

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CEVA SANTÉ ANIMALE S.A.,
EGG-CHICK AUTOMATED TECHNOLOGIES S.A.S, and
CEVA ANIMAL HEALTH, LLC

Petitioner,

v.

TARGAN, INC.,
Patent Owner.

Case No. IPR2024-00595
U.S. Patent No. 10,806,124

**DECLARATION OF LINA KARAM, PH.D.
IN SUPPORT OF PATENT OWNER'S RESPONSE CONCERNING
U.S. PATENT NO. 10,806,124**

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I. Introduction

1. I, Dr. Lina J. Karam, submit this declaration to state my opinions on the matter described below. All statements made herein of my own knowledge are true, and all statements made herein based on information and belief are believed to be true.

1. I have been retained by Patent Owner Targan, Inc. (hereafter, “Patent Owner” or “PO”), as an independent expert in this proceeding before the Patent Trial and Appeal Board (hereafter “PTAB” or “Board”) of the United States Patent and Trademark Office (hereafter “USPTO” or “Office”). I am being compensated at an hourly rate of \$700/hour. No part of my compensation depends on the outcome of this proceeding, and I have no other interest in this proceeding.

2. I understand that this proceeding involves U.S. Patent No. 10,806,124 (the “’124 patent”), and I have been asked to consider the validity of certain claims of the ’124 patent in view of several grounds laid out in a Petition filed on February 20, 2024 that names Ceva Santé Animale S.A., Egg-chick Automated Technologies S.A.S., and Ceva Animal Health, LLC as Petitioners (hereafter, “Petitioners” or “Ceva”). I been asked to consider each of the eight grounds laid out in the Petition as they relate to my area of expertise – imaging, image processing, and image analysis – and have also been asked to consider the state of the art and prior art

available as of November 13, 2015.¹ I have been asked to opine on the patentability of claims 1-18 of the '124 patent. Based on the grounds presented by Petitioner, the relevant legal principles as explained to me by counsel, my expertise, and the prior art referenced in those grounds and discussed in this declaration, it is my opinion that claims 1-18 of the '124 patent are not unpatentable over the grounds presented by Petitioners.

3. In summary, my opinions are as follows:

- Regarding Claims 1-5 as addressed in Grounds 1, 2, 3, 4, 5, 7 and 8: Pierre does not disclose “a database of images of male and female wing patterns for the particular breed,” and none of the proposed combinations disclose that the captured image is “compared to the database to determine the sex”
- Regarding Claims 6-8 as addressed in Grounds 3, 4, 6, and 8: Pierre does not disclose “a database of images of healthy and unhealthy chicks

¹ For purposes of this declaration, I have been asked to assume a priority date of November 13, 2015 for the '124 patent. I note that while I have been asked to assume this date, if I were to apply either June 14, 2016 (the date of a later filed provisional application), or November 11, 2016 (the date of the associated PCT application), or May 11, 2018 (the filing date of the national-stage entry non-provisional application) as the priority date, the opinions I offer herein would remain the same.

of the same breed,” and none of the proposed combinations disclose that the captured image is “compare[d] . . . to the database of images to detect a deviation from the database of images”

- Regarding Claims 9-18 as addressed in Grounds 7 and 8: Pierre does not disclose “a database of images of a predetermined feature of a chick therein,” and none of the proposed combinations disclose “processing images and determining deviation from the database of images”.

4. Moreover, a POSITA would not have a motivation to modify Pierre to meet the above-mentioned limitations, with a reasonable expectation of success.

5. My analysis and conclusions regarding each of the grounds are presented in more detail below.

II. Qualifications and Background

2. I believe that I am well qualified to serve as a technical expert in this matter on the matters I have been asked to opine on based upon my educational and work experience in image and video processing, computer vision, and signal processing, including but not limited to gender/age prediction, automated quality assessment, biological signal processing, biometrics, database driven image matching and recognition, data processing and visualization, automated bird

quantification and characterization, automated plant quantification and characterization.

3. My qualifications are stated more fully in my curriculum vitae, which has been provided as Exhibit 2004. My CV also lists publications on which I am a named author and patents on which I am a named inventor. Here, I provide a brief summary of my qualifications. As set forth in my curriculum vitae:

4. I received a Bachelor of Engineering (B.E.) from the American University of Beirut in Computer and Communications Engineering in 1989, and a M.S. and a Ph.D. from the Georgia Institute of Technology in Electrical Engineering in 1992 and 1995, respectively.

