JPO Initiatives for AI technologies

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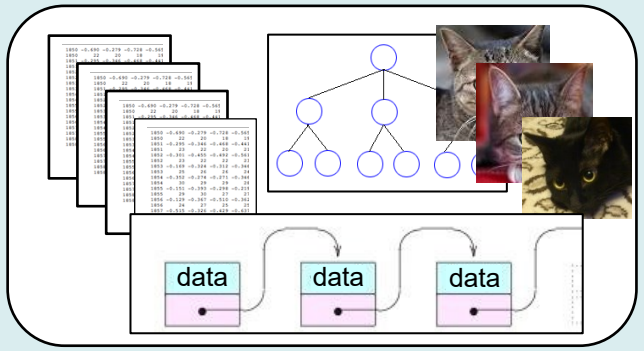
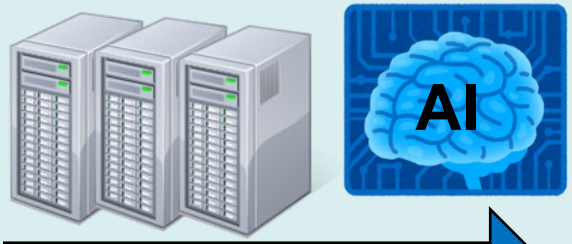
1. Application Trends of AI-related inventions
2. JPO’s initiatives for AI-related Patent Applications
3. International cooperation on examination of AI-related inventions
4. AI utilization to Improve Quality and Efficiency
5. AI competition for TM searches

1. Application Trends of AI-related inventions

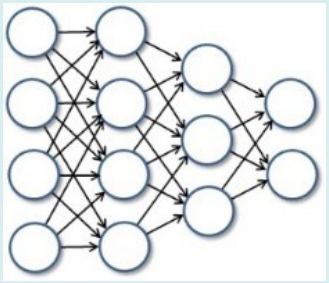
Outline of AI-Related Technologies



data



machine learning
(Deep learning has recently been realized.)



trained model

The generated trained model is used as software or application in a universal computer or terminal.

e.g., A kind of animal is determined in response to an image input.

Q1.

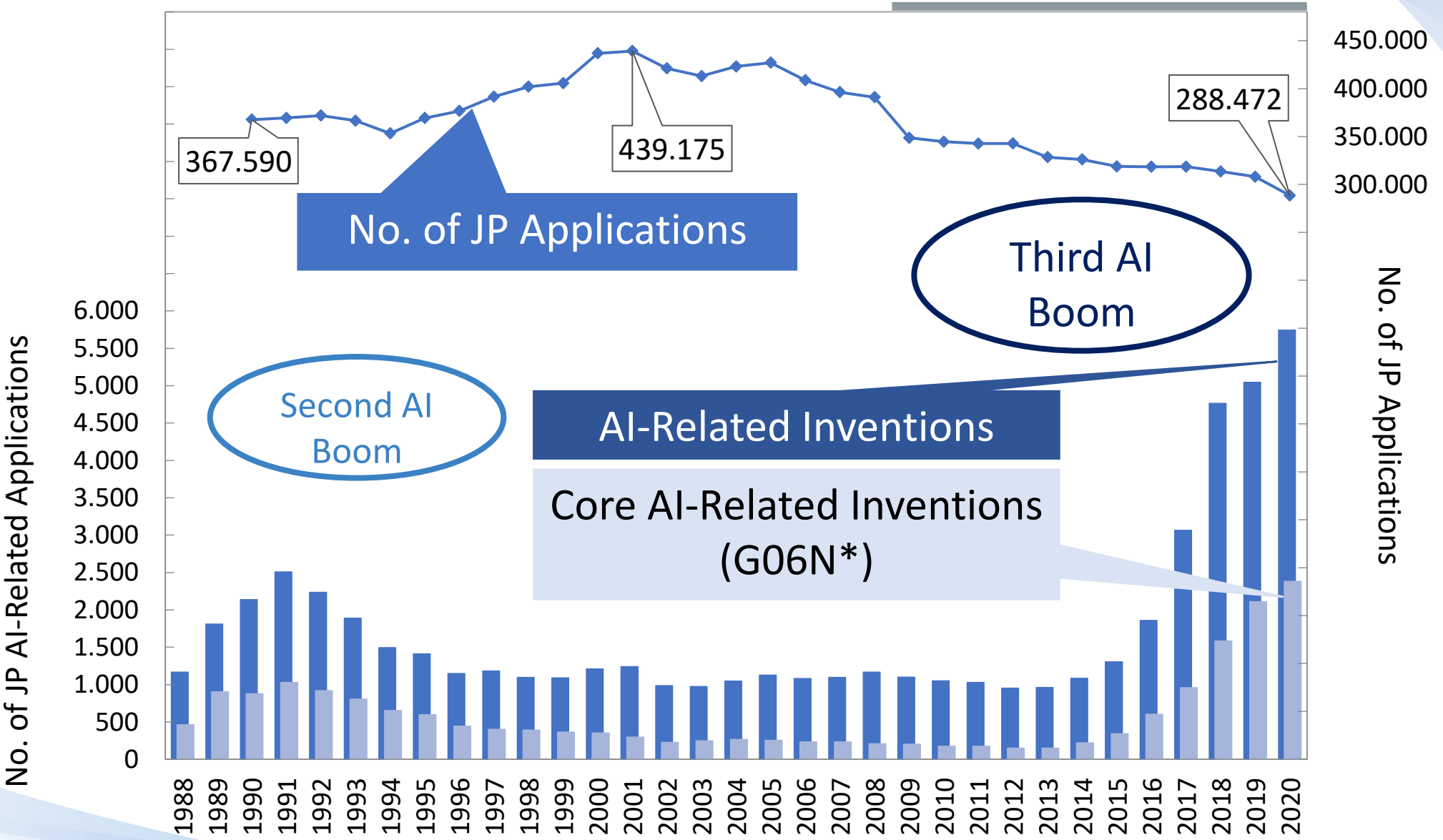
Q2.

