Newly Added Case Examples for AI-Related Technologies

January 30, 2019

Examination Standards Office

Japan Patent Office

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2. Related Text in the Examination Guidelines
3. Newly Added Case Examples

1. AI-Related Technologies

2. Related Text in the Examination Guidelines

3. Newly Added Case Examples

Industry 4.0 with IoT and AI technologies etc.

- The fourth industrial revolution is expected with the use of Big Data and AI (Artificial Intelligence) through technological innovations in AI and IoT (Internet of Things) etc.

Innovating power generation system (electric power, motor)

computer automation (robots, Internet)

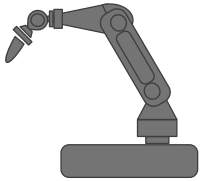
4th industrial revolution

3rd industrial revolution

Inventing power generation system (steam engine)

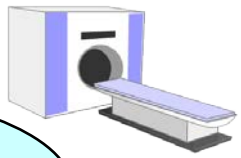
2nd industrial revolution

1st industrial revolution



IoT

AI



Data collection from various things through IoT technologies

➡ Analysis and training using the collected big data through AI technologies

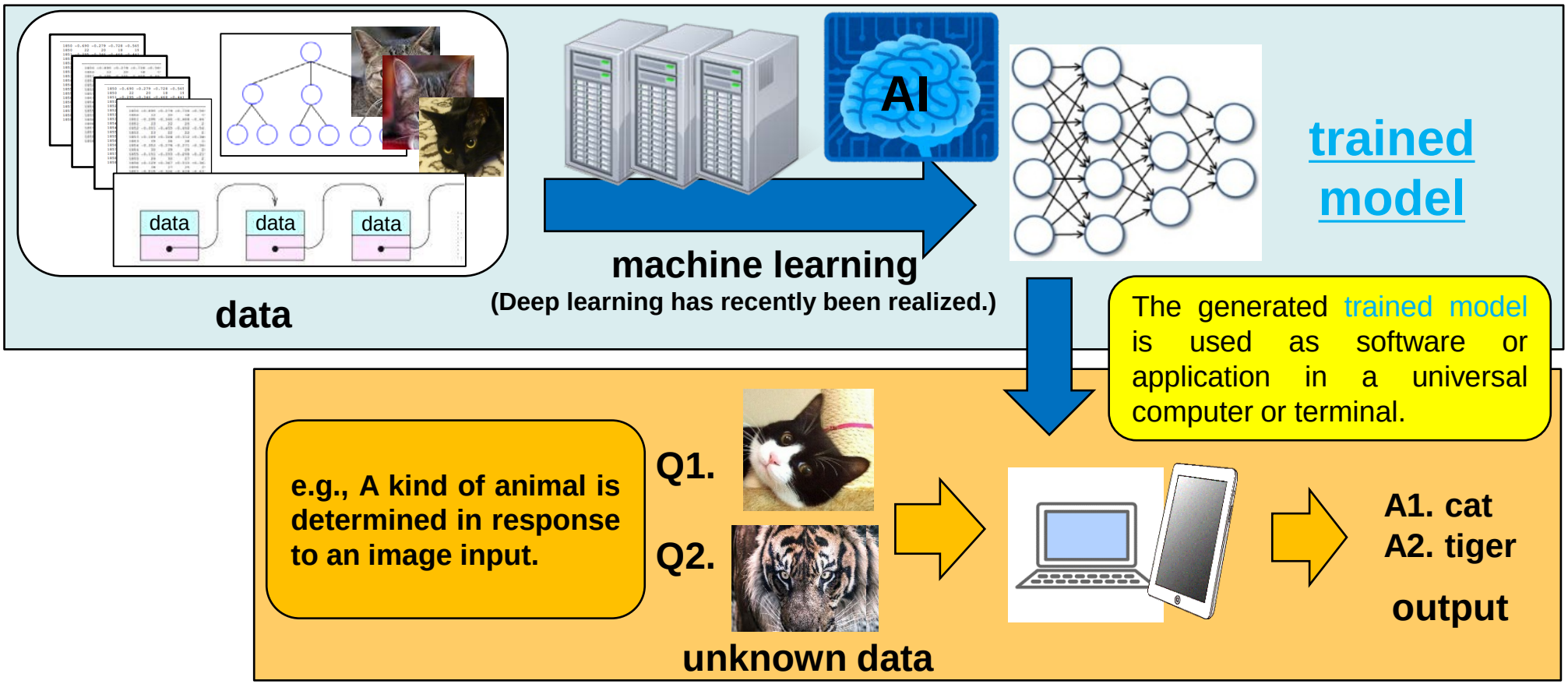
➡ Optimized computers and systems

Optimization of computers and systems

Proper management, analysis, and learning of a collected big data is a key to sharpen an industrial competitive edge.

Outline of AI-Related Technologies

- A big data that has been collected through IoT-related technologies are analyzed and learned through AI-based machine learning in many cases.
- There are many machine learning methods. A recent drastic development in computer calculation performance realized a deep learning using a multi-layer neural network, and a high quality trained model can be generated based on a big data.
- The trained model that has been generated in this way can output a correct solution even for an unknown data.



Publication of Case Examples for Examination on Industry 4.0 Technologies

- Case Examples for examination on Industry 4.0 technologies were newly added to Examination Handbook for Patent and Utility Model and published.

  September 2016 : 12 Case Examples
  March 2017 : 11 Case Examples

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  Enhancing a predictability of patent right obtainment by domestic enterprises, and boosting innovation.

- JPO continues a proper and timely information release.

AI-related Case Examples

- **Data Structure of Dialogue Scenarios in Voice Interactive System (patentability)**
- **Trained Model for Analyzing Reputations of Accommodations (patentability)**
- **Construction Machine Maintenance Server (inventive step)**
- **Learning System comprising On-Vehicle Device and Server (inventive step)**
- **Quality Management Program of Manufacturing Lines (inventive step)**

1. AI-Related Technologies

2. Related Text in the Examination Guidelines

3. Newly Added Case Examples

Needs for New Case Examples

- **Examination on AI-related inventions can smoothly be carried out with reference to the current Examination Guidelines, so far.**

- **However, AI-related technologies will further be developed in various technical fields. In view of this, it is JPO's mission to:**
  - ✓ **show our examination practices to applicants in an easy-to-understand way, even if they are not accustomed to AI-related technologies, and**
  - ✓ **make a patentability determination in accordance with a consistent criteria throughout all technical fields.**

- **JPO invited public comments on examination on AI-related inventions from October 9 to November 9 in 2018. As suggested in the comments given,**
  - ✓ **the degree of the description requirement may vary depending on a technical feature of an invention, though AI-related inventions can generally be examined in accordance with the text on computer software inventions in the Examination Guidelines; and**
  - ✓ **an inventive step determination may vary depending on a training data as a technical feature of an invention.**

- **AI-related Case Examples as to the description requirement and inventive step are newly added to the Examination Handbook.**

Examination Guidelines: Description Requirement (Enablement Requirement)

- **Determination on the enablement requirement is a key of examination on AI-related inventions as those in the other technical fields.**

Enablement Requirement (Section 1, Chapter 1 of Part II of the Examination Guidelines)

- The statement of the detailed explanation of the invention shall be clear and sufficient as to enable any person ordinarily skilled in the art to which the invention pertains to work the invention. (Patent Act Article 36(4)(i))

invention of a product	The description must be stated in a manner that a person skilled in the art **can produce and use the product**.
invention of a method	The description must be stated in a manner that a person skilled in the art **can use the method**.
Invention of a process for producing a product	The description must be stated in a manner that a person skilled in the art **can make the product through the process**.

Examination Guidelines: Description Requirement (Support Requirement)

- **Determination on the support requirement is a key of examination on AI-related inventions as those in the other technical fields.**

Support Requirement (Section 2, Chapter 2 of Part II of the Examination Guidelines)

- The scope of a claimed invention should not exceed the extent of disclosure in the description. (Patent Act Article 36(6)(i))

claimed invention ⟷ comparison / consideration ⟷ a matter that is stated as an invention in the description

Considering a substantial correspondence without sticking to the consistency of wordings

Examination on Substantial Correspondence

description ⇒ 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 actually be solved

a case where the scope of the claimed invention exceeds the "extent"

⇒ substantially inconsistent with each other

⇒ violation of the support requirement

Examination Guidelines: Inventive Step

- **Inventive step determination is a key of examination on AI-related inventions as those in the other technical fields.**

Examination Guidelines (Part III Chapter 2 Section 2 Inventive Step)

- The examiner comprehensively assesses the various factors in support of the non-existence of an inventive step and in support of the existence of an inventive step.

Factors in support of the non-existence of an inventive step	Factors in support of the existence of an inventive step
1. 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 **2. Design variation of primary prior art** **3. Mere aggregation of prior art**	**1. Advantageous effects** **2. 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.

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3. Newly Added Case Examples

Plan for Enhancing Case Examples

- Creating about 10 Case Examples as to the description requirement and inventive step in AI-related technologies.

- Creating Case Examples in various technical fields with a reference to prior art in patent applications, looking ahead to the future development of AI-related technologies in various technical fields.

- Creating helpful and interesting Case Examples in a manner that users (including people in the companies or associations that have not been familiar with AI-related technologies) can easily understand what is each invention and what are the key points for consideration in view of the Examination Guidelines.

- Creating both eligible and ineligible Case Examples to help a clear understanding of the key points in determination from the viewpoint of the description requirement and inventive step .

※ These Case Examples are created only for explanation from the viewpoint of the description requirement or inventive step, and not for giving examples of the reasons for refusal from the other viewpoints.