5. I am currently an Emerita Professor in the School of Electrical, Computer, and Energy Engineering at Arizona State University (ASU) and the Director of the R&D Image, Video, and Usability (IVU) Laboratory at ASU. Prior to becoming Emerita Professor, I was a tenured Full Professor, Computer Engineering Program Chair and Computer Engineering Director for Industry Engagement at ASU. From 2020 to 2022, I served as Dean of the School of Engineering at the Lebanese American University. From 2019 to 2021, I served as the Editor-In-Chief of the high-impact IEEE Journal of Special Topics in Signal Processing. I am also the President of PICARIS, LLC, a consulting company that

provides expertise on media processing, compression, computer vision, and machine learning. I am also Chief Technical Advisor at AIAEC, LLC.

6. My research includes topics such as Signal, Image, and Video Processing, Compression, and Transmission; Computer Vision; Machine Learning; Perceptual-based Processing; Visual Attention Models; Automated Quality Assessment and Monitoring; Multidimensional Signal Processing; Biological/Biomedical Signal Processing; and Digital Filtering. I have various awards in recognition of my research, including U.S. National Science Foundation CAREER Award, Intel Outstanding Researcher Award, U.S. National Aeronautics and Space Administration (NASA) Technical Innovation Award, the IEEE Signal Processing Society (SPS) Best Journal Paper Award, IEEE Phoenix Section Outstanding Faculty Award, and IEEE Region 6 Award. I am featured in the 8th, 9th and 10th editions of Research.com (2022, 2023 and 2024) among World Top Computer Science Scientists.

7. In addition, I am an Institute of Electrical and Electronics Engineers (IEEE) Fellow, which is the highest grade level conferred by IEEE each year to no more than one-tenth of 1% of all IEEE voting members, for my contributions in the areas of image and video processing, visual media compression and transmission, and digital filtering. In addition to serving as Editor-In-Chief of a prestigious IEEE

journal, I have also served on several IEEE Boards and chaired multiple IEEE committees. For example, I served on the IEEE Signal Processing Society (SPS) Board of Governors (2016-2018), IEEE SPS Publications Board (2019-2021), IEEE SPS Award Board (2019-2020), IEEE SPS Conference Board (2003-2005 & 2017-2018), IEEE Publication Services and Products Board (PSPB) Strategic Planning Committee (2014-2016), IEEE Technical Activities Board (TAB)/PSPB Product and Services Committee (2023), IEEE Educational Activities Board (EAB) Faculty Resources Committee (2023-present), IEEE Industry Engagement Committee (2024-present), and IEEE TechRxiv Advisory and Editorial Boards. I am also an expert delegate of the ISO/IEC JTC1/SC29 Committee (Coding of audio, picture, multimedia, and hypermedia information) and participating in JPEG/MPEG standardization activities.

8. As part of my various roles at ASU, PICARIS, AIAEC, ISO and IEEE, I am actively involved in industry. For example, as an intern I contributed to the development of image and video processing and compression at AT&T Bell Labs (Murray Hill), and multi-dimensional data processing and visualization at Schlumberger. Later in my career, I collaborated in the research and development of computer vision, machine learning, image/video processing, compression, and transmission projects with various industry leaders, including Intel, Qualcomm,

Google, NTT, Motorola, Freescale, NXP, General Dynamics, and NASA. More recently, I took on the role of Chief Technical Advisor at AIAEC, LLC, supervising work and product development in the field of AI and machine learning.

9. In addition, I directed the development of image/video processing, compression, computer vision and machine learning technologies. The developed automated image-based bird and plant quantification and characterization systems were adopted by biology researchers. Details about the developed automated bird quantification system can be found in Borkar and Karam, “Automated Bird Plumage Coloration Quantification in Digital Images,” Springer Lecture Notes, ISVC, December 2014. The developed image/video processing, computer vision and machine learning systems for automated defect detection, 3D characterization, camera calibration and distortion correction, gender/age prediction, and autonomous vehicles were adopted at Intel. The developed object identification and recognition system was granted a US patent, “Systems, Methods, and Media for Identifying Object Characteristics Based on Fixation Points,” US Patent 9,501,710, issued November 22, 2016.

10. I directed the development of camera calibration and distortion correction systems. Details about the developed camera calibration, camera modeling, and distortion correction systems can be found in Prakash and Karam,

“Camera Calibration using Adaptive Segmentation and Ellipse Fitting for Localizing Control Points,” IEEE International Conference on Image Processing (ICIP), September 2012, and in Li and Karam, “Depth Estimation from Multi-View Images,” IEEE International Conference on Emerging Signal Processing Applications, January 2012, and in Andrade and Karam, “Robust Radial Distortion Correction Based on Alternate Optimization,” IEEE International Conference on Image Processing, September 2016.

