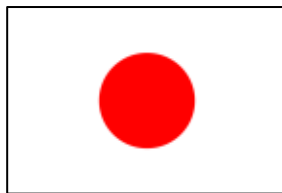


AI-Related Inventions in Japan



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**Japan Patent Attorneys Association
International Activities Center**

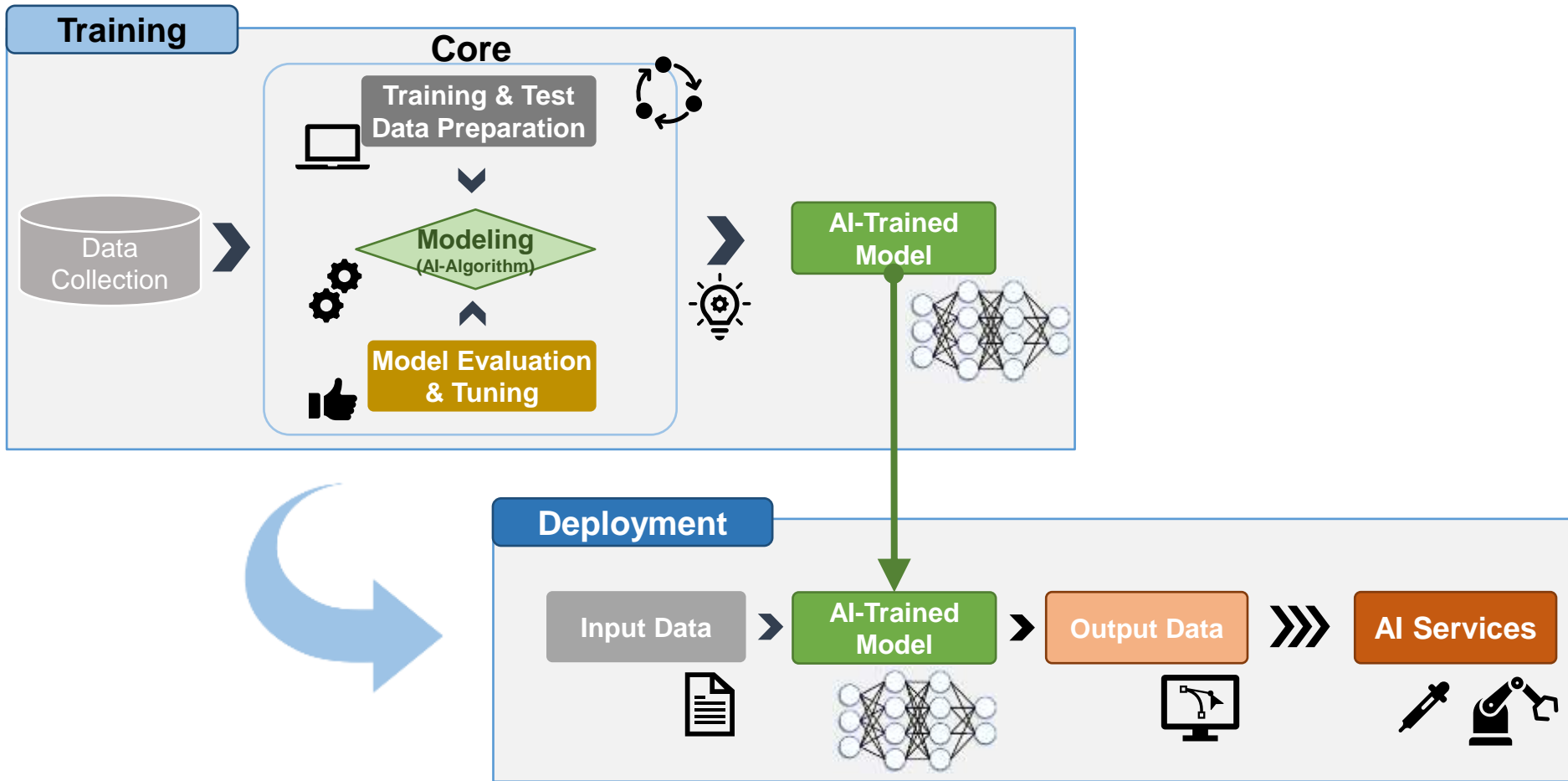
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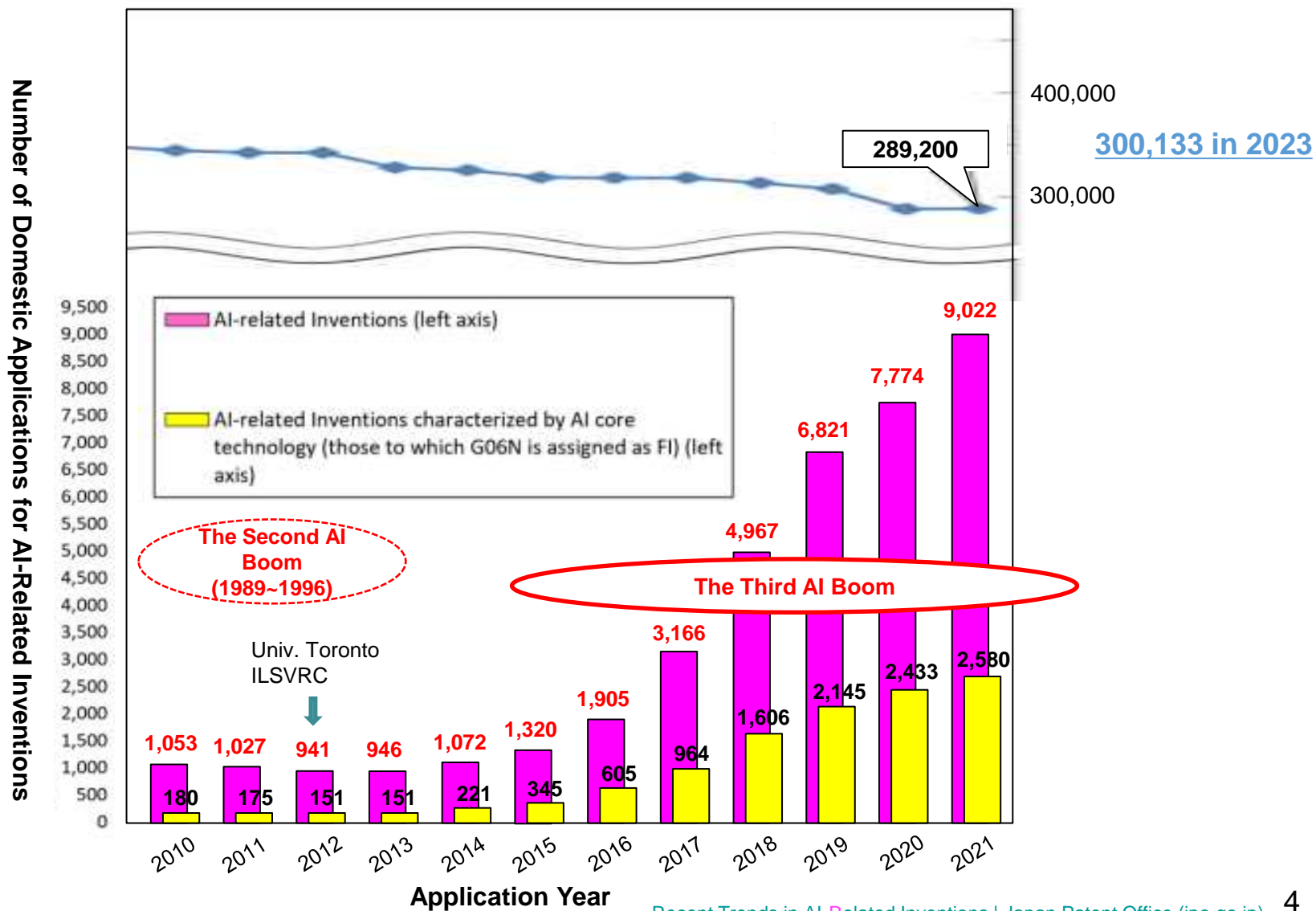
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AI-Related Inventions

