PATENT

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In the **PATENT APPLICATION** of:	
	Bar-Tal et al.
Application No.:	16/952,943
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Group:	3792
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REPLY BRIEF

Mail Stop Appeals - Patents
Commissioner for Patents
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Sir:

This Reply Brief timely responds to the Examiner's Answer of November 24, 2025.

A request for oral argument pursuant to 37 CFR § 41.47 and the requisite fee accompany this Reply Brief.

Contents

I. Status of the Claims

The rejections of Claims 1–20 and 22–24 in the Final Office Action, issued April 1, 2025, are the subject of the present Appeal.

The pending claims on Appeal were attached in the Claims Listing in the appendix of the Pre-Appeal.

II. Grounds of Rejection to be Reviewed on Appeal

The grounds for rejection to be reviewed on Appeal are as follows:

[A] Claims 1-20 and 22-24 stand rejected under 35 U.S.C. § 101 because the Office Action alleged that the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more.

III. Argument

The Appellant provides, in this Reply Brief, arguments specific and responsive to the Examiner's Answer. All arguments made in the Appeal Brief are maintained irrespective of whether they appear in this Reply Brief. In general, the

Appellant contends that the arguments presented in the Appeal Brief (supplemented in part by the Reply Brief) are not overcome by the Office Actions and Examiner's Answer.

The Answer maintains the § 101 rejection by characterizing catheter-based acquisition as "pre-solution" data gathering and then concluding that the "steps performed after the data gathering amount to the abstract idea itself," including the statement that "detecting the cardiac arrhythmia is part of the abstract idea." (Answer, p. 3; Answer, p. 4.) The Answer further treats the mapping and display limitations of claims 15–16 as "post-solution activity" and "nothing more than displaying the results," asserting that "a user interface is not recited" and that "only a display screen" is present. (Answer, p. 12.)

The Answer's analysis rests on a level-of-abstraction error and a divide-and-conquer characterization that collapses Step 2A into a tautology. By defining the alleged abstract idea at the results level and then labeling the claim's ordered, rule-bound signal-processing pipeline as "the abstract idea itself," the Answer does not meaningfully evaluate what the claims are directed to as a whole. (Answer, p. 4; Answer, p. 7.) Properly framed, the pending claims do not recite a result-oriented command to "detect arrhythmia." They recite a specific intracardiac electrogram

processing technique, including beat-bounded windowing, annotation-anchored activity determination, threshold-bounded POI delineation, multichannel template construction, and morphology-based weighting of correlation scores, implemented in the catheter-based electrophysiology context. The Answer's approach effectively treats any post-acquisition biomedical signal processing as abstract, notwithstanding the claims' concrete operational constraints. (Answer, p. 4; Answer, p. 7; Answer, p. 8.)

This Reply Brief addresses the Answer's principal grounds and explains why the cited authorities do not apply to the present claims. In particular, the Answer's reliance on result-oriented display and information-management decisions, and its treatment of the heart-map incorporation and emphasis limitations as mere presentation, does not fit claims that constrain how intracardiac signals are segmented, correlated, weighted, and used to govern the system's arrhythmia-identification and mapping workflow. (Answer, p. 12.) For these reasons, and as further explained below, the § 101 rejection should be reversed.

A. The Examiner's Step 2A framing impermissibly defines the alleged "abstract idea" at the result level and then treats the claimed technique as the abstract idea itself

The Examiner's Answer maintains the § 101 rejection by adopting a results-level characterization of the claims and then using that characterization to subsume the claim's operative limitations into the alleged judicial exception. The Answer states that catheter acquisition is "pre-solution activity of data gathering," that "Detecting the cardiac arrhythmia is part of the abstract idea," and that "the steps performed after the data gathering amount to the abstract idea itself." (Answer, p. 3; Answer, p. 4.) The Answer further emphasizes that "the particular technique implemented is directed to the abstract idea itself," effectively labeling the specific processing pipeline recited in the claims as the exception rather than analyzing what the claims are directed to as a whole. (Answer, p. 7.)

This framing is dispositively flawed at Step 2A, Prong One. As claimed, the asserted "technique" is not a result-level command to detect arrhythmia, but a constrained, ordered pipeline that specifies the mechanism for reaching the detection: selecting a window of interest that represents an entire cycle length for a single heartbeat, computing an activity signal using a median filter and reference annotations, deriving an activity threshold, delineating a pattern of interest corresponding to the portion of the heartbeat where arrhythmia activation is exhibited, forming and storing a multichannel template POI, correlating subsequent

multichannel intracardiac EGMs to that template, computing per-channel weights from the maximum slope of the template channels, applying those weights to generate a correlation score, and detecting arrhythmia only when that correlation score exceeds a threshold correlation score. That is precisely the kind of "how" that the Answer's results-level framing attempts to read out of the claims. (Answer, p. 4; Answer, p. 7.)

However, the Step 2A inquiry does not permit defining the abstract idea at the level of a desired outcome (here, "detecting arrhythmia") and then declaring that the ordered, rule-bound technique recited to achieve that outcome is itself "the abstract idea." (Answer, p. 4.) Doing so collapses Step 2A into a tautology and forecloses a meaningful "directed to" analysis because any technological implementation can be re-described as "making a determination" and then treated as abstract by definition. The proper question is whether the claim, considered as a whole, is focused on an abstract idea or instead on a concrete technological technique that improves how an electrophysiology system processes intracardiac electrograms to identify arrhythmia activation. The claims here are directed to the latter, as the ensuing discussion demonstrates.