11. I directed the development of automated biomedical image processing and computer vision technologies that enable high-throughput cancer diagnostics and drug discovery. The developed automated image analysis technologies were licensed for cancer research at different industries and institutions, including the Translational Genomics Institute (TGEN) and the New York School of Medicine. More details can be found in Karam and Said, “Automatic Cell Migration and Proliferation Analysis,” U.S. Patent 9,082,164, issued July 2015.

12. My work has been published numerous times in prestigious journals, including the IEEE Transactions on Signal Processing, IEEE Transactions on Image Processing, IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), IEEE Transactions on Broadcasting, and IEEE/CVF Computer Vision and Pattern Recognition (CVPR) Conference. Some selected publications include

“Morphological Reversible Contour Representation,” IEEE Transactions on Pattern Analysis and Machine Intelligence, March 2000, “Morphological Text Extraction from Images,” IEEE Transactions on Image Processing,” Nov. 2000, “Multi-Region Texture Image Segmentation based on Constrained Level-Set Evolution Functions,” IEEE DSP/SPE Workshop, Jan. 2009, “Automated Detection and Classification of Non-Wet Solder Joints,” IEEE Transactions on Automation Science and Engineering, Jan. 2011, “Automated Analysis of Leaf Venation,” IEEE Workshop on Computational Intelligence for Visual Intelligence, April 2011, “An Efficient Selective Perceptual-Based Super-Resolution Estimator,” IEEE Transactions on Image Processing, Dec. 2011, “Select Trends in Image, Video, and Multidimensional Signal Processing,” IEEE Signal Processing Magazine, Jan. 2012, “Fully Automated Quantification of Leaf Venation Structure,” International Conference of Artificial intelligence, July 2012, “A Distributed Canny Edge Detector: Algorithm and FPGA Implementation,” IEEE Transactions on Image Processing, July 2014, “Automated Bird Plumage Coloration Quantification in Digital Images,” Springer ISVC, Dec. 2014, “Quality Labeled Faces in the Wild (QLFW): a Database for Studying Face Recognition in Real-World Environments,” Proc. SPIE 9394, Human Vision and Electronic Imaging XX, March 2015, “A Subjective Study and an Objective Metric to Quantify the Granularity Level of

Textures,” Proc. SPIE 9394, Human Vision and Electronic Imaging XX, March 2015, “Unconstrained Ear Recognition using Deep Neural Networks,” IET Biometrics, January 2018, “Visual Saliency Prediction Using a Mixture of Deep Neural Networks,” IEEE Transactions on Image Processing, August 2018, “Quality Robust Mixtures of Deep Neural Networks,” IEEE Transactions on Image Processing, November 2018, “Augmented Sparse Representation Classifier (ASRC) for Face Recognition under Quality Distortions,” IET Biometrics Journal, November 2019, “It GAN DO Better: GAN-based Detection of Objects on Images with Varying Quality,” IEEE Transactions on Image Processing, November 2021.

13. I am an inventor, and I have been awarded eight patents in the field of image and video processing, compression, and transmission: U.S. Patent Nos. 6,154,493 (“The Compression of Color Images Based on a 2-Dimensional Discrete Wavelet Transform Yielding a Perceptually Lossless Image”), 6,124,811 (“Realtime Algorithms and Architectures for Coding Images Compressed by DWT-Based Techniques”), 6,717,990 (“Communication System and Method for Multi-Rate, Channel-Optimized Trellis-Coded Quantization”), 7,551,671 (“System and Method for Transmission of Video Signals using Multiple Channels”), 9,082,164 (“Automatic Cell Migration and Proliferation Analysis”), 9,501,710 (“Systems, Methods, and Media for Identifying Object Characteristics Based on Fixation

Points”), 9,704,232 (“Stereo Vision Measurement System and Method”), and 11,0304,85 (“Systems and Methods for Feature Corrections and Regeneration for Robust Sensing, Computer Vision, and Classification,”). I was also a named inventor on an additional patent application, published as U.S. 2008/0259796 (“Method and Apparatus for Network-Adaptive Video Coding”).

14. Additional information regarding my background, qualifications, publications, and presentations is provided in my CV, which is provided as Exhibit 2004.

III. Legal Standards

15. In forming my opinions and considering the subject matter of the ’124 patent and its claims in light of the grounds presented in the Petition, I am relying on certain legal principles that counsel in this case explained to me. My understanding of these concepts is summarized below.

16. I understand that the claims define the invention. I also understand that an unpatentability analysis is a two-step process. First, the claims of the patent are construed to determine their meaning and scope. Second, after the claims are construed, the content of the prior art is compared to the construed claims.

17. I understand that a claimed invention is only patentable when it is new, useful, and non-obvious in light of the “prior art.” That is, the invention, as defined

by the claims of the patent, must not be anticipated or rendered obvious by the prior art.

18. I understand that in this proceeding, the Petitioner has the burden to prove invalidity by a preponderance of the evidence.