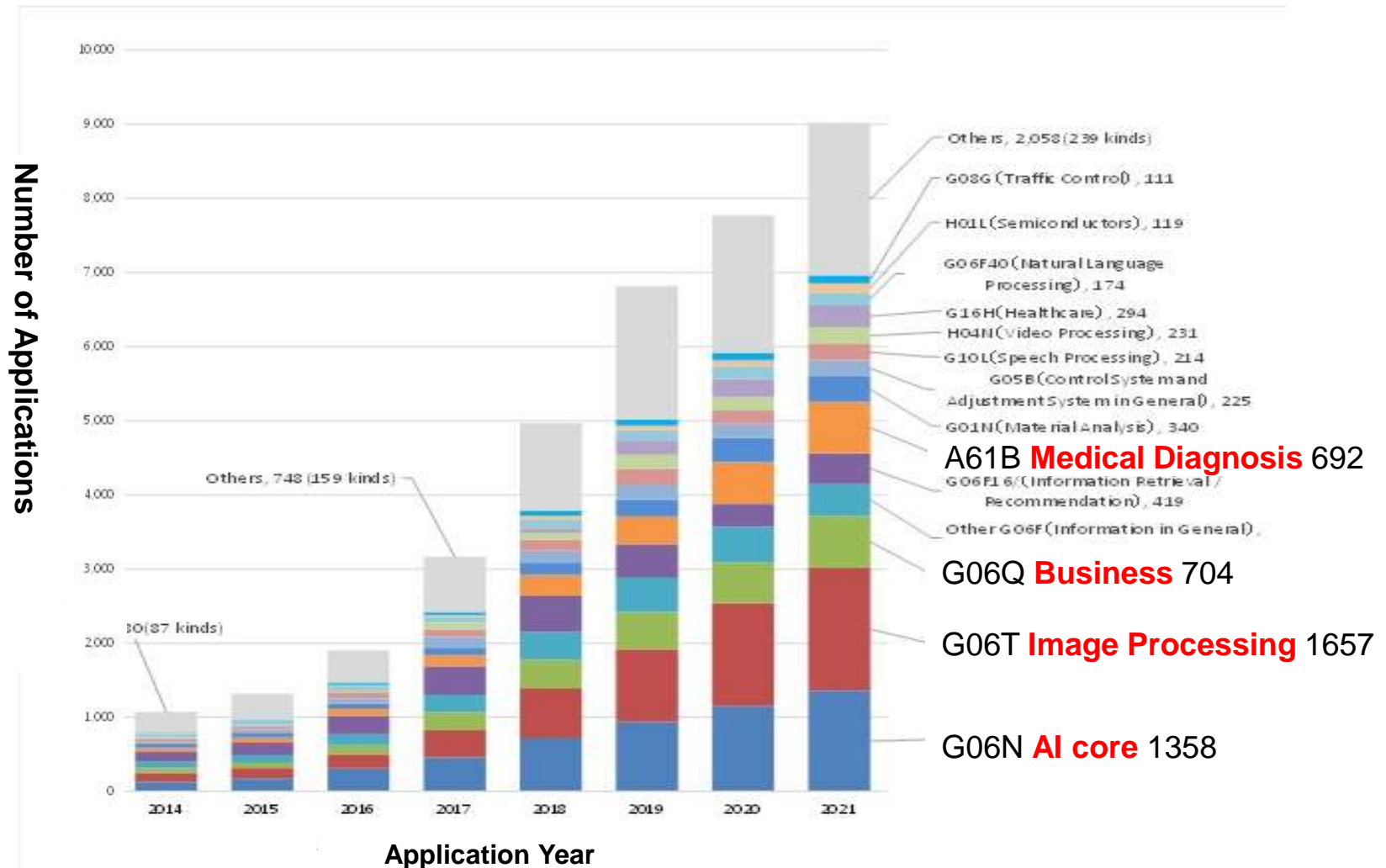


Applications

Number of AI-Related JP Applications



Trends in Technical Fields of AI-Related Applications



Composition of main classifications of AI-related inventions

Major Applicants

		AI-Related inventions	Referring to deep learning
1	Fujitsu Ltd.	1426	626
2	NTT	1123	549
3	Hitachi, Ltd.	921	375
4	Canon Inc.	911	630
5	NEC Corp.	806	313
6	Toyota Motor Corp.	743	291
7	Mitsubishi Electric Corp.	639	316
8	Google	554	313
9	Toshiba Corp.	551	270
10	IBM	551	253
11	Baidu	550	428
12	FANUC Corp.	426	259
13	Koninklijke Philips N.V.	422	205
14	KDDI Corp.	377	205
15	OMRON Corp.	338	197
16	Yahoo Japan Corp.	317	207
17	FUJIFILM Corp.	304	233
18	FUJIFILM Business Innovation Corp.	282	125
19	Panasonic IP Management Co., Ltd.	274	170
20	Sony Group Corp.	264	145

* application filed since 2014, and published by June 2023

Patentability Requirements

- Patent Eligibility
- Inventive Step
- Enablement and Support Requirements
- Inventorship

JPO Guidelines

■ Links to websites:

- A variety of examples relating to AI-related inventions (JPO)

https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/ai_jirei_e.html

- Recent Trends in AI-Related Inventions (JPO)

https://www.jpo.go.jp/e/system/patent/gaiyo/ai/ai_shutsugan_chosa.html

- “Manga” Examination Guidelines in AI/IoT technologies (JPO)

