UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/996,175	06/20/2013	Cornelis Conradus Adrianus Maria Van Zon	2010P01179WOUS	1695

24737 7590 01/03/2019

PHILIPS INTELLECTUAL PROPERTY & STANDARDS
465 Columbus Avenue
Suite 340
Valhalla, NY 10595

EXAMINER
HOLCOMB, MARK

ART UNIT	PAPER NUMBER
3626	

NOTIFICATION DATE	DELIVERY MODE
01/03/2019	ELECTRONIC

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):

patti.demichele@Philips.com
marianne.fox@philips.com
katelyn.mulroy@philips.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte CORNELIS CONRADUS ADRIANUS MARIA VAN ZON,
CHARLES LAGOR, WILLIAM LORD,
and
STEPHEN HERMANN RUDOLF THEISS[1]

Appeal 2017-010610
Application 13/996,175
Technology Center 3600

Before CARLA M. KRIVAK, HUNG H. BUI, and JON M. JURGOVAN, *Administrative Patent Judges*.

KRIVAK, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's Final Rejection of claims 1, 3–13, 16, and 21–30, which are all the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

---

[1] Appellants identify the real party in interest as KONINKLIJKE PHILIPS ELECTRONICS N.V. (*see* App. Br. 1).

STATEMENT OF THE CASE

Appellants' invention is directed to a method and apparatus for learning and optimizing clinical care protocols and guidelines by "determining one or more most common sequences of care steps" in medical workflow data, and integrating the determined sequences into an established clinical protocol (Spec. 2:17–21; Title).

Claims 1, 11, and 25 are independent. Independent claim 1, reproduced below, is exemplary of the subject matter on appeal.

> 1. A method for use in conjunction with an information technology (IT) infrastructure of a medical institution, said method comprising:
>
> receiving workflow data for a plurality of patients, wherein the workflow data includes a plurality of care steps and relations there between for each of the patients;
>
> identifying one or more sequences of same care steps from the workflow data, wherein the identification includes determining one or more most common sequences of same care steps from the workflow data, wherein the identified sequences of the same care steps include the most common sequences of the same care steps;
>
> selecting one of the identified sequences of the same care steps;
>
> integrating the selected sequences of the same care steps into an established clinical protocol; and
>
> displaying the integrated, selected sequence of the same care steps on a display device;
>
> wherein the determination of the most common sequences of the same care steps includes:
>
> grouping sequences of the same care steps of the workflow data based on clinically valid reasons explaining variances in the sequences of the same care steps, wherein the most common sequences of the same care steps include a most common sequence of the same care steps for each group.

REJECTIONS[2] and REFERENCES

The Examiner rejected claims 9 and 10 under 35 U.S.C. § 112, fourth paragraph, as being of improper dependent form.

The Examiner rejected claims 1, 3–13, 16, and 21–30 under 35 U.S.C. § 101 as directed to non-statutory subject matter.

The Examiner rejected claims 1, 6, 9–11, 16, 22, 26, and 27 under 35 U.S.C. § 103(a) based upon the teachings of Bocionek (US 2002/0099273 A1; published July 25, 2002), Arning (US 2005/0209841 A1; published Sept. 22, 2005), and Inokuchi (US 2010/0105989 A1; published Apr. 29, 2010).

The Examiner rejected claims 3, 8, and 12 under 35 U.S.C. § 103(a) based upon the teachings of Bocionek, Arning, Inokuchi, and Grigsby (US 2005/0215867 A1; published Sept. 29, 2005).

The Examiner rejected claim 4 under 35 U.S.C. § 103(a) based upon the teachings of Bocionek, Arning, Inokuchi, Grigsby, and Tice (US 2003/0182163 A1; published Sept. 25, 2003).

The Examiner rejected claim 5 under 35 U.S.C. § 103(a) based upon the teachings of Bocionek, Arning, Inokuchi, Grigsby, Tice, and Shen (US 2003/0212580 A1; published Nov. 13, 2003).

The Examiner rejected claim 7 under 35 U.S.C. § 103(a) based upon the teachings of Bocionek, Arning, Inokuchi, and Sadiq (US 2004/0133457 A1; published July 8, 2004).

---

[2] Claims 1, 3–13, 16, and 21–30 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite (Final Act. 3–4). However, this rejection was withdrawn in the Examiner's Advisory Action (mailed December 20, 2016), and is no longer pending on appeal (Advisory Act. 2; Ans. 28 (confirming rejection was withdrawn)).

The Examiner rejected claims 13 and 23 under 35 U.S.C. § 103(a) based upon the teachings of Bocionek, Arning, Inokuchi, and Tice.

