmentation generally includes identifying section headings in input notes 105. *Id.* at 8:26–27. Identified headings are categorized and associated with paragraphs falling within each section. *Id.* at 8:27–30. Section headings give context for interpreting associated paragraphs. *Id.* at 8:30–35. Automatic segmentation of input notes 105 includes (1) identifying possible section headings using lexical pattern matching, and (2) resolving and categorizing section heading utilizing “vector matching with marking of section extents.” *Id.* at 8:35–39.

Following note segmentation 110, morphological processing 115 occurs. *Id.* at 9:60–61. This involves normalizing word forms and phraseology using word and phrase level processing. *Id.* at 8:61–63.

Multiple processors parse notes in a distributed manner. *Id.* at 11:36–37. Using the same techniques as in the morphers, grammatical segments of sentences are identified and tagged. *Id.* at 11:37–39. According to Heinze, “[i]n the current implementation, there are three separate processes (120) that are used respectively to tag for use with History and Exam, ICD coding, and CPT coding.” *Id.* at 11:38–41. “[E]ach clause or phrase is stored in an object that contains data items in which the tags are stored.” *Id.* at 12:2–4.

Heinze’s system uses vector processing to associate particular diagnoses, procedures, or EM level codes with parse items. *Id.* at 20:58–59. Heinze states that “[i]n the current implementation, a vector defines a set of words.” *Id.* at 20:59–60. To associate a code number to a parse item, Heinze compares vectors with the words in a parse item, measures the difference, and assigns to the parse item the “code number with the smallest difference and below a maximum threshold.” *Id.* at 20:64–21:2.

Using “concept refinement” in combination with industry coding standards, code resolution algorithm 130 “combines, adds and/or removes specific codes.” *Id.* at 23:11–14. Concept refinement interleaves with vector processing, motivated by the objective to achieve minimal vector difference. *Id.* at 23:14–16. After vector processing assigns an initial code, concept refinement performs grammatical analysis to combine two adjacent parse items to form a new, larger parse item. *Id.* at 23:28–35. Vector processing assesses the vector difference for the new parse item. *Id.* at 23:35–37. If the new parse item has a smaller vector difference than either

of its constituent parse items, the new, larger parse item supplants the two smaller parse items. *Id.* at 23:37–39. Code resolution also involves identifying physician notes requiring further review. *Id.* at 23:19–20.

Coder Review Workstations 85, 99 (Figure 1) provide functions that “include (1) providing provider and payer specific code resolution, (2) displaying coding results for quality assurance reviews, and (3) formatting output for paper or electronic claims submission.” *Id.* at 24:36–42. Figure 6 of Heinze is reproduced below.

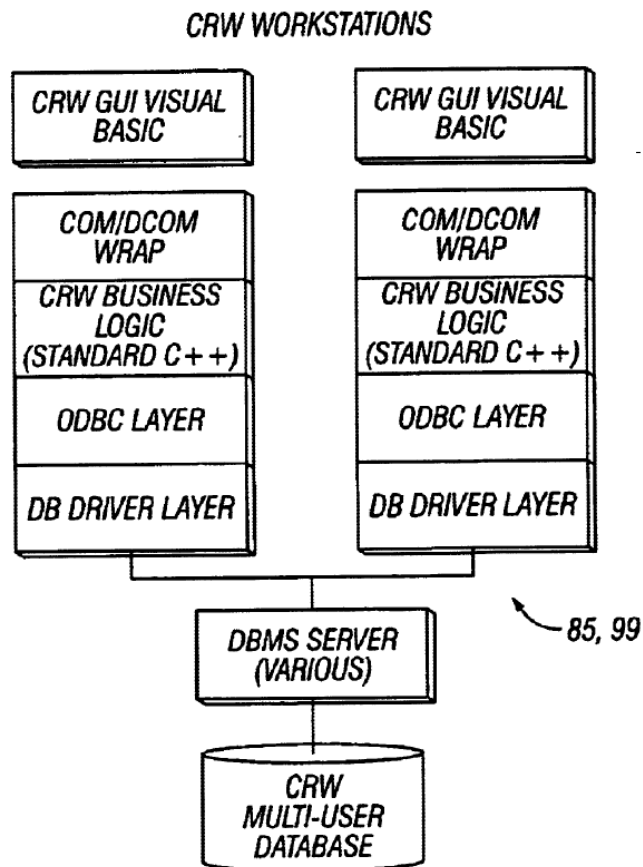


FIG. 6

Figure 6, a functional block diagram of Coder Review Workstation 85, 99, shows “the provider and payer specific components of the resolver, and output processing for the interactive graphical user interface, paper form printing, and electronic output.” *Id.* at 24:66–25:3.

Figure 8 illustrates a Physician Coder solution, a “variant on the Coder Review Workstation implementation.” *Id.* at 25:64–67. Figure 8 is reproduced below.

