

# PRACTICAL APPLICATIONS OF RECENT USPTO PATENT ELIGIBILITY EXAMPLES

JULY 2024

## PRACTICAL APPLICATIONS OF RECENT USPTO PATENT ELIGIBILITY EXAMPLES

The United States Patent and Trademark Office (USPTO) has released new guidance on patent subject matter eligibility (the Guidance), with a particular focus on artificial intelligence (AI) and related technologies. As noted by the Guidance, subject matter eligibility analysis for AI and AI-related technologies applies the existing *Alice/Mayo* test. While the *Alice/Mayo* test is unchanged, the Guidance provides a discussion on how to evaluate AI-related claims. The Guidance, exemplified in **examples 47 to 49**, provides a clear framework for understanding how AI inventions can be assessed for eligibility under 35 USC § 101.

This report will delve into these examples and their practical applications, providing stakeholders with insights into crafting eligible patent claims.

### USPTO'S SUBJECT MATTER ELIGIBILITY ANALYSIS

The USPTO's subject matter eligibility analysis consists of two steps. Step 1 of the subject matter eligibility analysis includes determining whether the claimed invention falls into at least one of the four patent eligible categories—processes, machines, manufactures, and compositions of matter. Step 2 of the subject matter eligibility analysis applies the *Alice/Mayo* test.

The *Alice/Mayo* test applies a two-part framework to identify claims that are directed to a judicial exception and to then evaluate if additional elements of the claim provide an inventive concept. The USPTO has defined the *Alice/Mayo* test to include Step 2A and Step 2B.

Step 2A is a two-pronged inquiry:

- Prong One: Determining whether a claim recites a judicial exception
- Prong Two: Determining whether the claim integrates the recited judicial exception into a practical application of the exception (in which case the claim is eligible) or whether the claim is "directed to" the exception (in which case the claim requires further analysis at Step 2B).

Step 2B evaluates whether the claimed additional elements amount to significantly more than the recited judicial exception itself. Step 2B is similar to Step 2A Prong Two; however, Step 2B further considers whether an additional element (or combination of elements) is a well-understood, routine, conventional activity.

The USPTO provides the following examples to assist examiners and applicants.

#### Example 47: Anomaly Detection Using AI

Example 47 evaluates three independent claims that recite an artificial neural network (ANN) used to identify or detect anomalies. The example provides a short description of the technology and the technological improvement provided through the use of the invention. Claim 1 is directed to an integrated circuit for an ANN, including different components that form the ANN, Claim 2 is directed to a method of using an ANN, and Claim 3 is directed to a method of using an ANN to detect malicious network packets. Claims 1 and 3 were found to be patent eligible and Claim 2 was found to be patent ineligible.

#### *Example 47 – Claim 1 Analysis*

# Morgan Lewis

## Claim 1:

An application specific integrated circuit (ASIC) for an artificial neural network (ANN), the ASIC comprising:

a plurality of neurons organized in an array, wherein each neuron comprises a register, a microprocessor, and at least one input; and

a plurality of synaptic circuits, each synaptic circuit including a memory for storing a synaptic weight, wherein each neuron is connected to at least one other neuron via one of the plurality of synaptic circuits.

Applying the subject matter eligibility analysis to Claim 1, the Guidance explains that Claim 1 is **patent eligible** because Claim 1:

1. Falls within a statutory category (Step 1: Yes); and
2. Does not recite a judicial exception (Step 2A Prong One: No).

The Guidance explains that Claim 1 recites a physical circuit (e.g., a machine and/or manufacture) and, instead of reciting a judicial exception, recites hardware components that form an ANN.

*Takeaway:* Claims that recite circuits and hardware components that form AI-related technology are less likely to face 35 USC § 101 challenges.

## *Example 47 – Claim 3 Analysis*

### Claim 3:

A method of using an artificial neural network (ANN) to detect malicious network packets comprising:

(a) training, by a computer, the ANN based on input data and a selected training algorithm to generate a trained ANN, wherein the selected training algorithm includes a backpropagation algorithm and a gradient descent algorithm;

(b) detecting one or more anomalies in network traffic using the trained ANN;

(c) determining at least one detected anomaly is associated with one or more malicious network packets;

(d) detecting a source address associated with the one or more malicious network packets in real time;

(e) dropping the one or more malicious network packets in real time; and

(f) blocking future traffic from the source address.