The Examiner rejected claim 21 under 35 U.S.C. § 103(a) based upon the teachings of Bocionek, Arning, Inokuchi, and Shen.

The Examiner rejected claims 24 and 25 under 35 U.S.C. § 103(a) based upon the teachings of Bocionek, Arning, Inokuchi, Tice, and Shen.

The Examiner rejected claims 28–30 under 35 U.S.C. § 103(a) based upon the teachings of Bocionek, Arning, Inokuchi, Grigsby, and Sadiq.

ANALYSIS

Rejection of claims 9 and 10 under 35 U.S.C. § 112, fourth paragraph

The Examiner rejected claims 9 and 10 under 35 U.S.C. § 112, fourth paragraph, as improper dependent claims drawn to an apparatus capable of performing the method of claim 1, the dependent claims being "conceivably . . . infringed by mere possession of the apparatus without performing any particular method steps at all" (Final Act. 4–5). We do not agree.

We agree with Appellants' arguments that claims 9 and 10 are proper as they further limit claim 1 (App. Br. 30–31). As Appellants explain, claim 1 addresses a method of processing workflow data, claim 9 further limits claim 1 to one or more processors *programmed to perform this method*, and claim 10 further limits claim 1 to a computer readable medium carrying *software which controls* processor(s) *to perform the method* (App. Br. 30–31; Reply Br. 19). The processor of claim 9 is, therefore, dependent on the method of claim 1. Similarly, the software of claim 10 is dependent on the method of claim 1. Additionally, the recitations of dependent claims 9 and 10 *specify further limitations* (*processor programmed to perform the*

method, and *software controlling a processor to perform the method*) of the subject matter claimed in base claim 1. *See* 35 U.S.C. § 112, fourth paragraph ("a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed"). Thus, the processors of claims 9 and 10 have patentable weight (contrary to Examiner's assertion, *see* Ans. 55–56).

We, therefore, do not sustain the Examiner's rejection of claims 9 and 10 under 35 U.S.C. § 112, fourth paragraph.

Rejection of claims 1, 3–13, 16, and 21–30 under 35 U.S.C. § 101

Appellants contend the Examiner erred in determining the subject matter of claims 1, 3–13, 16, and 21–30 is patent-ineligible under 35 U.S.C. § 101 for the reasons that: the claims are not abstract as they "solve problems in a specific technical area using specific technical components" and "describe how to better integrate a sequence of care steps into an established clinical protocol specifically using an IT infrastructure" (Reply Br. 16; App. Br. 22–23); the claims are not analogous to "claims in *Electric Power Group* [that] gathered data, but did not solve a problem in a specific technical area" (Reply Br. 16); and the claims describe *technological improvements* similar to *McRO* and *Amdocs* (Reply Br. 13–15; App. Br. 22–24 (citing *Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288 (Fed. Cir. 2016); *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299 (Fed. Cir. 2016))). We do not agree.

Alice Corp. Pty. Ltd. v. CLS Bank International, 134 S. Ct. 2347 (2014) identifies a two-step framework for determining whether claimed subject matter is judicially-excepted from patent eligibility under § 101.

According to *Alice* step one, "[w]e must first determine whether the claims at issue are directed to a patent-ineligible concept," such as an abstract idea. *Alice*, 134 S. Ct. at 2355. If the claims are directed to a patent-ineligible concept, the second step in the analysis considers the elements of the claims "individually and 'as an ordered combination'" to determine whether there are additional elements that "'transform the nature of the claim' into a patent-eligible application." *Id.* (citing *Mayo*, 566 U.S. at 79). In other words, the second step "search[es] 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.* (citing *Mayo*, 566 U.S. at 72–73).

Initially we note Appellants argue claims 1, 3–13, 16, and 21–27 together (App. Br. 22, 24–26, 29; Reply Br. 14). We select claim 1 as representative at points in our discussions herein. Independent claims 11 and 25, and dependent claims 3–10, 12, 13, 16, 21–24, 26, and 27 stand or fall with claim 1 (*see* 37 C.F.R. § 41.37(c)(1)(iv)).

The Examiner determines claim 1 is directed to an abstract idea of "collect[ing] information (workflow data), analyz[ing] it (determines most common sequence and groups based on valid reasons explaining variances), and display[ing] certain results (outputs integration of determined care steps into protocol)" (Ans. 41; Final Act. 7). The Examiner determines the claim's abstract idea is similar to data gathering and manipulation techniques previously identified by the courts (Ans. 41 (citing *Electric Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350 (Fed. Cir. 2016)); Final Act. 7 (citing *SmartGene, Inc. v. Advanced Biological Labs., SA*, 852 F.Supp.2d 42 (D.D.C. 2012), *aff'd* 555 F. App'x 950 (Fed. Cir. 2014))). The Examiner

also determines claim 1 is directed to mitigating risk in healthcare settings, which is a fundamental business practice analogous to abstract ideas in *Alice*, *Bilski*, and *PerkinElmer* (Ans. 41 (citing *Alice*, 134 S. Ct. at 2347; *Bilski v. Kappos*, 561 U.S. 593 (2010); *PerkinElmer Inc. v. Intema Ltd.*, 496 Fed.Appx. 65 (Fed. Cir. 2012))).