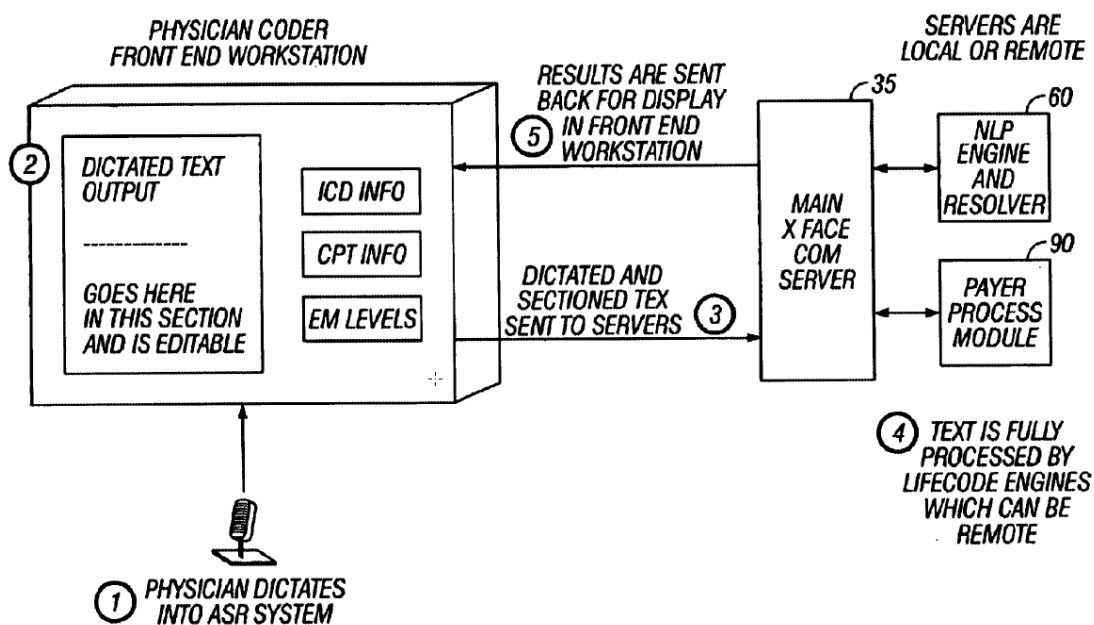


FIG. 8

○ = ORDER OF OPERATION

Figure 8 shows transmission and processing of information in connection with the Physician Coder Workstation. *See id.* at 25:65–26:3. Heinze teaches that

[u]sing keyboard or automated speech recognition, a Physician Coder front end workstation interacts with the physician to produce both the note and the clinical and billing codes in a single interactive session. The workstation uses a set of templet note modules from which the physician may pick and choose. Each templet is complete in itself, however, each has a set of

predefined sections that can be sequentially highlighted and changed in order to document the specifics of the current case that may vary from the template. Also, any portion of the text can be selected and changed using the keyboard, mouse or speech commands. By using a custom (modular) template approach rather than a complete template approach, the workstation efficiency could drastically improve a billing department's caseload.

Id. at 25:67–26:13.

2. Discussion

Petitioner asserts that independent claim 1 would have been obvious over “Heinze alone, or in view of Taira.” Pet. 23, 65–85. Petitioner alleges that the asserted references teach every limitation of claims 1 and 5. *Id.* at 65–85. Petitioner relies on Heinze alone as teaching many of the limitations of claim 1. *Id.* at 65–72, 80–85.

Petitioner argues that Heinze and Taira each teaches certain limitations of claim 1 (*Id.* at 42–49, 73–80), specifically the following limitations of claim 1:

wherein said processing of the input data stream to identify latent information comprises of identifying a relevant portion of the input data stream, bounding the relevant portion of the input data stream, identifying a predetermined class of information, and normalizing the relevant portion of the input data stream.

Ex. 1001, 16:17–23. Petitioner refers to these limitations as “the ‘processing the input data’” limitations. *See id.* at 26.

To the extent Heinze does not disclose these limitations, Petitioner argues, it would have been obvious to modify Heinze to use Taira's NLP. *Id.* at 79–80. Petitioner argues that Taira processes the same type of reports as Heinze, in order to find important information in those reports. *Id.* at 79.

Petitioner asserts that both Heinze and Taira teach using NLP of medical information. *Id.* Petitioner argues that

[i]t would have been obvious to a [person of ordinary skill in the art] to modify the method of Heinze by substituting the known NLP techniques described in Taira, including the steps of identifying, bounding, classifying and normalizing, for the processing described in Heinze, to arrive at the same identification of latent information.