unknown data

A1. cat
A2. tiger

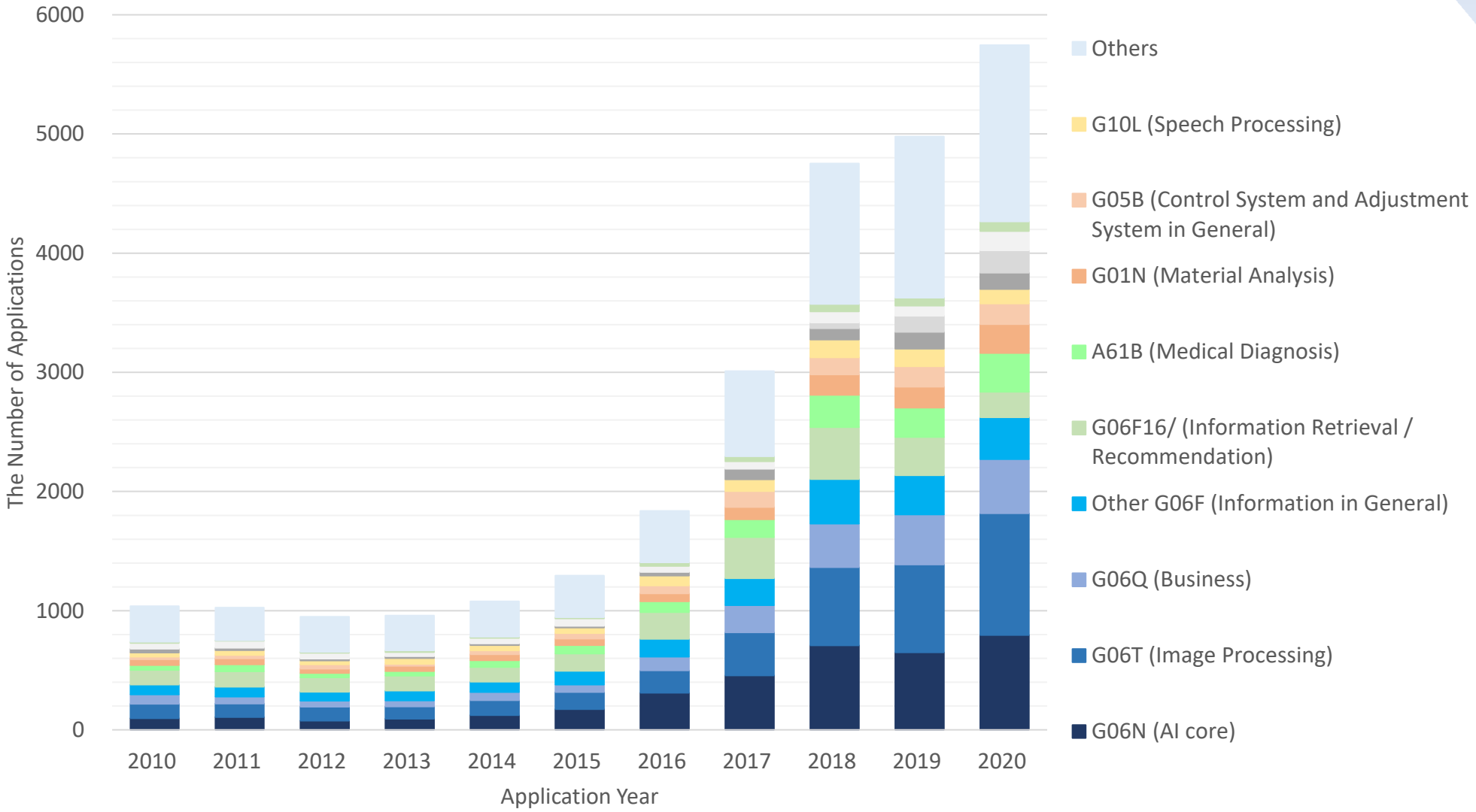
output

Application Trends of AI-related inventions



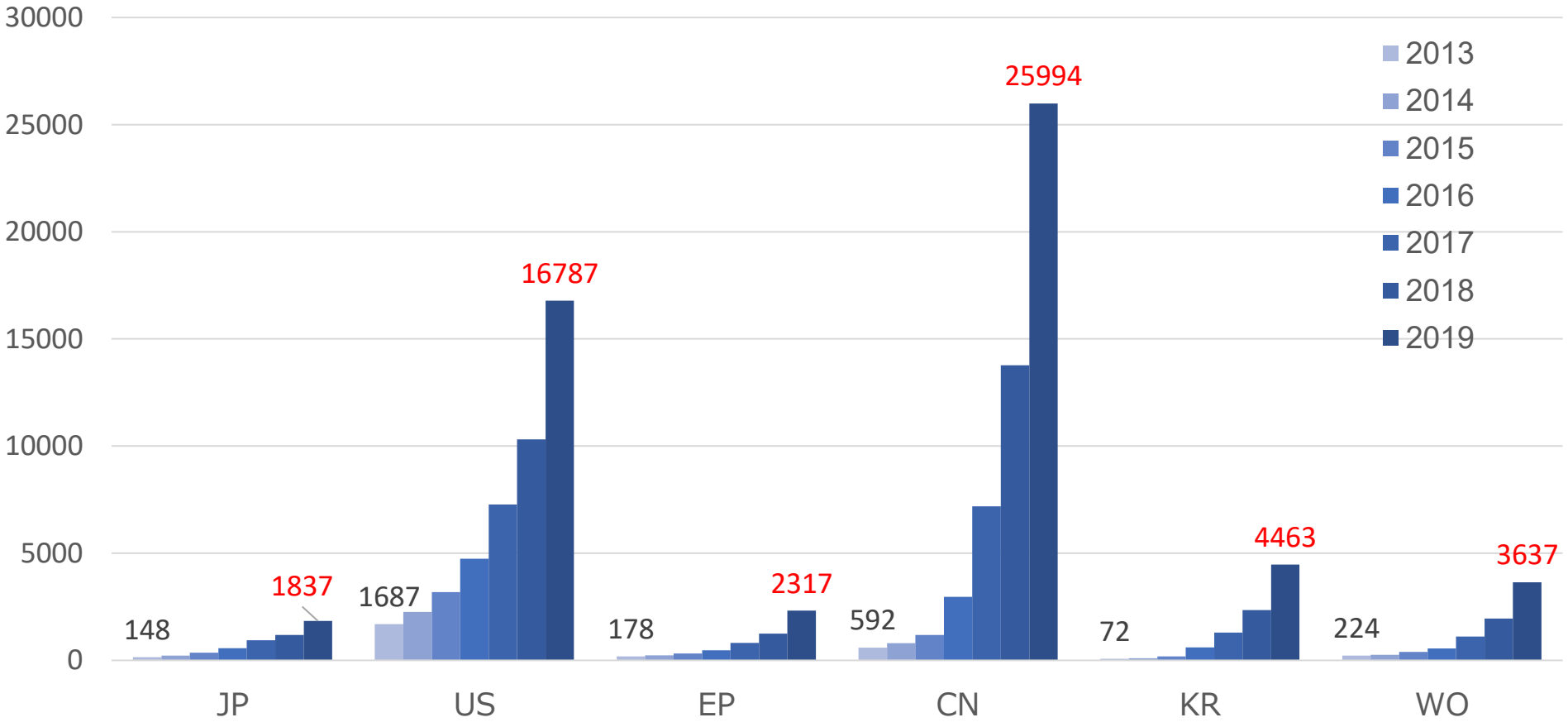
*G06N: "Computer systems based on specific calculation model.