We agree with the Examiner claim 1 is abstract because it is directed to collecting and analyzing workflow data, identifying sequences in the data, and displaying identified data—an abstract idea similar to data collection and manipulation techniques previously identified by the courts in *Electric Power Group*, *Content Extraction*, and the *Intellectual Ventures* cases (Ans. 41, 45; *see Electric Power Grp.*, 830 F.3d at 1353–54 (holding that the claims were directed to an abstract idea because "[t]he advance they purport to make is a process of gathering and analyzing information of a specified content, then displaying the results, and not any particular assertedly inventive technology for performing those functions."); *Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat'l Ass'n*, 776 F.3d 1343, 1347–48 (Fed. Cir. 2014) (finding "[t]he concept of data collection, recognition, and storage is undisputedly well-known," and "humans have always performed these functions"); *Intellectual Ventures I LLC v. Capital One Bank (USA)*, 792 F.3d 1363, 1367, 1370 (Fed. Cir. 2015) (administration of financial accounts using advanced internet interface providing user display access to customized webpages is an abstract idea); and *Intellectual Ventures I LLC v. Erie Indemnity Co.*, 850 F.3d 1315, 1328 (Fed. Cir. 2017) (claims directed to creating an index of descriptive tags and metadata and using the index to search for and retrieve data is an abstract idea)).

We are unpersuaded by Appellants' arguments claim 1 is not abstract because the claim is "specifically tied" to an IT infrastructure of a medical institution and improves the IT infrastructure's ability to learn and optimize clinical protocols for different subpopulations of patients (Reply Br. 13, 16; App. Br. 22–23, 26). The method of claim 1 does not recite nor require improving or optimizing an IT infrastructure because the method is merely "for use in conjunction with" an IT infrastructure (Ans. 45–46). The claim also does not recite a specific improvement in the technical functioning of an IT infrastructure. Claim 1 merely requires collecting workflow data and grouping workflow sequences to identify a sequence ("identifying one or more sequences") that is most commonly used. The claimed workflow collection and identification of a most common sequence are *performable by a human being* (*see* Spec. 10:3 and 22–24, 12:18–23).[3] Thus, claim 1 merely recites workflow processing steps capable of being performed by pen and paper, in conjunction with insignificant data input and output operations. *See Electric Power Grp.*, 830 F.3d at 1353–54 (collecting information and "analyzing information by steps people go through in their minds, or by mathematical algorithms, without more, [are] . . . essentially mental processes within the abstract-idea category"); and *Dealertrack, Inc. v. Huber*, 674 F.3d 1315, 1333–34 (Fed. Cir. 2012) ("Simply adding a

[3] The Specification provides "in certain embodiments, the workflow data is collected manually from clinicians, for example, in a written form," and "a physician provides the data analysis engine 176 with user input to facilitate the identification of the most common sequences of care steps" (*see* Spec. 10:3 and 22–24 (emphasis omitted)). Additionally, optimal sequences of care steps may be "manually selected by, for example, clinical specialists of the medical institution" (*see* Spec. 12:18–23).

'computer aided' limitation to a claim covering an abstract concept, without more, is insufficient to render [a] claim patent eligible.") (internal citation omitted). Appellants' arguments with respect to claim 25 are similarly non-commensurate with the claim, which does not require "determining which information to move between what medical database" (*see* Reply Br. 18).

We additionally note, Appellants' reliance on *Amdocs* to determine whether the claims are directed to an abstract idea under *Alice* step 1 is misplaced (*see* App. Br. 21–22). In *Amdocs*, the precise nature of the claims was unknown and not straightforward. Thus, in *Amdocs*, the Federal Circuit opted to bypass *Alice* step 1 in favor of *Alice* step 2. Nevertheless, Appellants' claims and Specification do not describe *technological improvements* similar to *Amdocs* or *McRO* (Ans. 45–48). Particularly, the court determined that *McRO*'s claim was not directed to an abstract idea because it "uses the limited rules in a process specifically designed to achieve an improved technological result" over "existing, manual 3-D animation techniques." *See McRO*, 837 F.3d at 1299, 1316. *McRO*'s improved technological result is "allowing computers to produce 'accurate and realistic lip synchronization and facial expressions in animated characters' that previously could only be produced by human animators." *See McRO*, 837 F.3d at 1313 (internal citation omitted). In contrast, Appellants' claim 1 performs generic data collection and manipulation (grouping sequences and identifying a most common sequence, performable by a human being) (*see* Spec. 10:3 and 22–24, 12:18–23). *See Bancorp Services, L.L.C. v. Sun Life Assurance Co. of Canada (U.S.)*, 687 F.3d 1266, 1278 (Fed. Cir. 2012) ("the fact that the required calculations could be performed more efficiently via a computer does not materially alter the

patent eligibility of the claimed subject matter.").