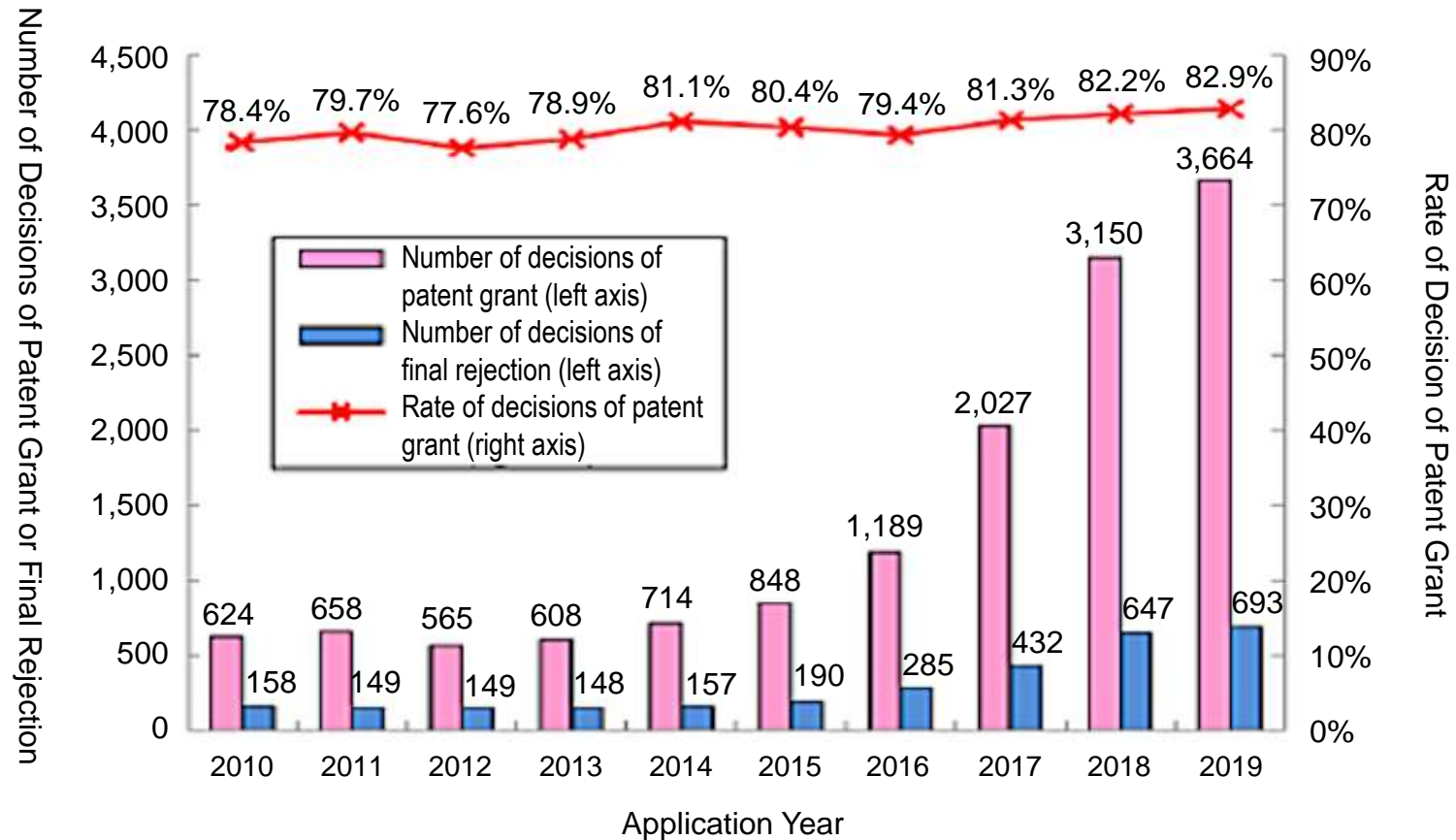
https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/comic_ai_iot_e.html

[Examination Guidelines in Manga: AI/IoT Edition - Prologue \(youtube.com\)](https://www.youtube.com/watch?v=...)



Recent Examination Trends

Japan's overall patent grant rate is about 75%.
For AI-related inventions, the rate exceeds **80%**!