Applying the subject matter eligibility analysis to Claim 3, the Guidance explains that Claim 3 is **patent eligible** because Claim 3:

1. Falls within a statutory category (Step 1: Yes);
2. Recites a judicial exception (Step 2A Prong One: Yes); and

# Morgan Lewis

3. Does integrate the recited judicial exception into a practical application (Step 2A Prong Two: Yes).

The Guidance explains that Claim 3 recites a process, which is within a statutory category. However, because Claim 3 recites an abstract idea (e.g., mental process and mathematical concepts), the Guidance explains that Claim 3 needs to be analyzed under Step 2A Prong Two. As the Guidance explains, one way to determine whether a judicial exception is integrated into a practical application is when the claimed invention **improves the functioning of a computer** or **improves another technology or technical field** (such an inquiry requires an evaluation of the specification and the claim to ensure that a technical explanation of the asserted improvement is present in the specification, and that the claim reflects the asserted improvement).

In analyzing Claim 3, the Guidance explains that the limitations of Claim 3 (e.g., limitations (d)–(f), reproduced above) reflect an improvement in the technical field identified by the specification (e.g., **improvement in network intrusion detection**). Specifically, the Guidance explains that Claim 3, as a whole, **integrates the judicial exception into a practical application** (such that the claim is not directed to the judicial exception) because the limitations of Claim 3 reflect the improvement described in the specification. Therefore, Claim 3 satisfied the *Alice/Mayo* test and was found to be patent eligible.

*Takeaway:* Reciting limitations in an AI-related claim that capture a technological improvement identified in the specification can overcome 35 USC § 101 challenges.

## *Example 47 – Claim 2 Analysis*

Claim 2:

A method of using an artificial neural network (ANN) comprising:

- (a) receiving, at a computer, continuous training data;
- (b) discretizing, by the computer, the continuous training data to generate input data;
- (c) training, by the computer, the ANN based on the input data and a selected training algorithm to generate a trained ANN, wherein the selected training algorithm includes a backpropagation algorithm and a gradient descent algorithm;
- (d) detecting one or more anomalies in a data set using the trained ANN;
- (e) analyzing the one or more detected anomalies using the trained ANN to generate anomaly data; and
- (f) outputting the anomaly data from the trained ANN.

Applying the subject matter eligibility analysis to Claim 2, the Guidance explains that Claim 2 is patent ineligible because Claim 2:

1. Falls within a statutory category (Step 1: Yes);
2. Recites a judicial exception (Step 2A Prong One: Yes);
3. Does not integrate the recited judicial exception into a practical application (Step 2A Prong Two: No); and

# Morgan Lewis

4. Does not, as a whole, amount to significantly more than the recited exception (Step 2B: No).

The Guidance explains that Claim 2 recites a process, which is within a statutory category. However, because Claim 2 recites an abstract idea (e.g., mental process and mathematical concepts), the Guidance explains that Claim 2 needs to be analyzed under Step 2A Prong Two.

The Guidance explains that the limitations of Claim 2 do not impose any meaningful limitation on Claim 2 and merely recite using an ANN trained using conventional algorithms, thus failing to integrate the recited judicial exception into a practical application. Because Claim 2 failed to integrate the recited judicial exception into a practical application under Step 2A Prong Two, Claim 2 was analyzed under Step 2B. However, as the Guidance further explained, Claim 2 does not provide an inventive concept because the additional elements of Claim 2 represent mere instructions to implement an abstract idea or other exception on a computer and insignificant extra-solution activity. Thus, Claim 2 failed to satisfy the *Alice/Mayo* test and was found to be patent ineligible.

*Takeaway:* Limitations that recite training of a model using a judicial exception (e.g., a mathematical concept, such as an algorithm) and/or using a model trained using a judicial exception, without more, are not likely to overcome 35 USC § 101 challenges. However, as shown by previously published Example 39, claims related to training AI models that do not recite a judicial exception and recite features that meaningfully limit the training of a model are patent eligible under 35 USC § 101. Additionally, as shown by Example 47 Claim 3, reciting limitations that connect the training of the model and/or the use of the trained model to technological improvements identified in the specification can make AI-related claims patent eligible.