The claims in *Amdocs* concerned network components "arrayed in a distributed architecture" that "collect[ed] and process[ed] data close to its source," and thereby "enable[d] load distribution" and reduced network congestion. *See Amdocs*, 841 F.3d at 1291–92, 1300, 1303, 1306. As such, *Amdocs'* claims "entail[] an unconventional . . . solution (enhancing data in a distributed fashion) to a technological problem (massive record flows which previously required massive databases)" and "improve the performance of the system itself" (*id.* at 1300; *see also* Ans. 45). In contrast to *Amdocs*, claim 1 discusses a method for use in conjunction with an IT infrastructure to integrate a sequence of steps into an established clinical protocol, which does not achieve an improvement *in computer functionality* (Ans. 45–47). Appellants do not describe an advance in hardware or software that, for example, causes a computer itself or a database itself to operate faster or more efficiently. Appellants do not address the operation of a computer itself or a database itself. Appellants also have not demonstrated their claims provide a "solution . . . necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer networks," as explained by the Federal Circuit in *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1257 (Fed. Cir. 2014); or "a specific improvement to the way computers operate," as explained in *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1336 (Fed. Cir. 2016).

We are also not persuaded by Appellants' argument the claims are not abstract because they "solve problems in a specific technical area using specific technical components" (Reply Br. 16). Appellants' claims focus on the *problem* of improving medical protocols and clinical decision making—a

problem that is not a technical problem or one rooted in computer technology or particular only to the Internet (*see* Spec. 1:2–6, 2:9–11; Ans. 52; *DDR Holdings*, 773 F.3d at 1257).

Accordingly, we agree with the Examiner claims 1, 11, and 25 are directed to an abstract idea.

We now turn to the second step of the *Alice* framework. Particularly, Appellants allege the claims recite significantly more than an abstract idea because: (i) the claims describe a technology-based solution similar to *BASCOM Global Internet Services, Inc. v. AT&T Mobility LLC,* 827 F.3d 1341 (Fed. Cir. 2016) (App. Br. 27; Reply Br. 16, 19), and (ii) similar to *DDR*, the claims provide a technological solution rooted in computer networking technology to "make it possible for an IT infrastructure to learn . . . clinical procedures and protocols" (Reply Br. 18; App. Br. 28–29).

Appellants' arguments are not persuasive. Appellants' claims and Specification do not identify a specific improvement to computer technology or computer operation effected by the claims (Ans. 50–51). For example, Appellants' Specification does not describe how the claimed grouping of sequences and identification of most common sequences would improve computer technology or the computer's operation (Ans. 50–51, 53–54). In contrast, *BASCOM's* patent-eligible ordered combination of claim limitations contain an "inventive concept [that] harnesses [a] . . . technical feature of network technology in a filtering system by associating individual accounts with their own filtering scheme and elements while locating the filtering system on an ISP [(Internet Service Provider)] server" (*see BASCOM*, 827 F.3d at 1350). *BASCOM's* claimed ordered combination "improve[s] the performance of the computer system itself" with a

"technology-based solution . . . to filter content on the Internet that overcomes existing problems with other Internet filtering systems" (*see BASCOM*, 827 F.3d at 1351–52 (internal citation omitted)).

As discussed *supra*, we are also not persuaded Appellants' claims provide a technological solution rooted in computer networking technology. Appellants have not provided evidence that the claims achieve an improvement in communication networks. Further, Appellants' Specification and claims describe generic computing elements (processors, data collecting engine, data analysis engine, and display device) performing generic computing functions (Ans. 42, 45, 51; *see* Spec. 4:23–5:10, 14:16–15:2, 16:3–20). "[T]he use of generic computer elements like a microprocessor or user interface" to perform conventional computer functions "do not alone transform an otherwise abstract idea into patent-eligible subject matter" (*FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1096 (Fed. Cir. 2016) (citing *DDR Holdings*, 773 F.3d at 1256)). We are also unpersuaded by Appellants' argument their claims are patent eligible because the claims are similar to certain examples in the Interim Guidance (App. Br. 25–26, 28–29; Reply Br. 15, 18). We note the examples set forth in the Interim Guidance are just that, examples, and Appellants' claims are directed to collecting and manipulating data—an abstract idea.