The rate of decision of patent grant for AI-related inventions

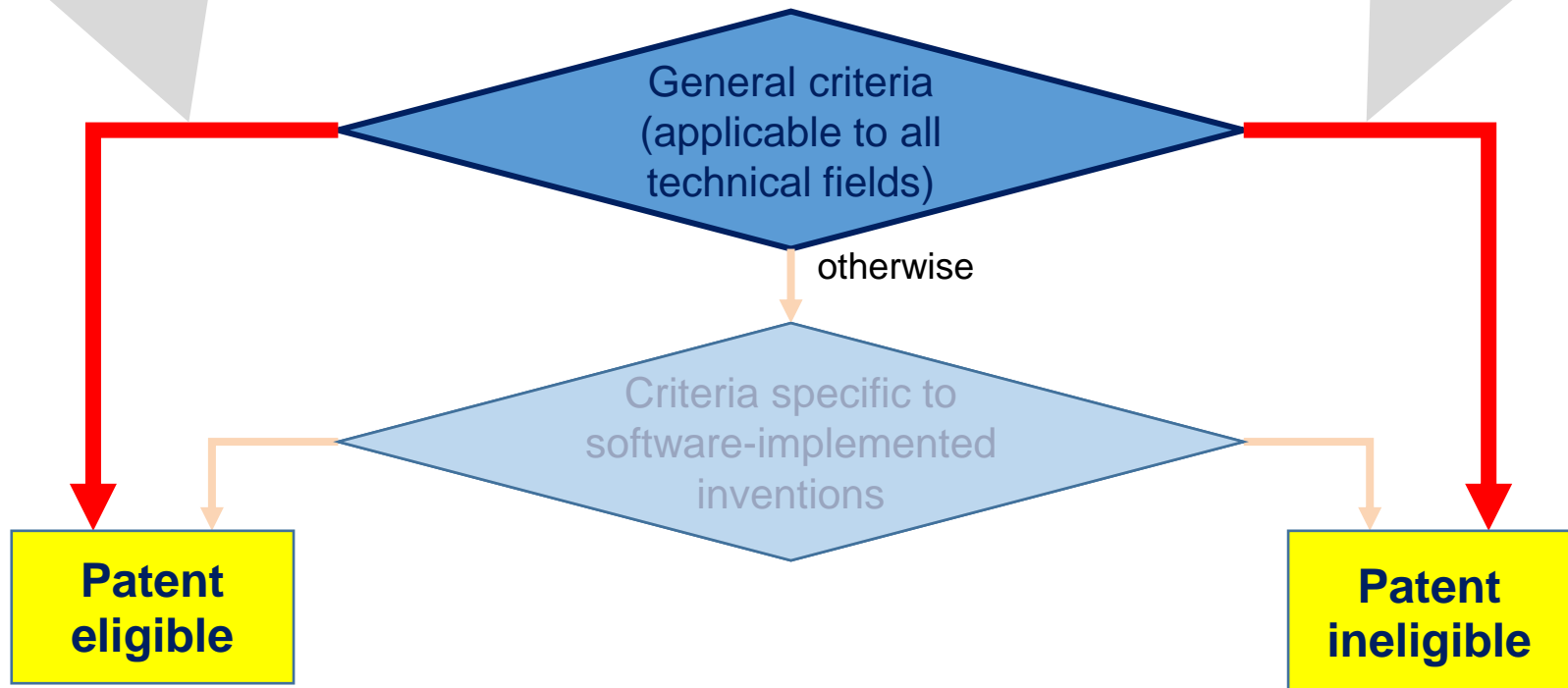
Flow for Determining Eligibility

Software-implemented (incl. AI-related) inventions

- First, **general criteria** are assessed.

(i) control on a device/apparatus, or process involving the control; or
(ii) information processing based on technical properties of an object

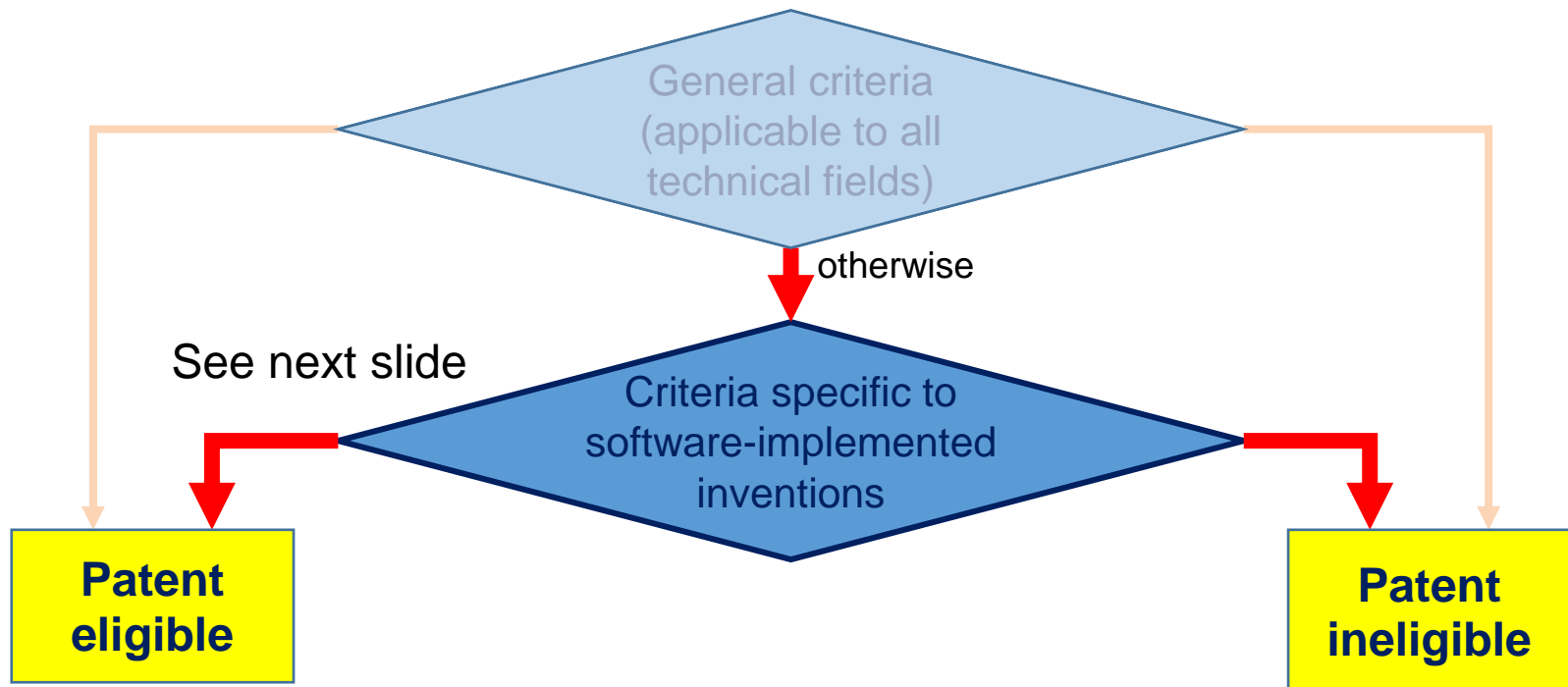
(i) mere presentation of information;
(ii) arbitrary arrangement;
(iii) mathematical formula; ... etc.