Overview of Case Examples as to Description Requirement

	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

Description Requirement : Case Example 46

SUGAR CONTENT ESTIMATION SYSTEM

Claim 1: 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.

[Claim 1]

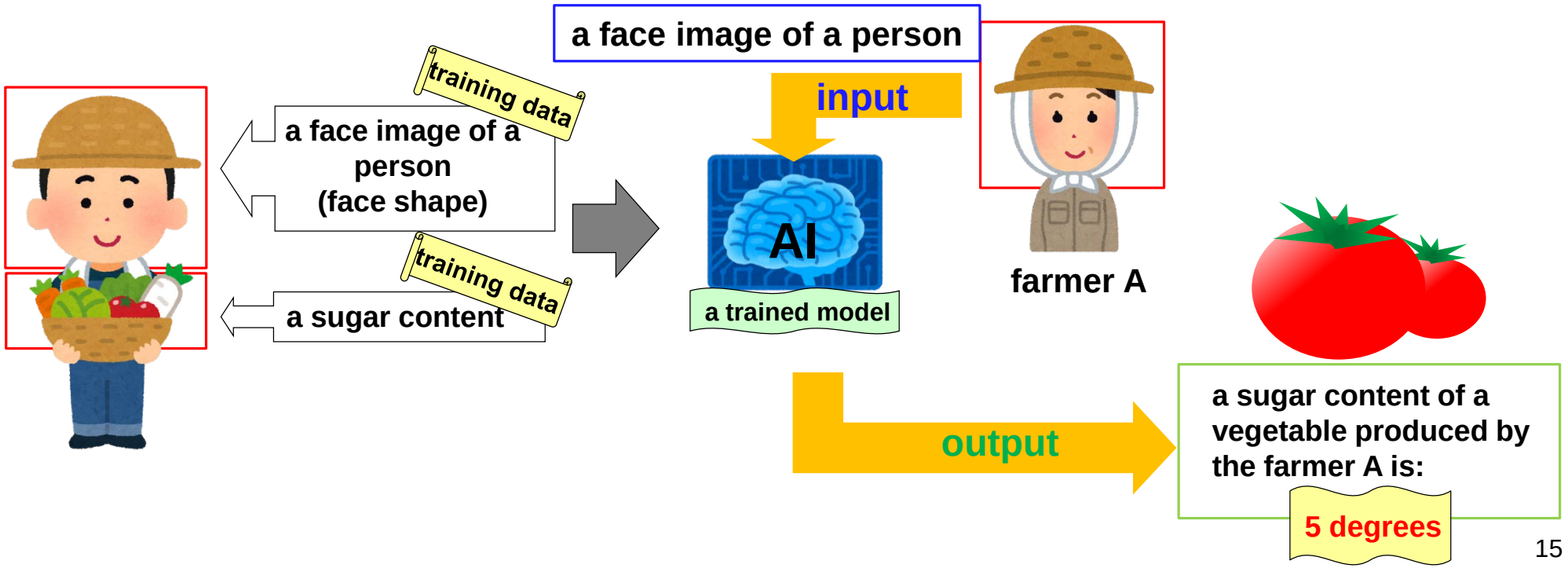
A sugar content estimation system comprising:

a storage means for storing face 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 face image of a person is input and from which a sugar content of a vegetable produced by the person is output, using training data containing the face images of the people stored in the storage means and the sugar contents of the vegetables,

a reception means for receiving an input of an face image; and

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



Description Requirement: Case Example 46

SUGAR CONTENT ESTIMATION SYSTEM

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[Overview of the Description]

It is an object of the present invention to provide a system that estimates a sugar content of a vegetable produced by a person based on his/her face image, taking advantage of the existence of a certain correlation between a face feature of a person and a sugar content of a vegetable produced by the person. For example, a face figure is characterized by a head length, face width, nose width, and lip width as shown in the figure. Here, a "sugar content" of a vegetable means a sugar content at the time when a certain period predetermined for each type of vegetables has passed after seeding. With this system, it is possible to estimate which person can produce a vegetable with a highest sugar content in a community.

A sugar content estimation system of the present invention firstly receives an input of a face image of a person by a user. A sugar content of a vegetable produced by a person is obtained using a determination model, to which a face image of the person is input and from which a sugar content of the vegetable produced by the person is output. The determination model is generated through a supervised machine learning using a known machine learning algorithm such as a convolutional neural network (CNN) by learning correlation between a face image of a person and a sugar content of a vegetable produced by the person.

[Overview of Reason for Refusal]

・Article 36(4)(i) (Enablement Requirement)

According to the description, a human face image is used for an input to a determination model that estimates a sugar content of a vegetable produced by the person. The description says that a face feature is characterized by a head length, face width, nose width, and lip width, for example.

However, the description only discloses that there is a certain correlation between a face image of a person and a sugar content of a vegetable produced by the person and does not disclose any correlation or the like between them, though disclosing that a face feature is characterized by a head length, face width, nose width, and lip width, for example. It cannot be presumed that there is a correlation or the like between them, even if a common general technical knowledge at the time of filing is taken into consideration. Further, there is no performance evaluation result of an actually generated determination model shown in the description.

Accordingly, it is not possible for a person skilled in the art to derive a sugar content estimation system that outputs an estimation of a sugar content of a vegetable produced by a person based on an input of a face image of the person, even if the disclosure in the description and a common general technical knowledge at the time of filing are taken into consideration.

Description Requirement : Case Example 47

BUSINESS PLAN DESIGN APPARATUS

Claim 1: 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.

[Claim 1]

A business plan design apparatus comprising:

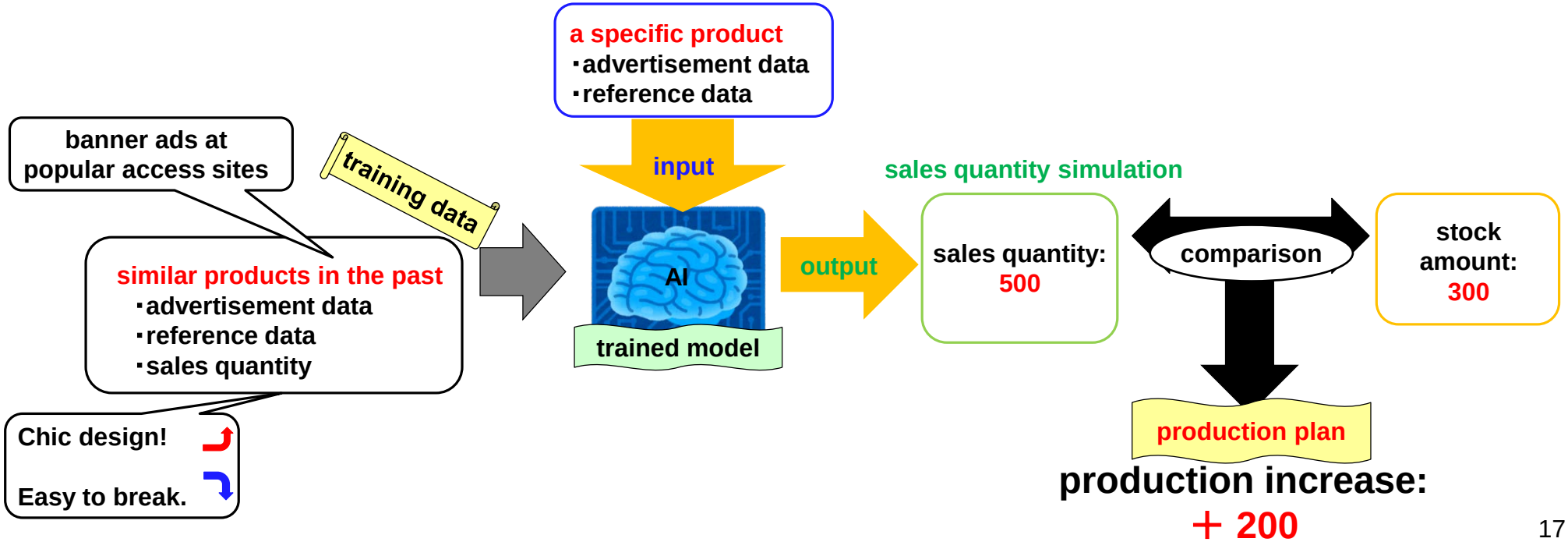
a storage means for storing a stock amount of a specific product;

a reception means for receiving a web advertisement data and mention data of the specific product;

a simulation and output means for, using an estimation model that has been trained through machine learning with a training data containing a web advertisement data and mention data of a similar product that has been sold in the past and a sales quantity of the similar product, simulating and outputting a future sales quantity of the specific product estimated based on the web advertisement data and mention data of the specific product;

a production plan making means for planning a future production quantity of the specific product, based on the stored stock amount and the output sales quantity; and

an output means for outputting the output sales quantity and the production plan.



Description Requirement : Case Example 47

BUSINESS PLAN DESIGN APPARATUS

[Overview of the Description]

As the internet is widely spreading, a web advertisement has become an effective way for sales promotion of a product. However, it cannot readily be determined on-site whether a web advertisement is actually effective, and through trial and error, not a few business opportunities have been wasted due to stock shortage or the like. In view of this, it is an object of the present invention to provide a business plan design apparatus that estimates a sales quantity of a specific product in the future based on a web advertisement data and mention data of the product, and presents a production plan of the product including a future production quantity based on a stored stock amount and an estimated sales quantity. With this apparatus, a seller of a specific product can revise a production plan of the product at an early stage.