1. The Answer characterizes the claims at a high level ("detect arrhythmia") and then declares the claimed processing pipeline to be "the abstract idea itself"

The Answer does not undertake a claim-focused "directed to" inquiry. Instead, it defines the alleged abstract idea at the level of the clinical outcome and then sweeps the claim's operative limitations into that label. In particular, the Answer asserts: (i) "the only structure claimed is a catheter with a plurality of electrodes," (ii) sensor acquisition is "pre-solution activity of data gathering," and (iii) "Detecting the cardiac arrhythmia is part of the abstract idea." (Answer, p. 3.) The Answer then draws a categorical line: "the steps performed after the data gathering amount to the abstract idea itself." (Answer, p. 4.)

That framing effectively converts Step 2A, Prong One into a labeling exercise: once the Examiner characterizes the endpoint ("detect arrhythmia") as an abstract idea, the Examiner then reclassifies the claim's specific technical mechanism as "the abstract idea itself," without analyzing whether the claim is actually focused on a specific technological solution.

2. This "result-first" characterization collapses Step 2A into a tautology that would render any physiological signal-processing technique "abstract" whenever it ends in a determination

The Answer's reasoning is not limited to a generalized "detect arrhythmia" label; it repeatedly treats the *claimed technique* as the alleged abstract idea. The Answer applies the same move to specific dependent-claim alignment logic, stating that the phase-shifted, moving-window approach is "the abstract idea itself of making a determination based on the correlation score." (Answer, p. 10.)

If the Board accepts the Examiner's approach, any claim that (1) receives physiological signals and (2) processes them using a defined, constrained pipeline to produce a classification or detection would be "directed to" an abstract idea simply because it culminates in a "determination." That is not a faithful Step 2A inquiry, which must evaluate what the claim is focused on as a whole, rather than re-describing the claim at a results level and treating the recited mechanism as inherent "abstraction."

3. Properly framed, the claims are directed to a concrete, rule-bound intracardiac EGM processing pipeline embedded in an EP device context—not an abstract objective

When the claim is evaluated as a whole, the focus is not the abstract concept of "detecting arrhythmia," but a specific and constrained technique for identifying arrhythmia activation from multi-channel intracardiac electrograms, including: heartbeat-bounded segmentation, annotation-anchored activity computation,

threshold-bounded POI formation, multichannel template construction, and weighted-correlation scoring using maximum-slope-derived weights. The Answer does not meaningfully address these constraints as the claim's focus; it instead declares, by characterization, that everything after acquisition is "the abstract idea itself." (Answer, p. 4.)

That is precisely the analytical defect here: the Answer is not identifying a judicial exception to which the claim is "directed." It is instead re-labeling the claim's operative limitations as the exception.

4. The Answer's "only structure claimed is a catheter" and "data gathering" assertions highlight the overgeneralization problem

The Answer asserts that "the only structure claimed is a catheter with a plurality of electrodes" and treats the acquisition step as mere "pre-solution activity of data gathering." (Answer, p. 3.) But that overgeneralizes the claim and ignores the claim's required signal-processing control sequence. The alleged "data gathering" is not claimed in isolation; it is the front end of an integrated workflow that (i) defines beat-bounded windows, (ii) constructs a POI and template from those windows, (iii) computes weighted multichannel correlations, and (iv) detects arrhythmia based on a threshold score. The Answer's categorical rule that everything

after acquisition is "the abstract idea itself" is not a substitute for Step 2A analysis of the claim's focus. (Answer, p. 4.)

5. Claims 15–16 further demonstrate the Answer's improper "post-solution" characterization (separately reversible error)

The Answer asserts that claims 15–16 recite "insignificant post-solution activity" and "nothing more than displaying the results" of detecting arrhythmia, further stating that "a user interface is not recited" and that the claims recite "only a display screen." (Answer, p. 12.) That characterization does not engage with what claim 16 actually requires.

Claim 16 is not limited to "displaying" a result. It requires that "the subsequent electrical activity having the correlation score exceeding the threshold is incorporated into a map of the heart appearing on the display screen," and further requires that "areas of the heart exhibiting the cardiac arrhythmia are emphasized." (Claim 16.) Those operative limitations do not merely present an already-computed conclusion; they constrain how the system forms and updates the displayed heart map, and they do so conditionally based on the computed correlation state. In other words, the claim requires a mapping operation in which only electrical activity satisfying the threshold condition is incorporated into the heart map, and the regions

corresponding to that activity are emphasized in the map output. That is a functional limitation on the mapping workflow itself, not a generic "reporting" step.

The Answer's "only a display screen" point is also beside the claim's operative requirements. A "user interface" need not be recited by that label; the claim recites what the system must do with the mapping output that is presented on the display. (Answer, p. 12.) Claim 16's requirements that arrhythmia-correlated activity is incorporated into the heart map and that arrhythmia regions are emphasized define the behavior of the mapping output shown to the user. The question under Step 2A, Prong Two is whether the claim merely appends conventional display activity to an abstract idea or instead integrates any alleged exception into a practical application. Here, claim 16 ties the computed detection state to concrete system behavior: constructing and presenting a heart map that incorporates threshold-exceeding activity and emphasizes the corresponding anatomical regions. (Answer, p. 12.)

Accordingly, the Answer's reduction of claim 16 to "nothing more than displaying the results" is an overgeneralization. Claim 16 does not simply display an outcome; it requires an operational map incorporation and emphasis step conditioned on the threshold correlation score, and therefore provides an additional,

independent basis for reversal even if the Board were to disagree regarding the independent claims. (Answer, p. 12.)