Flow for Determining Eligibility

Software-implemented (incl. AI-related) inventions

- If eligibility/ineligibility are undeterminable by general criteria, the next criteria based on a software-specific viewpoint are assessed.
- When **information processing by the software is concretely described in claims**, claimed inventions are determined as “inventions.” (I.e., eligibility is met.)



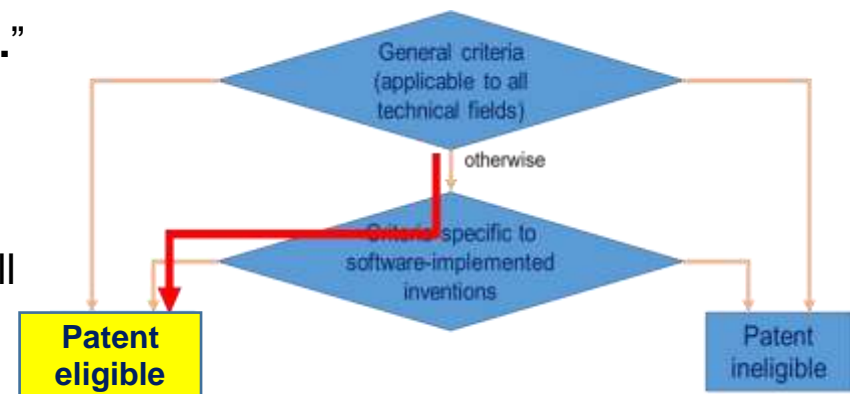
Example – Patent Eligible

Claim 1

A **trained model** for causing a computer to function to output quantified values of **reputations of accommodations** based on text data on reputations of accommodations, wherein;

- the model is comprised of a first neural network and a second neural network connected to receive output from the first neural network; [...]
- the model causes the computer to function to perform a calculation [...] in response to the appearance frequency of specific words obtained from the text data on reputations of accommodations input to the input layer of the first neural network and to output the quantified values of reputations of accommodations from the output layer of the second neural network.

- It is clear that the **trained model** is a “**program.**”
“the model causes the computer to function to ...”.
- Specific information processing or operation for analyzing reputations of accommodations is well identified.
“... to perform a calculation in response to ... and to output the quantified values ...”,



Inventive Step

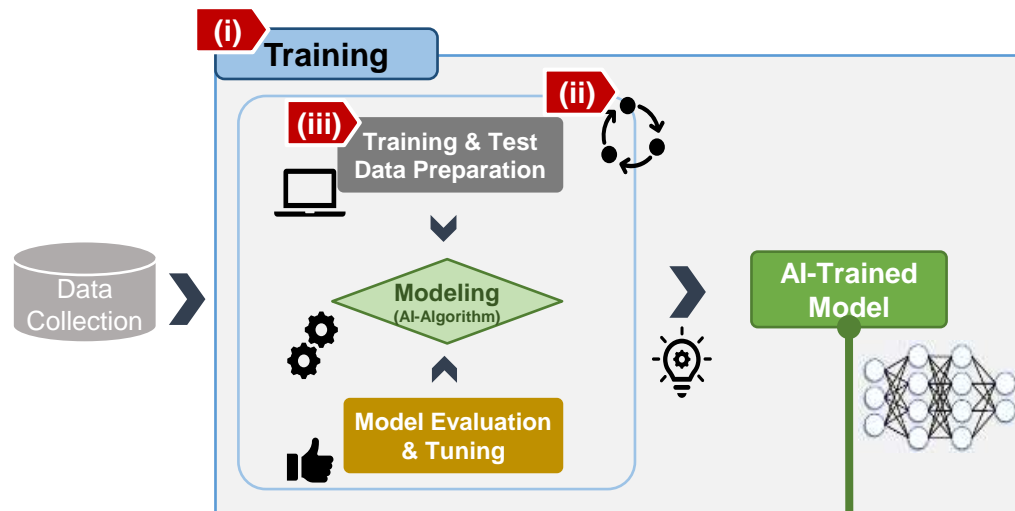
When a claim includes a technical and non-technical feature(s), no distinction is made regarding contribution to inventive step between technical features and non-technical features.

c.f. EP, COMVIK approach (T641/00, 2002)

Features making no technical contribution cannot contribute to inventive step.