The business plan design apparatus firstly stores a stock amount of a specific product. The apparatus then obtains an estimated product sales quantity of the product based on an input of a web advertisement data and mention data of the product, using an estimation model that outputs an estimated product sales quantity. In this case, the web advertisement data is the number of times when the specific product publicly appeared on the web. The advertisement includes banner ads, product listing ads, and direct e-mails. The mention data includes reviews on the product or advertisement in web articles, social media, and blogs etc. In the reviews on the product or advertisement, an evaluation value is set so that it becomes greater if there are a lot of positive reviews, and otherwise, it becomes lower. The evaluation value can be obtained through a known computer processing on the text in web articles, social media, and blogs etc. The estimation model is generated through a supervised machine learning with a training data using a known machine learning algorithm such as a neural network. The training data contains a relation between a web advertisement data and mention data of a similar product that has been sold in the past and an actual sales quantity of the similar product.

[Overview of Reason for Refusal]

・There is no reason for refusal found.

[Note]

・Article 36(4)(i) (Enablement Requirement)

According to the description, it is an object of the present invention to provide a business plan design apparatus that estimates a sales quantity of a specific product in the future based on a web advertisement data and mention data of the product, and presents a production plan of the product including a future production quantity based on a stored stock amount and an estimated sales quantity. Further, the description discloses that a web advertisement data and mention data are used. The web advertisement data is based on the number of times when a specific product publicly appeared on the web, and the mention data is based on an evaluation value of reviews on the product or advertisement in web articles, social media, and blogs etc.

Although the description does not discloses a correlation or the like between the web advertisement data and the mention data, it can be presumed that there is a correlation or the like between them in view of a common general technical knowledge at the time of filing.

Further, it is known at the time of filing that an estimation model can be generated that estimates an output in response to an input through machine learning with a training data containing an input data and output data having a correlation or the like, using a generally-used machine learning algorithm.

In view of the above, an estimation model can be generated using a universal machine learning algorithm with a training data containing the number of times when a similar product publicly appeared on a web advertisement, an evaluation value of reviews on the product or advertisement in web articles, social media, and blogs etc., and a sales quantity of the similar product. Accordingly, it is obvious for a person skilled in the art that a business plan design apparatus can be derived that simulates and outputs a sales quantity of a specific product, makes a production plan of the specific product based on the output sales quantity, using the above estimation model.

Description Requirement: Case Example 48

AUTONOMOUS VEHICLE

Claim 1: 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.

Claim 1

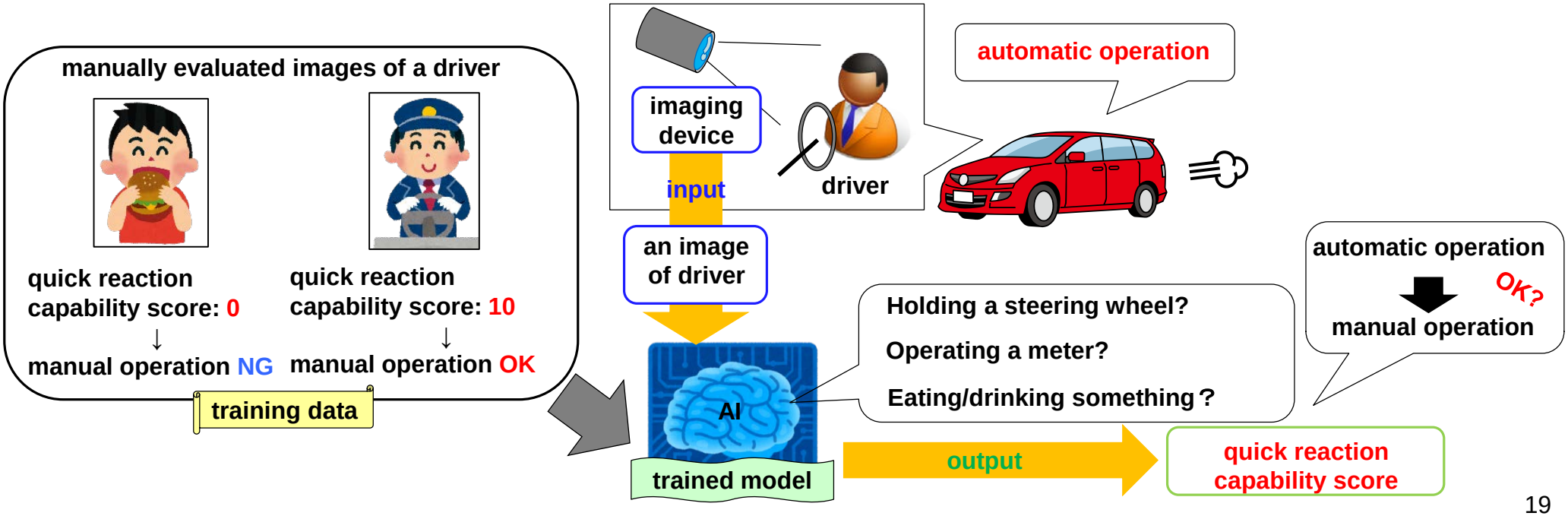
An autonomous vehicle having a driver monitoring device,

the driver monitoring device including:

an image obtainment unit that obtains an image taken by an imaging device that has been positioned so as to take an image of a driver seated in a vehicle seat; and

a quick reaction capability estimation unit that inputs the taken image to a trained learning model and obtains a quick reaction capability score representing a quick reaction capability of the driver during vehicle operation from the trained learning model, the trained learning model having been trained through machine leaning to estimate a quick reaction capability of the driver during vehicle operation,

wherein switching from an autonomous operation mode in which a vehicle is operated automatically to a manual operation mode in which a vehicle is operated manually by a driver is prohibited, in a case where the obtained quick reaction capability score does not satisfy a predetermined condition.



Description Requirement: Case Example 48

AUTONOMOUS VEHICLE

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[Overview of the Description]

・・・・・・ The driver monitoring device obtains a quick reaction capability score from a learning model that outputs the quick reaction capability score in response to an input of an image of a driver seated in a vehicle seat. The learning model is generated using a known machine learning algorithm such as a neural network. A training data that is input to the machine learning algorithm can be generated by associating a quick reaction capability score with each of images of a driver seated in a vehicle seat in various situations. The images of a driver are taken by a camera, for example, that is positioned so as to take an image of a driver seated in a vehicle seat.

The quick reaction capability score in this case is a numeric parameter between 0 to 10. Each of the images of a driver in various types of behavior is manually evaluated, and then a quick reaction capability score is set for each of the images. For example, when a driver is "holding a steering wheel," "operating a meter," "operating a navigation system" or the like, it is determined that the driver is ready for vehicle operation and a high numeric parameter is assigned to the image. Meanwhile, when a driver is "chatting," "smoking," "eating," "talking on the phone," "using a cell phone," or the like, it is determined that the driver is not ready for vehicle operation and a low numeric parameter is assigned to the image. The quick reaction capability score may differently be assigned depending on each specific situation, even for a similar behavior. ・・・・・・

[Overview of Reason for Refusal]

・There is no reason for refusal found.

[Notes]

・Article 36(4)(i) (Enablement Requirement)

The description discloses (i) using multiple images of a driver seated in a vehicle seat that have been taken by a camera positioned so as to take images of the driver in various behaviors and (ii) using a quick reaction capability score based on numeric parameters that have manually been assigned to the taken images.

Further, the description discloses examples of a driver's behavior in an image and a corresponding numeric parameter. It can be presumed that, in view of a common general technical knowledge at the time of filing, there is a correlation or the like between a driver's behavior seen in an image and a quick reaction capability of the driver.

It is also a common general technical knowledge for a person skilled in the art at the time of filing that a learning model can be generated that estimates an output in response to an input through machine learning with a training data containing an input data and output data having a correlation or the like with each other, using a generally-used machine learning algorithm.

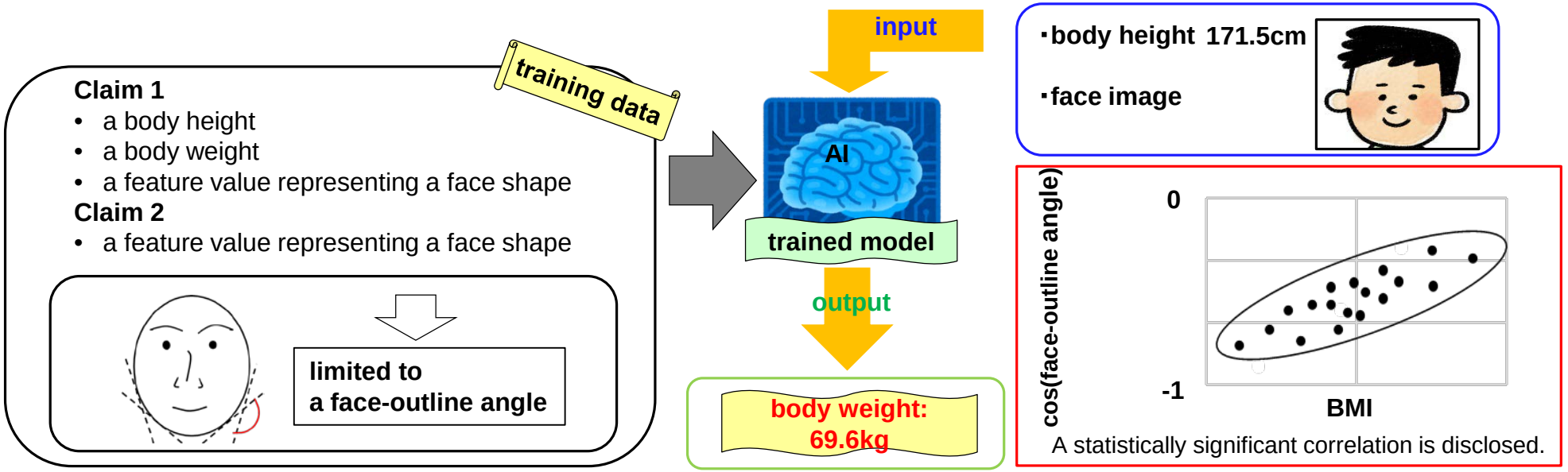
In view of the above, a learning model can be generated using a universal machine learning algorithm with a training data containing images of a driver and numeric parameters that have manually been assigned to the images through evaluation on each image. Accordingly, it is obvious for a person skilled in the art that an autonomous vehicle can be derived that (i) obtains a quick reaction capability score representing a quick reaction capability of the driver during vehicle operation from the above-mentioned learning model, and (ii) prohibits switching from an autonomous operation mode in which a vehicle is operated automatically to a manual operation mode in which a vehicle is operated manually by a driver, in a case where the obtained quick reaction capability score does not satisfy a predetermined condition.

