



Examination Guideline for AI-related inventions by JPO

Feb. 2024

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International Activities Center

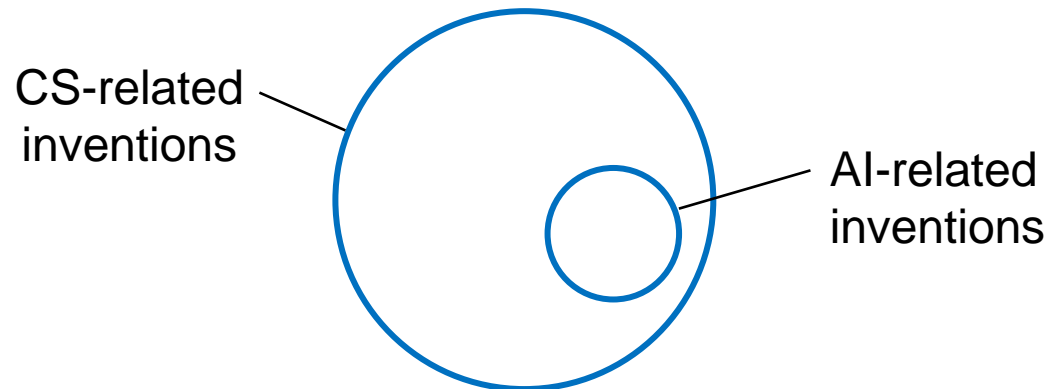


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AI-related Inventions

- AI (Artificial Intelligence)-related inventions
No definition from JPO
JPO considers them to be **part of CS-related inventions**
- CS (Computer Software)-related inventions
Inventions that use software to carry out the invention *

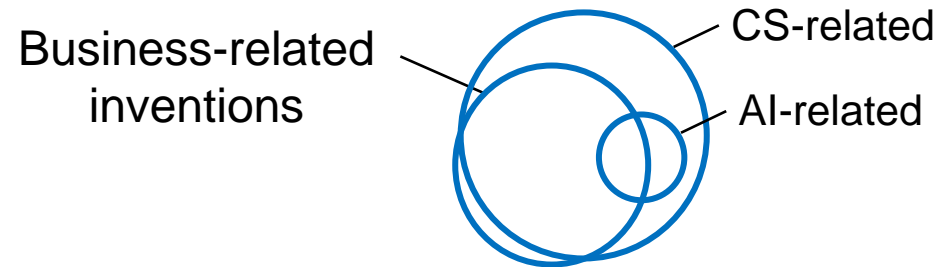


Inventions compatible with AI

- Business-related inventions

Inventions in which a business method is realized using Information and Communication Technology (ICT) *

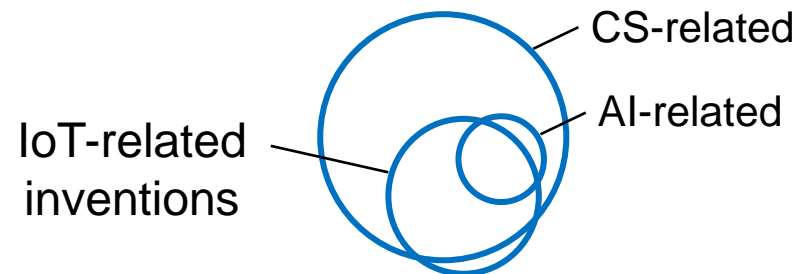
Most of them are CS-related inventions, and the proportion of AI-related inventions are increasing.



- IoT (Internet of Things)-related inventions

IoT collects data from various things.

Big data collected through IoT technologies are often processed with AI.



Examples of AI-related Inventions

- AI software itself

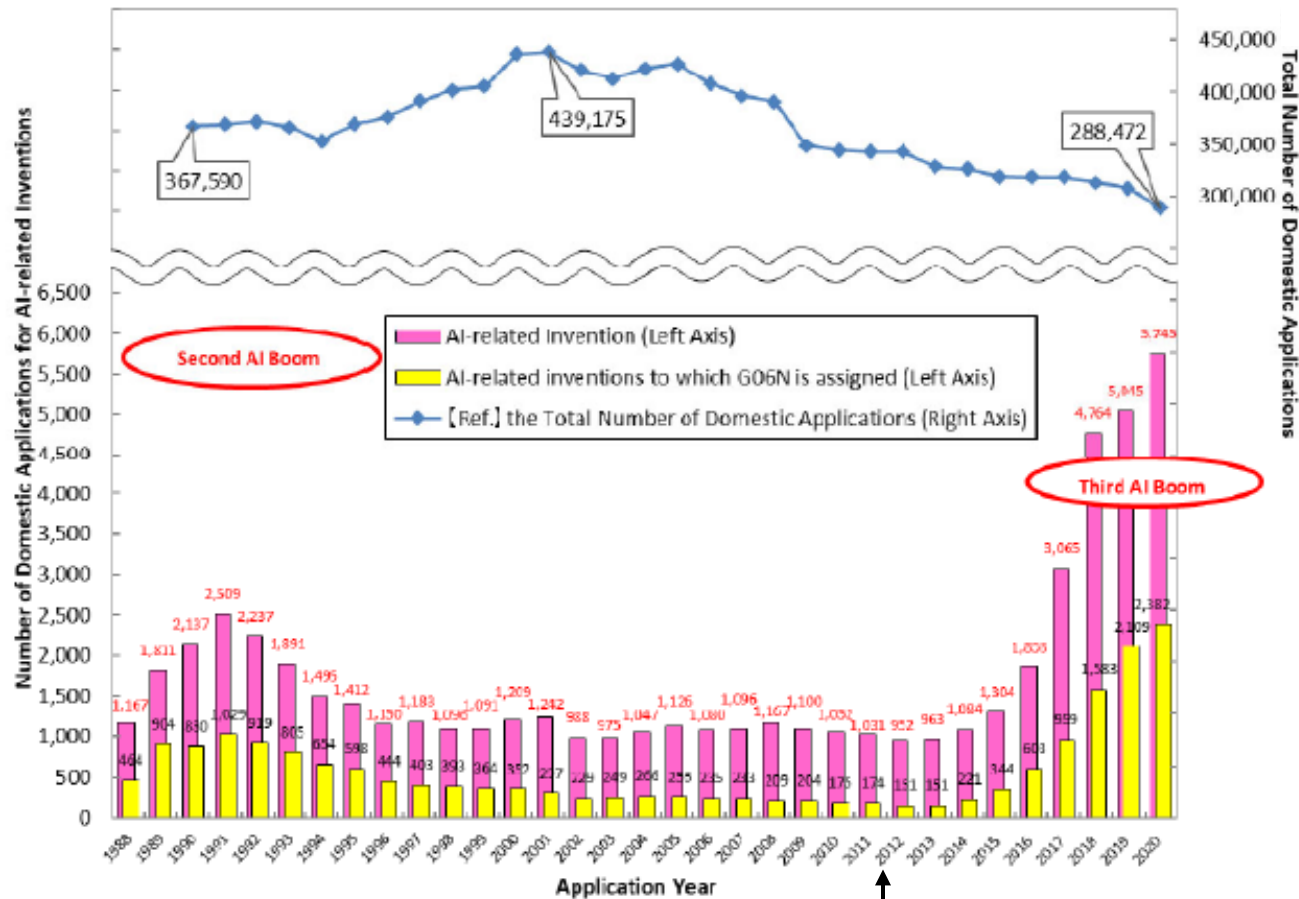
(Learning stage)

