

# Patentability of inventions using artificial intelligence (AI) and by AI

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WIPO SCP 34

September 2022

Japan Patent Office

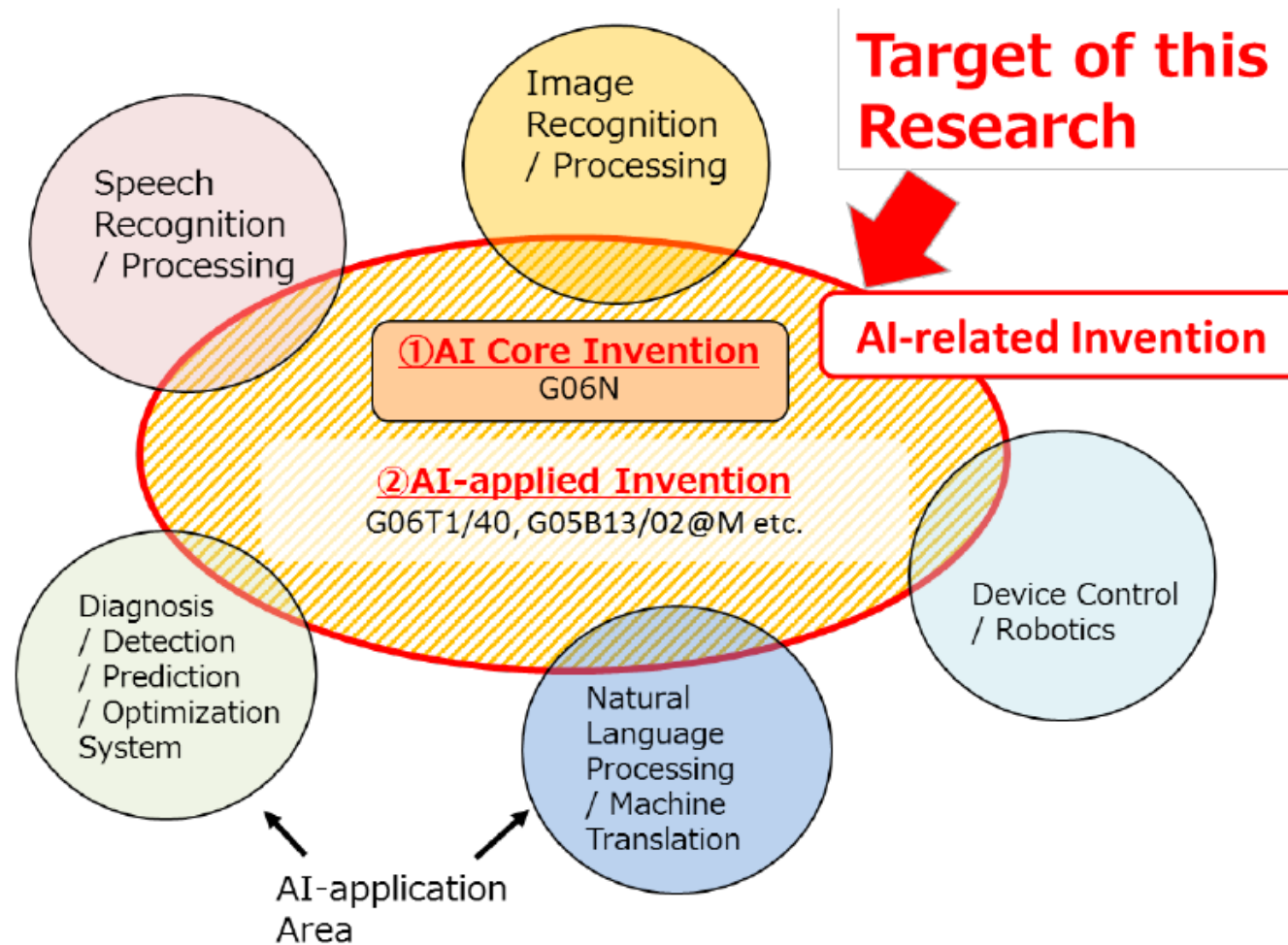
KUJI Jumpei



- 1 Application trends of AI-related inventions
- 2 Support for examination of AI-related inventions
- 3 Inventions with AI as the inventor