A. Claim Construction

19. I understand that the United States Patent and Trademark Office interprets claim terms in an *inter-partes* review proceeding under the same claim construction standard that is used in a United States federal court. I understand that under this standard, the meaning of claim terms is considered from the viewpoint of one of ordinary skill in the art at the time of the alleged invention (sometimes abbreviated as “POSA” or “POSITA”).

20. I understand that claim terms are generally given their ordinary and customary meaning as understood by one of ordinary skill in the art in light of the specification and the prosecution history pertaining to the patent. I understand, however, that claim terms are generally not limited by the embodiments described in the specification. I further understand that, under some circumstances, an inventor may clearly define a claim term in the specification or the prosecution history to mean something other than its ordinary meaning. Similarly, I understand that under

some circumstances, an inventor may clearly and intentionally disclaim certain claim scope within the specification or prosecution history.

21. I understand that in addition to the claims, specification, and prosecution history, other evidence may be considered to ascertain the meaning of claim terms, including textbooks, encyclopedias, articles, and dictionaries. I have been informed that this other evidence is often less significant and less reliable than the claims, specification, and prosecution history.

B. Anticipation Under 35 U.S.C. § 102

22. I understand that under 35 U.S.C. § 102, a patent claim is invalid if its subject matter was patented or described in a printed publication before the effective filing date of the claimed invention. I have been told that this is referred to as invalidity by anticipation. I have been told that a patent claim is anticipated under § 102 if a single prior art reference discloses all limitations of the claimed invention.²

C. Obviousness Under 35 U.S.C. § 103

23. I understand that a patent claim is invalid as obvious if the claimed invention would have been obvious to a person of ordinary skill in the art

² I understand that none of Petitioner's grounds contend that any of claims 1-18 of the '124 patent are anticipated by any single prior art reference.

(“POSITA”) at the time the claimed invention was made. This means that even if all of the elements of the claim cannot be found in a single prior art reference that would anticipate the claim, a person of ordinary skill in the field who knew about all the prior art would have come up with the claimed invention. I understand that in an obviousness determination, the person of ordinary skill in the art is presumed to have knowledge of all material prior art. I understand that whether a claim is obvious is based upon the determination of several factual issues. I understand that for a reference alone or in combination with other references to render a claim obvious, the POSITA must have had a motivation to and reasonable expectation of success in either modifying the reference or making the proposed combination.

24. I understand that obviousness is a determination of law based on underlying determinations of fact. I understand that these factual determinations include the scope and content of the prior art, the level of ordinary skill in the art, the differences between the claimed invention and the prior art, and secondary considerations of non-obviousness.

25. In considering obviousness, I understand that one must determine the scope and content of the prior art. I understand that, in order to be considered as prior art to a patent being considered, a prior art reference must be reasonably related to the claimed invention of that patent. A reference is reasonably related if it is in the

same field as the claimed invention or is from another field to which a person of ordinary skill in the art would look to solve a known problem.

26. I understand that one must determine what differences, if any, existed between the claimed invention and the prior art.

27. I understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was independently known in the prior art. In evaluating whether such a claim would have been obvious, one considers whether a reason has been identified that would have prompted a person of ordinary skill in the art to combine the elements or concepts from the prior art in the same way as in the claimed invention. There is no single way to define the line between true inventiveness on the one hand (which is patentable) and the application of common sense and ordinary skill to solve a problem on the other hand (which is not patentable). For example, market forces or other design incentives may be what precipitated a change, rather than true inventiveness.

28. I understand that whether a prior art reference renders a patent claim unpatentable as obvious is determined from the perspective of a person of ordinary skill in the art at the time of the alleged invention. I have been told that there is no requirement that the prior art contain an express suggestion to combine known elements to achieve the claimed invention, but a suggestion to combine known

elements to achieve the claimed invention may come from the prior art, as filtered through the knowledge of one skilled in the art. In addition, I have been told that the inferences and creative steps a person of ordinary skill in the art would employ are also relevant to the determination of obviousness.

29. I understand that there is no rigid rule that a reference or combination of references must contain a “teaching, suggestion, or motivation” to combine references. But I also understand that the “teaching, suggestion, or motivation” test can be a useful guide in establishing a rationale for combining elements of the prior art. I have been told that this test poses the question as to whether there is an express or implied teaching, suggestion, or motivation to combine prior art elements in a way that realizes the claimed invention, and that it seeks to counter impermissible hindsight analysis.