- training data, learned parameters
- learned model: AI software + learned parameters

(Usage stage)

- technology in a specific field that uses software with a learned model
- things created by software with a learned model

Number of Applications



Univ. of Toronto won by using deep learning at ILSVRC (ImageNet Large Scale Visual Recognition Competition)

Important AI technologies

(1) Convolutional Neural Network: CNN

for video or image recognition

(2) Recurrent Neural Network: RNN or

Long Short-Term Memory: LSTM (an extension of RNN)

for speech recognition and text processing

(3) Deep Reinforcement Learning

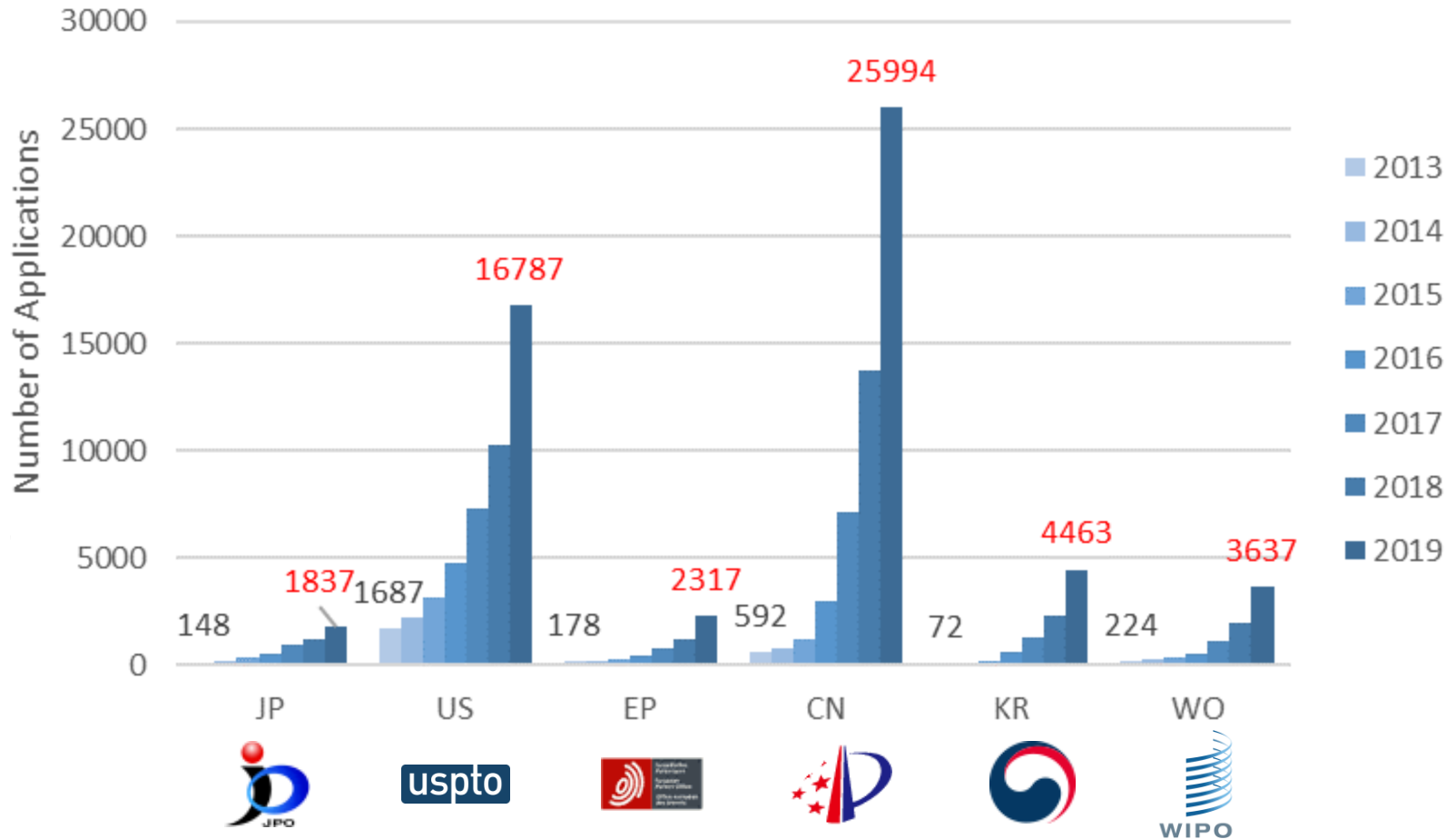
for system control and optimization

(4) Transformer

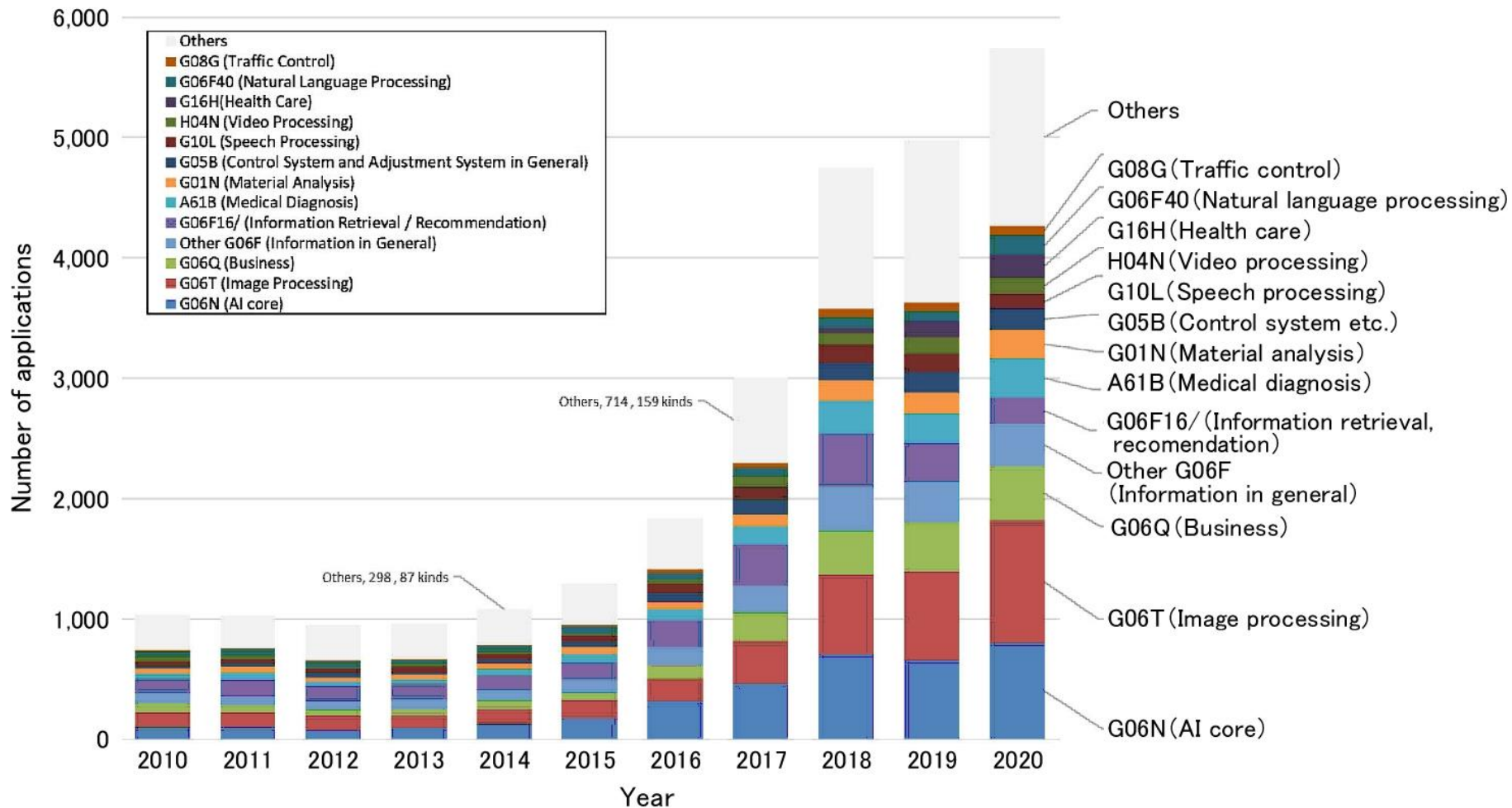
for natural language processing

Number of applications in major countries

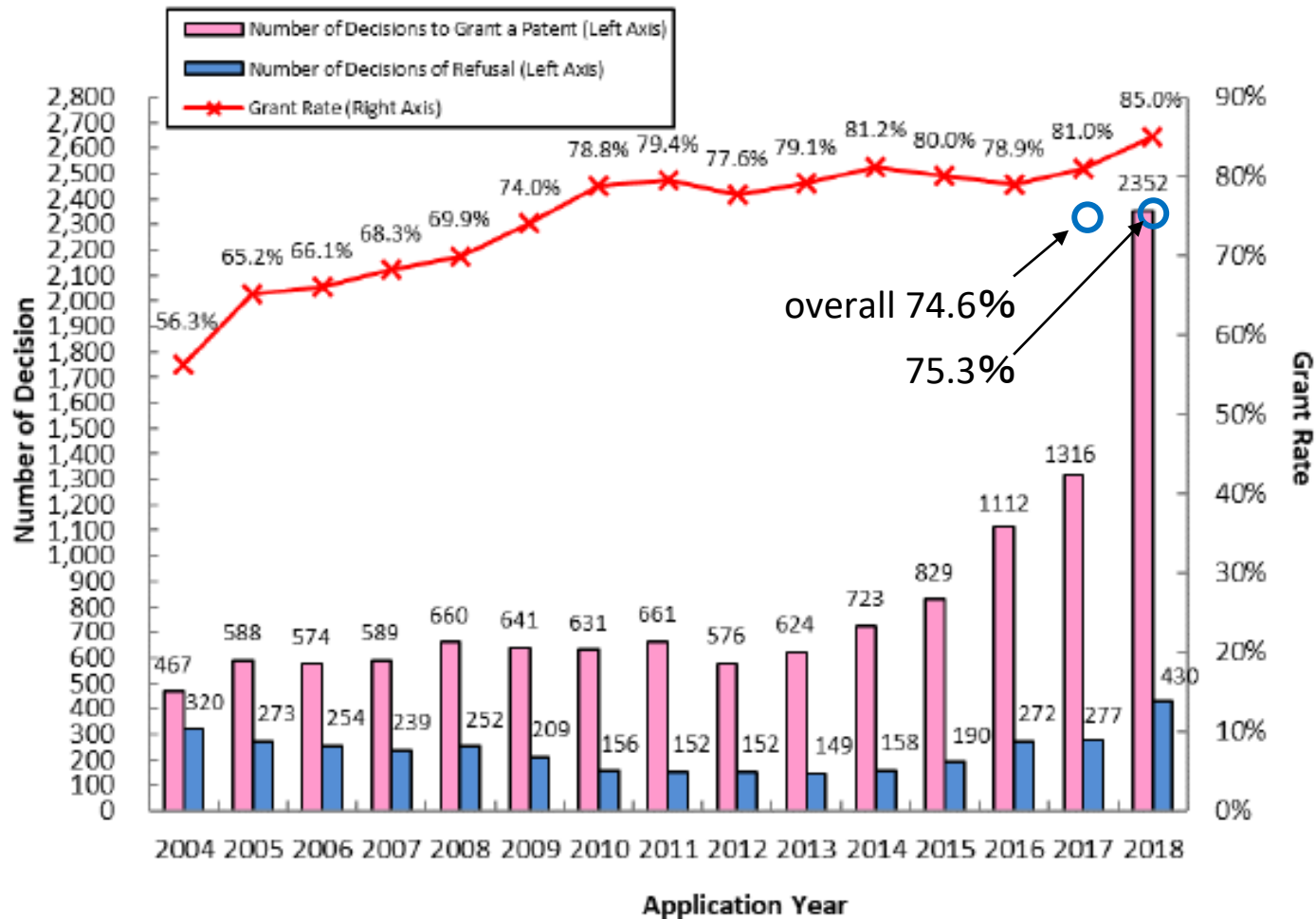
* applications classified to G06N (AI core)