# 1. Application trends of AI-related inventions

# AI-related inventions



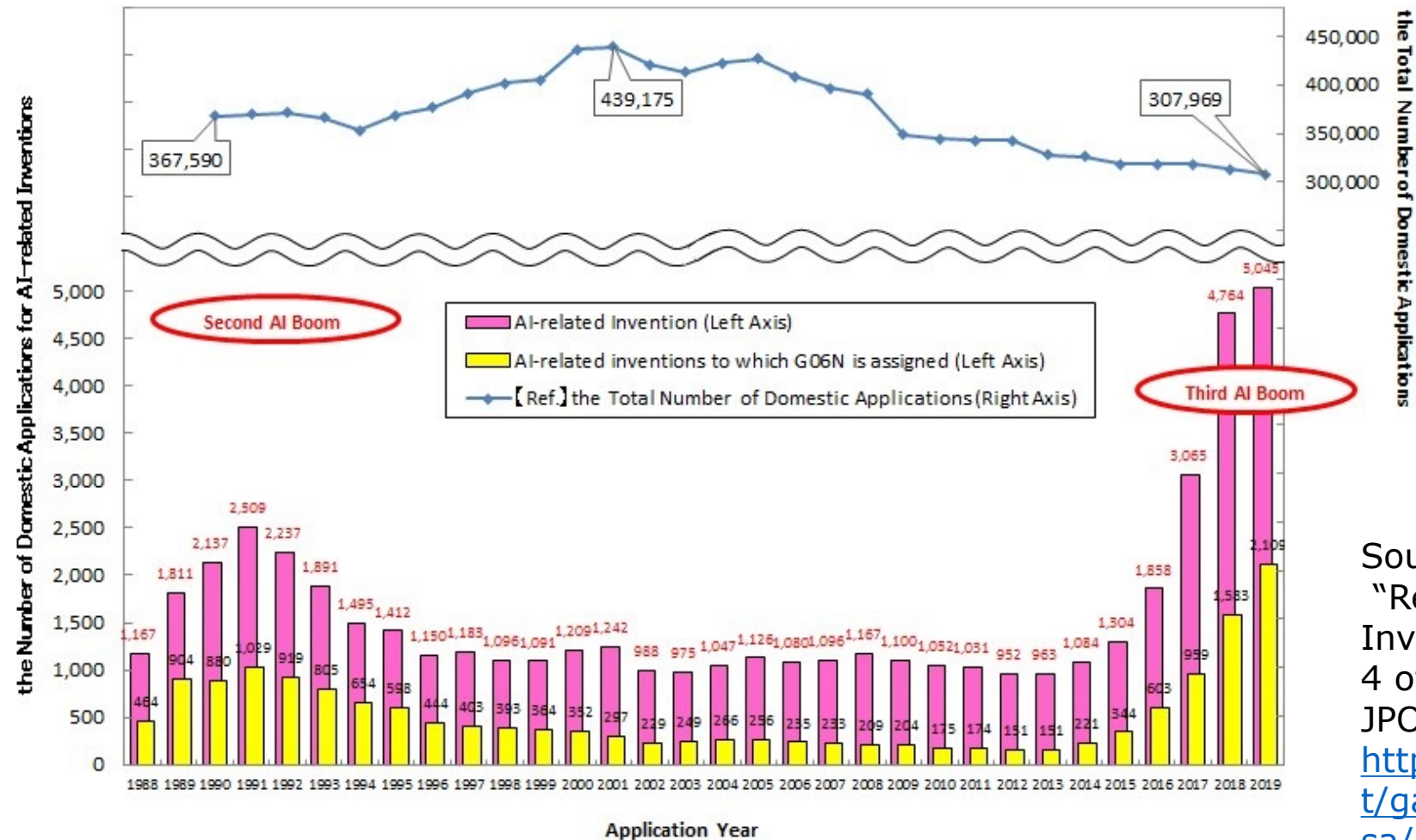
Source:

“Recent Trends in AI-related Inventions” (August 2021), Exam. Dep. 4 of Patent Examination Department, JPO

[https://www.jpo.go.jp/e/system/patent/gaiyo/ai/document/ai\\_shutsugan\\_chosa/report.pdf](https://www.jpo.go.jp/e/system/patent/gaiyo/ai/document/ai_shutsugan_chosa/report.pdf)

The above definition of "AI related invention" is used only in this research. It does not refer to an official definition from the Japan Patent Office.

# Overall Application Trends



Source:  
 “Recent Trends in AI-related Inventions” (August 2021), Exam. Dep. 4 of Patent Examination Department, JPO  
[https://www.jpo.go.jp/e/system/patent/gaiyo/ai/document/ai\\_shutsugan\\_chosa/report.pdf](https://www.jpo.go.jp/e/system/patent/gaiyo/ai/document/ai_shutsugan_chosa/report.pdf)

## Number of domestic applications for AI-related inventions

G06N : A patent classification assigned to inventions related to computer systems based on specific calculation models, which **mainly describes AI technology.**

## 2. Support for examination of AI-related inventions

# ⊖ Examination case examples of AI-related technologies

- Looking ahead to the development of AI-related technologies in various technical fields, **JPO created and published case examples of AI-related technologies.**
- These case examples aim to help provide a clear understanding of examination decisions from the viewpoint of the **description requirement, inventive step, etc.**

## Description Requirement: Case Example 50 METHOD FOR ESTIMATING ALLERGY INCIDENCE RATE OF TEST SUBSTANCE

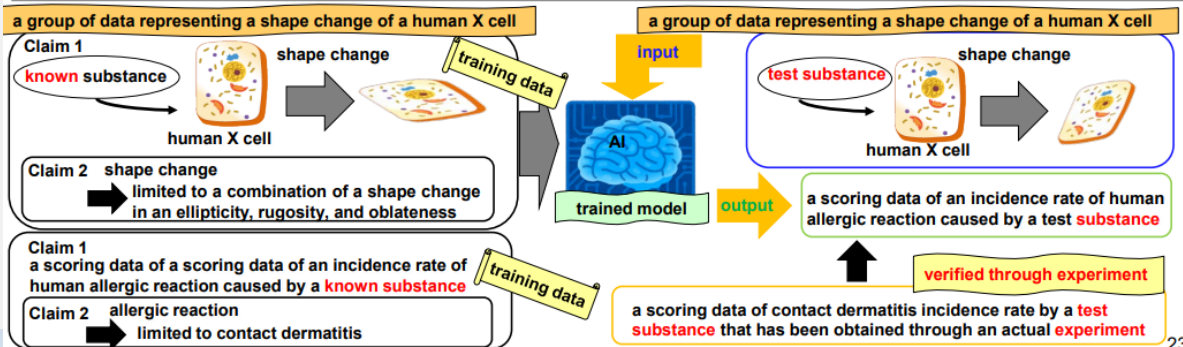
### Claim 1: violation of the support/enableness requirements

A certain correlation among each data in a training data disclosed in a generic concept is not supported by the description and is not a common general technical knowledge at the time of filing. Therefore, the description requirement is not satisfied.

### Claim 2: There is no reason for refusal found.

A certain correlation among each data in a training data is supported by a performance evaluation result using an actual AI model. Therefore, the description requirement is satisfied.