## Example 48: Speech Separation Technology

Example 48 evaluates three claims that recite AI-based methods of analyzing speech signals and separating desired speech from extraneous or background speech. The example provides a short description of the technology and the technological improvement provided through the use of the invention. Claim 1 is directed to a method of using a deep neural network (DNN) to determine embedding vectors, Claim 2 depends from Claim 1 and is directed to using the determined embedding vectors to generate and transmit a mixed speech signal for storage, and Claim 3 is directed to a method of using a DNN to convert a mixed speech signal  $x$  into embeddings that are used to generate a transcript. Claim 1 was found to be patent ineligible and Claims 2 and 3 were found to be patent eligible.

### Example 48 – Claim 1 Analysis

Claim 1:

A speech separation method comprising:

- (a) receiving a mixed speech signal  $x$  comprising speech from multiple different sources  $s_n$ , where  $n \in \{1, \dots, N\}$ ;
- (b) converting the mixed speech signal  $x$  into a spectrogram in a time-frequency domain using a short time Fourier transform and obtaining feature representation  $X$ , wherein  $X$  corresponds to the spectrogram of the mixed speech signal  $x$  and temporal features extracted from the mixed speech signal  $x$ ; and
- (c) using a deep neural network (DNN) to determine embedding vectors  $V$  using the formula  $V = f_{\theta}(X)$ , where  $f_{\theta}(X)$  is a global function of the mixed speech signal  $x$ .

# Morgan Lewis

Applying the subject matter eligibility analysis to Claim 1, the Guidance explains that Claim 1 is patent ineligible because Claim 1:

1. Falls within a statutory category (Step 1: Yes);
2. Recites a judicial exception (Step 2A Prong One: Yes);
3. Does not integrate the recited judicial exception into a practical application (Step 2A Prong Two: No); and
4. Does not, as a whole, amount to significantly more than the recited exception (Step 2B: No).

The Guidance explains that Claim 1 recites a process, which is within a statutory category. However, because Claim 1 recites an abstract idea (e.g., mental process and mathematical concepts), the Guidance explains that Claim 1 needs to be analyzed under Step 2A Prong Two.

The Guidance explains that the limitations of Claim 1 do not impose any meaningful limitation on Claim 1 and merely recite using a DNN to determine embedding vectors, thus failing to integrate the recited judicial exception into a practical application. Because Claim 1 failed to integrate the recited judicial exception into a practical application under Step 2A Prong Two, Claim 1 was analyzed under Step 2B. However, as the Guidance further explained Claim 1 does not provide an inventive concept because the additional elements of Claim 1 represent mere instructions to implement an abstract idea or other exception on a computer and insignificant extra-solution activity. Therefore, Claim 1 failed to satisfy the *Alice/Mayo* test and was found to be patent ineligible.

*Takeaway:* Detail and specificity is important in the evaluation of AI-related claims under 35 USC § 101. The Guidance emphasized the technical problem and solution identified by the specification and the relationship between the claims and the technical solution. As shown by Example 47 Claim 3, reciting limitations that connect AI-related claims to technological improvements (or solutions) identified in the specification, can make AI-related claims patent eligible. It is noted that the additional information on how the model operates or how the model solves a technical problem, may make the model non-generic (and make the model patent eligible).

## *Example 48 – Claim 2 Analysis*

Claim 2:

The speech separation method of claim 1 further comprising:

- (d) partitioning the embedding vectors  $V$  into clusters corresponding to the different sources  $s_n$ ;
- (e) applying binary masks to the clusters to create masked clusters;
- (f) synthesizing speech waveforms from the masked clusters, wherein each speech waveform corresponds to a different source  $s_n$ ;
- (g) combining the speech waveforms to generate a mixed speech signal  $x'$  by stitching together the speech waveforms corresponding to the different sources  $s_n$ , excluding the speech waveform from a target source  $s_s$  such that the mixed speech signal  $x'$  includes speech waveforms from the different sources  $s_n$  and excludes the speech waveform from the target source  $s_s$ ; and

# Morgan Lewis

(h) transmitting the mixed speech signal  $x'$  for storage to a remote location.