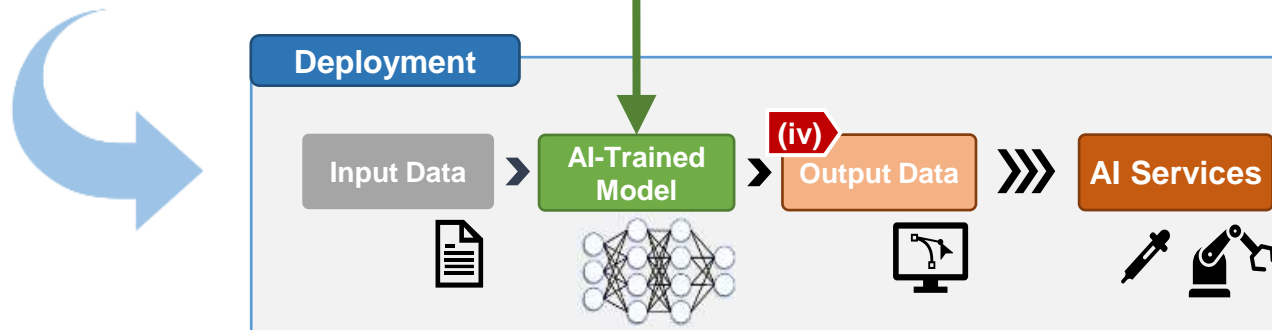
JPO standards of inventive step judgment can be said to be more lenient than those in the EPO.

Inventive Step



Inventive step can be confirmed from a variety of viewpoints, such as ...

- (i) difference in **training method** of AI model
- (ii) difference in training data that can **improve AI model outputs**
- (iii) preprocessing of **training/input data** for improved calculation efficiency
- (iv) new features in **output from AI model** (new prediction)
etc. ...



Example – Inventive Step

Claim 1

A **system to estimate the hydroelectric power generating capacity** of a dam comprising:

a **neural network** [...] having an input layer and an output layer, in which an input data to the input layer containing

- (i) the precipitation amount of the upper stream of a river,
- (ii) the water flow rate of the upper stream of the river, and
- (iii) the water inflow rate into a dam [...],

and an output data from the output layer containing a **future hydroelectric power generating capacity** [...];

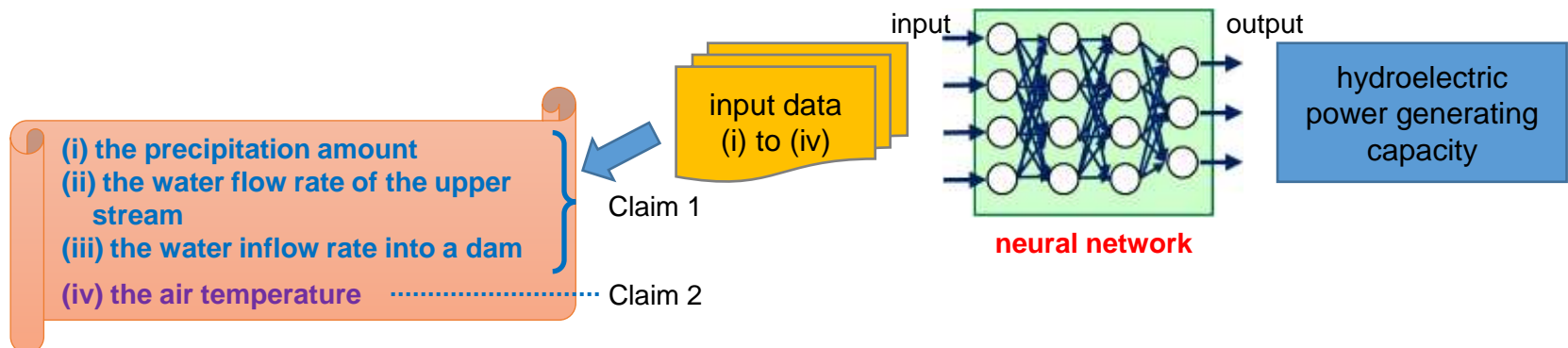
a machine learning unit that **trains** the neural network **using training data** corresponding to actual values of the input data and the output data; and

an estimation unit that inputs the input data to the **trained neural network** [...], and then calculates an estimated value of a future hydroelectric power generating capacity based on the output data [...].