Application Trends of AI-related inventions



Composition of main classification of AI-related inventions

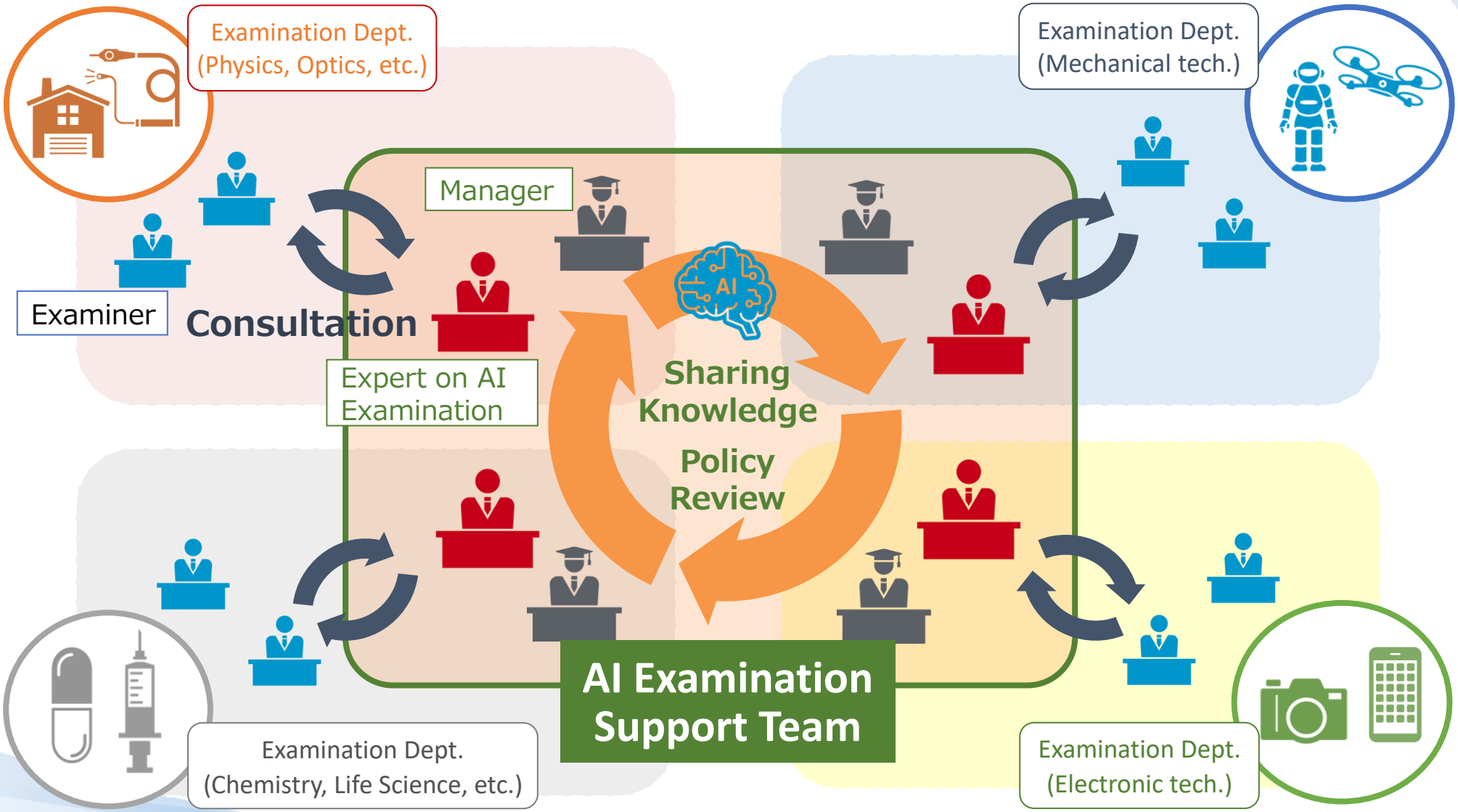
Application Trends of AI-related inventions



The number of applications to each country classified into G06N

2. JPO’s initiatives for AI-related Patent Applications

AI Examination Support Team



https://www.meti.go.jp/english/press/2021/0120_002.html

Examination Case Examples on AI/IoT related technologies

The first publication in the world

More than **30** Cases

Patent Examination Case Examples on AI and IoT-related inventions

Clear understanding of examination practices

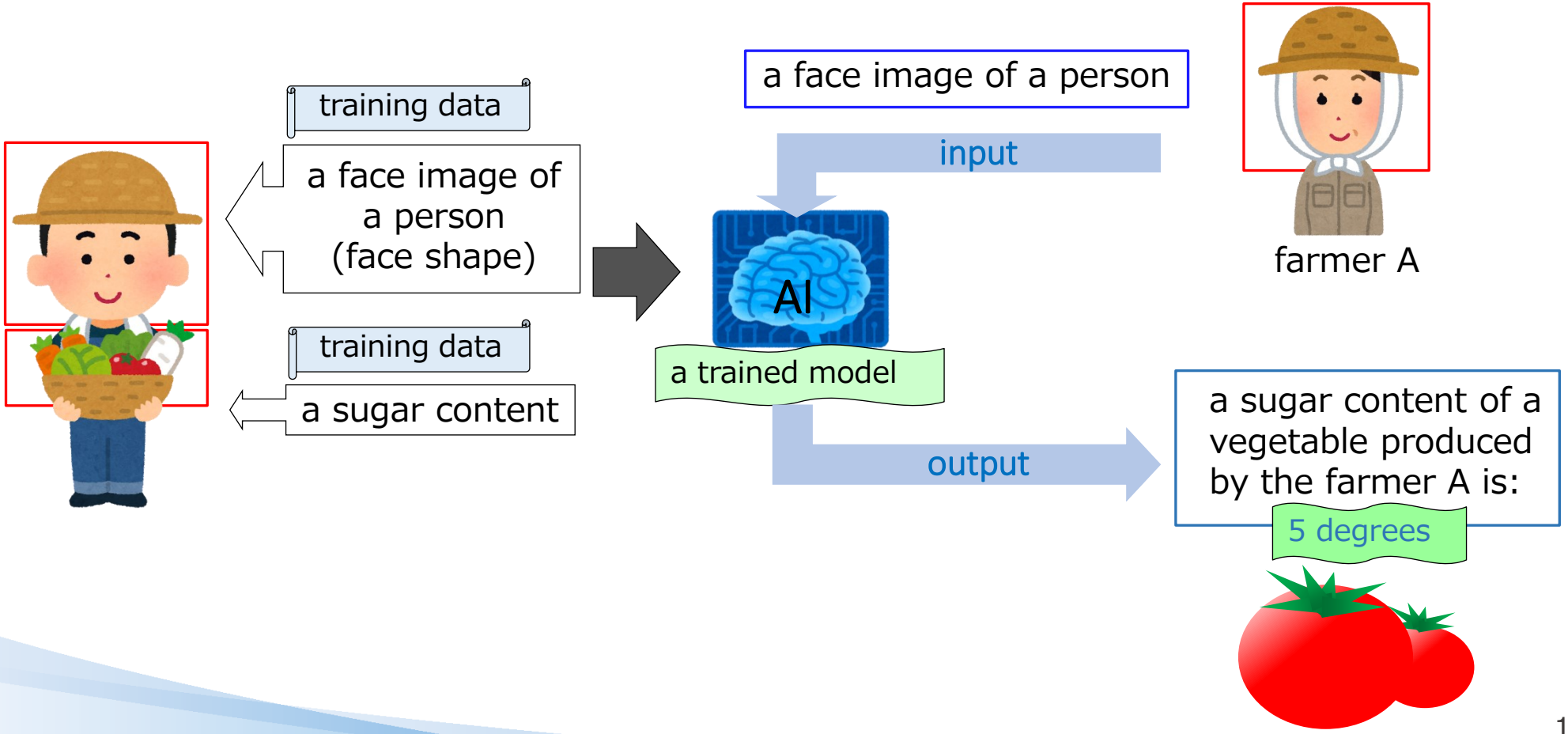
Patent eligibility,
Inventive step,
Description requirements ・・・

- Patent Examination Case Examples pertinent to AI-related technologies
  https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/ai_jirei_e.html
- Examination Guidelines pertinent to IoT-related technologies
  https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/iot_shinsa.html