30. I understand that one should consider, e.g., whether (1) the change was merely the predictable result of using prior art elements according to their known functions, or whether it was the result of true inventiveness; (2) there is some teaching or suggestion in the prior art to make the modification or combination of elements claimed in the patent; (3) the claimed innovation applies a known technique that had been used to improve a similar device or method in a similar way; (4) the claimed invention would have been obvious to try, meaning that the claimed

innovation was one of a relatively small number of possible approaches to the problem with a reasonable expectation of success by those skilled in the art; (5) the invention merely substituted one known element for another known element in order to obtain predictable results; (6) the invention merely applies a known technique to a known device, method, or product to yield predictable results; or (7) known work in the field may have prompted variations of use of the same inventions in the same or different fields due to market forces or design incentives that would have been predictable to a person of ordinary skill in the art.

31. I understand that any assertion of secondary considerations of non-obviousness must be accompanied by a nexus between the merits of the invention and the evidence offered. I understand the Patent Owner bears the burden by a preponderance of the evidence on secondary factors, though the burden never shifts to the Patent Owner to prove the ultimate question of validity.

IV. The '124 patent

32. I have reviewed the '124 Patent and its file history. I have also reviewed Dr. Keener's declaration wherein he provides an "Overview of the '124 Patent," and description of the "Prosecution History of the '124 Patent." Ex. 2002, ¶¶63-86. Dr. Keener's description is consistent with my own understanding, based on my own review, and I adopt and incorporate the same by reference. *Id.* I have also reviewed

Dr. Keener's declaration wherein he describes the level of skill that a person of ordinary skill in the art relevant to the '124 Patent at the time of the invention ("POSITA") would have had. *Id.*, ¶¶104-109. I agree with Dr. Keener's definition of a POSITA including as it concerns the background of a POSITA. *Id.*

33. Although I surpass this definition for the imaging expertise of one of ordinary skill in the art now and at the priority date of the '124 patent, my analysis regarding the '124 patent has been based on the perspective of one ordinary skill in the art as of the priority date of the '124 patent.

34. I am also familiar with the knowledge of the person of ordinary skill in the art as of the priority date of the '124 patent as it concerns imaging, image processing, and image analysis (also referred to herein as "imaging" for short). I am able to opine on how the person of ordinary skill in the art would have understood the imaging related disclosures and claim limitations of the '124 patent, the imaging related disclosures of the prior art, any motivation to combine nor not combine the prior art, and what combinations would and would not have been obvious to one of ordinary skill in the art with a reasonable expectation of success.

V. Claim Construction of Terms of the '124 patent

35. I have been informed that for purposes of *inter-partes* reviews, the standard for claim construction of terms within the claims of the patent is the same

as that applied in federal district court litigation. I have been asked to assume that the claim terms otherwise have their plain and ordinary meaning to a person skilled in the art in light of the specification and the prosecution history.

36. I have reviewed the claim-construction related portions of Dr. Keener's brief as well as the arguments regarding claim construction in the Petition. My opinions remain the same regardless of which plain and ordinary meaning of the terms (PO's or Petitioner's) is adopted.

VI. Overview of Prior Art

37. I have reviewed the prior art that Petitioner relies upon in each of their grounds. I have also reviewed Dr. Keener's declaration wherein he provides an "Overview of Prior Art." Dr. Keener's description is consistent with my own understanding, based on my own review of the prior art, and I adopt and incorporate the same by reference. *See* Ex. 2002, ¶¶87-103. That said, because some of Petitioner's arguments misapprehend the Pierre disclosure, some additional explanation about Pierre is relevant to my opinions, which I provide below.

A. Pierre

38. As an initial matter, Pierre is a reference that Petitioner relies upon for, among other things, alleged disclosure of a "database of images" that, together with the captured image of a chick, is used in a "comparison" or "determination" for

detecting something about a chick that a system wants to know (e.g., sex, health, etc.). But, Pierre does not disclose “a database” at all, much less one of images of the particular features claimed. Instead, Pierre discloses that while a chick has been put into free-fall, a camera takes a picture (or in some cases multiple pictures) of the chick, and then compares it to a **single image** (not a database of images) that it calls a “reference image.” Pierre (Ex. 1004), 4 (“comparison with [[a]/[the]] reference image”), 5 (same), 6 (same), 7 (same), 8 (same), 9 (same). The single reference image, and not a database of images, is thus used during processing. *Id.*, 5-7.

39. Relying only on information from a single reference image comes with the advantage of requiring less computing resources (e.g., no database or equivalent is required), but comes at the expense of accuracy. Pierre’s disclosure prioritizes a reduction in the use of computing resources, and instead prompts the POSITA to employ enhanced image capture techniques to improve accuracy. For example, Pierre discloses that the camera must be optimized “such that the image captured for image processing may be optimal for comparison with a reference image useful for each specific application.” Ex. 1004, 5-7. Some of the optimization techniques Pierre suggests involve “using reflective vision measuring” and “implementing lighting from above and a camera vertical to the place of the fall.” *Id.*, 6. Even so, Pierre recognizes the difficulty in capturing an image of the chick at just the right

time during the free-fall where the chick has opened its wings the optimal amount.