6. The § 101 rejection should be reversed because the Answer's Step 2A approach is a conclusory re-labeling of the claims' operative mechanism

Because the Answer (i) defines the alleged abstract idea at the results level ("detect arrhythmia"), (ii) treats the claim's specific technique as "the abstract idea itself," and (iii) repeats that move even for detailed alignment and mapping limitations, it does not properly establish that the claims are "directed to" a judicial exception under Step 2A. (Answer, pp. 3–4, 10, 12.) Evaluated as a whole, the claims are directed to a specific intracardiac EGM processing pipeline embedded in an electrophysiology device context, not an abstract objective.

B. Even if certain limitations are characterized as "mathematical," the claims integrate any such operations into a practical application under Step 2A, Prong Two

Assuming *arguendo* that some claim limitations can be described as involving "mathematical" calculations, the Answer still fails Step 2A because it does not conduct the required Prong Two inquiry into whether the claims, as a whole,

integrate any such operations into a practical application. Instead, the Answer treats catheter-based acquisition as "pre-solution" data gathering and then concludes that "the steps performed after the data gathering amount to the abstract idea itself," thereby dismissing the claim's ordered signal-processing sequence without evaluating how the claimed operations are used in a constrained, device-embedded workflow. (Answer, p. 4; Answer, p. 7.) The Answer applies the same categorical labeling to the mapping and display limitations of claims 15–16, characterizing them as "post-solution activity" that amounts to "nothing more than displaying the results." (Answer, p. 12.)

That approach is inconsistent with Step 2A, Prong Two. The proper question is not whether an equation appears in the claim or whether numbers can be computed, but whether the claim applies any such computations in a manner that meaningfully limits them to a specific, real-world technological use. Here, the claims do precisely that by requiring multi-channel intracardiac electrogram acquisition from a catheter, beat-bounded windowing, annotation-anchored activity determination, threshold-bounded POI delineation, multi-channel template creation, and morphology-based channel weighting applied to correlations to generate a thresholded score used for arrhythmia detection. Moreover, claims 15–16 further

couple that computed state to a heart-mapping workflow by incorporating threshold-exceeding activity into a heart map and emphasizing affected regions. The following discussion explains why these limitations integrate any alleged mathematical concept into a practical application and why the Answer's "pre-solution/post-solution" characterization does not defeat eligibility.

1. The Answer's "pre-solution data gathering" premise is legally and factually mismatched to the claimed integration

The Answer concedes Appellant's framing of the claimed system behavior—i.e., "sensor acquisition and pre-processing feed the beat-bounded, derivative-weighted correlation whose thresholded output updates a cardiac map and emphasizes affected anatomy"—but dismisses that integration by asserting that "sensor acquisition amounts to pre-solution activity of data gathering" and that "the steps performed after the data gathering amount to the abstract idea itself." (Answer, pp. 3–4.)

That characterization is not a Step 2A, Prong Two analysis. Prong Two asks whether the claim as a whole integrates any judicial exception into a practical application. Here, the claim does not recite "gather data, then think about it." It recites a closed, device-embedded workflow that begins with intracardiac, multi-

electrode acquisition and continues through physiologically anchored segmentation, template formation, and weighted correlation scoring used to drive the system's arrhythmia-detection output during an electrophysiology procedure. In that posture, the "acquisition" is not an independent, generic antecedent step; it is the front end of the claimed operational pipeline and supplies the constrained inputs on which the remainder of the steps necessarily operate.

The Answer's approach—treating acquisition as "pre-solution" and everything after as "the abstract idea itself"—amounts to a categorical rule that any medical-device processing following signal acquisition is abstract. (Answer, p. 4.) That is inconsistent with Prong Two's requirement to evaluate whether the claim applies any mathematical operations in a manner that meaningfully limits them to a specific, real-world technological use.

2. The independent claims integrate the alleged calculations into a concrete electrophysiology-device workflow by requiring beat-bounded segmentation and multi-channel, morphology-weighted correlation to detect arrhythmia from catheter-acquired intracardiac EGMs

Even accepting arguendo the Answer's assertion that the claim recites "mathematical" steps, the claimed operations are not performed in the abstract. They

are tied to, and constrained by, a particular medical-device setting and a specific manner of using intracardiac electrograms:

- **Beat-bounded physiological segmentation (WOI) and gated sub-window construction (POI).**

  The claims require selecting a WOI representing an entire heartbeat cycle, generating an activity signal based on a median filter and reference annotations, computing an activity threshold, and computing a POI corresponding to arrhythmia activation. This is not an undirected calculation; it is a prescribed physiological segmentation and gating technique used to isolate the portion of intracardiac signals relevant to arrhythmia activation.

- **Multi-channel template formation and morphology-weighted correlation scoring.**

  The claims require storing a template POI formed of a plurality of template channels, correlating subsequent electrical activity against that template, and generating a correlation score by applying channel weights computed from maximum slope. The Answer does not dispute that the claims require this particular architecture; it instead asserts that "the steps sequence of processing the data amount to the abstract idea" and that "an improvement to the abstract

idea is still an abstract idea." (Answer, p. 4.) That is not a Prong Two analysis. Prong Two requires asking whether the claim's recited use of the calculations meaningfully limits them to a concrete device operation. Here it does: the calculations are performed on catheter-acquired intracardiac signals, within heartbeat-bounded windows, and with channel weighting derived from signal morphology to detect arrhythmia.