Description Requirement : Case Example 46

Violation of the enablement requirement

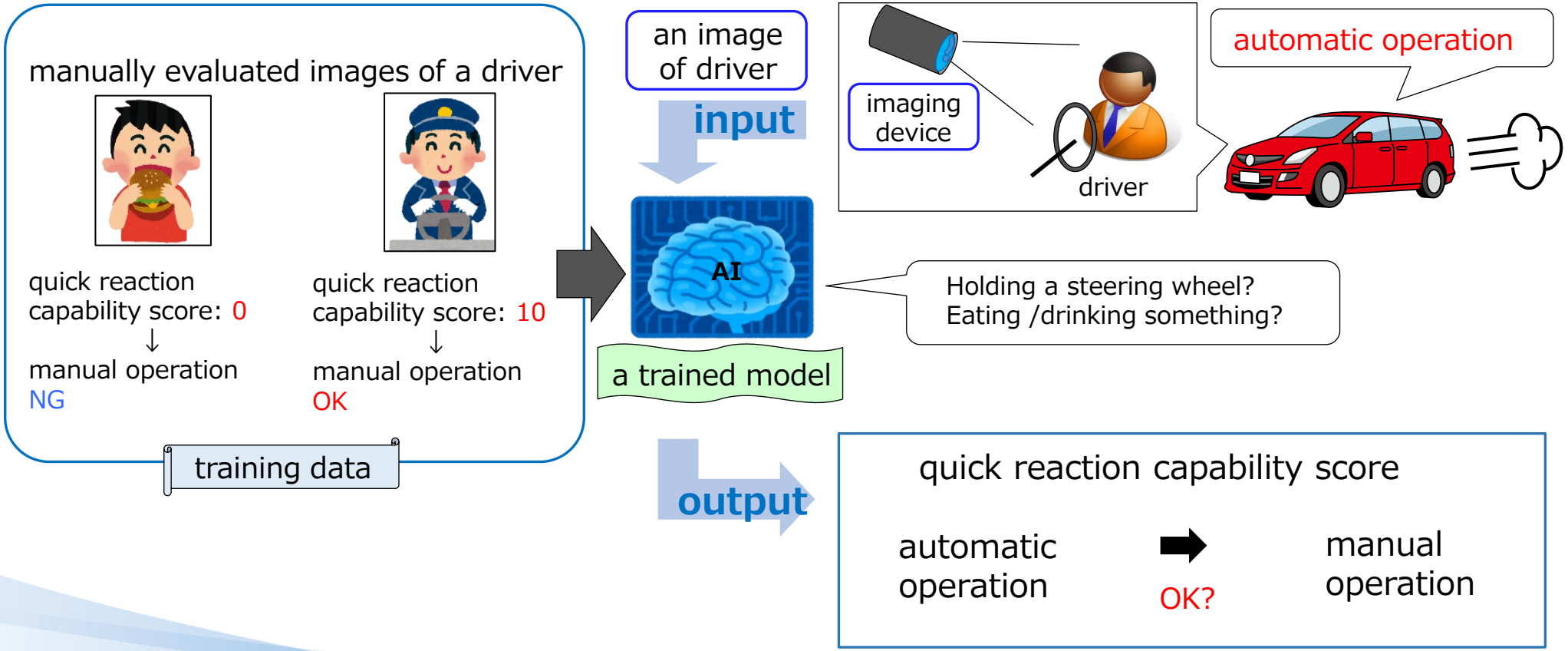
A certain correlation among each data in a training data is not supported by the description and is not a common general technical knowledge at the time of filing. Therefore, the description requirement is not satisfied.



Description Requirement: Case Example 48

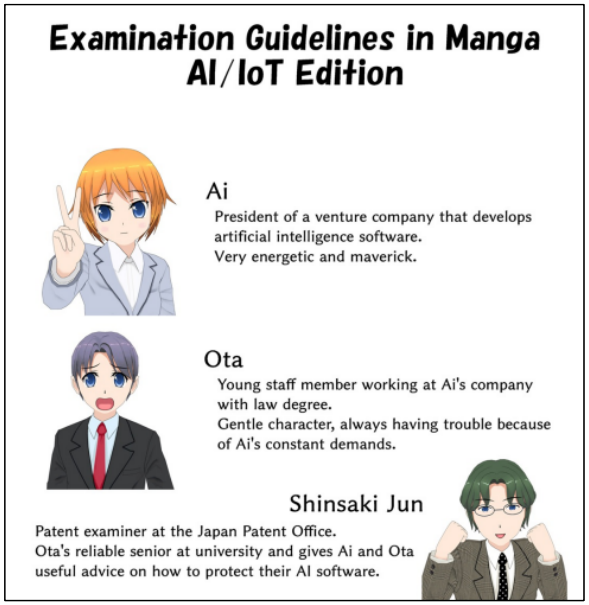
There is no reason for refusal found.

The description does not disclose a specific correlation among each data in a training data. However, such a specific correlation is a common general technical knowledge at the time of filing, and the description requirement is satisfied.

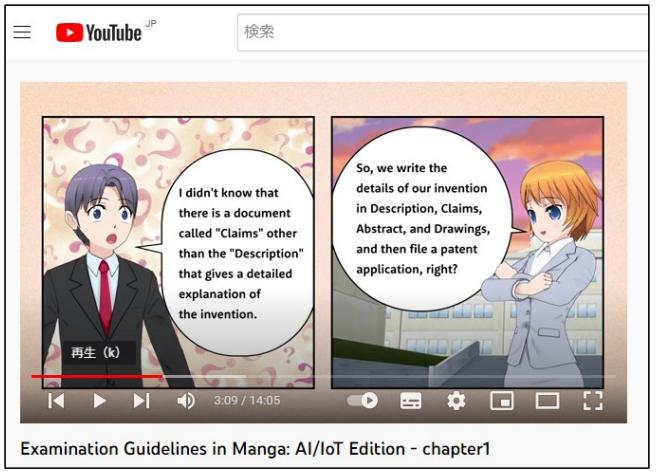


Manga Patent Examination Guidelines – AI/IoT fields –

English “Manga”



- Patent Eligibility
- Novelty
- Inventive Step
  (Multi-Factor Reasoning(MFR))
- Description Requirements



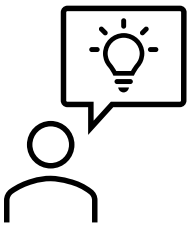
Manga

YouTube

HP: https://www.jpo.go.jp/e/system/laws/rule/guideline/patent/comic_ai_iot_e.html
YouTube: https://youtube.com/playlist?list=PLGv4h5a07975wBc8QpwOIV5h6bQsx5wLF

Indication of Inventor in Patent Applications in Japan

- ✓ "Shimei" (Last name & First name) of Art.36(1) is interpreted to mean the name of a "natural person".
- ✓ "Shimei" or "Meisho (name of juridical person)" can be indicated as an applicant, whereas only "Shimei" can be indicated as an inventor in the application.
- ✓ The inventor is the entity that has the right to be granted the patent upon completion of the invention. (Art.29(1))
- ✓ The inventor may transfer the said right prior to filing the patent application. (Art.33(1)&34(1))



The inventor shall be a "natural person" and meaning a person who has the legal capacity of the right.

It shall not be permitted to indicate in the column for the inventor of the application an entry that is not a natural person (e.g., machines including AI)

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

Japan Patent Act and “Invention”

Art. 2 (1) Statutory "Invention"

"Invention" in this Act means the **highly advanced creation** of **technical ideas utilizing the laws of nature**.

Highly advanced	Creation	Technical ideas	Utilizing the laws of nature

- Claimed subject matter is **eligible** when it falls under the definition of “Invention” defined in the Patent Act above.

Ineligible subject matter list

A **highly advanced creation** of **technical ideas utilizing the laws of nature**.