As an alternative, Pierre teaches that one could take multiple photos of the chick in free-fall. *Id.*, 6-7. Pierre encourages these image capture techniques and alternatives so that the captured image that comes closest to the single “reference image” can be used in the comparison.

40. Pierre discloses ways to improve the image capturing methods that will serve as the front-end inputs to the comparison with the “reference image” (Ex. 1004, 5-7), but, as explained in further detail below, Pierre never discloses any enhancement to the information it will be compared against (the “reference image”) that would even suggest the use of a “database of images” as claimed. There is no disclosure, teaching or suggestion in Pierre of any “database” of multiple “images” as claimed, or anything equivalent thereto, that is relied upon for a “comparison” with or “determination” about the chick in the captured image.

VII. GROUNDS 1-8 FAIL BECAUSE THEY ALL RELY ON PIERRE FOR A DISCLOSURE THAT PIERRE DOES NOT HAVE

41. All the independent claims require a “database of images” of some type, as well as a “comparison” made between a captured image and the “database of images,” or a “determination” made on the basis of the captured image and the “database of images.” Ex. 1001, Claims 1, 6, 9. Independent claim 1 of the ’124 Patent requires “a database of images of male and female wing patterns for the

particular breed” and further that the “image of the chick” is “compared to the database to determine the sex.” *Id.*, Claim 1. Claims 2-5 inherit these limitations by virtue of their dependency on Claim 1. *Id.*, Claims 2-5. Similarly, independent claim 6 of the ’124 Patent requires “a database of images of healthy and unhealthy chicks of the same breed” and further that the “image of the chick” is “compare[d] . . . to the database of images to detect a deviation from the database of images.” *Id.*, Claim 6. Claims 7-8 inherit these limitations by virtue of their dependency on Claim 6. *Id.*, Claims 7-8. Similarly, independent claim 9 of the ’124 Patent requires “a database of images of a predetermined feature of a chick therein” and further requires “processing” of the “image of the chick” and “determining deviation from the database of images.” *Id.*, Claim 9. Claims 10-18 inherit these limitations by virtue of their dependency on Claim 9. *Id.*, Claims 10-18.

42. Every single ground (Grounds 1-8) in the Petition relies upon Pierre as disclosing and/or rendering obvious the foregoing “database of images . . .” limitations, as well as the “comparison” and/or “determining” limitations that relate to the “database of images.” Pierre’s disclosure thus impacts all the claims and all of Petitioner’s grounds. For brevity, in some instances below I will refer to all of the “database of images . . .” limitations, collectively, as the “Database Limitations.” Similarly, also for brevity, in some instances below I will refer to all of the

“comparison” and/or “determining” limitations, collectively, as the “Comparison Limitations.”

43. All of Grounds 1-8 improperly rely on Pierre as disclosing a teaching it does not have, whether considered alone or in combination with the teachings from the other references Petitioner relies upon or based on the knowledge of the POSITA. In my opinion, neither Pierre nor the proposed combinations of references that Petitioner proposes discloses and renders obvious the Database Limitations or the Comparison Limitations, and for that reason all of Petitioner’s grounds fail as detailed further below.

A. Pierre Does Not Disclose or Render Obvious The Database Limitations

44. All of Petitioner’s grounds cite to Pierre as disclosing and rendering obvious the Database Limitations, but Pierre does not. Based on my review of the Petition, the Petitioner lays out its reliance on Pierre for the Database Limitations as follows:

- **Ground 1:** With reference to Ground 1 Petitioner admits that Gershman does not explicitly teach that the computer includes a database of images of male and female wing patterns,” and instead relies upon Pierre’s disclosure of “reference images recording a specific state” of a bird for this limitation, arguing that “[i]t would have been obvious to a POSITA to store the reference images of male and female wing patterns taught by Pierre in a database” and that such a “database” of the Database Limitations could be “in the computer of Gershman.” Pet. at 23-24 (Ground 1).