Description Requirement: Case Example 49

BODY WEIGHT ESTIMATION SYSTEM

Claim 1: violation of the support/enablement 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 the statistics in the description. Therefore, the description requirement is satisfied.

[Claim 1]
A body weight estimation system comprising:
a model generation means for generating an estimation model that estimates a body weight of a person based on a feature value representing a face shape and a body height of the person, through machine learning using training data containing feature values representing face images as well as actual measured values of body heights and body weights of people;
a reception means for receiving an input of a face image and body height of a person;
a feature value obtainment means for obtaining a feature value representing a face shape of the person through analysis of the face image of the person that has been received by the reception means; and
a processing means for outputting an estimated value of a 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.
[Claim 2]
The body weight estimation system as in Claim 1, wherein the feature value representing a face shape is a face-outline angle.



Description Requirement: Case Example 49

BODY WEIGHT ESTIMATION SYSTEM

[Overview of the Description]

There is a certain degree of correlation between a face feature and physical size of a person. …, the inventor found a statistically significant correlation between a cosine of a face-outline angle and BMI (defined as a body weight divided by the square of a body height) of a person. The face-outline angle here means an angle defined between a tangent line to a jaw and a tangent line to a cheek. …. This suggests a certain degree of correlation between a body height and weight used for BMI calculation and a face-outline angle. Accordingly, an estimation model with a highly accurate output can be generated through machine learning, using a known machine learning algorithm such as a neural network with a training data. The training data contains actual measured values of face-outline angles, body heights, and body weights. The face-outline angles are obtained through analysis on face images of people. A feature value representing a face shape of a person is a face-outline angle in this embodiment, but it is not limited to this. Any feature value representing a face shape may be obtained from a face image and used.

(Note) In this case, it is assumed that, even in view of a common general technical knowledge at the time of filing, a person skilled in the art can presume a certain relation such as a correlation between (i) a body height, weight, and the like of a person and BMI based on these and (ii) a feature representing a face shape such as a face-outline angle is not a common general technical knowledge at the time of filing here.

[Overview of Reason for Refusal]

・Claim 1: Article 36(6)(i) (Support Requirement)/Article 36(4)(i) (Enablement Requirement)

…, the description only discloses that any feature value other than a face-outline angle representing a face shape may be obtained from a face image and used. It does not disclose a correlation or the like between (i) a feature value other than a face-outline angle representing a face shape and (ii) a body height, weight, and the like of a person and BMI based on these. Further, it cannot be presumed that there is such a correlation or the like even if a 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. Accordingly, the description does not provide a sufficient disclosure for a person skilled in the art to recognize that a body weight estimation can be attained based on a body height and any feature value representing a face shape. In other words, the scope of the description cannot be expanded or generalized to that of the invention of Claim 1, in which an input to an estimation model that outputs an estimation value of a body weight is specified only by a body height and a feature value representing a face shape in a face image of a person. …, it does not seem that a person skilled in the art can make a body weight estimation system that estimates a body weight of a person in response to an input of a body height and a feature value representing a face shape of a person, by generating an estimation model using a universal machine learning algorithm with a training data containing actual measured values of body weights, body heights, and feature values representing face shapes of people.

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

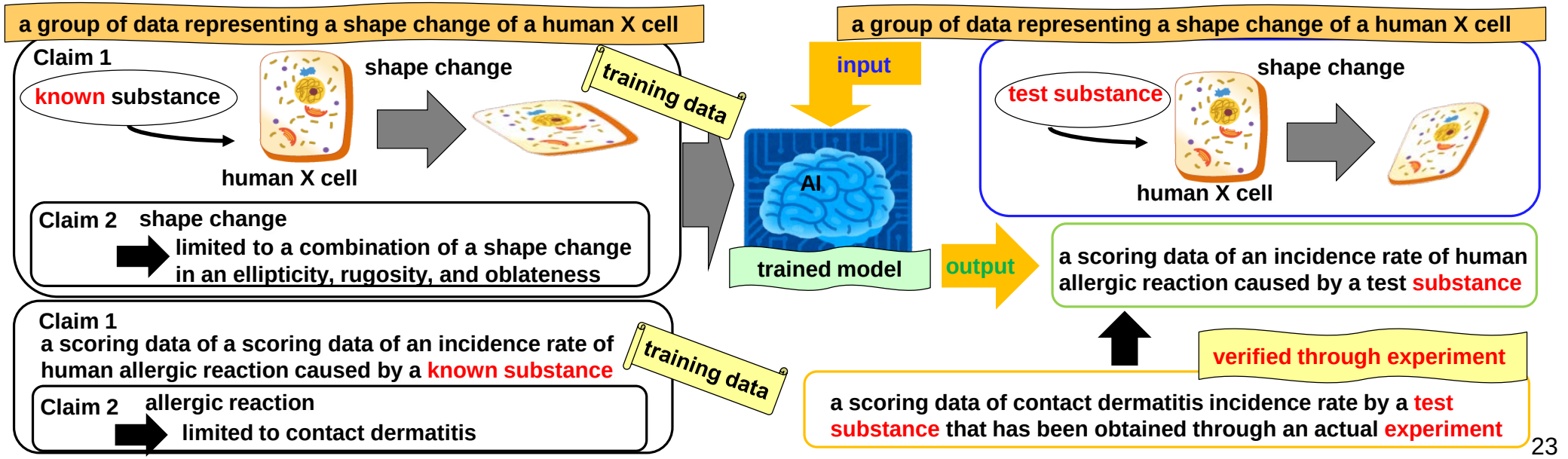
The description discloses that there is a statistically significant correlation between a cosine of a face-outline angle and BMI of a person. Based on the disclosure in the description, a person skilled in the art can recognize that there is a certain degree of correlation between a body height and weight and a face-outline angle, and can generate an estimation model using a universal machine learning algorithm with a training data containing actual measured values of body heights, body weights, and face-outline angles. Accordingly, a body weight estimation system can be made that estimates a body weight of a person in response to an input of a face-outline angle and a body height of a person, using the above estimation model. …. Further, the invention of Claim 2 is disclosed in the description and Claim 2 satisfies the support requirement.

Description Requirement: Case Example 50

METHOD FOR ESTIMATING ALLERGY INCIDENCE RATE OF TEST SUBSTANCE

Claim 1: violation of the support/enablement 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.



Description Requirement: Case Example 50

METHOD FOR ESTIMATING ALLERGY INCIDENCE RATE OF TEST SUBSTANCE

[Overview of the Description]

An embodiment discloses an experimental result verified by (i) adding each of candidate substances, of which contact dermatitis incidence rate is known, is separately added to culture solution for a human X cell, (ii) obtaining a group of data representing a shape change of a human X cell in the culture solution in an ellipticity, rugosity, and oblateness between before and after the addition; inputting, to a universal artificial intelligence model, a training data to train the model including the above-mentioned 3 types of data in the shape change and a scoring data on incidence rates of contact dermatitis caused by each of the substances so as to train the model; each of substances that has not been used for the training of the artificial intelligence model, of which contact dermatitis incidence rate is known, is separately added to culture solution for a human X cell; obtaining a group of data representing a shape change of a human X cell in the culture solution in an ellipticity, rugosity, and oblateness between before and after the addition; inputting the obtained group of data to the trained artificial intelligence model; and calculating a scoring data on contact dermatitis incidence rates that is estimated by the artificial intelligence. The experimental result shows that, for ○% or more of the candidate substances, the difference between the estimated score and the actual score was equal to or less than ○%.

[Overview of Reason for Refusal]

・Claim 1: Article 36(6)(i) (Support Requirement)/Article 36(4)(i) (Enablement Requirement)

Claim 1 discloses a method for estimating an allergy incidence rate that is specified only by a training data including a group of data representing a shape change of a human X cell and a scoring data on incidence rates of human allergic reaction. The description only discloses some specific examples of training data that could be used for an incidence rate estimation of allergic reaction, namely, a combination of an ellipticity, rugosity, and oblateness of a human X cell, and a scoring data on incidence rates of contact dermatitis. A shape change of a human X cell can be represented by various parameters in addition to the ellipticity, rugosity, and oblateness. However, it is difficult to know the parameters that lead to an incidence rate estimation of allergic reaction other than the combination of these three factors, because it is difficult to presume a correlation or the like between an allergic reaction incidence rate and a cell shape change even if a common general technical knowledge at the time of filing of the present invention is taken into consideration. ・・・・・It is not possible to find a ground to expand or generalize the disclosed matters in the description to the scope of the invention as in Claim 1, in which an input to an artificial intelligence model that calculates a scoring data of incidence rates of allergic reaction is specified only by a group of data representing a shape change of a human X cell and a scoring data on incidence rates of allergic reaction. ・・・・・ it does not seem that the invention is sufficiently disclosed for a person skilled in the art to recognize that an allergic reaction incidence rate can be estimated through a method for estimating an allergy incidence rate, which uses a training data including a group of data representing a shape change of a human X cell other than the combination of a shape change in an ellipticity, rugosity, and oblateness, and a scoring data on known incidence rates of human allergic reaction other than contact dermatitis.