Utilizing the laws of nature

- ⃠ Laws of nature as such
- ⃠ Not utilizing laws of nature

A rule for playing a game as such

(i) Any laws other than laws of nature
(ii) Arbitrary arrangements
(iii) Mathematical formula
(iv) Mental activities of humans
(v) Those utilizing only (i) to (iv)

Methods for doing business as such

Technical ideas

- ⃠ Personal skill
- ⃠ **Mere presentation of information**

Image data taken with a digital camera
Computer program list

Creation

- ⃠ Mere discoveries of things in nature

Highly advanced

Not necessary to be considered

Almost the same criteria as other major countries

Examination Guidelines *Part III, Chapter 1, 2.*

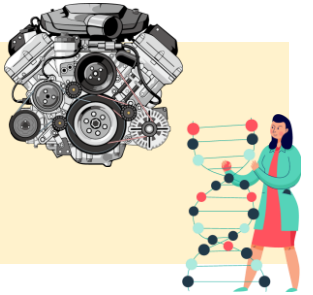
Two major eligible subject matter examples

(i) Those concretely **performing control** of an **apparatus**, or processing with respect to the control

e.g., rice cooker, washing machine, engine, hard disk drive, chemical reaction apparatus, nucleic acid amplifier

(ii) Those concretely **performing information processing** based on the **technical properties** such as physical, chemical, biological or electric properties of an object

e.g., rotation rate of engine, rolling temperature, relation between gene sequence and expression of a trait in a living body, physical or chemical relation of bound substances



Naturally eligible because of their technical character

Examination Guidelines *Part III, Chapter 1, 2.*

When not falling under two major eligible examples…

General software Inventions

Business method, GUI, Statistical analysis, Information recommendation, Data mining, Data classification, Database management, Natural language processing, Information security, Data encryption, and so on.

Examination Handbook Annex B, Chapter 1, 2.1

Eligibility of software invention is determined by
whether or not "information processing by the software is concretely realized by using hardware resources“

If an invention meets this requirement,
it is determined to be patent eligible.

Boundary between eligible / ineligible software inventions

Eligible: information processing is concrete

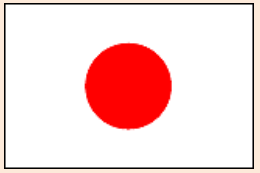
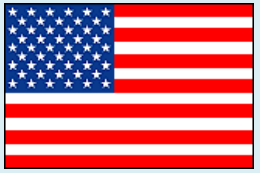
A computer implemented method comprising:
storing (i) **past sales records**, (ii) **future weather forecast data** and (iii) correction rules corresponding to weather;
getting **the first predicted value** by reading **sales records** of the past several weeks, wherein said first predicted value is the average of said read sales records being of the same day of the week as that of the predicted date;
getting **weather forecast data** of the predicted date, and selecting correction rules to be applied based on said **weather forecast data**;
determining **the second predicted value** by correcting **the first predicted value** based on said correction rules to be applied; and outputting **the second predicted value**.

Ineligible: information processing is not concrete, mere desire or result to be achieved

A computer implemented method comprising;
predicting sales of the predicted date based on **the past sales records** and **weather forecast data**; and outputting the predicted sales.

Predicting sales based on past sales and weather forecast

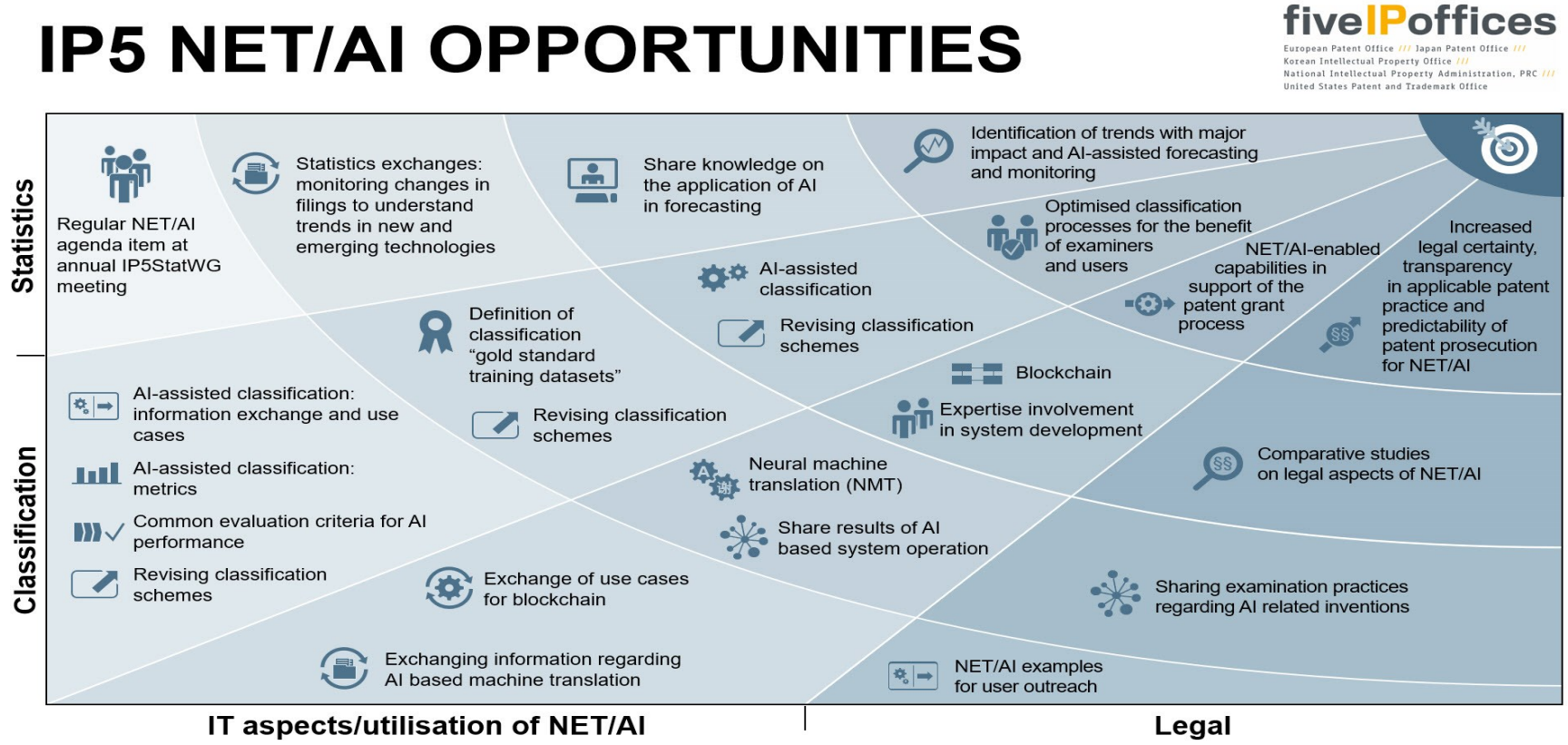
Comparison of Examination Guidelines

How to determine Eligibility	Computer Software related invention	Extra factor in determination on Inventive Step
Whether information processing by the software is concretely realized by using hardware resources (Examination Handbook, Annex B, Chapter 1, 2.1.1.2)		**None**
Subject Matter Eligibility Test: (MPEP 2106) (Step 2A Prong 1) Directed to one of the judicial exceptions? (Step 2A Prong 2) Integrate into a practical application? (Step 2B) Significantly more than the judicial exception?		None
Presence or absence of technical character (Examination Guidelines, Part G, Chapter II, 3.6)	Europaisches Patentamt European Patent Office Office européen des brevets	Features which do not contribute to the technical character of the invention cannot support the presence of an inventive step. (Examination Guidelines, Part G, Chapter VII, 5.4)

3. International cooperation on examination of AI-related inventions

IP5 : Roadmap for cooperating in the fields of NET/AI

- At the IP5 Heads Meeting (2021), the heads agreed on a roadmap for cooperating in the fields of New Emerging Technologies (NET) and Artificial Intelligence (AI).
- As the first project based on the roadmap, IP5 offices collected materials on the examination practices of the IP5 Offices on AI-related inventions in June 2023.



Japan-ASEAN Heads of IP Offices Meeting etc.