Accordingly, even if individual sub-steps can be expressed mathematically, the claim integrates them into a practical application by specifying *how the electrophysiology system processes catheter-acquired signals to detect arrhythmia activation*—rather than claiming a result or a generic calculation divorced from a technological process.

3. Claims 15–16, in particular, further integrate the pipeline into a practical application by constraining map incorporation and anatomical emphasis based on the computed state

The Answer asserts that claims 15–16 "amount to post-solution activity" and that the "displaying limitation is insignificant post-solution activity because it amounts to nothing more than displaying the results of steps being performed to detect a cardiac arrhythmia." (Answer, p. 4.) The Answer repeats that view later,

stating that claims 15–16 are "post-solution activity," that "a user interface is not recited… only a display screen," and that "the result of the abstract idea determination is what is displayed, which does not result in an improvement." (Answer, p. 12.)

That treatment improperly collapses operative mapping constraints into mere presentation. Claim 16 does not simply say "display the outcome." It requires that the subsequent electrical activity meeting the threshold condition is incorporated into a map of the heart and that areas exhibiting arrhythmia are emphasized in the map. These are not merely "post-solution" output steps; they are constraints on the mapping workflow and on what the electrophysiology system includes and emphasizes in its mapping output during the procedure. The Answer's reliance on the absence of the words "user interface" is also misplaced; user-interface functionality is commonly claimed through functional display limitations, and claim 16's "incorporated into a map" plus "emphasized" requirements define a specific mapping behavior conditioned on the algorithmic state. (Answer, p. 12.)

In short, claims 15–16 supply an additional integration path: they couple the computed correlation state to a heart-mapping output in a way that goes beyond merely reporting a determination.

4. The Answer's reliance on "post-solution" labeling does not address whether the claim's limitations impose meaningful constraints on how the system operates

The Answer repeatedly relies on conclusory labels—"pre-solution activity," "post-solution activity," and "abstract idea itself"—rather than identifying why the claim, as a whole, fails to meaningfully limit any alleged mathematical concept to a practical application. (Answer, pp. 3–4, 12.) That matters because the claims here do not recite mathematical operations in a vacuum. They recite the application of those operations to a specific technological workflow (intracardiac, multi-channel electrophysiology signal processing in beat-bounded windows with morphology-derived weighting).

5. Under Step 2A, Prong Two, the claims integrate any alleged mathematical operations into a practical application in an electrophysiology mapping system

Even assuming arguendo that some limitations can be described as "mathematical," the claim language applies those operations within a concrete, device-embedded workflow operating on catheter-acquired intracardiac EGMs, with physiologically anchored segmentation, multi-channel template formation, morphology-derived weighting, and thresholded detection—plus mapping incorporation/emphasis for claims 15–16. The Answer's categorical "pre-

solution/post-solution" framing does not defeat that integration. (Answer, pp. 3–4, 12.)

C. The Examiner's reliance on *Intellectual Ventures I v. Symantec* is misplaced in view of *Ex parte Desjardins* and the claim's recited technical improvement

The Answer cites *Intellectual Ventures I LLC v. Symantec Corp.* for the propositions that "an improvement to the abstract idea is still an abstract idea" and that the "novelty" of steps is not relevant to § 101. (Answer, pp. 3–4.) Those statements, even if correct as far as they go, do not resolve the eligibility inquiry for the present claims because *Ex parte Desjardins* Appeal 2024-000567 (precedential) explains the precise limiting principle the Answer does not apply: *Intellectual Ventures* stands for the point that a specification's assertion of "improvement" is not enough unless the claims themselves reflect the disclosed improvement, and where the claims do reflect that improvement, the claims are treated as directed to an improvement in technology/technical field rather than "an abstract idea improved." (Desjardins, p. 9.)

1. *Desjardins* clarifies the correct use of *Intellectual Ventures*: the dispositive question is whether the claim language itself operationalizes the improvement

In *Desjardins*, the Appeals Review Panel acknowledged that "an assertion in the Specification alone is insufficient to support a patent eligibility determination" absent a subsequent determination that "the claim itself reflects the disclosed improvement," expressly citing *Intellectual Ventures* via MPEP § 2106.05(a). (Desjardins, p. 9.) The ARP then found eligibility because "we are persuaded that the claims reflect such an improvement." (Desjardins, p. 9.) This framing is directly responsive to the way *Intellectual Ventures* is often misused: it is not a categorical rule that all "improvements" are abstract, but a requirement that the improvement must be claimed as a concrete mechanism, not merely described as a goal.

That *Desjardins* approach is particularly relevant here because the Answer's reliance on *Intellectual Ventures* functions as a shortcut: it treats Appellant's showing of a specific signal-processing technique as, at best, "novelty," and then concludes the claims remain directed to an abstract idea because "an improvement to the abstract idea is still an abstract idea." (Answer, p. 3.) *Desjardins* rejects that kind of stop-short analysis by requiring the Examiner to answer the claim-centric question: does the claim itself embody the asserted technical improvement? (Desjardins, p. 9.)

2. The Answer applies *Intellectual Ventures* as a categorical bar, without performing the *Desjardins* "claim reflects the improvement" determination

The Answer states that "Detecting the cardiac arrhythmia is part of the abstract idea," characterizes catheter acquisition as "pre-solution" data gathering, and concludes that the post-acquisition steps "amount to the abstract idea itself." (Answer, pp. 2–3.) The Answer then invokes *Intellectual Ventures* to assert that even if Appellant identifies a different method, "an improvement to the abstract idea is still an abstract idea," and separately emphasizes that "novelty" is not determinative under § 101. (Answer, pp. 3–4.)