Applying the subject matter eligibility analysis to Claim 2, the Guidance explains that Claim 2 is **patent eligible** because Claim 2:

1. Falls within a statutory category (Step 1: Yes);
2. Recites a judicial exception (Step 2A Prong One: Yes); and
3. Does integrate the recited judicial exception into a practical application (Step 2A Prong Two: Yes).

The Guidance explains that Claim 2 recites a process, which is within a statutory category. However, because Claim 2 recites an abstract idea (e.g., mental process and mathematical concepts), the Guidance explains that Claim 2 needs to be analyzed under Step 2A Prong Two.

In analyzing Claim 2, the Guidance explains that Claim 2 expands on the features of Claim 1 by including **limitations that reflect improvements in the technical field**, as discussed in the specification (e.g., creating a new speech signal that no longer contains extraneous speech signals from unwanted sources). The Guidance explains that Claim 2, as a whole, integrates the judicial exception into a practical application (such that the claim is not directed to the judicial exception) because the limitations of Claim 2 (e.g., limitations (f) and (g), reproduced above) reflect the **technical improvement in the technical field** as described in the specification. Thus, Claim 2 satisfied the *Alice/Mayo* test and was found to be patent eligible.

*Takeaway:* Reciting limitations in an AI-related claim that capture an improvement to technology and/or a technical field can overcome 35 USC § 101 challenges. The improvements to technology and/or the technical field should have support in the specification.

## Example 48 – Claim 3 Analysis

Claim 3:

A non-transitory computer-readable storage medium having computer-executable instructions stored thereon, which when executed by one or more processors, cause the one or more processors to perform operations comprising:

- (a) receiving a mixed speech signal  $x$  comprising speech from multiple different sources  $s_n$ , where  $n \in \{1, \dots, N\}$ , at a deep neural network (DNN) trained on source separation;
- (b) using the DNN to convert a time-frequency representation of the mixed speech signal  $x$  into embeddings in a feature space as a function of the mixed speech signal  $x$ ;
- (c) clustering the embeddings using a k-means clustering algorithm;
- (d) applying binary masks to the clusters to obtain masked clusters;
- (e) converting the masked clusters into a time domain to obtain  $N$  separated speech signals corresponding to the different sources  $s_n$ ; and
- (f) extracting spectral features from a target source  $s_d$  of the  $N$  separated speech signals and generating a sequence of words from the spectral features to produce a transcript of the speech signal corresponding to the target source  $s_d$ .

# Morgan Lewis

Applying the subject matter eligibility analysis to Claim 3, the Guidance explains that Claim 3 is **patent eligible** because Claim 3:

1. Falls within a statutory category (Step 1: Yes);
2. Recites a judicial exception (Step 2A Prong One: Yes); and
3. Does integrate the recited judicial exception into a practical application (Step 2A Prong Two: Yes).

The Guidance explains that Claim 3 recites a manufacture, which is within a statutory category. However, because Claim 3 recites an abstract idea (e.g., mental process and mathematical concepts), the Guidance explains that Claim 3 needs to be analyzed under Step 2A Prong Two.

In analyzing Claim 3, the Guidance explains that Claim 3 includes additional limitations (e.g., limitations (e) and (f), reproduced above) that **integrate the abstract idea into a practical application** (e.g., speech-to-text). The Guidance explains that the ordered combination of the recited limitations reflect the technical improvements to speech-to-text technology provided in the disclosure by making individual transcriptions of each separated speech signal possible. Thus, Claim 3 satisfied the *Alice/Mayo* test and was found to be patent eligible.

*Takeaway:* Claims reciting outputs of AI-related models can be patent eligible under 35 USC § 101 if the claims recite limitation that identify an improvement to technology or the technical field described in the specification.

## Example 49: Personalized Medical Treatment

Example 49 evaluates two claims that recite an AI-based model that is designed to assist in personalizing medical treatment to the individual characteristics of a particular patient. The example provides a short description of the technology and the technological improvement provided through the use of the invention. Claim 1 is directed to a method of identifying high-risk patients using an AI model (the “ezAI model”) and administering an appropriate treatment to the high-risk patients, and Claim 2 depends from Claim 1 and identifies the appropriate treatment as Compound X eye drops. Claim 1 was found to be patent ineligible and Claim 2 was found to be patent eligible.