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

The description discloses … the fact that the trained artificial intelligence model could actually estimate an incidence rate of contact dermatitis with a certain accuracy, using data that had not been used to train the artificial intelligence model. Thus, the description provides a clear and sufficient disclosure of the invention …, which is a method for estimating a contact dermatitis incidence rate of a test substance in a human being using an artificial intelligence model, in a manner that a person skilled in the art can carry out the invention.

Description Requirement: Case Example 51

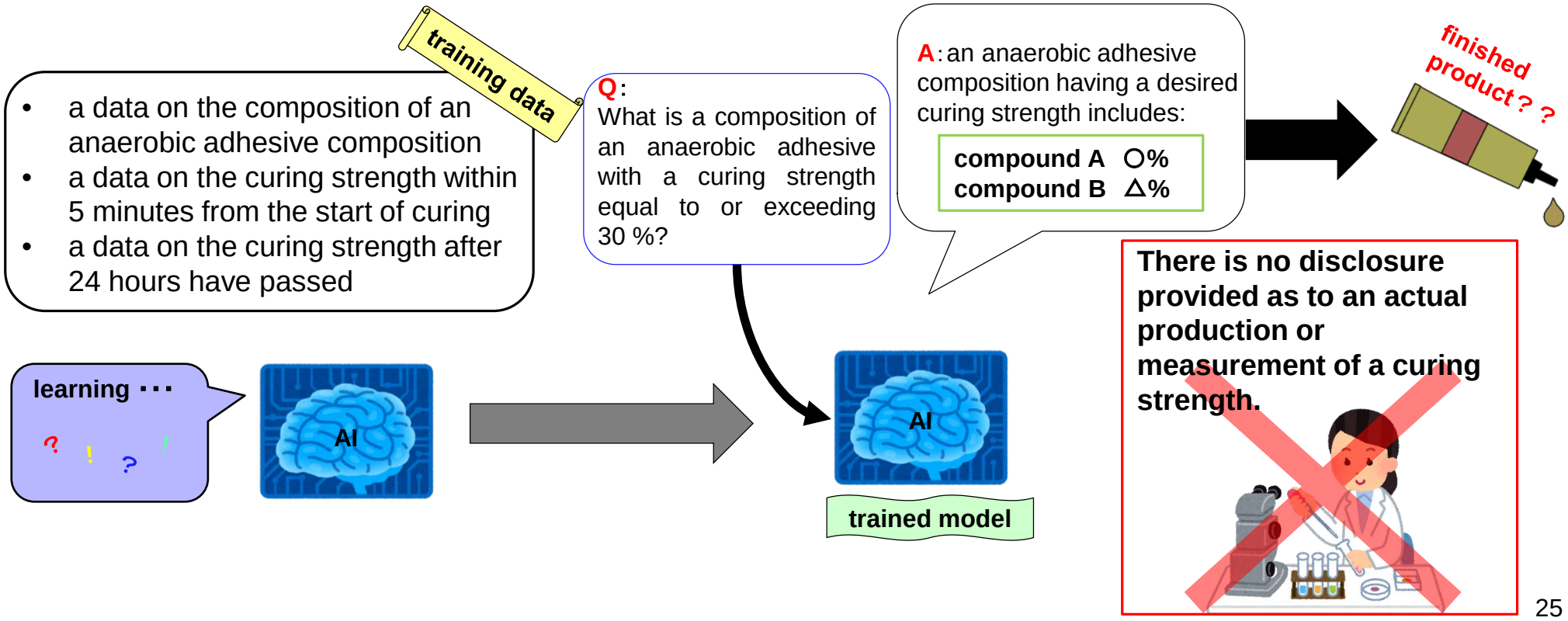
ANAEROBIC ADHESIVE COMPOSITION

Claim 1: violation of the support/enablement requirements

An invention of product is claimed. However, the invention is not evaluated using an actually-produced product and an estimation accuracy of a trained model is not verified. Further, it is not assumed that it is a common general technical knowledge at the time of filing that an estimation result by a trained model can be a substitution for an actual experimental result. Therefore, the description requirement is not satisfied.

[Claim 1]

An anaerobic adhesive composition comprising: a 0.08 - 3.2 mass % compound A, a 0.001 – 1 mass % compound B, and a residue containing an anaerobically curable (meth)acrylate monomer, wherein the anaerobic adhesive composition shows the curing strength equal to or exceeding 30 % of the curing strength after 24 hours have passed, within 5 minutes from the start of curing.



Description Requirement: Case Example 51

ANAEROBIC ADHESIVE COMPOSITION

[Overview of the Description]

In an embodiment, in order to derive an anaerobic adhesive composition attaining such an object, a conventionally known component data of an anaerobic adhesive composition, a curing strength data within 5 minutes from the start of curing, and a curing strength data after 24 hours have passed were input to a neural network; and then a trained model was prepared in a manner that a component of the anaerobic adhesive composition and a ratio between the curing strength within 5 minutes from the start of curing and the curing strength after 24 hours have passed were associated with each other. Further, an estimation result is disclosed showing the possibility where an anaerobic adhesive composition containing an anaerobically curable (meth)acrylate monomer can be obtained using the trained model, which realizes the curing strength equal to or exceeding 30% of the curing strength after 24 hours have passed within 5 minutes from the start of curing, by adding a 0.08 - 3.2 mass % compound A and a 0.001 – 1 mass % compound B in combination.

(Notes) The description does not disclose any embodiment in which an anaerobic adhesive composition is actually produced within the above combination ratio and then the curing strength is measured. Further, there is no verification shown on the estimation accuracy of the trained model. Furthermore, it is not known that the curing strength is enhanced within 5 minutes after the start of curing, by adding any one of a compound A, a compound B, and the combination thereof. Meanwhile, a measurement method and condition are specifically disclosed to measure the curing strength within 5 minutes after the start of curing and the curing strength after 24 hours have passed.

[Overview of Reason for Refusal]

・Article 36(4)(i) (enablement requirement) / Article 36(6)(i) (support requirement)

It is the common technical knowledge at the time of filing that it is difficult to control an anaerobic adhesive composition so as to rapidly raise the curing temperature within 5 minutes or so after the start of curing, and that various conditions for production such as a type, combination, or combination ratio of polymer material, free radical initiator, or free radical reducing agent closely interact with each other.

The description only discloses that a trained model predicted that, as long as a composition meets the combination ratio prescribed in Claim 1, the composition has the curing strength equal to or exceeding 30% of the curing strength after 24 hours have passed, within 5 minutes from the start of curing. Further, the accuracy of an estimation value by the trained model is not verified, and there was no such a common technical knowledge at the time of filing that an estimation result by a trained model can be a substitution for an actual experimental result.

Any embodiment is not disclosed supporting the fact that the claimed composition shows the curing strength equal to or exceeding 30 % of the curing strength after 24 hours have passed within 5 minutes from the start of curing, by actually producing a composition including a 0.08 - 3.2 mass % compound A, a 0.001 – 1 mass % compound B, and a residue containing an anaerobically curable (meth)acrylate monomer, and then measuring the curing strength.

Thus, it does not seem that the description provide a sufficient disclosure of the invention in a manner that a person skilled in the art can produce the anaerobic adhesive composition as in Claim 1 that shows the curing strength equal to or exceeding 30 % of the curing strength after 24 hours have passed, within 5 minutes from the start of curing.

Claim 1 discloses an invention of an anaerobic adhesive composition comprising a 0.08 - 3.2 mass % compound A, a 0.001 – 1 mass % compound B, and a residue containing an anaerobically curable (meth)acrylate monomer, in which the curing strength of the composition is equal to or exceeds 30% of the curing strength after 24 hours have passed, within 5 minutes from the start of curing. Meanwhile, in view of the disclosure in the description and the common general technical knowledge at the time of filing, the description does not provide a sufficient disclosure so as to enable a person skilled in the art to recognize that an object of the present invention to provide an anaerobic adhesive composition showing the curing strength equal to or exceeding 30 % of the curing strength after 24 hours have passed within 5 minutes from the start of curing can be attained.

Overview of Case Examples as to Inventive Step

	○ inventive step	✕ inventive step
mere an application of AI		**Case Example 33** mere a systemization using AI of operations by human beings **Case Example 34: Claim 1** mere a modification of method for estimating an output data based on an input data
modification of training data	**Case Example 34: Claim 2** a significant effect by adding a training data for machine learning	**Case Example 35** modification of a training data for machine learning is mere a combination of known data, and a significant effect is not identified.
preprocessing of training data	**Case Example 36** preprocessing of a training data for machine learning	

Inventive Step : Case Example 33

CANCER LEVEL CALCULATION APPARATUS

Claim 1: Mere a systemization of manually-operated tasks using AI and considered to be lack of inventive step.