That mode of analysis is precisely what *Desjardins* warns against: it treats "improvement" as irrelevant unless it is merely a specification-level label, rather than asking whether the claims operationalize the improvement through concrete limitations. (Desjardins, p. 9.) Put differently, *Intellectual Ventures* is not a license to re-describe a claim at a results level and then deem the claim's mechanism "the abstract idea itself"; under *Desjardins*, the eligibility analysis must turn on whether the claim's limitations reflect the disclosed technological improvement. (Desjardins, p. 9.)

3. Unlike the claims at issue in *Intellectual Ventures*, the present claims recite the operative technical mechanism and therefore fall on the eligible side of the *Desjardins* line

Under *Desjardins*, the relevant inquiry is whether the claim language itself embodies the technical improvement. (Desjardins, p. 9.) Here, the independent claims do not merely state an outcome ("detect arrhythmia") or a generic analytic directive. They recite a specific, rule-bound intracardiac processing pipeline that constrains how catheter-acquired, multi-channel intracardiac signals are segmented and scored, including (among other constraints) median-filter- and reference-annotation-based activity computation, threshold-based POI delineation, multi-channel template construction, and weighted correlation scoring with weights derived from a maximum slope of template channels before thresholded detection. The improvement is therefore not asserted only in the specification as a desirable result; it is implemented in the claim limitations as the prescribed means.

That is exactly the distinction *Desjardins* draws when it explains that a specification assertion alone is insufficient "absent a subsequent determination that the claim itself reflects the disclosed improvement," and then finds eligibility when the claims do reflect it. (Desjardins, p. 9.) Applying that framework, the Answer's reliance on *Intellectual Ventures* as a broad proposition that "an improvement to the

abstract idea is still an abstract idea" does not fit these claims because the improvement here is not an abstract idea being "improved" in the abstract; it is a concrete, claimed technical solution in a specific technical field. (Answer, p. 3; Desjardins, p. 9.)

4. *Intellectual Ventures* in view of *Desjardins* support patent eligibility

The Answer's citation to *Intellectual Ventures* is not dispositive because *Desjardins* makes clear that the correct eligibility inquiry is whether the claims themselves reflect the disclosed technical improvement. (Desjardins, p. 9.) The Answer does not perform that determination; it instead labels the post-acquisition pipeline "the abstract idea itself" and treats any improvement arguments as merely "novelty." (Answer, pp. 2–4.) Under the *Desjardins* framework, the proper conclusion is that the present claims are directed to a specific technological improvement recited in the claim limitations, and the Examiner's reliance on *Intellectual Ventures* does not support maintaining the § 101 rejection. (Answer, p. 3; Desjardins, p. 9.)

D. The Examiner's Application on *CardioNet* Does Not Support Sustaining the § 101 Rejection

In the Answer, the Examiner attempts to limit *CardioNet, LLC v. InfoBionic, Inc.* by asserting that *CardioNet* turned on the absence of record support that doctors "performed the same techniques," and then asserting—without evidentiary support—that "processes for detecting cardiac arrhythmias have been done before" in the present case and that any purported improvement is "directed to the abstract idea itself." (Answer, p. 6).

That is not a legally correct use of *CardioNet*, and it does not meaningfully distinguish the present claims. *CardioNet* is helpful to Appellant for three independent reasons.

1. CardioNet Prohibits the Answer's Oversimplification of the Claims as "the Abstract Idea" of Data Analysis

The Federal Circuit reversed in *CardioNet* because the district court (and the accused infringer) improperly generalized the claimed invention as "collecting, analyzing, and reporting data," which the court held was inconsistent with the requirement to assess the "specific requirements of the claims" and to "avoid oversimplifying." *CardioNet*, p. 9 (955 F.3d at 1370). The court emphasized that the asserted claims "do not merely collect electronic information, display information, or embody mental processes," and instead "fit into the class of claims that focus on

an improvement in computers [and other technologies] as tools." *CardioNet*, p. 9 (955 F.3d at 1370–71).

The Answer repeats the same type of prohibited generalization when it treats "the steps in the sequence of processing the data" as "the abstract idea" itself and concludes that "an improvement to the abstract idea is still an abstract idea." (Answer, p. 5). But under *CardioNet*, the question at Alice step one is whether the claims, "as a whole," are directed to an abstract idea, not whether the Examiner can restate the claim at a high level (e.g., "processing data" or "detecting arrhythmia") and then declare the rest to be the abstract idea. *CardioNet* requires analysis of the concrete, claimed signal-processing pipeline—including the claim's constraints on how the signals are filtered, windowed (WOI), narrowed to the clinically relevant portion (POI), correlated, slope-weighted, and then used to drive the system's detection decision—rather than collapsing those concrete steps into the label "data analysis."

2. *CardioNet* Rejects the Answer's Attempt to Turn *Alice* Step One into a Prior-Art Inquiry

The Answer's central "distinction" is essentially that arrhythmia detection is "known" and therefore the claims cannot be an "improvement," or that the improvement is "directed to the abstract idea itself." (Answer, p. 6).

But *CardioNet* expressly holds that Alice step one "does not require an evaluation of the prior art," and that the "directed to" inquiry is "regardless of whether the prior art demonstrates that the idea or other aspects of the claim are known, unknown, conventional, unconventional, routine, or not routine." *CardioNet*, p. 10 (955 F.3d at 1372) (citing *Diehr* and explaining that novelty "is of no relevance" to whether a claim falls within § 101 categories).