**[Claim 1]** A method for estimating an allergy incidence rate of a test substance in a human being comprising:  
 inputting a training data to an artificial intelligence model to train the model, the training data including a group of data representing a shape change of a human X cell in culture solution and a scoring data on incidence rates of human allergic reaction caused by each substance, in which each of the substances is separately added to the culture solution and the incidence rates of human allergic reaction caused by each of the substances are already known;  
 obtaining a group of data representing a shape change of a human X cell that has been measured in culture solution to which a test substance is added;  
 inputting, to the trained artificial intelligence model, the group of data representing a shape change of a human X cell that has been measured in the culture solution to which the test substance is added; and  
 causing the trained artificial intelligence model to calculate a scoring data of an incidence rate of human allergic reaction.  
**[Claim 2]** The method for estimating an allergy incidence rate as in Claim 1, wherein the group of data representing a shape change of a human X cell is a combination of a shape change in an ellipticity, rugosity, and oblateness of the human X cell; and the allergic reaction is contact dermatitis.

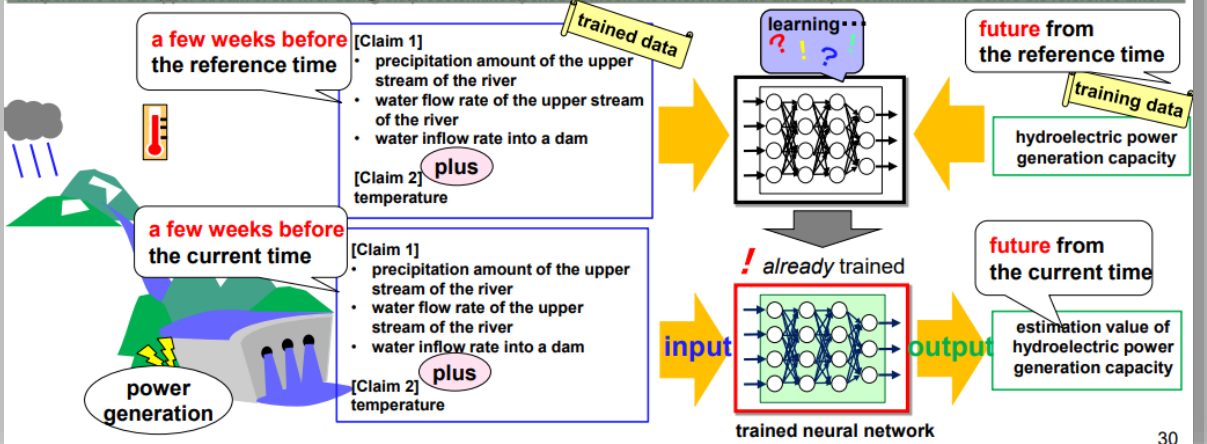


## Inventive Step: Case Example 34 ESTIMATION SYSTEM OF HYDROELECTRIC GENERATING CAPACITY

Claim 1: mere a modification of estimation method to estimate output data based on input data, and considered to be lack of inventive step

Claim 2: a significant effect is found because of addition of training data for machine learning, and considered to have inventive step

**[Claim 1]** An estimation system of a hydroelectric power generating capacity of a dam comprising:  
 a neural network that is built by means of an information processor, the neural network having an input layer and an output layer, in which an input data to the input layer containing a precipitation amount of the upper stream of a river, a water flow rate of the upper stream of the river, and a water inflow rate into a dam during a predetermined period between a reference time and a predetermined time before the reference time, and an output data from the output layer containing a hydroelectric power generating capacity in the future after the reference time;  
 a machine learning unit that trains the neural network using a training data corresponding to actual values of the input data and the output data;  
 and  
 an estimation unit that inputs the input data to the neural network that has been trained by the machine learning unit with setting a current time as the reference time, and then calculates an estimated value of a future hydroelectric power generating capacity based on the output data of which reference time is the current time.  
**[Claim 2]** The estimation system of a hydroelectric power generating capacity as in Claim 1, wherein the input data to the input layer further contains a temperature of the upper stream of the river during the predetermined period between the reference time and the predetermined time before the reference time.



