Machine Learning Goes 0 for 3 on Patent Eligibility at the Federal Circuit in *Dental Monitoring v. Align Tech.*

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In today's *Dental Monitoring SAS v. Align Tech., Inc.* (nonprecedential), the Federal Circuit once again struck down claims directed to machine learning (ML) for patent ineligibility under 35 U.S.C. § 101. This is the third time that ML has failed at the Federal Circuit: the first time was *Recentive* and the second time was *Rensselaer Polytechnic Inst*. Of course, the instrument of death was the *Electric Power Group* (*EPG*) case. You might ask: is it time to sound the alarm? Well, that's for you to decide.

This case involved two patents: the '248 and the '409. The '248 patent assesses "the shape of an orthodontic aligner using a 'deep learning device'" and the '409 patent acquires an image of a dental arch and analyzes it using a "deep learning device." The court explained that a "'deep learning device' is a machine learning device that, through training, can analyze images and recognize patterns within the images." The representative claims were claim 14 of the '248 patent and claim 12 of the '409 patent.

'248 Patent

> 1. A method for assessing the shape of an orthodontic aligner, said method comprising the following steps:
>
> a) more than 1 week after the start of the treatment with the aligner, acquisition of at least one image at least partially representing the

aligner in a service position in which it is worn by a patient, called "analysis image", the analysis image being a photograph, or an image extracted from a film;

b) analysis of the analysis image by means of a deep learning device, trained by means of a learning base, so as to determine a value

for at least one tooth attribute of an "analysis tooth zone" representing, at least partially, a tooth on said analysis image, the tooth attribute relating to a separation between the tooth represented by the analysis tooth zone, and the aligner represented on the analysis image,

in the step a), a cellphone is used to acquire the analysis image.

14. The method as claimed in claim 1, in which the step b) comprises the following steps:

1) creation of a learning base comprising more than 1000 images of dental arches, or "historical images", each historical image representing an aligner worn by a "historical" patient and comprising one or more zones each representing a tooth, or "historical tooth zones", to each of which, for at least one tooth attribute relating to a separation between the tooth represented by the historical tooth zone considered, and the aligner represented, a tooth attribute value is assigned;

2) training of at least one deep learning device, by means of the learning base;

3) submission of the analysis image to the deep learning device for it to determine at least one probability relating to:

the presence, in a location of said analysis image, of an analysis tooth zone; and

the attribute value of the tooth represented on said analysis tooth zone;

4) determination, as a function of said probability, of an amplitude of said separation.

’409 Patent

1. A method for acquiring an image of a dental arch of a patient, said method comprising the following steps:

a) activation of an image acquisition apparatus so as to acquire an image, called “analysis image”, of said arch;

b) analysis of the analysis image by means of a deep learning device trained by means of a learning base;

c) determination, for the analysis image, as a function of the results of the analysis in the preceding step, of a value for an image attribute;

d) comparison of said image attribute value with a setpoint;

e) sending of an information message as a function of said comparison, the information message being related to the quality of the image acquired or to the position of the acquisition apparatus in relation to said arch or to the setting of the acquisition apparatus or to the opening of the mouth or to the wearing of a dental appliance, or to a combination thereof,

to check whether the analysis image respects the setpoint and, if it does not respect the setpoint, to a new analysis image.

7. The method as claimed in claim 1, in which the step b) comprises the following steps:

1) creation of a learning base comprising more than 1000 images of dental arches, or “historical images”, each historical image comprising an attribute value for at least one image attribute, or “image attribute value”;

2) training of at least one deep learning device by means of the learning base;

3) submission of the analysis image to the deep learning device for it to determine, for said analysis image, at least one probability relating to said image attribute value.

> 12. The method as claimed in claim 1, in which the information message is sent by the acquisition apparatus.

The district court had granted summary judgment of patent ineligibility under 35 U.S.C. § 101, and the Federal Circuit affirmed. At *Alice's* step one, the Federal Circuit found that the '248 patent's claim 14 was directed to "the abstract idea of collecting and analyzing image information using a deep learning device." And the Federal Circuit found that the '409 patent's claim 12 was directed to "the abstract idea of image acquisition, analysis via a 'deep learning device,' comparison to a setpoint, and transmittal of the analysis result."

Here's the interesting part. The Federal Circuit applied *EPG* to both claims:

> Both claims thus fall within the "familiar class of [patent-ineligible] claims" that focus on "collecting information, analyzing it, and displaying certain results of the collection and analysis." *See Elec. Power Grp.*, 830 F.3d at 1353–54 (holding claims ineligible that "gather[ed] and analyz[ed] information of a specified content, then display[ed] the results").

The court then held that the "deep learning device" did not help the claims escape the grasp of *EPG* because the claims "simply apply machine learning to the above-mentioned abstract ideas in a new environment—the field of dental arch image analysis." (citing *Recentive*)

The claims at issue are specific and detailed, which oftentimes has saved claims (*see e.g., McRO*). But that was not enough for the court here:

> Furthermore, while [the claims] require that the "deep learning device" be trained in a specific manner —i.e., on a "learning base" comprising more than a thousand images of dental arches, see '248 pat., col. 34 ll. 21–33; '409 pat., col. 33 ll. 12–17—that does not mean they provide a specific technological solution that would render the claims patent-eligible. That a "deep learning device" be trained on a specific subset of data is "incident to the very nature of machine learning," and thus is

> not a "technological improvement" rendering the claims eligible under § 101. *See Recentive*, 134 F.4th at 1212.

At *Alice's* step two, the court found that there was no inventive concept because the "deep learning device" in each claim was conventional, stating "the patents themselves explain that the device can be chosen from a list of well-known and available neural networks." The patent owner argued that the "'deep learning device' must be trained in a specific process." But the court held that a specially trained machine learning model "'is incident to the very nature of machine learning'" and training the "deep learning device" on specific images "does not make the 'deep learning device' *itself* non-generic." (emphasis in original)

The patent owner also argued that using "deep learning devices" for orthodontic treatment was not conventional. The court responded:

> But that misses the mark because "the relevant inquiry is not whether the claimed invention as a whole is unconventional or non-routine." Rather, we look for an "inventive concept" that "transforms the claims into something 'significantly more'" than the abstract idea. To the extent that Dental Monitoring considers the "deep learning device" to be "something significantly more" so as to render the claims patent-eligible, that argument is unavailing given that the patents themselves confirm that the "deep learning device" is generic.

(citations omitted) This is a little confusing because conventionality is certainly a part of the *Alice* two-step test. I think what the court is saying here is that a nonconventional abstract idea is still an abstract idea.

<u>Key takeaways</u>:

1. *EPG* continues to serve as the Federal Circuit's weapon of choice in striking down claims for patent ineligibility. It is used for data analysis/manipulation claims directed to artificial intelligence like ML, business methods (*see e.g.,* the *Trading Technologies* cases), and

mental steps/organizing human activity (*see e.g., Univ. of Fla. Research Found.*).

2. Reciting significant details in the claims will not necessarily save them from *EPG*, as we saw here.

3. Beware: ML is treated differently by the Federal Circuit and the USPTO. As I've often said, I'd love to see what the Federal Circuit would do with the claims from the PTAB's *Ex Parte Desjardins* decision.

4. Lastly, adding generic components—even for highly complex technology like ML—to a known process is likely insufficient for patent eligibility.