Accordingly, the Answer does not distinguish *CardioNet* by asserting at a high level that "processes for detecting cardiac arrhythmias have been done before." (Answer, p. 6). Even if arrhythmia detection as a general objective is known, the eligibility inquiry is whether these claims are directed to the abstract idea of "detecting arrhythmia" (or "processing data") versus being directed to the specific, claimed technological mechanism that improves how an electrophysiology system identifies arrhythmia activation from intracardiac EGM channels. *CardioNet* makes clear that collapsing a specific technological mechanism into the general goal and

then treating the goal as the "abstract idea" is the wrong level of abstraction for step one.

3. The Answer's "Doctors Could Do It" Rationale Conflicts with *CardioNet*'s Treatment of Similar Medical-Signal Processing

The Answer also relies on the notion that the claim sequence reflects steps a doctor "could (and would) perform" and therefore constitutes a mental process. (Answer, p. 6).

In *CardioNet*, the Federal Circuit rejected the same move. It explained that the claims at issue were not mental processes and that it was "difficult to fathom" a human performing the required analysis mentally, particularly where the claim required application of a specific statistical function to physiological-signal variability to improve the diagnostic output. *CardioNet*, p. 8 (955 F.3d at 1370).

That reasoning applies with even greater force here, where the independent claims require (i) multi-channel intracardiac EGM acquisition from catheter electrodes, (ii) selection of a WOI spanning an entire cycle length, (iii) calculation of an activity signal using a median filter and reference annotations, (iv) derivation of an activity threshold and a POI corresponding to the specific arrhythmia activation within the WOI, (v) storage of a template POI formed of multiple template channels,

(vi) computation of signal correlations against subsequent electrical activity, (vii) computation of per-channel weights based on maximum slope, and (viii) generation of a weighted correlation score for automated detection. Treating that constrained, device-embedded pipeline as something "any doctor" would do—rather than as a specific technological mechanism for improving detection accuracy—is the type of oversimplification that *CardioNet* forbids.

4. *CardioNet Confirms Patentability*

For purposes of the Reply Brief, the appropriate point is not that Appellant must prove novelty at step one, nor that the Board must resolve whether "arrhythmia detection" exists in the prior art. Rather, *CardioNet* requires the eligibility analysis to focus on what these claims are actually "directed to": a specific, constrained, multi-stage intracardiac signal-processing technique that improves the operation of an EP mapping/detection system, not the abstract idea of "analyzing heart data." The Answer's attempted distinction—"processes … have been done before" and "an improvement to the abstract idea is still an abstract idea"—is inconsistent with *CardioNet*'s instruction that step one is a legal inquiry grounded in the intrinsic record, not a prior-art dispute, and that courts must not generalize medical-device signal processing into the forbidden "collect/analyze/report" caricature.

E. The Examiner's Reading of *Ex Parte Fautz* Imposes Limitations the PTAB Did Not Adopt

The Examiner relies on *Ex parte Fautz* for the proposition that eligibility turns on whether the claimed mathematical processing yields an "improvement" akin to reconstructing MR image data, and then asserts that the instant claims do not qualify because "detecting an arrhythmia is known in the prior art," there is "no criticality" showing non-conventional electrode use, and the application is allegedly "directed to an improvement of the abstract idea itself." (Answer, p. 8).

That framing misreads what *Fautz* treated as dispositive. The PTAB did not premise eligibility on the novelty of the end goal (better imaging) or on a requirement that the underlying sensors be used in a "non-conventional" way as a condition precedent to Step 2A, Prong Two. Rather, the PTAB's reasoning was that the independent claims' mathematical processing was technically rooted in the operation of a specific medical device architecture and was claimed as part of a concrete acquisition-and-processing workflow that improves the device's output, meaning it was not a mere field-of-use label or token components appended to math. (Fautz, p. 9).

Consistent with that principle, *Fautz* expressly rejected the very type of characterization the Answer repeats here, namely that recited acquisition and device elements reduce to insignificant data gathering around a mathematical idea. The PTAB held it "disagree[d] with the Examiner that the recited data collection is a field of use or merely adds token components to the mathematical equations," because, "as in *Thales*, the independent claims solve a technical problem." (Fautz, p. 9).

1. *Fautz* Supports Eligibility Here Because the Amended Claims Similarly Integrate the Mathematics into a Device-Embedded Technical Workflow that Improves Output

The Answer acknowledges that *Fautz* found a "practical application" where "the claimed method, device, and medium improve the output by reconstructing 'image data … on the basis of the sum signal,'" and further confirms that the use of mathematical equations does not doom the claims where the calculations are a consequence of the device configuration and signal reception and result in an improved reconstructed image. (Fautz, pp. 10–11).

The same analytical structure applies to the present claims. The amended independent claims are not drafted as free-floating "detect arrhythmia" results. They recite a specific intracardiac acquisition context (multi-electrode catheter channels producing unipolar pattern IC EGM signals), a defined heartbeat-bounded WOI, a

rule-based POI extraction tied to an activity threshold derived from a median-filtered activity signal and reference annotations, and then a specific multi-channel template correlation process in which correlations are weighted using a maximum slope of template channels to generate a correlation score that is compared to a threshold to detect the arrhythmia. Those recited constraints are not incidental; they define how the system operates on raw physiological signals to produce a refined detection output.