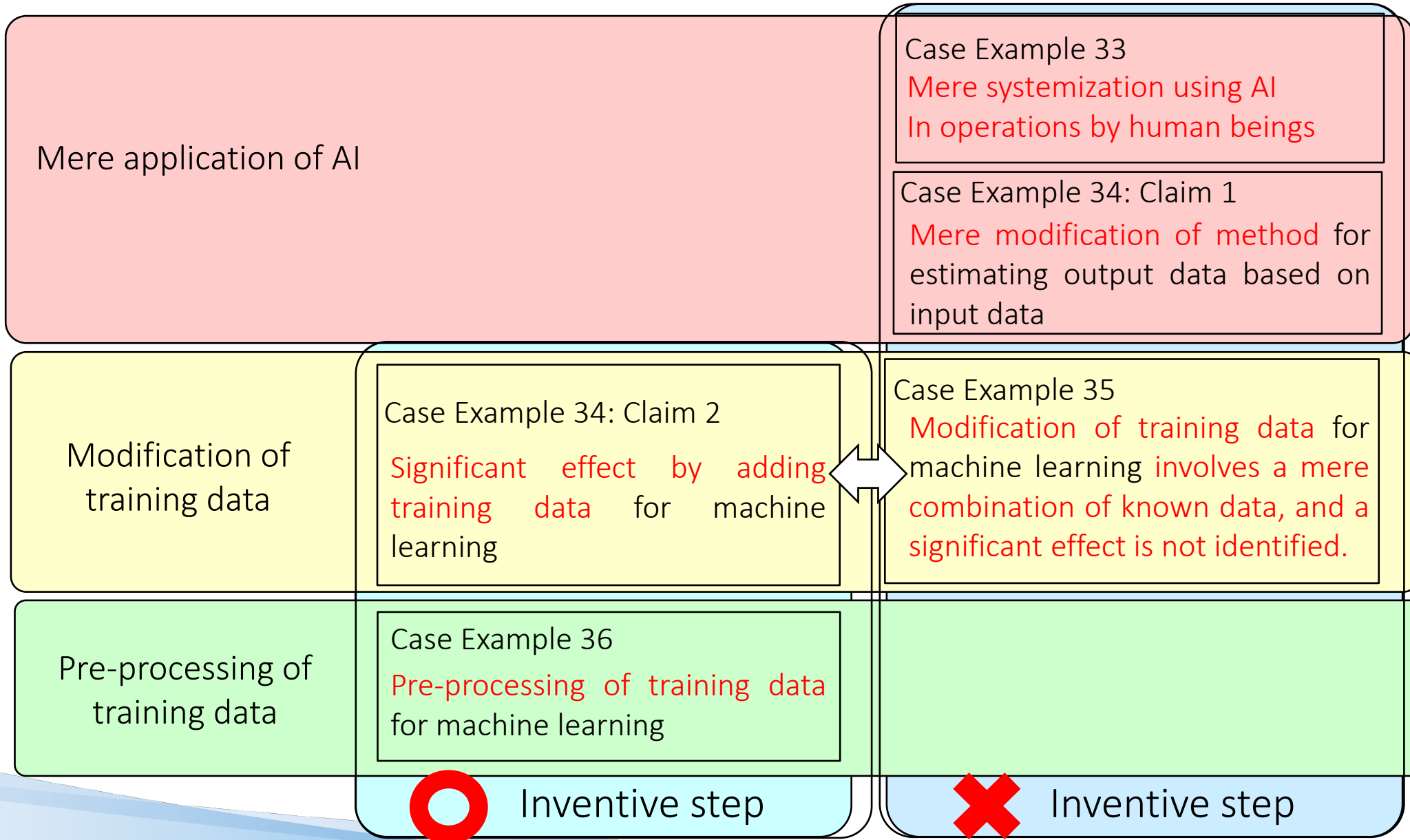
Newly Added Case Examples for AI-Related Technologies (2019)

[https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/document/ai\\_jirei\\_e/jirei\\_tsuika\\_e.pdf](https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/document/ai_jirei_e/jirei_tsuika_e.pdf)

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# ⊖ Examination Case Examples of AI-related technologies