With respect to Appellants' preemption argument (App. Br. 30; Reply Br. 19), we note the *McRO* court explicitly "recognized that 'the absence of complete preemption does not demonstrate patent eligibility'" (*see McRO*, 837 F.3d at 1315 (quoting *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015))). "Where a patent's claims are deemed only to disclose patent ineligible subject matter" under the *Alice/Mayo*

framework, "preemption concerns are fully addressed and made moot" (*Ariosa*, 788 F.3d at 1379).

Because we agree with the Examiner's analysis and find Appellants' arguments insufficient to show error, we sustain the Examiner's § 101 rejection of independent claims 1, 11, and 25, and dependent claims 3–10, 12, 13, 16, 21–24, 26, and 27, for which no separate arguments are provided.

Appellants submit separate arguments with respect to dependent claims 28, 29, and 30, arguing (i) claim 28 is "rooted in computer technology" because it employs a graph traversal algorithm that "advantageously allows for further addition of rules to limit the search space" (App. Br. 23), (ii) claim 29 "improves technical functioning of the system because limiting the amount of time reduces the burden on processors and memory of the system" (App. Br. 23), and (iii) claim 30 "improves technical functioning of the system because limiting the search space reduces the burden on processors and memory of the system" (App. Br. 23; Reply Br. 13–14, 17).

Appellants' arguments are not persuasive because claims 28, 29, and 30 do not recite any detail for how a processor or memory traverses a graph or is improved (Ans. 46). These claims do not require a processor performing graph traversal, as opposed to pen and paper, for example. *See Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d 1332, 1342 (Fed. Cir. 2017) (explaining that "[o]ur law demands more" than claim language that "provides only a result-oriented solution, with insufficient detail for how a computer accomplishes it"); *SiRF Tech., Inc. v. Int'l Trade Comm'n*, 601 F.3d 1319, 1333 (Fed. Cir. 2010) ("In order for the addition of a machine to impose a meaningful limit on the scope of a claim, it must play

a significant part in permitting the claimed method to be performed, rather than function solely as an obvious mechanism for permitting a solution to be achieved more quickly, i.e., through the utilization of a computer for performing calculations.").

Appellants' additional argument that claims 28–30 present a novel way of improving medical system technology (*see* App. Br. 27) improperly conflates the test for § 101 with the separate tests for §§ 102 and 103. *See, e.g., Genetic Techs. Ltd. v. Merial L.L.C.*, 818 F.3d 1369, 1376 (Fed. Cir. 2016) ("under the *Mayo/Alice* framework, a claim directed to a newly discovered law of nature (or natural phenomenon or abstract idea) cannot rely on the novelty of that discovery for the inventive concept necessary for patent eligibility"). As Appellants' arguments have not persuaded us of error in the Examiner's rejection, we sustain the Examiner's § 101 rejection of claims 28–30.

Rejections of claims 1, 3, 4, 9–13, 16, 21, and 23 under 35 U.S.C. § 103(a)

With respect to claim 1, Appellants contend Arning merely compares the cost of two sequences of steps, which does not teach or suggest a clinically valid reason and "grouping sequences of same care steps based on clinically valid reasons explaining variances in the sequences of the same care steps" (App. Br. 11; Reply Br. 2). Appellants also argue Bocionek and Arning do not teach or suggest determining a most common sequence of same care steps for each group, as recited in claim 1 (App. Br. 10). Appellants further argue Inokuchi "simply extract[s] a medical treatment behavior pattern as a rule . . . [which] in no way suggests using clinically

valid reasons to explain variances in care steps (as in claim 1)" (Reply Br. 3 (citing Inokuchi Fig. 6)). We do not agree.

We agree with and adopt the Examiner's findings as our own. Particularly, we agree with the Examiner that Arning groups sequences of steps based on *cost*, which suggests grouping step sequences based on *reasons explaining variances in the sequences of same care steps* as recited in claim 1 (Ans. 29). Particularly, Arning's *execution sequence 1* (sequence 114 of steps A→B→C→D) and *execution sequence 2* (sequence 116 of steps A→C→B→D) are *groups* determined *based on a reason (cost)* explaining variances in the sequences (Final Act. 14 (citing Arning ¶ 52, Fig. 1); Ans. 29). That is, a lower cost of failure is a reason for executing step C (step most likely to fail) before step B (most expensive step) as in sequence 116, rather than step B before step C (*see* Arning ¶¶ 52–53).