Applications by technical field



Grant Rate



$$\text{Grant rate} = \frac{\text{decisions to grant}}{\text{decisions to grant} + \text{decisions of refusal} + \text{abandonment after OA}}$$

Major Applicants



		AI-related inventions	Referring to deep learning
1	Fujitsu	970	384
2	NTT	831	356
3	Hitachi	693	247
4	Canon	663	384
5	Toyota Motor	547	157
6	Toshiba	402	179
7	FANUC	394	235
8	KDDI	301	134
9	NEC	284	51
10	Mitsubishi Electric	281	117
11	FUJI FILM Business Innovation	252	99
12	Omron	246	137
13	Yahoo Japan	238	148
14	Panasonic IP Management	176	93
15	NHK	152	97
16	Samsung Electronics	139	84
17	KONICA MINOLTA	137	77
18	Ricoh	135	67
19	Sony Group	127	61
20	Strad Vision	122	114

* application filed in or after 2014, and published in or before June 2022

JPO's Activity

- Report on recent trends in AI-related inventions (Oct. 2022, Oct. 2023)
- Revision of Examination Guideline (Mar. 2018)
- Publication of case examples (Jan. 2019, planned in Mar. 2024)
- Team supporting AI examinations (Jan. 2021, expanded in Sep. 2023)

Five IP offices

- Examination practices on AI-related inventions (Jan. 2023)

JPO-EPO

- Comparative study on computer implemented inventions/software related inventions (2021)

JPO-CNIPA

- ¹² Comparative study on AI-related inventions (2023)

GL* and HB*

GL for all inventions applies also to AI-related inventions

Supplement and case examples for CS-related are given in HB

2015.10 GL fully revised

HB Annex A "Case Examples" (incl. CS-related invention cases)

HB Annex B § 1 "CS-related inventions"

2016.9, 2017.3 Case examples of IoT-related inventions added to HB

2018.3 GL revised for CS-related inventions

Case examples of CS-related inventions added to HB

2019.1 Case examples of AI-related inventions added to HB

2024.3 Case examples of AI-related inventions addition to HB (planned)

* GL: Examination Guideline for Patent and Utility Model
HB: Examination Handbook for Patent and Utility Model

Relevant chapter in GL and HB

	Patent Law	General guideline	Supplement for CS-related invention
Patent eligibility	art.29 (1) main paragraph	GL part III chap.1	HB annex B, chap.1, 2.1.2
Description requirement			
Clarity	art.36 (6) (ii)	GL part III chap.2, sec.3	HB annex B, chap.1, 1.2.1
Support	art.36 (6) (i)	GL part III chap.2, sec.2	
Enablement	art.36 (4) (i)	GL part III chap.1, sec.1	HB annex B, chap.1, 1.1.1
Inventive step	art.29 (2)	GL part III chap.2, sec.2	HB annex B, chap.1, 2.2.3

Examination Handbook Annex B, Chapter 1: "CS-related inventions"

Case examples of AI-related inventions

HB Annex A	Case#	Title of invention	Eligibility	Description requirement			Inventive step
				Clarity	Support	Enablement	
1. Description requirement	46	Sugar content estimation system				NG	
	47	Business plan design apparatus				OK	
	48	Autonomous vehicle				OK	
	49	Body weight estimation system			OK/NG	OK/NG	
	50	Method for estimating the allergy incidence rate of a test substance			OK/NG	OK/NG	
	51	Anaerobic adhesive composition			NG	NG	
3.1 Eligibility	3-2	Sugar content data of apples and a method for predicting sugar content data of apples	OK/NG				
5. Inventive step	31	Learning system comprising on-vehicle devices and a server					NG
	32	Quality management program of manufacturing lines					NG
	33	Cancer level calculation apparatus					NG
	34	Estimation system of hydroelectric power generating capacity					OK/NG
	35	Screw clamping quality estimation apparatus					NG
	36	Dementia stage estimation apparatus					OK
HB Annex B							
3.2 Eligibility	2-13	Data structure of dialogue scenarios in voice interactive system	OK				
	2-14	Trained model for analyzing reputations of accommodations	OK				