- At the Japan-ASEAN Heads of IP Offices Meeting (2021), the Economic Research Institute for ASEAN and East Asia (ERIA) reported the results of Research on Patent Examination Practices for Emerging Technologies in ASEAN Member States.

- At the ASEAN-Japan Heads of IP Offices Meeting (2022), ERIA presented an interim report of their 2nd research findings on patent examination practices for emerging technologies in ASEAN Member States.
- This 2nd research uses case examples pertinent to emerging technologies, including AI and IoT-related technologies, from the JPO Examination Handbook and investigates examination results for each case, judging in accordance with laws and regulations of ASEAN countries.
- Based on this report, topics such as determination of novelty by the IP offices were discussed at the third ASEAN-Japan Patent Experts Meeting (Nov. 2022).

Comparative Study Report on software-related inventions

① Comparative study with the EPO

- The JPO and the EPO conducted a comparative study on software-related inventions and published a report in March 2019.

- Recently, including AI-related inventions, a comparative study was conducted by adding six new case examples concerning description requirements and inventive step, and the report was updated and published in November 2021.

② Comparative study with the CNIPA

- The JPO and the CNIPA confirmed their cooperation at their Heads Meeting in November 2021 and are carrying out a comparative study on examination of AI-related inventions.

Comparative Study with the EPO (AI : Inventive step)

- Differences exist between the EPO and the JPO in the approach to assess inventive step for the CII.

EPO

- Features which do not contribute to the technical character of the invention cannot support the presence of an inventive step.
- Considering neural networks to be of a non-technical, purely mathematical nature (i.e., Case C-8).

JPO

- The claimed subject-matter is considered as a whole; it is not divided into technical and non-technical features when assessing inventive step.
  → The inventive step of an invention is seldom rejected solely based on a general-purpose computer as prior art.

		JPO	EPO
Case C-6 (JPO) Estimation system of hydroelectric generating capacity	CL1	×	×
	CL2	○	○
Case C-8 (EPO) Training a neural network ("drop-out")		○	×

4. AI utilization to Improve Quality and Efficiency

AI utilization to Improve Quality and Efficiency

In-house development of patent examination support system using AI

Patent Classification

Non-JP Patent documents

AI

A61B34/35, B25J13/00, ・・・

Automatic FI/F-term Assignment

Concept Search

Re-rank search results based on ML model

High

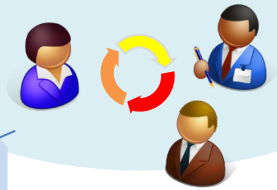
Possibility to be cited

Low

Search Result
1. JP2018-10007A
2. JP2018-10005A
3. JP2018-10001A
・・・
100. JP1998-10001A

AI

Information Exchange with External AI Experts



Advanced Search

Query Suggestion

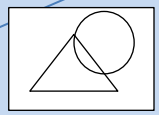
AI

A61B34/35, manipulator, ・・・

Examiner

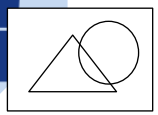
?

Examiner



・・・

Image Search



Search result

Search query

Examination Management

Examiners

AI

AI-assisted Application Assignment

Patent classification

Issue: Using each search index for each jurisdiction is inefficient for examiners to retrieve the patent documents.

JPO Examiners

FIs
F-terms

CPC etc.

Japanese patent documents

Foreign patent documents

Examiners had to retrieve Japanese and foreign patent documents <u>separately using the search index of each jurisdiction.</u>

Automatic FI/F-term Assignment
to Foreign patent documents
(35 million documents already)

- SVM
- BERT

JPO Examiners

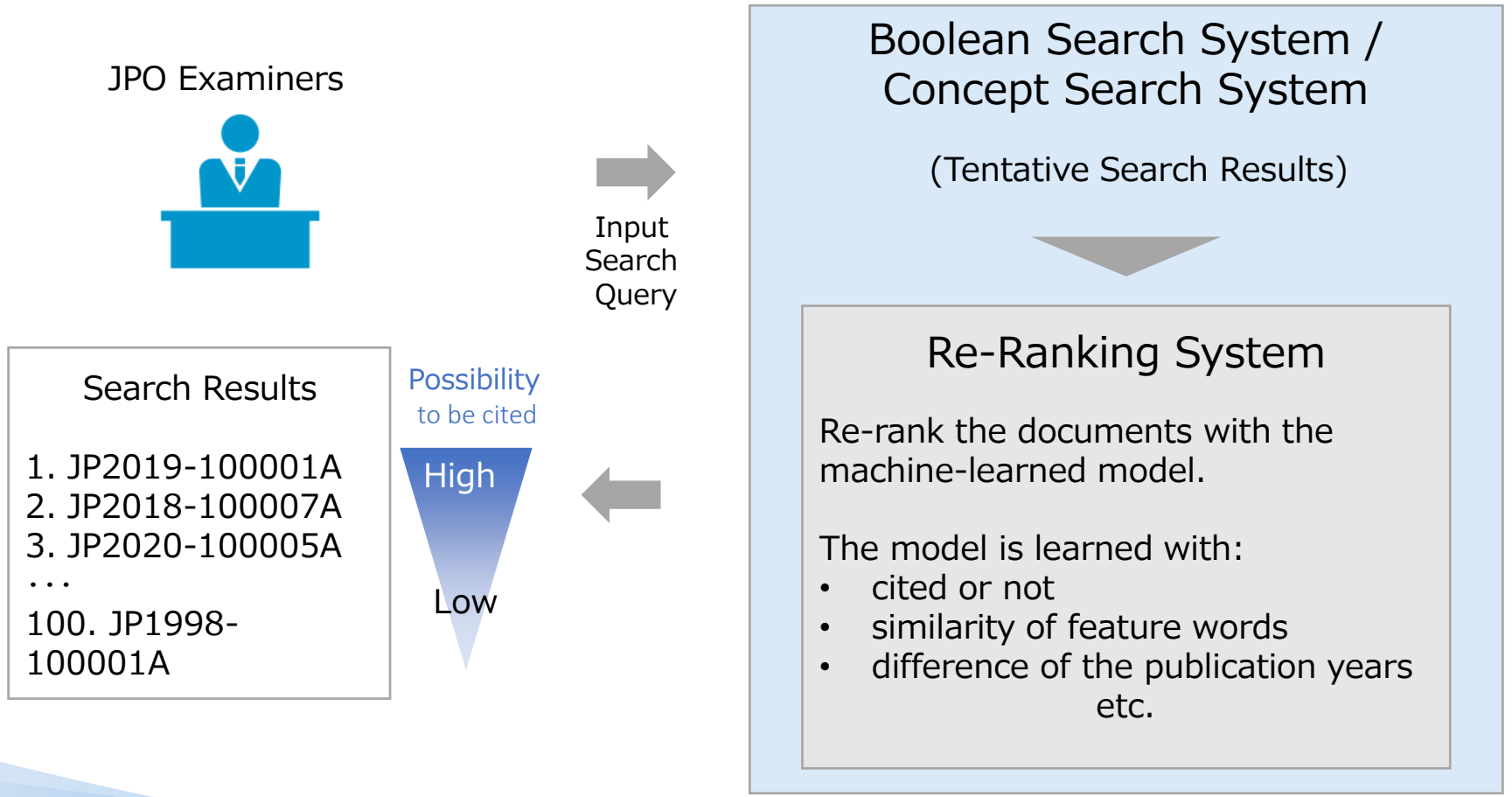
FIs
F-terms

Japanese patent documents
+
Foreign patent documents

Examiners can retrieve patent documents from all over the world <u>seamlessly.</u> (depends on the tech. field)