Appellants argue Arning's *cost* is not a *clinically valid reason* as in Appellants' "application [that] relates to clinical decision making in hospital settings" (App. Br. 11). Appellants' Specification, however, does not provide an explicit and exclusive definition of the claimed term "clinically valid reason," rather, the Specification merely provides discussion of non-limiting examples of the term.[4] Thus, Arning's *cost* of failure is commensurate with the broad description of "clinically valid reason" in Appellants' Specification, especially since "[c]osts are well known to be a primary consideration in providing healthcare to patients" (Ans. 29 (citing

[4] Appellants' Specification broadly describes "grouping is performed for *clinically valid reasons* explaining variances in the sequences of care steps, *such as particular attributes of the patients associated with the sequences of care steps, time of day, and the like*" (*see* Spec. 11:11–13 (emphases added)).

Spec. 1:9–10, 19–21, and 24–27)). We agree with the Examiner Arning's cost-based sequencing would have logically commended itself to the problem of reducing cost of care in hospital settings (Ans. 29; Final Act. 15). Arning also teaches the claimed *determining a most common sequence* of same steps for each group—for example, Arning's sequence 116 (A→C→B→D) is the most common sequence in the group of execution sequence 2 (*see* Arning ¶ 52, Fig. 1; Final Act. 14).

Appellants' arguments regarding Inokuchi are presented for the first time in the Reply Brief (*see* Reply Br. 3). The Reply Brief is not an opportunity to present new arguments that could have been made in the principal brief on appeal to rebut the Examiner's rejection. *See Ex parte Borden*, 93 USPQ2d 1473, 1474 (BPAI 2010) (informative); *see also* 37 C.F.R § 41.41(b)(2) (2012). Moreover, we agree with the Examiner the rows in Inokuchi's Figure 6 group sequences of same care steps (steps of a medical examination followed by particular treatment steps) *based on clinically valid reasons* (treatment outcomes revealing efficacy of particular treatment sequences) explaining variances in the sequences of the same care steps as recited in claim 1 (Final Act. 14–15 (citing Inokuchi Fig. 6)). Inokuchi also teaches the claimed *determining a most common sequence* of same care steps for each group—for example, "[e]ach row of [Inokuchi's] Fig[ure] 6[] discloses a grouping of sequences of care steps (examination followed by treatment) with a most common sequence of care steps for that group" (Final Act. 14).

In light of the broad terms recited in claim 1 and the arguments presented, Appellants have failed to clearly distinguish the claimed invention over the prior art relied on by the Examiner. Thus, we sustain the

Examiner's obviousness rejection of independent claim 1, and independent claim 11 argued for substantially the same reasons (App. Br. 12). We also sustain the Examiner's obviousness rejections of dependent claims 3, 4, 9, 10, 12, 13, 16, 21, and 23, for which no separate arguments are presented.

Rejections of claims 5 and 24 under 35 U.S.C. § 103(a)

Appellants contend Shen does not disclose "anything . . . [that] would correspond to the claimed workflow efficiency. . . [or] to the claimed scheduling" (App. Br. 14). Appellants further argue Shen and the other cited references do not teach or suggest ranking sequences of same care steps against one another based on the claimed factors (App. Br. 14–15; Reply Br. 6–7).

The Examiner, however, finds Shen teaches it was known in the art to evaluate performance of medical workflow sequences based on competing interests including workflow efficiency and scheduling, as recited in claim 5 (Ans. 32–33 (citing Shen ¶¶ 71–75, Fig. 3)). For example, Shen's post-testing phase evaluates outcomes of medical imaging sequences based on *workflow efficiency* (*see* Shen ¶ 8). Shen also suggests that performance of medical imaging sequences is affected by *scheduling* considerations seeking to "maximize the utilization of expensive medical equipment, such as diagnostic imaging equipment, without unduly sacrificing the interests of any single stakeholder" (Ans. 33 (citing Shen ¶ 3)). Additionally, Inokuchi identifies workflow sequences of same care steps as discussed *supra*, and Tice, Inokuchi, and Bocionek teach it was known to *rank* workflow sequences based on performance (Ans. 32–33 (citing Tice ¶ 189); *see also* Inokuchi ¶ 63; Bocionek ¶¶ 24, 26). Accordingly, we sustain the

Examiner's § 103(a) rejection of claim 5, as Appellants' arguments have not persuaded us of error in the Examiner's rejection. We also sustain the Examiner's rejection of claim 24, reciting features similar to claim 5, for which Appellants provide the same arguments (App. Br. 18–19).

Rejections of claims 6, 22, and 25 under 35 U.S.C. § 103(a)

With respect to independent claim 25, Appellants contend Arning does not teach or suggest determining the most common sequence of care steps in grouped sequences of care steps (App. Br. 13). However, as discussed *supra* with respect to claim 1, we agree with the Examiner the combination of Bocionek, Arning, and Inokuchi teaches and suggests determining the most common sequences of care steps by grouping sequences based on clinically valid reasons explaining variances in the sequences (as recited in claim 25).