[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

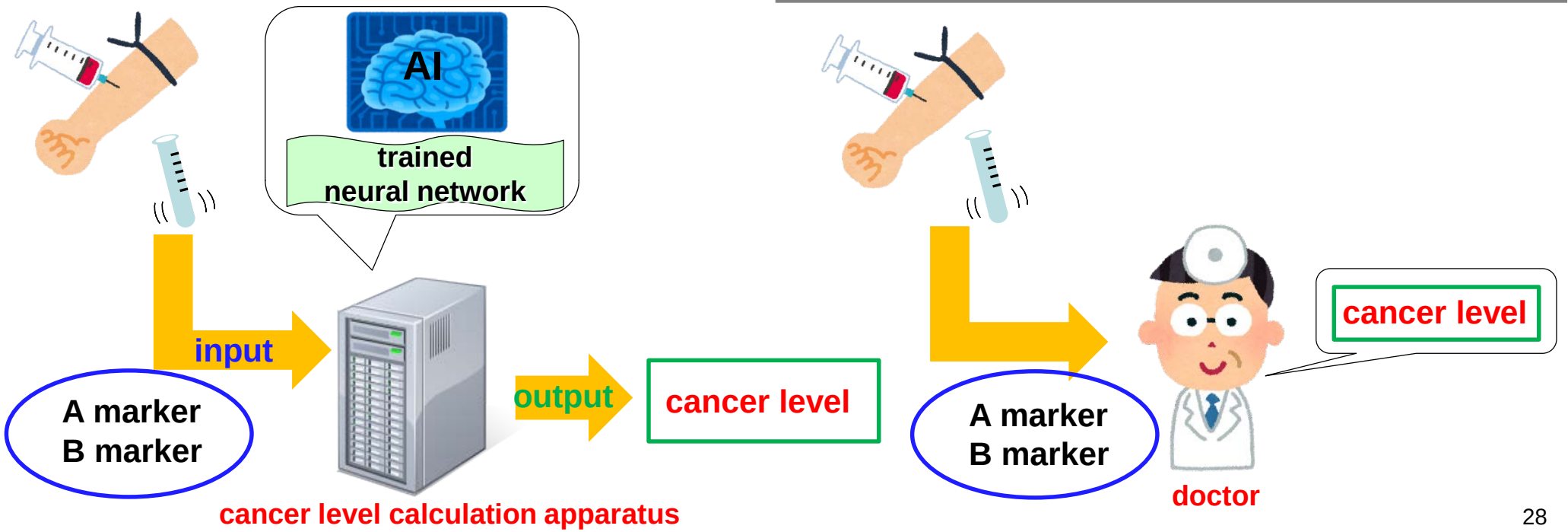
a cancer level calculation unit that calculates a possibility that a subject person has cancer, in response to an input of measured values of A marker and B marker that have been obtained through blood analysis of the subject person,

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.



Inventive Step : Case Example 33

CANCER LEVEL CALCULATION APPARATUS

[Well-known Art]
It is well-known, in the field of machine learning, to calculate an output data representing a possibility that a subject person has a certain disease based on a prescribed set of input data on the subject person, using a trained neural network, which has been trained through machine learning with training data. The training data contains an input data that has been collected from multiple people, each of which consists of a prescribed set of input data (biological data etc.) on each person, and an output data representing a possibility that the person has the disease.

Claim 1 lacks inventive step.

[Overview of Reason for Refusal]

The invention of Claim 1 and Cited Invention 1 are different from each other at the point below.

(Difference)

The invention of Claim 1 is a cancer level calculation apparatus that calculates a possibility that a subject person has cancer in response to an input of measured values of A marker and B marker, using a trained neural network through machine learning with training data. Meanwhile, Cited Invention 1 discloses a cancer level calculation method through which a doctor calculates a possibility that a subject person has cancer based on measured values of A marker and B marker.

The difference is assessed as follows.

.....

Both Cited Invention 1 and the well-known art relate to estimation of the possibility of illness, and they share a common problem to be solved. It is mere the exercise of the ordinary creativity of a person skilled in the art to systemize an estimation method carried out by a doctor in the medical field using a computer or the like.

In view of the factors above, a person skilled in the art can easily conceive of systemizing a calculation method of a possibility that a subject person has cancer, which has been carried out by a doctor, by applying the well-known art to Cited Invention 1, and calculating a possibility that a subject person has cancer in response to an input of measured values of A marker and B marker using a trained neural network through machine learning with training data.

Further, a person skilled in the art can readily anticipate the effects of the invention of Claim 1. Also, there are no obstructive factors found to apply the well-known art to Cited Invention 1.

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

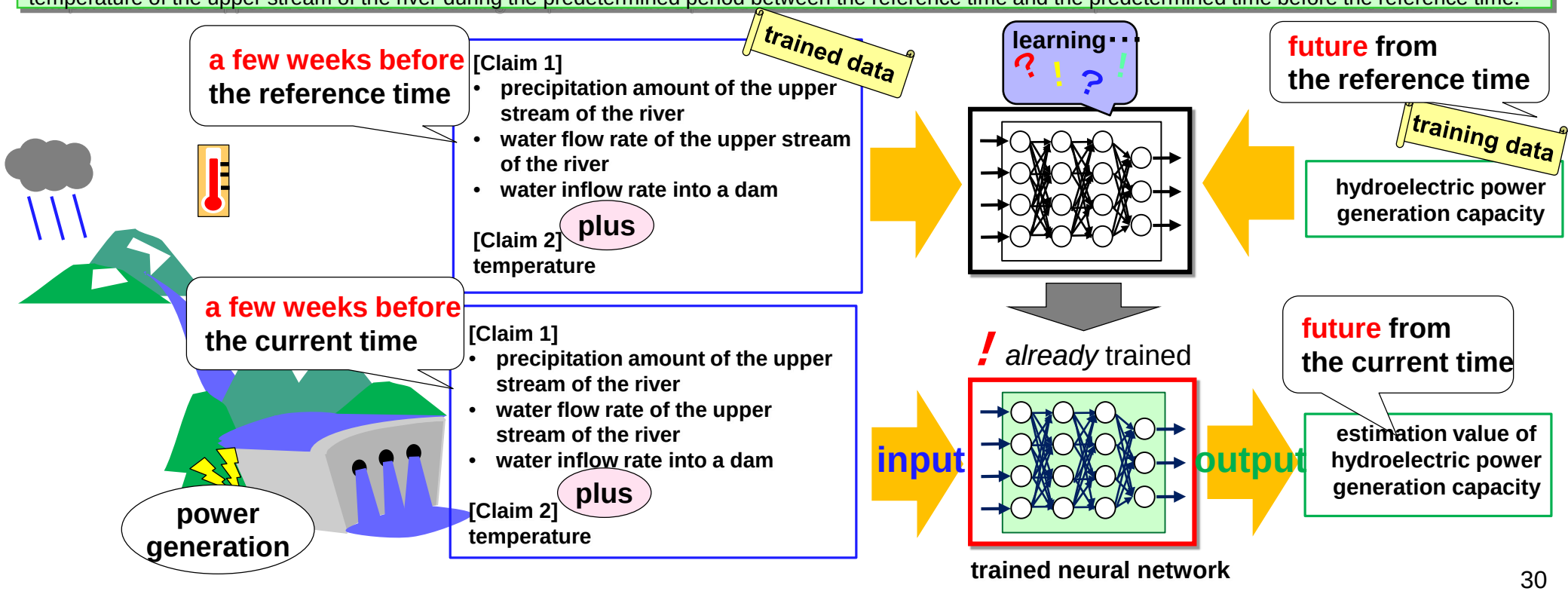
[Claim 1] An estimation system of a hydroelectric power generating capacity of a dam comprising:

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.



Inventive Step: Case Example 34

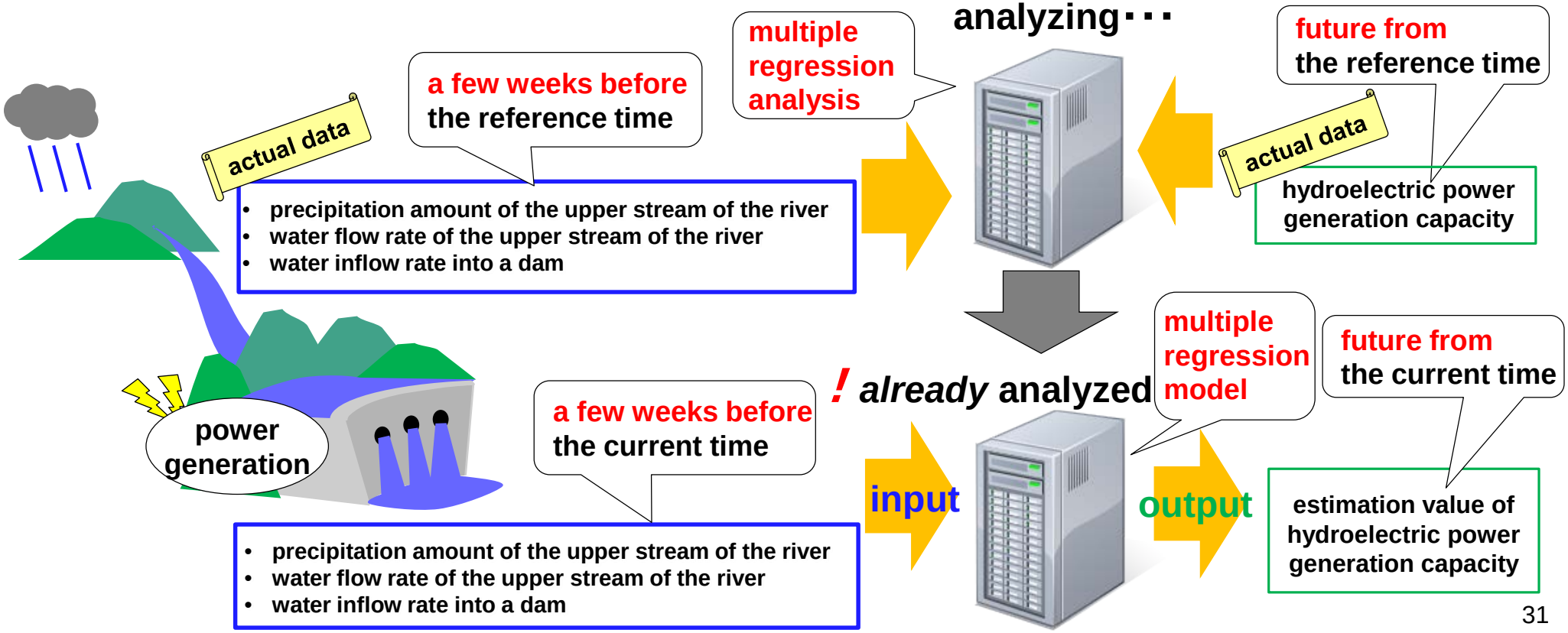
ESTIMATION SYSTEM OF HYDROELECTRIC GENERATING CAPACITY

[Cited Invention 1] An estimation system of a 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 a 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 a future hydroelectric power generating capacity based on an output data from the objective variable setting a current time as the reference time.