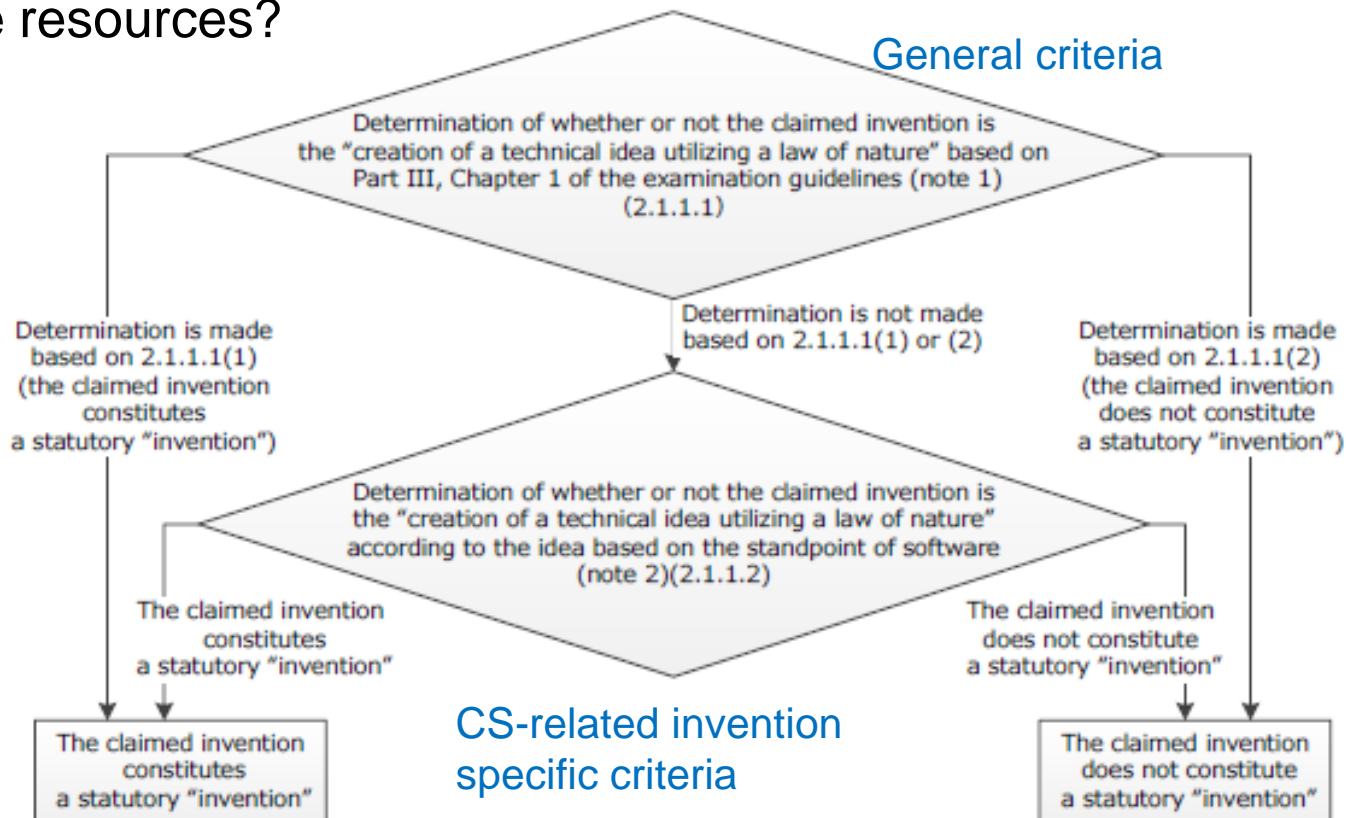
Criteria for Patent Eligibility

General criteria:

Is the invention creation of a technical idea utilizing a law of nature?

CS-related criteria:

Is information processing by the software concretely realized by using hardware resources?



Criteria for Patent Eligibility

JP

Is the invention creation of a technical idea utilizing a law of nature?

Is information processing by the software concretely realized by using hardware resources?

c.f. US, Alice Case 3 (2014)

Step 1: Does the patent claim under examination contain an abstract idea?

Step 2: Does the patent add to the idea "something extra" that embodies an "inventive concept"?

JPO more generous than USPTO?

Case 3-2 Sugar content data of apples (1)

[Claim 1]

Sugar content data of preharvest apples on trees measured by a portable sugar content sensor for apples which performs reflective near-infrared spectroscopic analyses.

Claim 1 does not specify any means for or a method of presenting sugar content data of apples. It is characterized only in the content of information that “sugar content data of preharvest apples on trees is measured by a specific sensor.”

The sugar content data of apples of Claim 1 is a **mere presentation of information**.

It is not a creation of the technical idea utilizing a law of nature and , therefore, does not fall under "invention."



Not eligible

Case 3-2 Sugar content data of apples (2)

[Claim 2]

The sugar content data of apples as described in Claim 1 received by a receiving unit of a server and stored in a memory unit of the said server.

Claim 2 identifies the sugar content data of apples of Claim 1 as "received by a receiving unit of a server and stored in a memory unit of the server," but it still does not specify any means for or method of presenting the sugar content data of apples.

The sugar content data of apples of Claim 2 is a **mere presentation of information**.

It is not a creation of a technical idea utilizing a law of nature and thus does not fall under "invention."



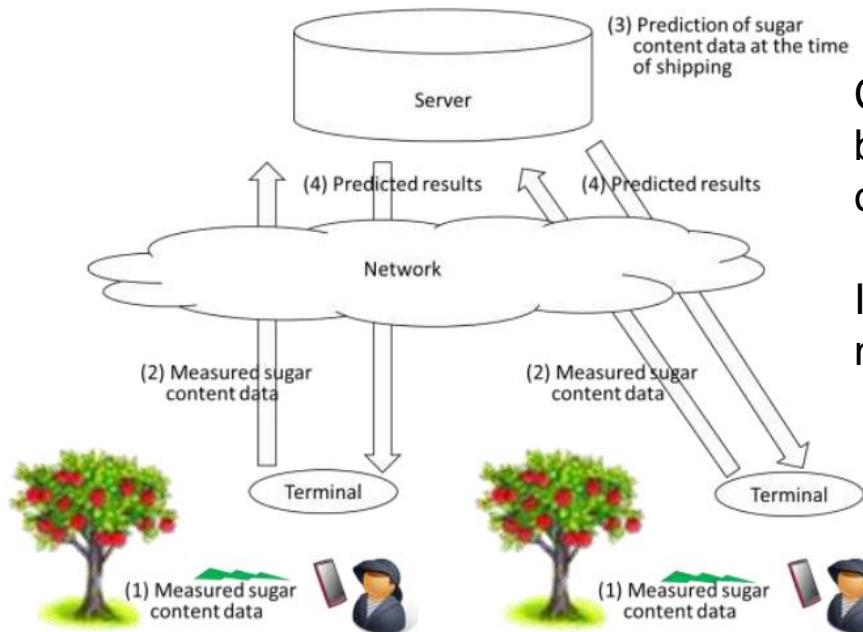
Not eligible

5. Eligibility

Case 3-2 Sugar content data of apples (3)

[Claim 3]

A method for predicting sugar content data of apples comprising;
a step in which an analyzing unit of the server analyzes the relationship between the sugar content data of preharvest apples for specified periods and data on meteorological conditions, and the sugar content data of apples at the time of their shipping, based on past performance;
a step in which the receiving unit of the said server receives the sugar content data of apples for specified periods as described in Claim 1; and
a step in which a prediction unit of the said server predicts and outputs the sugar content data of apples at the time of future shipping using the said received sugar content data of apples for specified periods and data on past and future meteorological conditions as inputs, based on the said analyzed relationships.