—Overview of case examples involving Inventive Step—





# ⊖ Examination Case Examples of AI-related technologies

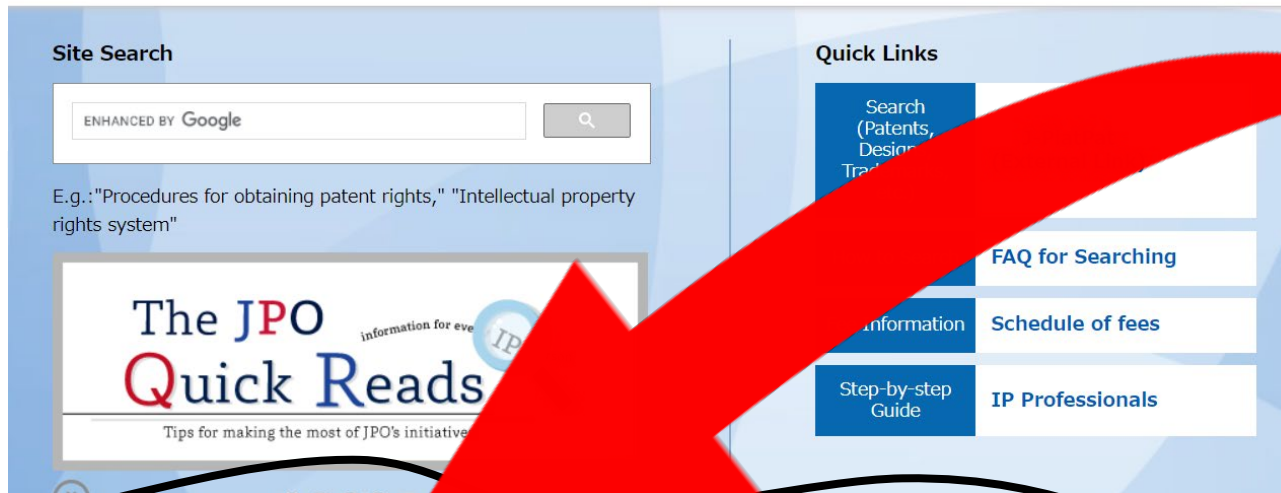
## —How to access case examples—



Important Announcement | [Handling of Procedures Affected by COVID-19 \(Last updated 28 December 2021\)](#)

Important Announcement | [Relief Measures based on "Reasons beyond one's Control" and "Legitimate Reasons" when prescribed procedures are affected by COVID-19 \(Last updated 28 December 2021\)](#)

Important Announcement | [Revision of Fees under Amended Patent Act of 2021 \(effective on or after April 1, 2022\)](#)