Id. Petitioner further argues that a person of ordinary skill in the art “would have been motivated to substitute the NLP engine of Taira for the NLP engine of Heinze because they perform the same function, and given the favorable performance touted by Taira with respect to accuracy, precision and time.” *Id.* at 79–80. Petitioner asserts that the references address the same issue of automating medical reporting using conventional NLP approaches. *Id.* at 80. Petitioner also argues that combining the references’ teachings involves only substituting one known NLP method for another. *Id.* Therefore, Petitioner argues, a person of ordinary skill in the art would have expected success in combining the references’ teachings. *Id.*

The parties’ arguments raise disputes regarding various aspects of Petitioner’s challenge of claims 1 and 5 as allegedly obvious over Heinze alone or in combination with Taira. For this ground, the dispositive issue is the parties’ dispute regarding claim 1’s recitation of “activating a relevant report template based on the said identified latent information.”

Petitioner indicates that Heinze discloses this limitation, citing Dr. Beigi’s testimony and Heinze’s disclosures at column 5, lines 10–23, column 26, lines 3–14 (under the heading “Physician Coder”), and column 33, lines 31–35 (claim 32). Pet. 80–82. These portions of Heinze disclose:

The NLP engine includes a set of knowledge vectors that broadly define the language of the entire set of diagnoses that can be coded. These vectors—termed “semi-knowledge vectors”—are not sufficiently detailed to permit accurate coding of specific diagnoses in all instances. Each semi-knowledge vector yields a range of possible diagnosis codes when matched to information in the normalized file. When a match to a semi-knowledge vector occurs, the NLP engine checks whether an acceptable standard vector is also matched. When a standard vector is not matched, the physician note is flagged. The NLP engine may interactively prompt a human coder for additional information in an effort to gather information necessary to complete coding of the note.

Ex. 1004, 5:10–23.

The workstation uses a set of template note modules from which the physician may pick and choose. Each template is complete in itself, however, each has a set of predefined sections that can be sequentially highlighted and changed in order to document the specifics of the current case that may vary from the template. Also, any portion of the text can be selected and changed using the keyboard, mouse or speech commands. By using a custom (modular) template approach rather than a complete template approach, the workstation efficiency could drastically improve a billing department’s caseload.

Id. at 26:3–14.

A template selector for allowing a human coder to select among a plurality of template note modules, each module corresponding to a predefined set of NLP rules for generating said codes.

Id. at 33:31–35.

Based on these passages, Dr. Beigi testifies that “Heinze discloses activating a template based on the information identified from the Physician note and input via the NLP that was in latent form.” Ex. 1003 ¶ 161. Dr. Beigi also testifies that Heinze discloses identifying embedded latent information and evaluating its sufficiency using a matching vector and

related NLP rules. *Id.* ¶ 162. Additionally, Dr. Beigi testifies that “[g]iven the matching vector and associated rules from the NLP, a corresponding template is selected by the coder.” *Id.* Dr. Beigi concludes that “[t]hus, the selection of the template in Heinze is based upon the latent information identified by the NLP engine.” *Id.* ¶ 163.

Patent Owner argues that the cited portions of Heinze do not teach “activating a relevant report template based on the said identified latent information.” PO Resp. 58–64. Citing Dr. Yegnanarayanan’s testimony, Patent Owner asserts that claim 32’s recitation of “[a] template selector for allowing a human coder to select among a plurality of template node modules” refers to an interface described in greater detail under the heading “Physician Coder” at column 26, lines 3–13. *Id.* at 58.

Dr. Yegnanarayanan testifies that this portion of Heinze teaches that a physician selects and arranges template note modules in order to enter a physician note to the NLP engine. Ex. 2005 ¶¶ 224–229. According to Dr. Yegnanarayanan, a person of ordinary skill in the art would have understood from this that the template note modules are activated when the physician selects them, before any NLP could be performed on the physician’s note. *Id.* ¶ 229. Thus, “[w]hen the template note modules are selected to create the input note, no NLP has yet been performed on the note (which is still being created), and in no way is the selection of a template note module ‘based on’ any information identified by the NLP,” testifies Dr. Yegnanarayanan. *Id.* Dr. Yegnanarayanan further testifies that Heinze discloses its NLP engine processes a completed input note. *Id.* ¶ 230.

Regarding Heinze’s claim 32 (column 33, lines 31–35), Dr. Yegnanarayanan notes that a person of ordinary skill in the art would have

understood from claim 32's plain language that a human coder selects the template note modules. *Id.* ¶ 231. Consequently, a person of ordinary skill in the art would have understood claim 32's "template note modules" and "template selector" as corresponding to the template note modules and interface discussed in the "Physician Coder" section, Dr. Yegnanarayanan testifies. *Id.* ¶ 232. Thus, according to Dr. Yegnanarayanan, a person of ordinary skill in the art would have understood that claim 32's template selector is used by a human coder to select template note modules the physician plans to use to generate a physician note for input to the NLP engine for coding. *Id.* ¶ 233. Dr. Yegnanarayanan explains that claim 32's recitation that "each [template note] module corresponds to a predefined set of NLP rules for generating said codes" would be understood by a person of ordinary skill in the art as meaning that a physician's selection of a template note module triggers subsequent application of a particular set of NLP rules. *Id.* ¶¶ 234–237.