- **Ground 2:** With reference to Ground 2, Petitioner admits that “Yavnai does not expressly teach the claimed database of images,” and instead relies upon Pierre’s disclosure of “reference images recording a specific state” of a bird for this limitation, and similarly argues, without citation that “[i]t would have been obvious to store a collection of reference images in a database to organize the collection of reference images.” Petitioner appears to imply that such a “database” of the Database Limitations would be in “a computer processor” of Yavnai. Pet. at 27-28 (Ground 2).
- **Ground 3:** With reference to Ground 3, Petitioner does not even mention Goodwin in connection with the Database Limitations, and instead points directly to the limited disclosures in Pierre and again argues, without citation, that “[i]t would have been obvious to store a collection of reference images in a database to organize the collection of reference images.” Pet. at 31-32, 34-35 (Ground 3). Petitioners are silent about where the “database” would be hosted or which system (Pierre’s or Goodwin’s) would be modified to include the undisclosed “database.” *Id.*
- **Ground 4:** With reference to Ground 4, Petitioner relies on Pierre alone to disclose Database Limitations, citing the same limited disclosure it pointed to in Grounds 1-3 (“reference images recording a specific state”), and repeating substantially the same conclusory statement as to obviousness that it stated in Grounds 1-3 (“[i]t would have been obvious to store a collection of reference images in a database to organize the collection of reference images.”). *See supra*; *see also* Pet. at 37-38. Unlike Grounds 1 and 2, Petitioners do not point to any disclosure of either reference (Pierre or Gershman) for the claimed “computer processor” limitation, and instead remain silent about what disclosure corresponds to an element that could, if at all, host the recited “database.”
- **Ground 5:** With reference to Ground 5, Petitioner refers back to Ground 3 for purposes of the Database Limitations, and thus relies on Pierre exactly as stated above for Ground 3. *See supra*; *see also* Pet. at 41.

- **Ground 6:** With reference to Ground 6, Petitioner refers back to Ground 4 for purposes of the Database Limitations, and thus relies on Pierre exactly as stated above for Ground 4. *See supra*; *see also* Pet. at 42.
- **Ground 7:** With reference to Ground 7, Petitioner refers back to Ground 1 for purposes of the Database Limitations, and thus relies on Pierre exactly as stated above for Ground 1. *See supra*; *see also* Pet. at 43. Then, for purposes of the Database Limitations of claims 9-15, Petitioner repeats substantially the same argument it relied on in Ground 1. Petitioner acknowledges that “Gershman does not explicitly teach that the computer includes a database of images” and then repeats the argument, again without citation, that “[i]t would have been obvious to store a collection of reference images in a database in order to organize the collection of reference images.” Pet. at 48. Petitioner states for Ground 7 that the images of Pierre would be stored in the computer system of Gershman. *Id.*
- **Ground 8:** With reference to Ground 8, Petitioner refers back to Ground 2 for purposes of the Database Limitations of claim 2. Pet. at 54. Then, for Purposes of the Database Limitations of claims 9-18, Petitioner repeats substantially the same argument it relied on in Ground 2. Petitioner acknowledges that “Yavnai does not expressly teach the claimed database of images” and then repeats the argument, again without citation, that “[i]t would have been obvious to store a collection of reference images in a database to organize the collection of reference images.” Pet. at 58-59. Petitioner states for Ground 8 that the images of Pierre would be stored in the computer system of Yavnai. Pet. at 59.

45. In some instances, Petitioner argues that computing systems of some other references (*e.g.*, the “computer” of Gershman, the “computer processor” of Yavnai) make it obvious that Pierre’s reference image would be stored in a “database,” but ultimately Petitioner relies on Pierre for the disclosure of this

element. A “computer” or “computer processor” is not a database and Petitioner sets forth no evidence showing why a POSITA would modify Pierre to include a database. In my opinion, Pierre fails, alone or in combination with Gershman, Goodwin, Yavnai or Tao, to disclose or render obvious the Database Limitations as claimed. See Ex-1001 at 6:54-8:45. I summarize why further below.

1. Pierre does not include a “database” (All Claims)

46. Petitioner relies on Pierre as disclosing and rendering obvious the “*database* of images of male and female wing patterns for the particular breed” (Claim 1), “*database* of images of healthy and unhealthy chicks of the same breed” (Claim 6), and “*database* of images of a predetermined feature of a chick” (Claim 9). Ex. 1001, 6:60-67, 7:25-31, 8:1-6. But, Pierre does not disclose “a database” at all, much less one of images of the particular features claimed. Instead, Pierre teaches that an image of a chick is compared to a **single** pre-identified reference image. Ex. 1004, 4 (“means for image processing comprising means for image comparison, in order to compare an image of opened wings captured by said camera selected for each bird being examined. . . with **a reference image**); 5 (“[t]he implementation of the invention is then quite particularly useful for making a decision about the destination of each chick as a function of the results of the examination of its plumage in comparison with **a reference image** may specifically

be done so as to reveal variations in sizes of one row of feathers or another, because differences in plumage that are seen clearly, for example between a rooster and a hen, are already detectable at an early stage in the growth of the chick.”); 5 (“[f]or this purpose, the capturing of the digital image used for processing by comparison with a reference image”). The single reference image Pierre teaches to use for the comparison is associated with the particular breed of bird, its stage of growth, or particular application. *Id.*, 5. (“image processing may be optimal for comparison with a reference image useful for each specific application”); *id.* (“the invention finds a particularly advantageous application in the industrial breeding of poultry when applied to the young chicks of each batch breed”); *id.* (teaching that the single “reference image” is for “similar chicks at the same stage of growth”).