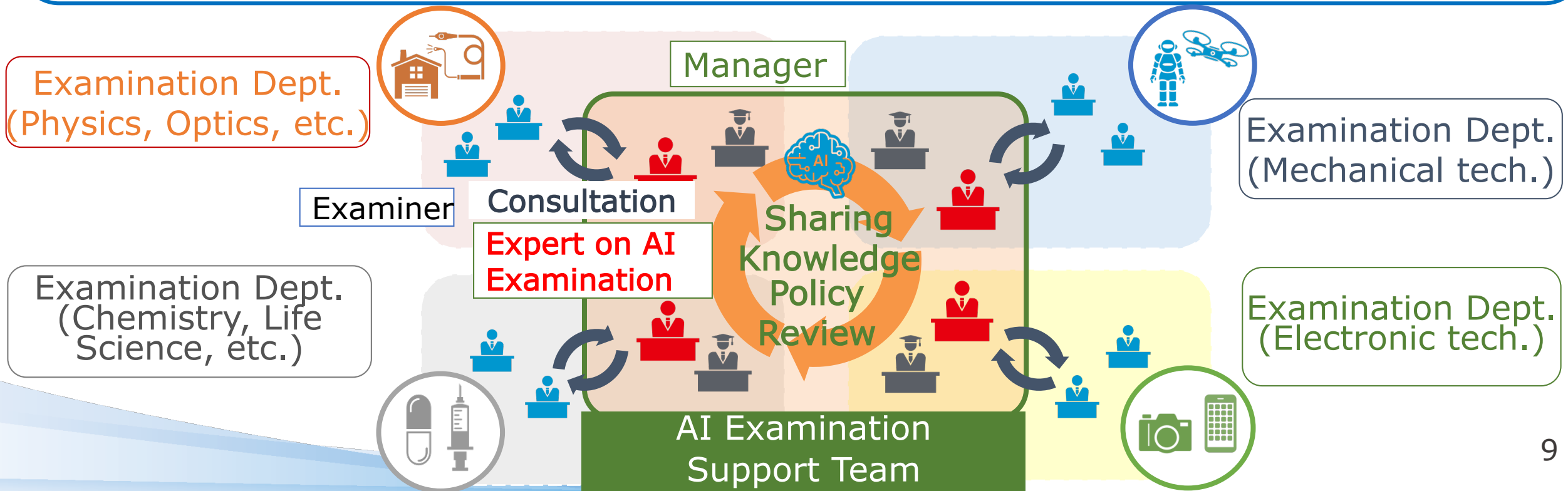


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# ⊖ Inauguration of a Team for Supporting AI Examinations


- The JPO inaugurated a Team for Supporting AI Examinations in January 2021.
  - **The team collaborates beyond their responsible technical fields**, collecting and sharing knowledge on the latest AI-related technologies, case examples of examination results, etc.
  - **Experts on AI Examination** provide consultation services to examiners. They also share their knowledge to examiners by holding study meetings, etc.
- ⇒ Realization of efficient, highest-quality examinations



# ⊗ Publication of Examination Guidelines in Manga Form - AI/IoT Edition -

- The basic concept of Examination Standards has been introduced in Manga form by using AI and IoT-related technologies as the subject matter.
- The manga explains not only the characteristic determination aspects of AI and IoT-related technologies, but also the basic concepts regarding patent examinations that are common to all technical fields.
- The guidelines were published in April 2021, followed by an English version in Oct. 2021.

**Examination Guidelines in Manga  
AI/IoT Edition**

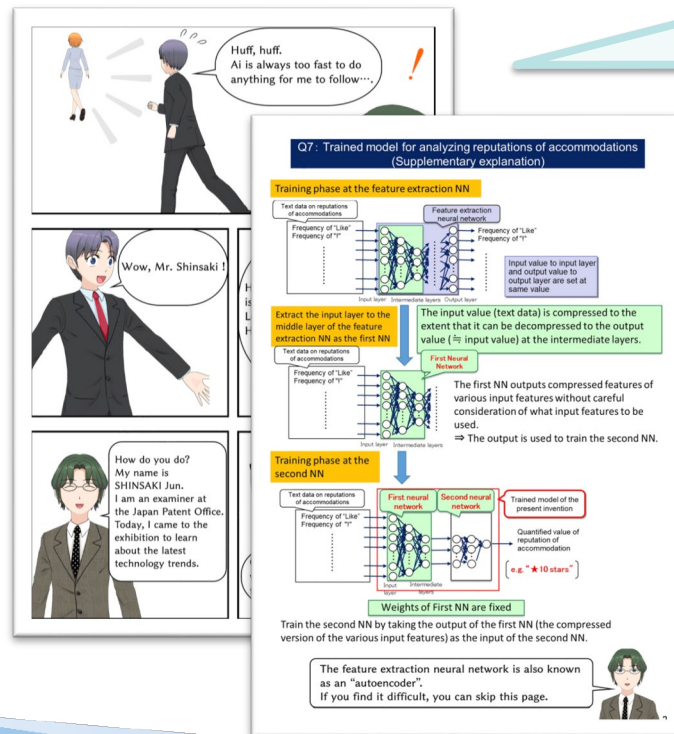


**Ai**  
President of a venture company that develops artificial intelligence software. Very energetic and maverick.

**Ota**  
Young staff member working at Ai's company with law degree. Gentle character, always having trouble because of Ai's constant demands.

**Shinsaki Jun**  
Patent examiner at the Japan Patent Office. Ota's reliable senior at university and gives Ai and Ota useful advice on how to protect their AI software.