Inventive Step : Case Example 34

ESTIMATION SYSTEM OF HYDROELECTRIC GENERATING CAPACITY

[Well-known Art] In the technical field of machine learning, it is well-known that an estimation process of an output in the future is carried out based on an input of time series data in the past, by using a trained neural network which has been trained with a training data containing an input of time series data in the past and a certain output in the future.

✕ **The invention of Claim 1 lacks an inventive step.**

○ **The invention of Claim 2 has an inventive step.**

[Overview of Reason for Refusal]

The invention of Claim 1 and Cited Invention 1 are different from each other at the point below.

(Difference)

The invention of Claim 1 realizes an estimation of a hydroelectric power generating capacity by means of a neural network having an input layer and output layer. Meanwhile, Cited Invention 1 realizes an estimation of a hydroelectric power generating capacity by means of a regression equation model.

The difference is assessed as follows. ・・・・・・Cited Invention 1 and the well-known art are common with each other in estimating a certain output in the future based on an input of time series data in the past, with reference to a correlation among data. Therefore, a person skilled in the art could easily derive a configuration that enables estimation of a hydroelectric power generating capacity, by applying the well-known art to Cited Invention 1 and adopting a trained neural network in substitution of a regression equation model.

(Basis for Determination that there is No Reason for Refusal found)

The invention of Claim 2 and Cited Invention 1 are different from each other at the point below.

(Difference)

The invention of Claim 2 contains, in an input data into an input layer, a temperature of the upperstream of the river during a predetermined period between a reference time and a predetermined time before the reference time. Meanwhile, Cited Invention 1 does not have such a configuration.

The difference is assessed as follows.

The invention of Claim 2 uses a temperature of the upperstream of the river for estimation of a hydroelectric power generating capacity. There is no prior art found disclosing such use of a temperature of the upperstream of the river. Accordingly, it is not a common general technical knowledge that there is a correlation between a temperature and a hydroelectric power generating capacity.

Generally, an input of data of which correlation is unknown may cause a noise in machine learning. However, the invention of Claim 2 uses an input data containing a temperature of the upperstream of the river during a predetermined period between a reference time and a predetermined time before the reference time. This enables a highly accurate estimation of a hydroelectric power generating capacity, taking an increase of inflow rate due to meltwater in the spring into consideration. It is a significant effect that a person skilled in the art cannot expect.

Accordingly, it does not considered to be a mere workshop modification that can be carried out in application of the well-known art to Cited Invention 1 by a person skilled in the art to contain, in an input data in an estimation of a hydroelectric power generating capacity, a temperature of the upperstream of the river during a predetermined period between a reference time and a predetermined time before the reference time.

Inventive Step: Case Example 35

SCREW CLAMPING QUALITY ESTIMATION APPARATUS

Claim 1: Modification of a training data for machine learning is made only in a combination of known data, and considered to be lack of inventive step

[Claim 1] A screw clamping quality estimation apparatus that assesses a screw clamping quality at the time of automatic screw clamping operation by means of a screwdriver comprising:

a condition measurement unit that measures a set of condition variables containing a rotation speed, angular acceleration, position, and inclination of the screwdriver;

a machine learning unit that trains a neural network through machine learning by associating, with each other, the set of condition variables measured by the condition measurement unit and the screw clamping quality at the time of automatic screw clamping operation with the use of the set of condition variables; and

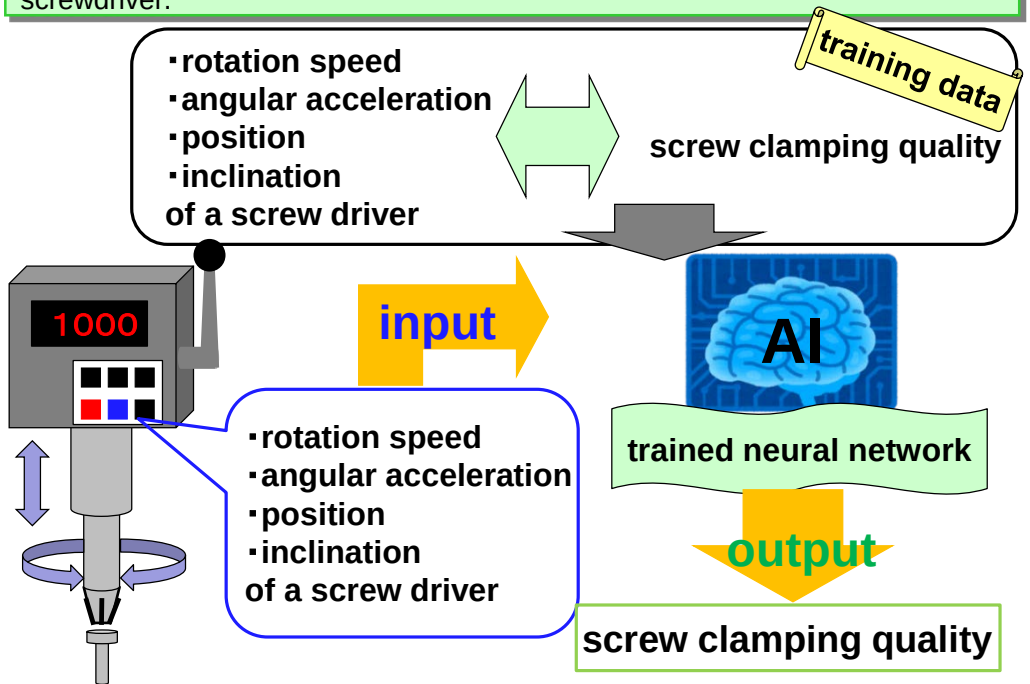
a screw clamping quality estimation unit that estimates a screw clamping quality in response to an input, to the neural network that has been trained by the machine learning unit, of the set of condition variables that have been measured at the time of automatic screw clamping operation by means of a screwdriver.

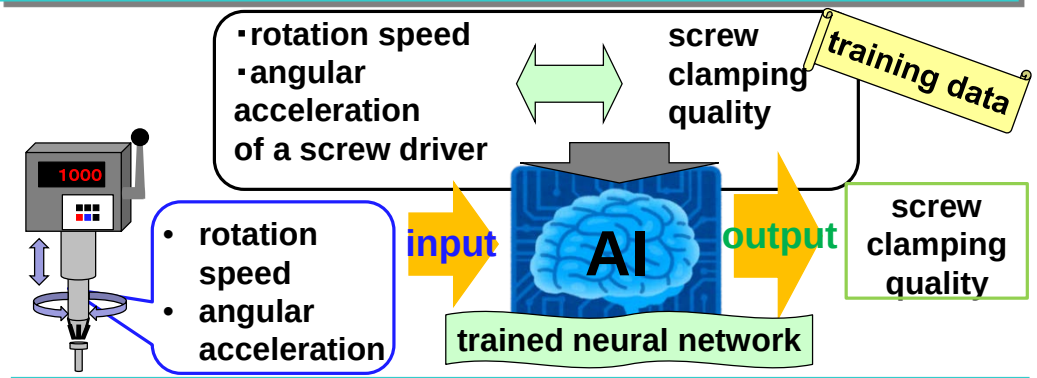
[Cited Invention 1] A screw clamping quality estimation apparatus that assesses a screw clamping quality at the time of automatic screw clamping operation by means of a screwdriver comprising:

a condition measurement unit that measures a set of condition variables containing a rotation speed and angular acceleration of the screwdriver;

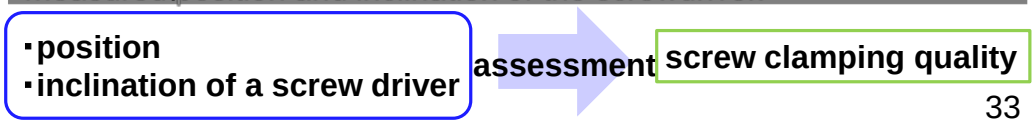
a machine learning unit that trains a neural network through machine learning by associating, with each other, the set of condition variables measured by the condition measurement unit and the screw clamping quality at the time of automatic screw clamping operation with the use of the set of condition variables; and

a screw clamping quality estimation unit that estimates a screw clamping quality in response to an input, to the neural network that has been trained by the machine learning unit, of the set of condition variables that have been measured at the time of automatic screw clamping operation by means of a screwdriver.





[Cited Invention 2] A screw clamping quality assessment method comprising: measuring a position and inclination of a screwdriver; and assessing a screw-clamping quality based on the measured position and inclination of the screwdriver.



Inventive Step: Case Example 35

SCREW CLAMPING QUALITY ESTIMATION APPARATUS

[Well-known Art] It is a common general technical knowledge in the technical field of machine learning to adopt, as an input to a machine learning device, variables that may have a correlation with an output with high possibility, in order to enhance a reliability and accuracy of an output from the machine learning device.