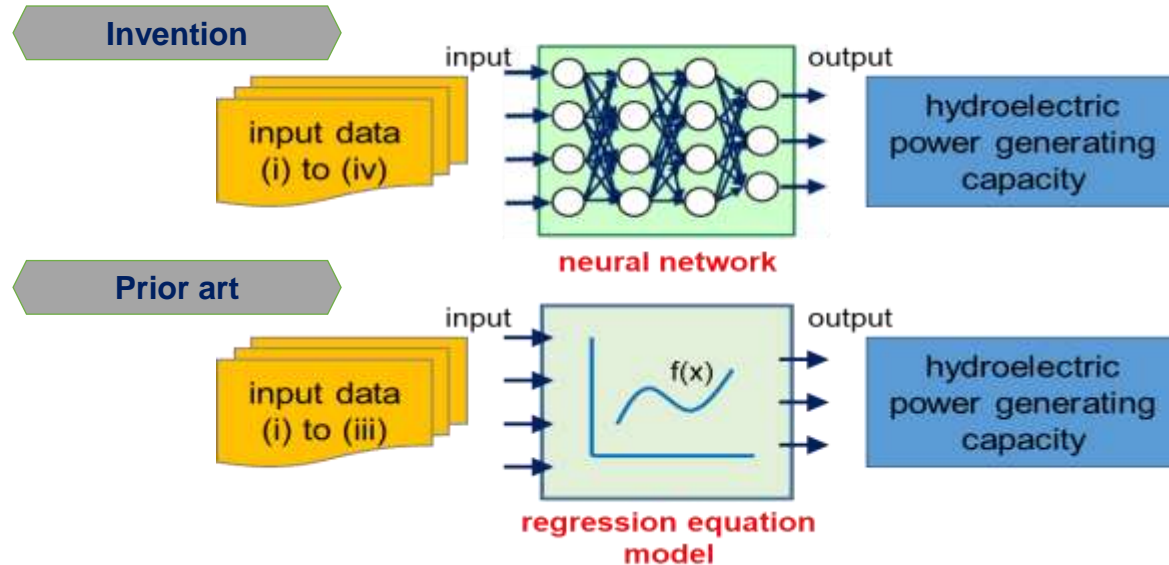
Claim 2

The estimation system as in Claim 1, wherein the input data to the input layer further contains

- (iv) an air temperature at the upper stream of the river [...].



Example – Inventive Step



[Claim 1] Not Inventive

- ✓ Claim 1 uses a neural network to estimate the hydroelectric power generating capacity, whereas D1 uses a regression equation model to estimate the same.
- ✓ A neural network is well known in the related art as a method for making an estimation.

[Claim 2] Inventive

- ✓ Claim 2 further utilizes, as an input to the neural network, temperature data of the upper stream of the river. D1 does not.
- ✓ The invention of claim 2 provides a significant technical effect that it is possible to estimate accurately a hydroelectric power generating capacity that is in response to an increase of inflow rate due to “meltwater in the spring.”

Inventive Step

Should the concept of inventive step be changed from the current one considering the expanding use of AI?

In Japan, many seem to be of the opinion that there is no need to do so at this time.

AI will be included in the common general technical knowledge at the time of application as an ordinary technical means for research and development, etc. used by those skilled in the art.

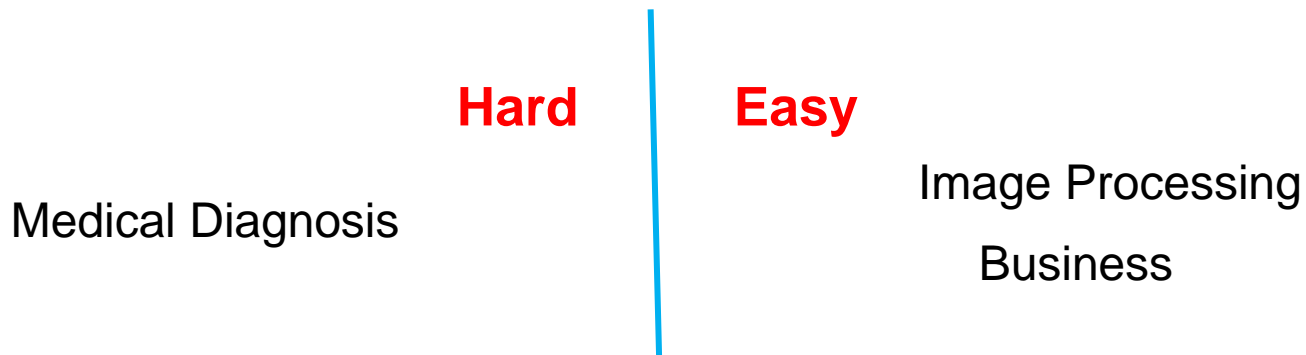
This would mean that the level of a person skilled in the art would naturally change with the development of AI.

As a result, inventive step is more likely to be denied.

Enablement / Support Requirements

It should be possible to infer that a **correlation exists between the input data and the output results:**

- presumable in view of **common general technical knowledge**
- supported by **an explanation or statistic information in the description**, or
- supported by a **performance evaluation** of the AI model



Enablement / Support Requirements

Active compounds: desired function predicted by AI.

Generally, if the specification of the application does not include experimental results in which the function concerned is evaluated, the enablement and support requirements are not satisfied.

Those requirements may be satisfied if experimental data can be substituted with prediction by AI, for example,

- if the accuracy of the predicted values indicated by AI is verified in the specification, etc., or
- if it is common knowledge in the art that the results predicted by AI can be substituted for experimental data.

If prediction accuracy by AI increases in the future, experimental results might no longer be needed to satisfy enablement and support requirements ?

AI Can Be an Inventor?

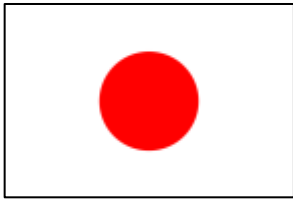
DABUS can be an inventor?

The AI inventor was objected to by the JPO's formality check. The applicant brought the case to the Tokyo District Court.

The plaintiff argued that there is no provision in the Patent Act limiting who can obtain a patent right.

On May 16, 2024, the Tokyo District Court issued a decision stating that an inventor listed in a patent application must be a natural person.

However, the Court expressed its hope that the legal issues concerning AI inventors would be settled through future legislation.



Thank you for your attention !

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