Appellants also argue Bocionek does not teach or suggest "communicat[ing] workflow data between hospital departments" and "workflow data . . . received from a plurality of medical institutions and/or national registries" as required by claim 25 (App. Br. 13; Reply Br. 5). Claim 25, however, does not require *communicating workflow data between hospital departments*; rather, it merely recites processors "programmed to: receive workflow data received from a plurality of medical institutions and/or national registries for a plurality of patients."

The Examiner further explains, Bocionek's CCIS application accesses *patient records* received from a "Hospital Information System (HIS) 20 patient record repository and other hospital departments," and generates workflow (task sequences) based on the patient records (*see* Bocionek ¶¶ 16,

20 (emphasis omitted); Ans. 30–31). Bocionek's workflow (task sequences) are generated by "searching patient records in multiple patient medication and treatment databases for statistically significant data correlations and patterns identifying treatment features leading to verifiable improvement" (*see* Bocionek ¶ 20). This suggests the *received patient records* in Bocionek include *information on care steps* performed on the patients, e.g., "workflow data" including "a plurality of care steps and relations there between for each of the patients" recited in claim 25 (Ans. 30–31).

Accordingly, Appellants' arguments have not persuaded us of error in the Examiner's rejection of claim 25. Therefore, we sustain the Examiner's § 103(a) rejection of claim 25. We also sustain the Examiner's rejection of claims 6 and 22, reciting features similar to claim 25, for which Appellants provide the same arguments (App. Br. 15, 17–18; Reply Br. 7).

Rejection of claim 7 under 35 U.S.C. § 103(a)

Appellants contend "Sadiq simply arranges its fragments based on conflicts" and "does not fairly suggest adding one or more of the free floating nodes to its optimal location and/or most common location within the established clinical protocol" as recited in claim 7 (App. Br. 16; Reply Br. 8). We do not agree.

We agree with the Examiner that Sadiq adds free floating nodes (tasks or processes, such as a mammogram or ultrasound) to a medical workflow graph at a graph location considered *optimal* for a particular patient (Ans. 34–35 (citing Sadiq ¶ 44, Figs. 2 and 4A)). Appellants' claimed "optimal location" does not exclude Sadiq's task location based on medical constraints that control sequencing of steps or combinations of medications

(*see* Sadiq ¶¶ 49, 70). Accordingly, we sustain the Examiner's § 103(a) rejection of claim 7.

Rejection of claim 8 under 35 U.S.C. § 103(a)

With respect to dependent claim 8, the Examiner finds Grigsby's paragraphs 4 and 11 and Figures 2 and 6 teach and suggest the steps for updating clinical protocols as recited in claim 8 (Ans. 35–36; Final Act. 19).

Appellants argue Grigsby does not teach "comparing identified sequences of the same care steps" (the steps previously determined as the most common sequences in grouped workflow sequences); rather, Grigsby merely updates a patient's treatment to achieve a planned treatment objective (Reply Br. 9). Appellants argue Grigsby also does not identify differences between an established clinical protocol and the sequences of same care steps, and does not add a most frequent or valuable difference to the clinical protocol, as required by claim 8 (Reply Br. 8; App. Br. 17). We agree with Appellants.

The cited portions of Grigsby merely disclose changing a patient's treatment when the initially planned treatment would not achieve a particular objective by a scheduled time deadline (*see* Grigsby ¶¶ 4, 11 and Abstract). This does not teach claim 8's process for updating a clinical protocol by identifying the most frequent or valuable differences between the protocol and the most common treatment sequences used on patients. As the Examiner has not identified sufficient evidence to support the rejection of claim 8, we do not sustain the Examiner's § 103(a) rejection of claim 8.

Rejection of claim 26 under 35 U.S.C. § 103(a)

Appellants contend "Arning is entirely silent with respect to a patient," "an attribute of a patient," and "using an attribute of a patient to group sequences of steps together" as required by dependent claim 26 (App. Br. 19). The Examiner, however, refers Appellants to "the answer to the arguments concerning the rejections of claim 1," which include findings regarding Inokuchi (Ans. 12–13, 30, 36). We agree with the Examiner that the combination of Bocionek, Arning, and Inokuchi teaches the features of claim 26. As discussed *supra* with respect to claim 1, Inokuchi groups sequences based on clinically valid reasons such as *treatment outcomes* revealing treatment efficacy *on patients with particular medical conditions* (*see* Inokuchi Fig. 6).