Claim 3 **concretely performs information processing** based on the technical properties, such as chemical or biological properties, of apples.

It is a creation of a technical idea utilizing a law of nature as a whole and thus falls under "invention."

Eligible



Example of Data Patent

- Patent No. 7,282,070 Compressed **data**
- Patent No. 7,177,608 System including work machine, computer implemented method, method for producing trained position estimation model, and **training data**
- Patent No. 6,731,683 Distinguishing device, information processing device, program, **teacher data**, and distinguishing method

Description Requirements

Clarity

One invention should be identified based on matters stated in one claim.

Support

Whether or not the claimed invention exceeds "the extent of disclosure in the description to which a person skilled in the art would recognize that a problem to be solved by the invention would be actually solved."

Enablement

Whether or not the description is "clear and sufficient in such a manner as to enable any person ordinarily skilled in the art to work the invention."

Description Requirements

Correlation among data in training data should be

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

Cases Involving Description Requirements

	the description requirement is satisfied	the description requirement is NOT satisfied
invention using AI in various technical fields		Case Example 46 inventions in which a correlation among multiple types of data in a training data is NOT supported in the description, and further, it is NOT presumable that there is any such correlation even in view of a common general technical knowledge at the time of filing
inventions in which it is presumable that there is a correlation among multiple types of data in a training data in view of a common general technical knowledge at the time of filing	Case Examples 47 and 48 inventions in which a specific correlation among multiple types of data in a training data is NOT disclosed in the description, but it is presumable that there is such a correlation in view of a common general technical knowledge at the time of filing	
inventions in which an explanation or statistic information in the description should support a correlation among multiple types of data in a training data	Case Example 49: Claim 2 inventions in which an explanation or statistic information in the description supports a correlation among multiple types of data in a training data	Case Example 49: Claim 1 inventions in which a correlation among multiple types of data in a training data that has been claimed in a generic concept is NOT supported in the description, and further, it is NOT presumable that there is any such correlation even in view of a common general technical knowledge at the time of filing
inventions in which a performance evaluation using an actual AI model should support a correlation among multiple types of data in a training data	Case Example 50: Claim 2 inventions in which a performance evaluation using an actual AI model supports a correlation among multiple types of data in a training data	Case Example 50: Claim 1 inventions in which a correlation among multiple types of data in a training data that has been claimed in a generic concept is NOT supported in the description, and further, it is NOT presumable that there is any such correlation even in view of a common general technical knowledge at the time of filing
an invention of product in which it has been presumed by AI that the product has some function		Case Example 51 inventions of a product that do NOT satisfy the description requirement because there is no evaluation result provided using an actual product, an estimation accuracy of an estimation value by a trained model is not verified, and there is no such a common general technical knowledge that an estimation result by AI can be a substitution of an evaluation result on an actually-produced product, though the claimed product has been presumed that the product has some function by AI

Case 46: Sugar content estimation system* (1)

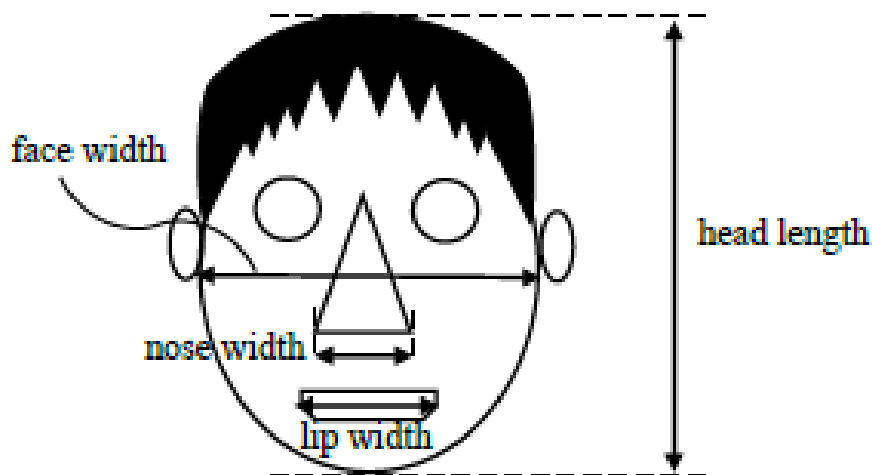
[Claim 1]

A sugar content estimation system comprising:

a storage means for storing facial images of people and sugar contents of vegetables produced by the people;

a model generation means for generating a determination model through machine learning, to which a facial image of a person is input and from which the sugar content of a vegetable produced by the person is output, using training data containing the facial images of the people stored in the storage means and the sugar contents of the vegetables, a reception means for receiving an input of a facial image; and

a processing means for outputting, using the generated determination model that has been generated by the model generation means, the sugar content of a vegetable produced by a person that is estimated based on the facial image of the person input to the reception means.



Case 46: Sugar content estimation system (2)

[Claim 1]

The description says that

- there is a certain correlation between the facial image of a person and the sugar content of a vegetable produced by the person
- a facial feature is characterized by the head length, face width, nose width, and lip width, for example

But

- The **description does not disclose any correlation** or the like between them.
- No correlation or the like between them can be presumed if **common general technical knowledge** at the time of filing is taken into consideration.
- There is no **performance evaluation result** of an actually generated determination model shown in the description.



Case 49: Body weight estimation system* (1)

[Claim 1]

A body weight estimation system comprising:

a model generation means for generating an estimation model that estimates the body weight of a person based on a feature value representing the face shape and body height of the person, through machine learning using training data containing feature values representing facial images as well as actual measured values of body heights and body weights of people;

a reception means for receiving an input of the facial image and body height of a person;

a feature value obtainment means for obtaining a feature value representing the face shape of the person through analysis of the facial image of the person that has been received by the reception means; and

a processing means for outputting an estimated value of the body weight of the person based on the feature value representing the face shape of the person that has been received by the feature value obtainment means and the body height of the person that has been received by the reception means, using the generated estimation model by the model generation means.