Under *Fautz*, the relevant question at Step 2A, Prong Two is whether the claims integrate any recited judicial exception into a practical application by embedding it in a specific technological process that solves a technical problem and yields a concrete improvement in the operation and output of the system. (Fautz, pp. 10–11). The Answer's assertion that the instant application is merely "directed to an improvement of the abstract idea itself" (Answer, p. 8) is therefore conclusory where the claims themselves recite a device-embedded signal-processing pipeline that constrains how intracardiac signals are filtered, windowed, templated, and scored to improve detection output.

2. "Known in the Prior Art" and "Criticality" Are Not the Step 2A, Prong Two Touchstones Applied in *Fautz*

The Answer attempts to distinguish *Fautz* on the ground that "detecting an arrhythmia is known in the prior art" and that the specification allegedly shows no "criticality" that the electrodes are used in a non-conventional manner. (Answer, p. 8). Those assertions do not track *Fautz*'s rationale and do not supply a principled Step 2A, Prong Two distinction.

First, whether the claimed objective is "known" is not the Step 2A, Prong Two inquiry. Alice step one asks what the claims are "directed to" as a whole, and that analysis is regardless of whether the prior art demonstrates that the idea or other aspects of the claim are known, unknown, conventional, unconventional, routine, or not routine. (CardioNet, 955 F.3d at 1372). Thus, even accepting arguendo that "detecting an arrhythmia" is a known clinical objective, that does not answer whether the claims here are directed to an abstract idea or instead to a specific technological implementation that improves device output by the claimed signal-processing sequence.

Second, *Fautz* did not impose a requirement that the physical sensing elements be non-conventional as a prerequisite for integrating mathematics into a practical application. To the contrary, the PTAB's emphasis was that the claimed mathematical operations were not a disembodied algorithm but were concretely tied

to the device's signal acquisition and physical properties and produced an improved output, hence why the Board rejected the examiner's field-of-use and token-components characterization. (Fautz, pp. 9, 11). The Answer's "criticality" critique therefore asks for something *Fautz* does not require, namely an express evidentiary showing that the sensors themselves are used in a novel manner, rather than focusing on whether the claimed processing pipeline is a technical workflow that yields an improved technological output.

3. The Proper *Fautz* Comparison Favors Reversal of the § 101 Rejection

When *Fautz* is applied as written, the parallels are straightforward. In *Fautz*, the examiner argued the claims were akin to collecting information, analyzing it, and displaying certain results, but the PTAB reversed because the claims solved a technical problem in a specific medical-device context and used mathematical calculations in a way that improved the system's output, not as an abstract end in itself. (Fautz, pp. 9–11). The Answer repeats the same type of reductionism, treating the catheter-based acquisition and the claimed sequence of heartbeat-bounded windowing, POI extraction, template-based multi-channel correlation, and slope-

based weighting as merely an improvement of the abstract idea itself. (Answer, p. 8).

Under *Fautz*, that is the wrong level of abstraction. Properly construed, the amended claims integrate any recited mathematical concepts into a concrete electrophysiology mapping and detection workflow that processes real-world intracardiac signals in a defined, constrained manner to yield an improved detection output (and, in the dependent claims, improved visualization and mapping behavior conditioned on that output). For that reason, the Answer's attempt to distinguish *Fautz* should be rejected, and the § 101 rejection should be reversed.

F. The Answer's Reliance on *Interval Licensing* Improperly Treats the Amended Claims as Result-Oriented, When the Claims Recite the "How"

The Answer invokes *Interval Licensing LLC v. AOL, Inc.* for the proposition that claims are abstract when they "recite steps performed in a result-oriented manner, without any limitations specifying how to achieve the desired result." (Answer, p. 12). That characterization fits *Interval*, but it does not fit the amended independent claims here.

In *Interval*, the Federal Circuit emphasized that the claims, as construed, demanded the result of displaying a second information set without interfering with the first, yet did not describe how the system actually ensured non-overlap or managed screen "unused capacity." The court repeatedly faulted the claims for providing only generic acquisition and display instructions while offering "no clues" for how the "attention manager" achieved the non-interference result. *Interval*, 896 F.3d at 1340–44. In short, the "how" was missing.

Here, the amended claims do not merely announce a desired outcome (accurate detection) and leave the implementation unspecified. They recite a concrete and ordered signal-processing pipeline that constrains how arrhythmia activation is isolated and detected. By way of example, the method claim requires (among other steps) selecting a WOI representing an entire cycle length, calculating an activity signal based on a median filter and reference annotations, deriving an activity threshold, calculating a POI corresponding to a specific portion of the WOI where arrhythmia activation is exhibited, storing a template POI built from multiple template channels, correlating subsequent activity against the template, applying per-channel weights based on maximum slope, and generating a correlation score used for detection. Those limitations are implementation details that materially

confine the claim scope to a particular technical approach for identifying activation within intracardiac EGM signals. Treating that sequence as "result-oriented" in the *Interval* sense reads out precisely the kind of "how-to" detail *Interval* found absent.

1. The Answer's Use of *Interval* to Dismiss the Display/Map Features as "Post-Solution Activity" Overextends *Interval*'s Holding

The Answer also uses *Interval* in service of the conclusion that the "displaying limitation is insignificant post-solution activity because it amounts to nothing more than displaying the results" of arrhythmia detection. (Answer, p. 4). This framing again reflects *Interval*'s fact pattern, where the claimed advance was fundamentally about presenting additional information on a screen, and the court found only generic, conventional instructions for acquiring and displaying content without any technical mechanism for achieving the claimed segregation. *Interval*, 896 F.3d at 1343–46.