Regarding Heinze's disclosure in column 5, Dr. Yegnanarayanan testifies that activating a relevant report template based on identified latent information is not disclosed in column 5, lines 10–23 of Heinze. *Id.* ¶¶ 242–258. Dr. Yegnanarayanan explains that activating a relevant report template is not disclosed in connection with vector matching (*id.* ¶¶ 242–245) or in connection with interactively prompting a human coder for additional information (*id.* ¶¶ 246–258). Petitioner's Reply does not respond to Patent Owner's arguments and evidence that Heinze does not teach "activating a relevant report template based on the said identified latent information." See *generally* Pet. Reply.

Weighing the parties' arguments and evidence, Petitioner has not demonstrated by a preponderance of the evidence that Heinze teaches this claim limitation. In Heinze, "template" appears two places, first at column 26, lines 3–13 when describing the "Physician Coder," and second in claim 32 (Ex. 1004, 33:25–35). Petitioner does not respond to Patent Owner's argument, supported by Dr. Yegnanarayanan's testimony, that claim 32's "template selector" is described in more detail at column 26, lines 3–13. *See generally* Pet. Reply; PO Resp. 58 (citing Ex. 2005 ¶¶ 224–233, 261–262). Nor does Petitioner dispute Dr. Yegnanarayanan's testimony that a person of ordinary skill in the art would understand the discussion at column 26, lines 3–13 and claim 32 as referring to selection of one or more template note modules to compose a note, before any NLP is performed. *See generally* Pet. Reply; Ex. 2005 ¶¶ 224–233. This undisputed testimony supports Patent Owner's argument that a person of ordinary skill in the art would read Heinze's references to template node module selection, including claim 32, as referring to selection of template note modules in a manner based in no way on latent information identified by NLP. PO Resp. 59. This weighs in favor of Patent Owner's argument that Heinze does not teach "activating a relevant report template based on the said identified latent information," as recited in claim 1.

Petitioner does not marshal more persuasive evidence for the contrary position that Heinze discloses activating its template note modules based on latent information identified by NLP. Although Petitioner and Dr. Beigi cite Heinze's disclosure at column 26, lines 3–14, they do not discuss it in any detail. *See* Pet. 80–82; Ex. 1003 ¶¶ 161–163. As noted above, Dr. Yegnanarayanan's undisputed testimony supports Patent Owner's position

that column 26, lines 3–14 tends to support Patent Owner’s position and contradict Petitioner’s. Ex. 2005 ¶¶ 223–241.

Additionally, without more persuasive explanation or supporting evidence, Heinze’s disclosures in column 5 and claim 32 provide little support for Petitioner’s reading of Heinze. Column 5 does not discuss templates or template note modules. See Ex. 1004, 5:10–23. Rather, column 5 refers to prompting a coder for “additional information.” *Id.* at 5:21–23. Claim 32 refers to template note modules, but does not recite plainly that template note modules are selected based on NLP or latent information identified by NLP. Instead, claim 32 refers to template note modules “corresponding to” NLP rules. We find the plain meaning of these disclosures too vague to convey activation of template note modules (or any other templates) based on latent information identified with Heinze’s NLP.

Petitioner’s arguments and evidence do not provide a persuasive reason that, notwithstanding the plain meaning, a person of ordinary skill in the art would have understood column 5 and claim 32 as specifically disclosing “activating a relevant report template based on the said identified latent information.” Indeed, neither Petitioner nor Dr. Beigi offers any reasoned explanation for concluding that “the selection of the template in Heinze is based upon the latent information identified by the NLP engine” (Pet. 81; Ex. 1003 ¶ 163), even though no portion of Heinze expressly says so, and column 26, lines 3–13 suggests otherwise. Pet. 81; Ex. 1003 ¶ 163. In contrast, Dr. Yegnanarayanan explains in detail why a person of ordinary skill in the art would not read Heinze in this manner. Ex. 2005 ¶¶ 234–258.

For the foregoing reasons, Petitioner fails to support adequately its assertion that claims 1 and 5 would have been obvious over Heinze alone or in combination with Taira.

IV. CONCLUSION

In summary,

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–6	§ 103(a)	Taira, Buchanan		1–6
1, 5	§ 103(a)	Heinze, Taira		1, 5
Overall Outcome				1–6

V. ORDERS

In consideration of the foregoing, it is hereby

ORDERED that Petitioner has not shown by a preponderance of the evidence that claims 1–6 of the '946 patent are unpatentable;

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2018-01355
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