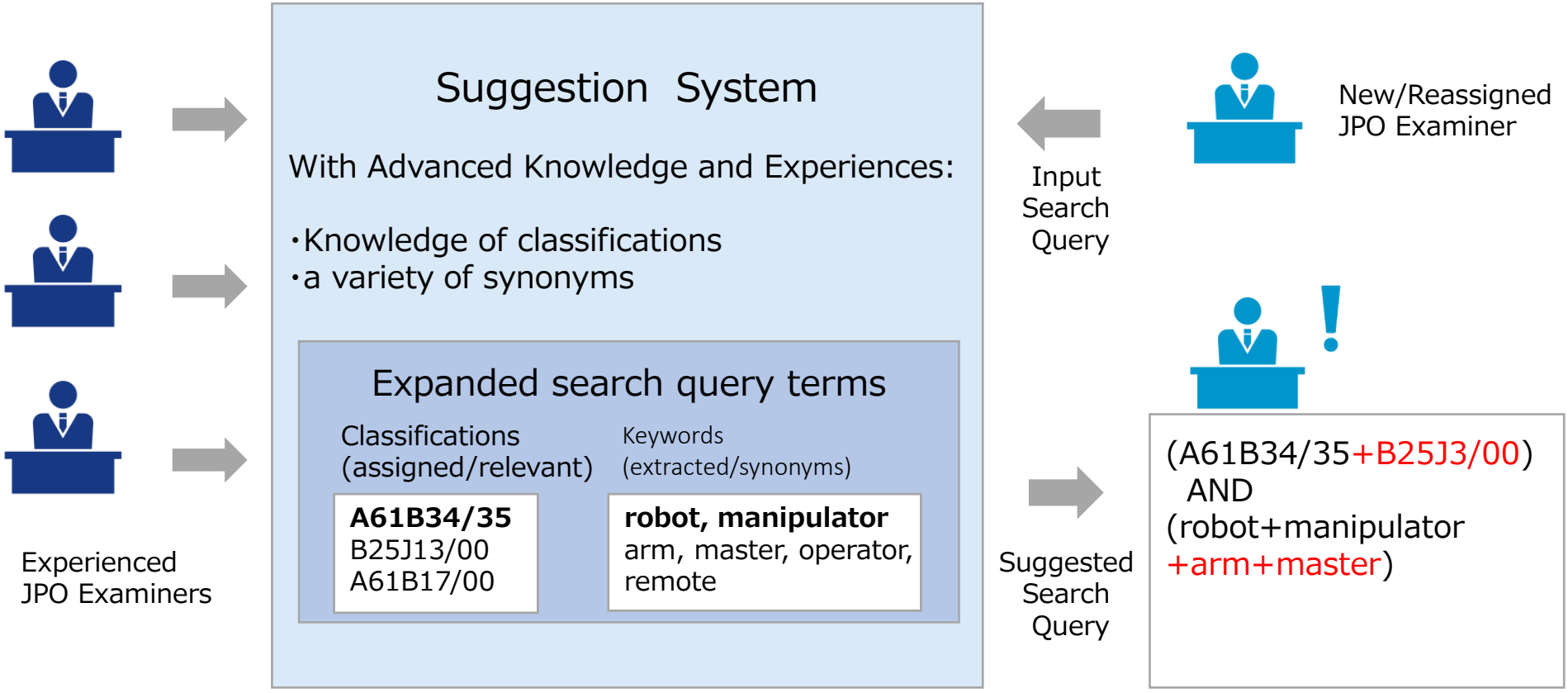
Concept Search and Re-Ranking Patent Documents

Issue: Although Examiners must conduct a complete search, based on efficiency, they prefer to read from the most relevant documents.



Advanced Search - Expanding search query terms -

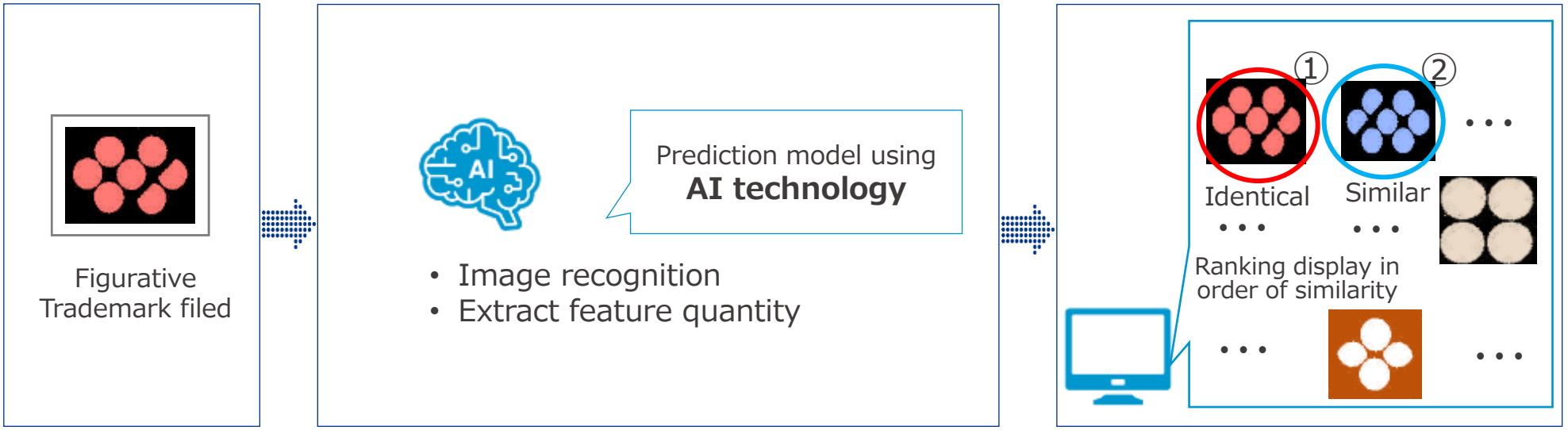
Issue: It's difficult for new/reassigned examiners to select effective search query terms.



5. AI Competition

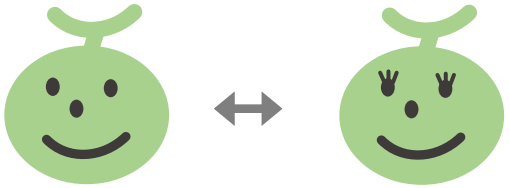
Examinations for Figurative Trademarks

Image Search



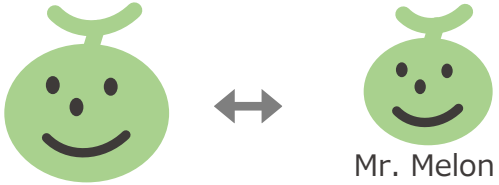
Issues to Be Solved for Image Search Tools（Prototype）