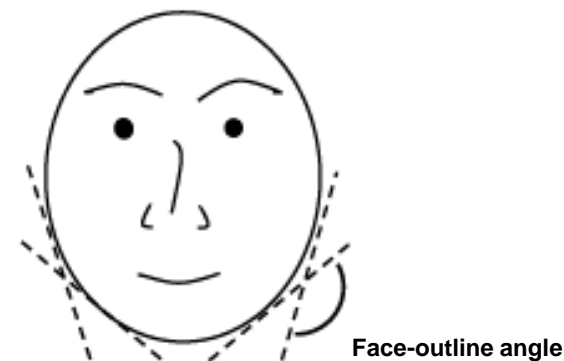
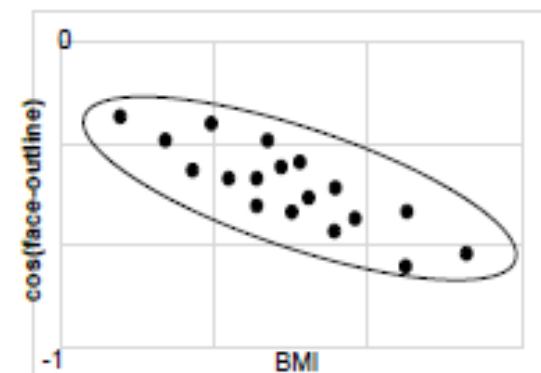


Fig. 1



Case 49: Body weight estimation system (2)

[Claim 1]

The description

- defines a face-outline angle as **a feature value representing a face shape**
- discloses a statistically significant correlation between the face-outline angle and BMI (body weight divided by the square of a body height) of a person.

of a person

But,

- It **does not disclose a correlation** or the like between (i) a feature value other than the face-outline angle and (ii) the body height, weight, and the like of a person and BMI based on these.
- It cannot be presumed that there is such a correlation even if **common general technical knowledge** at the time of filing is taken into consideration.
- There is no **performance evaluation result** disclosed on an estimation model that has actually been generated using a feature value other than a face-outline angle representing a face shape.

Support requirement is **NOT** satisfied



Case 49: Body weight estimation system (3)

[Claim 2]

The body weight estimation system as in Claim 1, wherein the feature value representing a face shape is the **face-outline angle**.

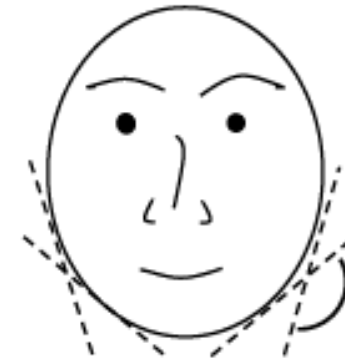


Fig. 1

Face-outline angle

The description

- defines the face-outline angle as a feature value representing a face shape
- discloses a statistically significant correlation between the face-outline angle and BMI

Support requirement is satisfied



Criteria for Inventive Step

Whether or not it could be reasoned that a person skilled in the art easily arrives at the claimed invention based on the prior art.

Factors in support of the non-existence of an inventive step

- Motivation for applying secondary prior art to primary prior art
 - (1) Relation of technical fields
 - (2) Similarity of problems to be solved
 - (3) Similarity of operations or functions
 - (4) Suggestions shown in the content of prior art
- Design variation of primary prior art
- Mere aggregation of prior art



Factors in support of the existence of an inventive step

- Advantageous effects
- Obstructive factors
Example: It is contrary to the purpose of the primary prior art to apply the secondary prior art to the primary prior art.

Determining Inventive Step

during the inventive step assessment of mixed-type invention
(a mix of technical and non-technical features appearing in a claim),

JP: no distinction is made 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 more generous than EPO?

Case 33 Cancer level calculation apparatus* (1)

[Claim 1]

A cancer level calculation apparatus that calculates a possibility that a subject person has cancer, using a blood sample of the subject person comprising

- a cancer level calculation unit that calculates a possibility that a subject person has cancer, in response to an input of measured values of A marker and B marker that have been obtained through blood analysis of the subject person,
- the cancer level calculation unit including a neural network that has been trained through machine learning using training data to calculate an estimated cancer level in response to the input of the measured values of A marker and B marker.

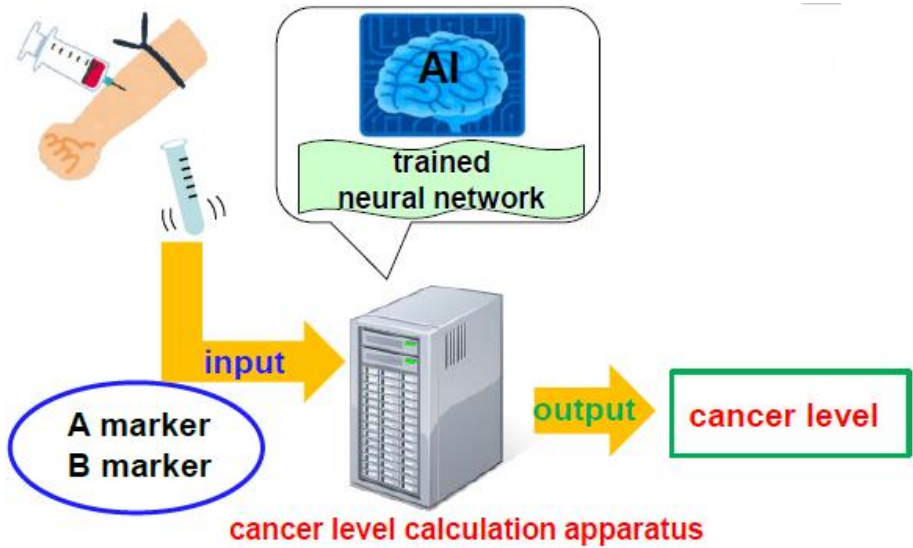
Cited invention 1

A cancer level calculation method of calculating a possibility that a subject person has cancer carried out by a doctor, using a blood sample of the subject person comprising