Thus, Inokuchi's clinically valid reasons include *attributes of those patients*, as required by claim 26 (Ans. 30, 36). Accordingly, we sustain the Examiner's § 103(a) rejection of claim 26.

Rejection of claim 27 under 35 U.S.C. § 103(a)

The Examiner finds "Inokuchi discloses the recordation of the time of day," thus, Inokuchi's "system that discloses variance and records the time of day would meet the claimed element" of dependent claim 27 (Ans. 37 (citing Inokuchi ¶¶ 12, 58, Fig. 6)).

Appellants argue although Inokuchi records dates and times of treatment and examination, "Inokuchi does not suggest grouping sequences of the same care steps of the workflow data based on clinically valid reasons including the time of day explaining variances in the sequences of the same

care steps" as required by claim 27 in view of its base claim 1 (App. Br. 20). We agree with Appellants.

The cited portions of Inokuchi do not disclose *grouping workflows/sequences of care steps based on the time of day*, as required by claim 27 (App. Br. 20; Reply Br. 10–11). The Examiner also has not shown the additional teachings of Bocionek and Arning make up for Inokuchi's deficiency. As the Examiner has not identified sufficient evidence to support the rejection of claim 27, we do not sustain the Examiner's § 103(a) rejection of claim 27.

Rejection of claims 28–30 under 35 U.S.C. § 103(a)

Appellants contend Sadiq merely discusses using a constraint, which "does not fairly suggest employing a graph traversal algorithm, much less suggest employing a graph traversal algorithm to identify a best sequence of care steps using an evaluation function" as recited in claim 28 (App. Br. 20). We do not agree.

We agree with the Examiner Sadiq uses a graph traversal algorithm to traverse a graph of nodes (representing medical tests or procedures, *see* Figs. 4A and 17) and identify a valid sequence of nodes (e.g., a sequence without conflicts between nodes) using an evaluation function defined by order constraints and fork constraints (Ans. 38 (citing Sadiq ¶¶ 7, 107, 110, 113, Figs. 11, 12, 17)). Appellants' arguments have not addressed these specific findings by the Examiner. Accordingly, Appellants' arguments have not persuaded us of error in the Examiner's rejection of claim 28, and we sustain the Examiner's § 103(a) rejection of dependent claim 28.

With respect to claim 29, Appellants argue Sadiq's restriction on how many fragments may be included in a graph does not suggest a rule limiting an amount of time that the graph traversal algorithm employs searching the graph, as claim 29 requires (App. Br. 20–21). Appellants' arguments do not address the Examiner's specific findings that Sadiq's "maximum" constraints "limit the number of fragments . . . included in the creation of a workflow template, which would limit the amount of time the algorithm employs searching the graph" (Ans. 38 (citing Sadiq ¶ 127); *see also* Sadiq ¶ 28). We agree with the Examiner's reasonable findings. Therefore, we sustain the Examiner's § 103(a) rejection of independent claim 29.

With respect to claim 30, Appellants argue Sadiq's disclosure of forks does not suggest limiting a search space of a graph traversal algorithm, as recited in claim 30 (App. Br. 21). The Examiner finds, however, Sadiq's order constraints limit a search space that a graph traversal algorithm employs searching a graph (Ans. 38 (citing Sadiq ¶¶ 107, 110, 113)). We agree with the Examiner's findings. Sadiq's order constraint limits the order of nodes/steps, which is commensurate with the broad description of "limiting a [graph] search space" in Appellants' Specification (*see* Sadiq ¶¶ 70, 100, 109).[5] Accordingly, Appellants' arguments have not persuaded us of error in the Examiner's rejection of claim 30, and we sustain the Examiner's § 103(a) rejection of dependent claim 30.

[5] Appellants' Specification describes a "graph traversal algorithm . . . employs rules to limit the search space. For example, a rule that prohibits the graph traversal algorithm from exploring a path in which care step B follows care step A" (*see* Spec. 12:4–6).

DECISION

The Examiner's decision rejecting claims 9 and 10 under 35 U.S.C. § 112, fourth paragraph is reversed.

The Examiner's decision rejecting claims 1, 3–13, 16, and 21–30 under 35 U.S.C. § 101 is affirmed.

The Examiner's decision rejecting claims 1, 3–7, 9–13, 16, 21–26, and 28–30 under 35 U.S.C. § 103(a) is affirmed.

The Examiner's decision rejecting claims 8 and 27 under 35 U.S.C. § 103(a) is reversed.

Because we have affirmed at least one ground of rejection with respect to each claim on appeal, we affirm the Examiner's decision rejecting claims 1, 3–13, 16, and 21–30. *See* 37 C.F.R. § 41.50(a)(1).

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

AFFIRMED