a. Identical or Very Similar



★★★ **HIGH** level of accuracy

b. Partial Matching

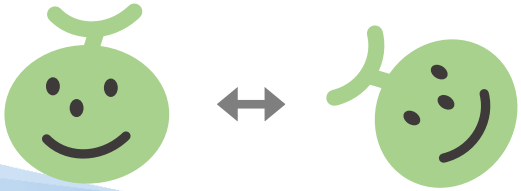


★☆☆ **LOW** level of accuracy

c. Difference in Color and Shade

★☆☆ **LOW** level of accuracy

d. Difference in Orientation

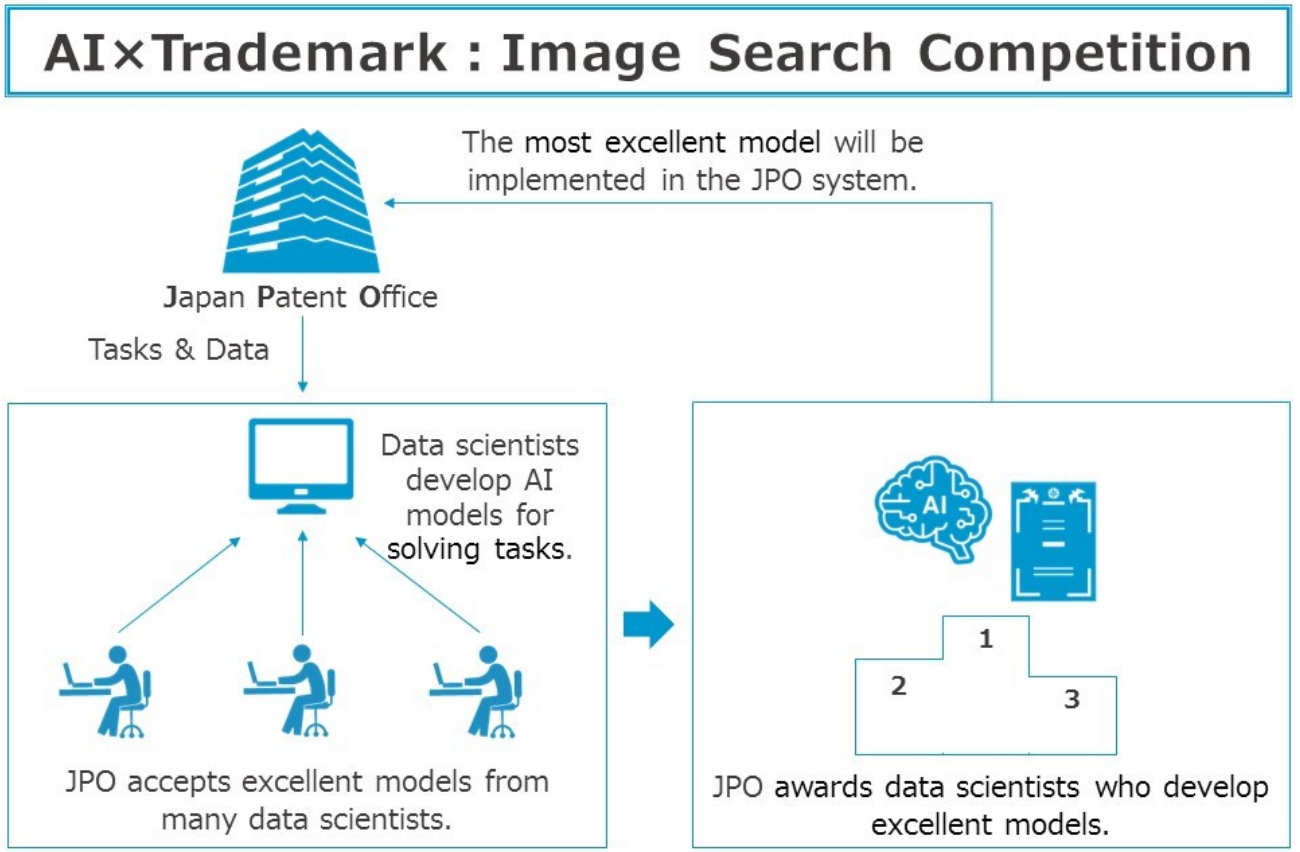


★☆☆ **LOW** level of accuracy

Issues to be solved

Outline of AI Competition

- **The JPO** conducted its first machine learning (ML) competition, "**AI x Trademark: Image Search Competition**" (26 November 2021 – 31 January 2022).



Read more

How to Participate

Steps for participating in the AI competition

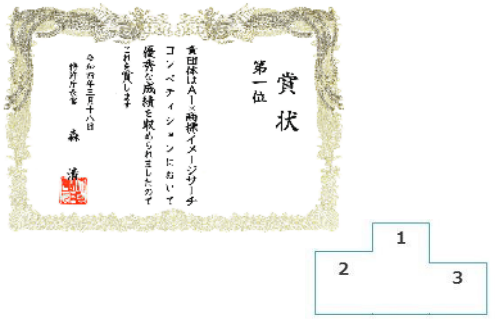
1) Register & download

2) Machine Leaning

3) Search & Submit

4) Rank & Decide potential winners

5) Winners are selected



Number of Participants and Submissions

- The number of participants and submissions for our competition was higher than for similar other government competitions.

Number of AI Competition Participants and Submissions

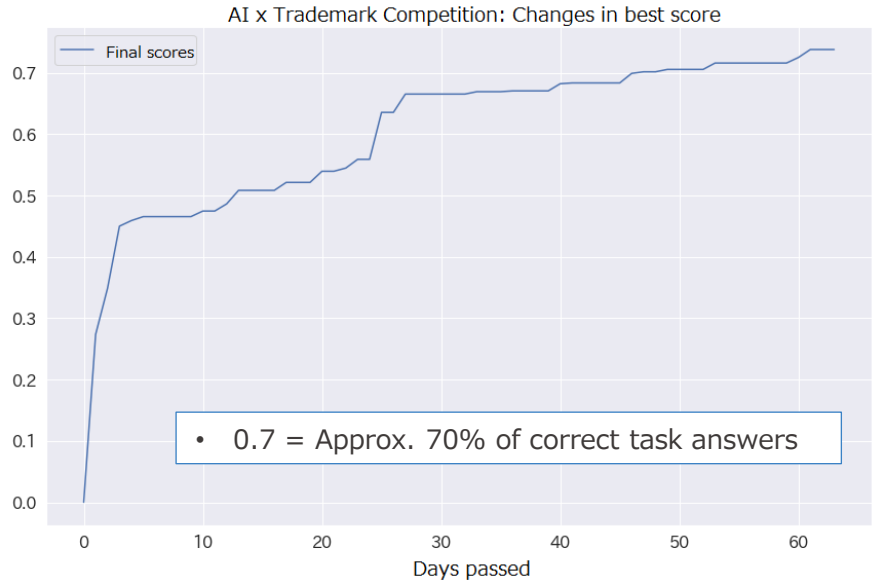
- Number of participants: **637**
- Number of submissions: **1,453**

Results Summary (Winners and their scores)

- Approx. 70% of the 1st-place scores on the tasks were correct.

Winners and their scores

Rank	Name/Affiliation	Number of Submissions	Score
1st	**Yahoo Japan Corporation** **Team name : tmsbir**	101	0.734
2nd	**Mr. Kota Anai** **Toyota Technical Development Corp.**	85	0.685
3rd	**NRI Digital, Ltd.** **Team name: Team TDX**	162	0.667



Read more

Outcome of the AI Competition

- The **accuracy** of the image search tool is expected to **improve** with the AI competition.
- The JPO has also confirmed the **effectiveness** of the competition.

Improvement of image search tool accuracy

- **Accuracy** **70%** **for tasks**
- **Improvement** **Twice**

Effectiveness of the competition

- Competition is **effective** for development of **support tools.**
- **Development period** can be **shortened.**
- ML competitions that Include implementation are **extremely rare.**

Reasons for Improvement of Accuracy

- Reasons for the improvement of accuracy include ingenuity in the preparation of data provided by the JPO, and ingenuity on the part of the competition participants.

Preparation of data provided by the JPO

- Selected by TM examiners
- Suited for this competition
- Eliminated unwanted noise

Ingenuity on the part of the competition participants

- Latest **Open-Source-Software**
- **Ensemble learning** utilizes **multiple models**
- **Pre-processing** e.g. margin removal

Thank you very much.