But the present record and claim structure are materially different. First, the core alleged advance of the amended independent claims is not display formatting or information presentation. The advance is the claimed electrophysiology signal-processing technique for isolating an arrhythmia activation segment (POI) within a heartbeat-bounded window (WOI) and then reliably detecting recurrence using

template correlations weighted by maximum slope. That is not a "display two data sets" invention like *Interval*, and the claim's technical steps are not merely "connected to" an abstract idea in the manner *Interval* criticized. Second, where dependent claims recite visual emphasis or incorporation into a heart map, those limitations are tied to a specialized clinical mapping context and operate as part of the system's real-time procedural guidance. Even if the Board were to treat "displaying results" as generally non-transformative standing alone, the Answer's reasoning still does not justify importing *Interval*'s "result-only" critique into claims that recite extensive operational detail for identifying arrhythmia activation in catheter-acquired intracardiac signals. (Answer, pp. 4, 12).

2. *Broadband iTV* Does Not Support the Answer's Framing Because It Addresses Content Organization and Recommendations, Not Biomedical Signal Processing

The Answer's treatment of claims 15–16 also resembles the ineligibility rationale in *Broadband iTV, Inc. v. Amazon.Com, Inc., 113 F.4th 1359 (Fed. Cir. 2024).*, which addressed claims directed to organizing and presenting video content, reordering categories, and recommending content based on viewer history. Those claims were evaluated in the context of content management and presentation, where

the claim focus was on arranging information and providing recommendations rather than on a technical improvement to a technological process.

That is not the focus here. The present claims operate on physiological signals acquired from within a patient's heart through a catheter's electrodes and use a specific, rule-bound pipeline to compute a device state, namely whether a correlation score exceeds a threshold correlation score. Claim 16 then ties that computed state to the mapping output by requiring that subsequent electrical activity meeting the threshold condition is incorporated into a heart map and that areas exhibiting arrhythmia are emphasized in that map. The limitations therefore constrain what is incorporated into the system's heart map and how the map's regions are emphasized based on the computed arrhythmia state. That is materially different from the content organization and recommendation paradigms addressed in *Broadband iTV*.

3. The Answer's "only a display screen" point does not defeat eligibility where claim 16 constrains map incorporation and emphasis conditioned on the computed state

Finally, the Answer's observation that claim 16 recites "only a display screen" and not a "user interface" is not a basis to treat the claim as mere presentation. (Answer, p. 12.) Claim 16 does not merely say "display a result." It requires incorporation of threshold-exceeding electrical activity into a heart map and

emphasis of arrhythmia regions on that map. Those are functional constraints on the mapping output conditioned on the computed correlation state. The presence or absence of the phrase "user interface" does not change the claim's operative requirement that the mapping output be formed and rendered in a particular way.

For these reasons, the Answer's reliance on Interval Licensing and Broadband iTV does not support maintaining the § 101 rejection of claims 15–16. The cited cases address result-oriented information presentation and content organization without a claimed technical mechanism; the present claims recite a concrete signal-processing pipeline and, for claim 16, map-construction and emphasis constraints tied to the computed arrhythmia state. (Answer, p. 12.)

IV. Conclusion

For the reasons set forth above, the Examiner's Answer does not sustain the rejection under 35 U.S.C. § 101. The Answer defines the alleged "abstract idea" at the results level and then treats the claimed, ordered intracardiac signal-processing technique as "the abstract idea itself," by characterizing catheter-based acquisition as "pre-solution" data gathering and concluding that "the steps performed after the data gathering amount to the abstract idea itself," including that "Detecting the

cardiac arrhythmia is part of the abstract idea." (Answer, pp. 3–4; Answer, p. 7.) That framing collapses Step 2A into a tautology and does not evaluate what the claims are directed to as a whole.

Even assuming arguendo that certain limitations involve mathematical operations, the claims integrate any such operations into a practical application under Step 2A, Prong Two by reciting a concrete, device-embedded electrophysiology workflow operating on catheter-acquired intracardiac electrograms, including heartbeat-bounded windowing, annotation-anchored activity computation, threshold-bounded POI delineation, multichannel template formation, morphology-based channel weighting, and weighted correlation scoring used for thresholded detection. (Answer, p. 4; Answer, p. 12.) Claims 15–16 further couple the computed state to a heart-mapping workflow that incorporates threshold-exceeding activity into a heart map and emphasizes regions exhibiting arrhythmia, and the Answer's characterization of these limitations as merely "post-solution activity" and "nothing more than displaying the results" does not address those operational constraints. (Answer, p. 12.)

The authorities relied upon by the Answer do not compel a different outcome. As discussed above, the Answer's reliance on *Intellectual Ventures* does not justify

treating a claim that recites the operative technical mechanism as merely "an improvement to the abstract idea," particularly in view of *Ex parte Desjardins* and the requirement that the claims themselves reflect the improvement. The Answer's attempts to distinguish *CardioNet* and *Fautz* likewise rely on the same results-level abstraction and, in places, improperly inject a prior-art inquiry into Alice step one. Finally, the Answer's reliance on *Interval Licensing* and similar display cases does not fit claims that recite a specific physiological signal-processing pipeline and, for claims 15–16, constrain map incorporation and anatomical emphasis in a specialized electrophysiology mapping context. (Answer, pp. 8, 12.)

Accordingly, Appellant respectfully requests that the Board reverse the § 101 rejection of claims 1–20 and 22–24.

Respectfully submitted,

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