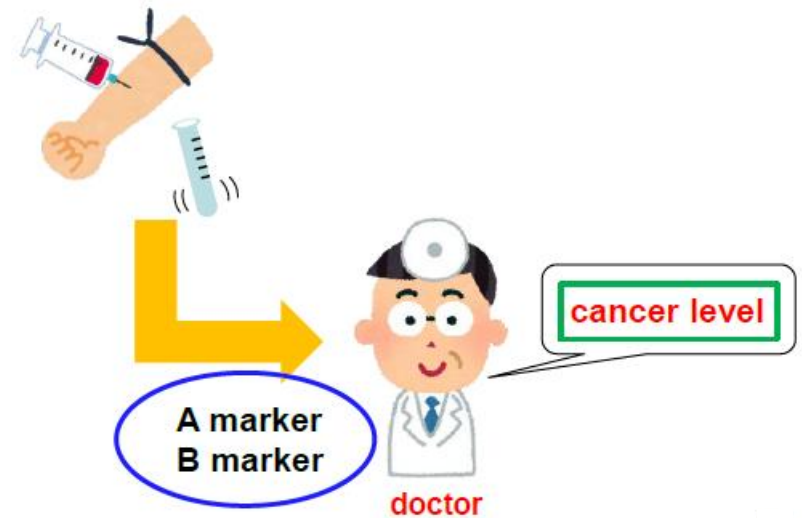
- a step of cancer level calculation, wherein a possibility that a subject person has cancer is calculated, using measured values of A marker and B marker that have been obtained through blood analysis of the subject person.

Case 33 Cancer level calculation apparatus (2)

[Claim 1]



Cited invention 1



It is well-known to calculate the possibility of a certain disease based on a prescribed set of input data using a trained neural network.

Mere systemization of tasks performed by humans using AI

NOT Inventive



Case 34 Estimation system of hydroelectric power generating capacity* (1)

[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 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 the future hydroelectric power generating capacity based on the output data of which reference time is the current time.

[Claim 2]

The estimation system of hydroelectric power generating capacity as in Claim 1, wherein the input data to the input layer further contains the temperature of the upper stream of the river during the predetermined period between the reference time and the predetermined time before the reference time.

Cited invention 1

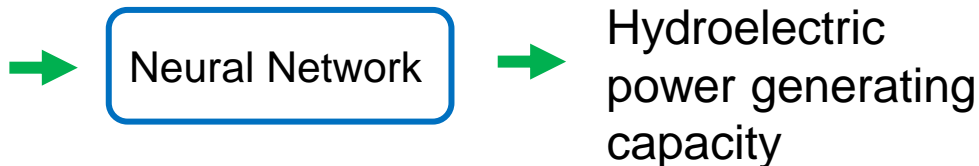
An estimation system of hydroelectric power generating capacity that carries out a multiple regression analysis by an information processor, comprising:
a regression equation model, in which explanatory variables are a precipitation amount of the upper stream of a river, a water flow rate of the upper 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 objective variable is the hydroelectric power generating capacity in the future after the reference time;
an analysis unit that calculates a partial regression coefficient of the regression equation model based on actual values corresponding to the explanatory variables and the objective variable; and
an estimation unit that, into the regression equation model to which the partial regression coefficient that has been calculated by the analysis unit is set, inputs data of the explanatory variables with setting a current time as the reference time, and then, calculates an estimated value of the future hydroelectric power generating capacity based on an output data from the objective variable setting a current time as the reference time.

7. Inventive step

Case 34 Estimation system of hydroelectric power generating capacity (2)

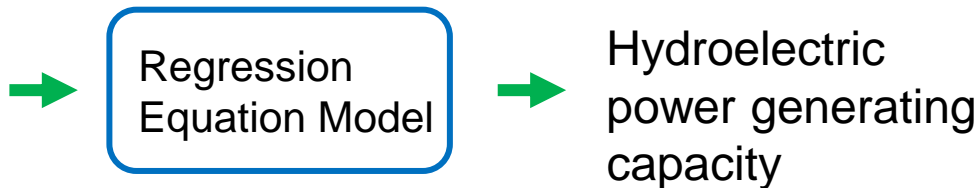
[Claim 1]

- precipitation amount of the upper stream of a river
- water flow rate of the upper stream of the river
- water inflow rate into a dam



Cited Invention 1

- precipitation amount of the upper stream of a river
- water flow rate of the upper stream of the river
- water inflow rate into a dam



Well-known art:

To estimate an output in the future based on an input of time series data in the past, by using a trained neural network

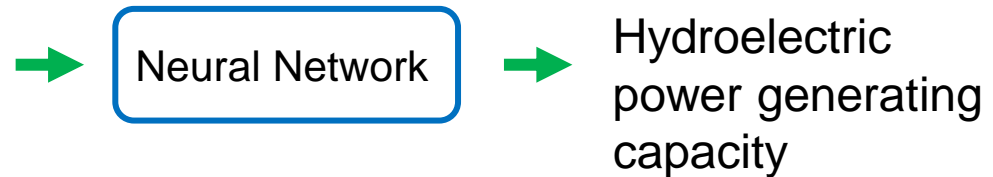


NOT Inventive

Case 34 Estimation system of hydroelectric power generating capacity (3)

[Claim 2]

- precipitation amount of the upper stream of a river
- water flow rate of the upper stream of the river
- water inflow rate into a dam
- **temperature of the upper stream of the river during the predetermined period**



This enables a highly accurate estimation of a hydroelectric power generating capacity, taking into account an increase of inflow rate due to meltwater in the spring.

It is a significant effect that a person skilled in the art cannot expect.



Inventive

Selected Resources

JPO

Examination Guidelines for Patent and Utility Model in Japan

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

Examination Handbook for Patent and Utility Model in Japan

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

Patent Examination Case Examples Pertinent to AI-related technologies

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

Recent Trends in AI-related Inventions

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

Five IP Offices

Chart Examination Practices on AI-related inventions

https://www.fiveipoffices.org/sites/default/files/2023-07/Chart_Examination_practices_on_AI-related_inventions.pdf

JPO-EP

Comparative study on computer implemented inventions/software related inventions

https://www.jpo.go.jp/news/kokusai/epo/document/software_201903/01_en.pdf

JPO-CNIPA

Comparative study on AI-related inventions

https://www.jpo.go.jp/e/news/kokusai/cn/ai_report_2023_e.html



Thank you for your attention!!