### *Example 49 – Claim 1 Analysis*

Claim 1:

A post-surgical fibrosis treatment method comprising:

- (a) collecting and genotyping a sample from a glaucoma patient to provide a genotype dataset;
- (b) identifying the glaucoma patient as at high risk of post-implantation inflammation (PI) based on a weighted polygenic risk score that is generated from informative single-nucleotide polymorphisms (SNPs) in the genotype dataset by an ezAI model that uses multiplication to weight corresponding alleles in the dataset by their effect sizes and addition to sum the weighted values to provide the score; and
- (c) administering an appropriate treatment to the glaucoma patient at high risk of PI after microstent implant surgery.



# Morgan Lewis

Applying the subject matter eligibility analysis to Claim 1, the Guidance explains that Claim 1 is patent ineligible because Claim 1:

1. Falls within a statutory category (Step 1: Yes);
2. Recites a judicial exception (Step 2A Prong One: Yes);
3. Does not integrate the recited judicial exception into a practical application (Step 2A Prong Two: No); and
4. Does not, as a whole, amount to significantly more than the recited exception (Step 2B: No).

The Guidance explains that Claim 1 recites a process, which is within a statutory category. However, because Claim 1 recites an abstract idea (e.g., mental process, mathematical concept, law of nature), the Guidance explains that Claim 1 needs to be analyzed under Step 2A Prong Two. The Guidance explains that the limitations of Claim 1 do not impose any meaningful limitation on Claim 1 and merely recite using the ezAI model to identify patients, thus failing to integrate the recited judicial exception into a practical application.

The Guidance further makes a distinction between improvements to the functioning of a computer or to any other technology, and improvement to an abstract idea. In particular, the Guidance acknowledged that the azAI model is an improvement over the PSR model (an existing model); however, notes that the improvement is to the abstract idea itself and not the technological field. Because Claim 1 failed to integrate the recited judicial exception into a practical application under Step 2A Prong Two, Claim 1 was analyzed under Step 2B. However, as the Guidance further explained, Claim 1 does not provide an inventive concept because the additional elements of Claim 1 represent mere application of data collection and routine laboratory techniques. Thus, Claim 1 failed to satisfy the *Alice/Mayo* test and was found to be patent ineligible.

*Takeaway:* The specification and AI-related claims should capture improvements to the functioning of a computer or to any other technology. AI-related claims focused on improved outputs of a model may be seen as improvements to an abstract idea and found patent ineligible.

## *Example 49 – Claim 2 Analysis*

Claim 2:

The method of claim 1, wherein the appropriate treatment is Compound X eye drops.

Applying the subject matter eligibility analysis to Claim 2, the Guidance explains that Claim 2 is **patent eligible** because Claim 2:

1. Falls within a statutory category (Step 1: Yes);
2. Recites a judicial exception (Step 2A Prong One: Yes); and
3. Does integrate the recited judicial exception into a practical application (Step 2A Prong Two: Yes).

The Guidance explains that Claim 2 recites a process, which is within a statutory category. However, because Claim 2 recites an abstract idea (e.g., mental process, mathematical concept, law of nature), the Guidance explains that Claim 2 needs to be analyzed under Step 2A Prong Two.

# Morgan Lewis

In analyzing Claim 2, the Guidance explains that Claim 2 expands on the features of Claim 1 by including a limitation that defines the appropriate treatment as Compound X eye drops. The Guidance explains that Claim 2, as a whole, integrates the judicial exception into a practical application (such that the claim is not directed to the judicial exception) because the limitations of Claim 2 apply **meaningful limits to the claim** (e.g., narrowing the applicability of the invention to a particular group and/or particular action). In particular, the limitations identify specific patients and a specific treatment for the specific patient. Thus, Claim 2 satisfied the *Alice/Mayo* test and was found to be patent eligible.

*Takeaway:* Limitations that meaningfully limit the scope of AI-related claims can overcome 35 USC § 101 challenges.

## CONCLUSION

The USPTO's recent examples provide valuable guidance on framing AI and AI-technology related claims to meet patent eligibility requirements. By focusing on practical applications and technological improvements, applicants can enhance their chances of securing patents. Stakeholders are encouraged to carefully craft their claims to emphasize specific improvements and practical applications, ensuring that their innovations are recognized as patent eligible.