AI & IoT  
Shinsaki Jun



Huff, huff. Ai is always too fast to do anything for me to follow...

Wow, Mr. Shinsaki!

How do you do? My name is SHINSAKI Jun. I am an examiner at the Japan Patent Office. Today, I came to the exhibition to learn about the latest technology trends.

**Q7: Trained model for analyzing reputations of accommodations (Supplementary explanation)**

**Training phase at the feature extraction NN**

Test data on reputations of accommodations: Frequency of "Like", Frequency of "I".

Feature extraction neural network: Frequency of "Like", Frequency of "I".

Input value to input layer and output value to output layer are set at same value.

Extract the input layer for the middle layer of the feature extraction NN as the first NN.

The input value (text data) is compressed to the extent that it can be decompressed to the output value (1/2 input value) at the intermediate layers.

First Neural Network

The first NN outputs compressed features of various input features without careful consideration of what input features to be used.

⇒ The output is used to train the second NN.

**Training phase at the second NN**

Test data on reputations of accommodations: Frequency of "Like", Frequency of "I".

First neural network, Second neural network.

Trained model of the present invention: Quantified value of reputation of accommodation (e.g. ★10 stars).

Weights of First NN are fixed.

Train the second NN by taking the output of the first NN (the compressed version of the various input features) as the input of the second NN.

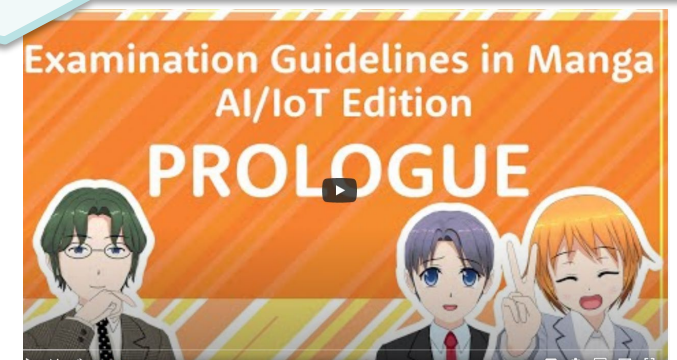
The feature extraction neural network is also known as an "autoencoder". If you find it difficult, you can skip this page.

Available for download from the JPO website:

[https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/comic\\_ai\\_iot\\_e.html](https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/comic_ai_iot_e.html)

Videos are also available for some chapters!

[https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/comic\\_ai\\_iot\\_e.html](https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/comic_ai_iot_e.html)



Examination Guidelines in Manga  
AI/IoT Edition  
**PROLOGUE**

## 3. Inventions with AI as the inventor

# Patent inventor

➤ From the JPO website, "About Indication for Inventor, etc." (in Japanese)  
<https://www.jpo.go.jp/system/process/shutugan/hatsumei.html>

➤ Art. 36(1) (Art.184-5(1)) of the Patent Act provides that the "shimei (name)" of the *inventor* must be stated in the application, etc., while the "shimei or meisho (name)" of the *applicant* must also be indicated.

→ "Shimei" in each item of Article 36(1) is interpreted to mean the name of a natural person.

"Meisho" in each item of Article 36(1) is interpreted to mean the name of a juridical person.

Further,

it has been interpreted that a natural person who made an invention shall be described in the column for "inventor" mentioned in item 2 of the same paragraph.

➤ The interpretation of the inventor as a natural person provided in Art. 36(1)(ii) of the Patent Act is also consistent with the contents of the introductory clause of Art. 29(1), Art. 33(1) and Art. 34(1) of the same Act.

→ In sum, an inventor is an entity that has a right to obtain a patent upon the completion of an invention. And these provisions that an inventor who has the right to obtain a patent may transfer said right prior to filing holds that the inventor is a natural person who has right capacity, and can be an applicant.



➤ The indication for "Inventor" is interpreted to be limited to a natural person, and it shall not be permitted to indicate in the column for inventor of the application, etc. an entry that is not a natural person (e.g., machines including artificial intelligence

(AI), etc.

# Thank you!!

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