47. In sum, the comparison in Pierre is *always* to a single reference image. By contrast, the ’124 Patent requires that a database consisting of multiple images is the basis for which the claimed “comparison” occurs, which has the advantage of increasing the classification accuracy (*e.g.*, “female” vs. “male” determination). It follows, then, that Pierre also does not disclose nor suggest comparing an image of a chick to a database of images either (or making a determination on the basis of the multiple images in the database), as required by all independent claims. *See* Ex. 1001, 6:54-67 (Claim 1), 7:17-32 (Claim 6), 7:40-8:16 (Claim 9). A POSITA would

have recognized this material distinction from the claims based on the disclosures of Pierre, but Petitioner appears to have ignored this. For example, Petitioner's arguments all seemingly assume that if you have only one reference image, then there must be a database storing it somewhere in the image processing system, or there would be a motivation to store it in a database in the image processing system. But that is not the case. A POSITA would have understood that databases include a level of organization and/or structure that is not needed in Pierre at least because the captured images of Pierre are only ever compared with a single "reference image".

2. Pierre does not disclose that the captured image of the chick is "compared to the database to determine the sex" (Claims 1-5) or "compare[d] . . . to the database of images to detect a deviation from the database of images" (Claims 6-8)

48. As noted above, all the independent claims include Comparison Limitations. More specifically, independent claim 1 of the '124 Patent requires "a database of images of male and female wing patterns for the particular breed" and further that the "image of the chick" is "compared to the database to determine the sex." Ex. 1001, Claim 1. Similarly, independent claim 6 of the '124 Patent requires "a database of images of healthy and unhealthy chicks of the same breed" and further that the "image of the chick" is "compare[d] . . . to the database of images to detect

a deviation from the database of images.” *Id.*, Claim 6. Pierre fails to disclose these limitations.

49. Petitioner relies upon Pierre as disclosing and rendering obvious these Comparison Limitations in each and every Ground, but Pierre does not. *See supra*. To do so, Petitioner states that “Pierre teaches that a digital image is compared with reference images to determine the sex of a chick.” Pet. at 24, citing Ex. 1004, page 5. However, Petitioner overlooks that Pierre does not teach that anything is compared with “reference images” in the plural form. More specifically, for purposes of claims 1-5, the single “reference image” of Pierre could only be, at best, **either** a male or female, **but not both**. Similarly, for purposes of claims 6-8, the single “reference image” could only be, at best, **either** healthy or unhealthy chick, **but not both**. While Pierre makes one reference to “reference images”, it is merely recognizing the fact that the single reference image that the system uses may depend on what the system is designed to analyze (e.g., the type or state of animals being examined). But in the end, the system compares only the individual captured images of the chick to a single “reference image” (not a database or anything equivalent thereto).

50. Notably, and also for purposes of claims 6-8, Pierre says absolutely nothing about how a single reference image can be used to reliably and successfully

determine whether a chick is healthy or not. From an image processing perspective, this type of information needs to be provided because there are simply too many ways a chick could be unhealthy for a single reference image to be the basis for that determination. *See, e.g.,* Ex. 1001, 1:31-63 (referencing “any physical abnormalities,” including but not limited to “malformed or disabled leg or foot or malformed beak or eye.”)

51. A POSITA would understand that Pierre’s system neither requires nor suggests the use of a database, and certainly not one that includes multiple images reflecting two different binary states (e.g., male chicks and female chicks) to inform a comparison with a captured image to make a decision about a given chick’s characteristics. This is another material distinction between the claimed technology and the Pierre system that a POSITA would have recognized but Petitioner appears to have ignored. Thus, for the objectives achieved by the ’124 patent (e.g., sexing a chick, determining health of a chick), it would not have been obvious to a POSITA, and there would not have been any apparent need from the perspective of a POSITA, to store Pierre’s single reference image in a database for purposes of some unnecessary “organization” that Petitioner purports to impute to Pierre.

52. Accordingly, each of Petitioner’s Grounds fails for their misplaced reliance upon Pierre for disclosing something it does not in fact disclose:

comparison of a captured image of a chick against a database of multiple images of chicks.

VIII. Conclusion

53. For the reasons set forth above, I believe claims 1-18 of the '124 patent are not obvious in view of the prior art and grounds presented in the Petition. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

54. I declare that all statements made herein of my knowledge are true, that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: November 12, 2024

By: 
Lina Karam, Ph.D.