For further details on these examples and their applications, refer to the USPTO's comprehensive index of eligibility examples and related guidance documents.

# Morgan Lewis

## ISSUE SPOTTING CHART

The Issue Spotting Chart included in the USPTO's examples provides a detailed breakdown of various considerations relevant to each example. This chart can help stakeholders quickly identify the specific issues addressed in each example and understand how they relate to the overall eligibility analysis.

Issue Spotting Chart	Anomaly Detection	Speech Separation	Fibrosis Treatment
Example Number	47	48	49
Claim Type			
Process	•	•	•
Product (Composition of Matter, Manufacture, and/or Machine)	•	•	
Judicial Exception			
Abstract Idea: Mathematical Concept	•	•	•
Abstract Idea: Mental Process	•	•	•
Abstract Idea: Certain Methods of Organizing Human Activity			
Law of Nature			•
Product of Nature			
Multiple exceptions in same claim	•	•	•
No recited exception	•		
Detailed Analysis			
Step 2A Prong One: Generally	•	•	•
Step 2A Prong One: Markedly Different Characteristics analysis			
Step 2A Prong Two: Exception Integrated into a Practical Application	•	•	•
Step 2B: Generally	•	•	•
Step 2B: Claim is eligible because it provides an Inventive Concept			
Considerations Discussed in Step 2A Prong Two and/or Step 2B			
Improvements to Functioning of a Computer or Other Technology	•	•	•
Particular Treatment or Prophylaxis (Prong Two only)			•
Particular Machine			
Particular Transformation			
Other Meaningful Limitations			
Mere Instructions to Apply an Exception	•	•	•
Insignificant Extra-Solution Activity	•	•	•
Field of Use and Technological Environment	•	•	•
Well-Understood, Routine, Conventional (WURC) Activity (Step 2B only)	•	•	•

# Morgan Lewis

## CONTACTS

If you have any questions or would like more information on the issues discussed in this report, please contact any of the following:

### Silicon Valley

Dion M. Bregman	+1.650.843.7519	<a href="mailto:dion.bregman@morganlewis.com">dion.bregman@morganlewis.com</a>
Manita Rawat	+1.650.843.7267	<a href="mailto:manita.rawat@morganlewis.com">manita.rawat@morganlewis.com</a>
Pablo Herrera	+1.650.843.7512	<a href="mailto:pablo.herrera@morganlewis.com">pablo.herrera@morganlewis.com</a>

### Orange County

Benjamin H. Pezzner	+1.714.830.0545	<a href="mailto:benjamin.pezzner@morganlewis.com">benjamin.pezzner@morganlewis.com</a>
---------------------	-----------------	--

## ABOUT US

Morgan Lewis is recognized for exceptional client service, legal innovation, and commitment to its communities. Our global depth reaches across North America, Asia, Europe, and the Middle East with the collaboration of more than 2,200 lawyers and specialists who provide elite legal services across industry sectors for multinational corporations to startups around the world. For more information about us, please visit [www.morganlewis.com](http://www.morganlewis.com).

# Morgan Lewis

At Morgan Lewis, we're always ready to respond to the needs of our clients and craft powerful solutions for them.

Connect with us     

[www.morganlewis.com](http://www.morganlewis.com)

© 2024 Morgan Lewis

Morgan, Lewis & Bockius LLP, a Pennsylvania limited liability partnership

Morgan Lewis Stamford LLC is a Singapore law corporation affiliated with Morgan, Lewis & Bockius LLP.

Morgan, Lewis & Bockius UK LLP is a limited liability partnership registered in England and Wales under number OC378797

and is a law firm authorised and regulated by the Solicitors Regulation Authority. The SRA authorisation number is 615176.

Our Beijing, Shanghai, and Shenzhen offices operate as representative offices of Morgan, Lewis & Bockius LLP.

In Hong Kong, Morgan, Lewis & Bockius is a separate Hong Kong general partnership registered with The Law Society of Hong Kong.

This material is provided for your convenience and does not constitute legal advice or create an attorney-client relationship.

Prior results do not guarantee similar outcomes. Attorney Advertising.

073124\_241404