✗ Lacks inventive step

[Summary of Reasons for Refusal]

The invention of Claim 1 and Cited Invention 1 are different with each other at the point below.

(Difference)

According to the invention of Claim 1, a condition measurement unit measures a set of condition variables containing a rotation speed, angular acceleration, position, and inclination of a screwdriver. Using the set of condition variables containing these four types of variable, a machine learning of a neural network is carried out and a screw clamping quality is estimated. Meanwhile, according to Cited Invention 1, a condition measurement unit measures a set of condition variables containing a rotation speed and angular acceleration of a screwdriver. Using the set of condition variables containing these two types of variable, a machine learning of a neural network is carried out and a screw clamping quality is estimated.

The difference is assessed as follows.

Cited Invention 2, in which a screw clamping quality is assessed based on a position and inclination of a screw driver, discloses that there is a correlation between a position and inclination of a screw driver and it affects the assessment. Both Cited Invention 1 and Cited Invention 2 assess a screw clamping quality based on several conditions of a screw driver, and have a common object. Further, it is a common general technical knowledge in the technical field of machine learning to adopt, as an input to a machine learning device, variables that may have a correlation with an output with high possibility, in order to enhance a reliability and accuracy of an output from the machine learning device.

In view of the above, a person skilled in the art can easily derive a configuration that enables a machine learning of a neural network and an estimation of screw clamping quality using a set of condition variables containing four types of variable (in addition to a rotation speed and angular acceleration of a screwdriver in Cited Invention 1, a position and inclination of a screwdriver having a correlation with a screw clamping quality in Cited Invention 2 are adopted), in order to enhance a reliability and accuracy of an output from a machine learning device.

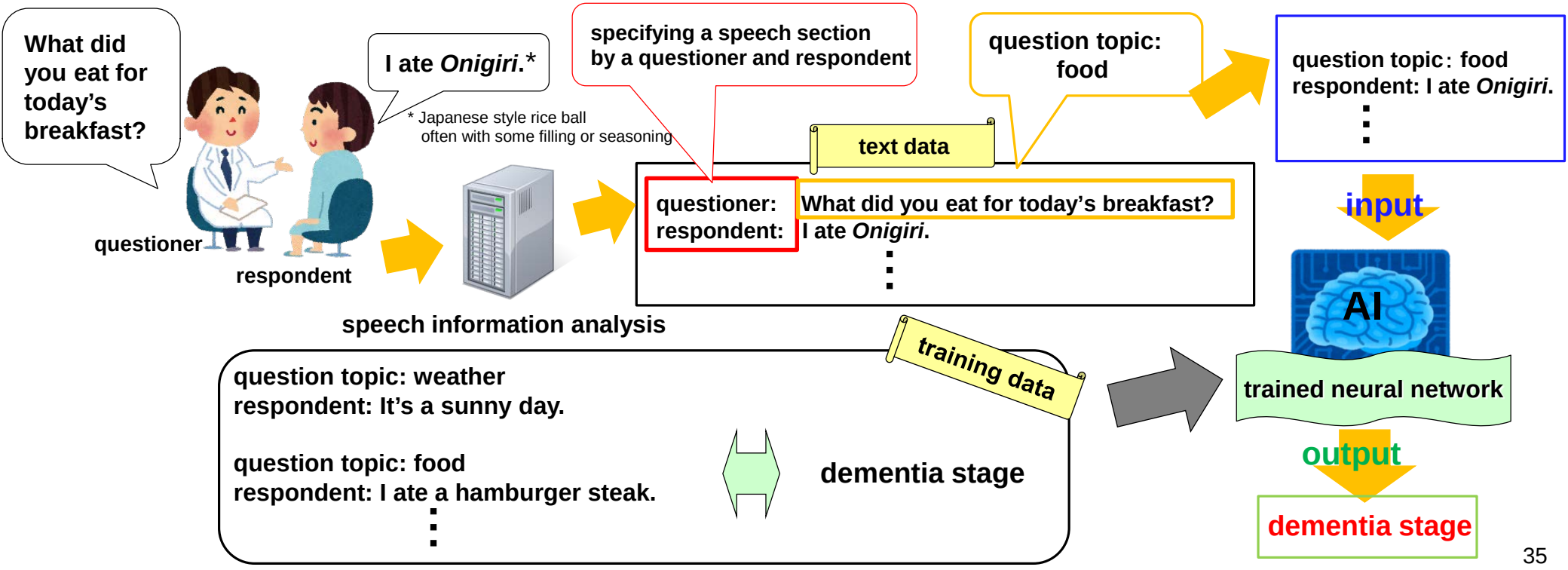
Further, a person skilled in the art can expect the effect of the invention of Claim 1, and thus, there is no obstructive factor found to apply Cited Invention 2 to Cited Invention 1.

Inventive Step: Case Example 36

DEMENTIA STAGE ESTIMATION APPARATUS

Claim 1: Pre-processing of training data for machine learning is a factor supporting the existence of inventive step.

[Claim 1] A dementia stage estimation apparatus comprising:
a speech information obtainment means for obtaining a speech information on a conversation between a questioner and a respondent;
a speech information analysis means for analyzing the speech information, and then specifying a speech section by the questioner and a speech section by the respondent;
a speech recognition means for converting, through speech recognition, the speech information on the speech section by the questioner and the speech section by the respondent into text and then outputting a character string;
a question topic specification means for specifying a question topic by the questioner based on the result of the speech recognition; and
a dementia stage determination means for inputting, to a trained neural network, the question topic by the questioner and the character string of the speech section by the respondent to the question topic in an associated manner with each other, and then determining a dementia stage of the respondent,
wherein the neural network is trained through machine learning using training data so as to output an estimated dementia stage, in response to an input of the character string of the speech section by the respondent in an associated manner with the question topic by the questioner.

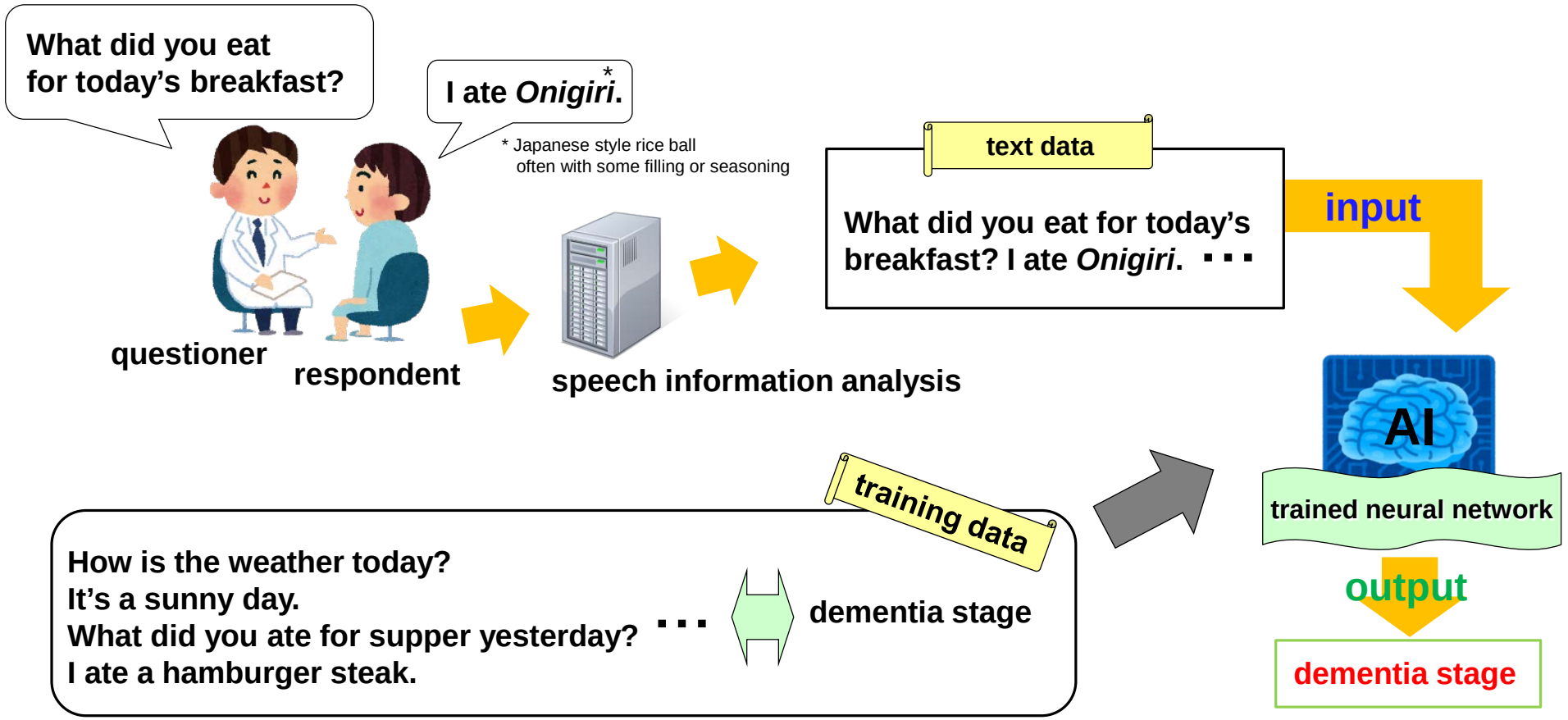


Inventive Step: Case Example 36

DEMENTIA STAGE ESTIMATION APPARATUS

[Cited Invention 1] A dementia stage estimation apparatus comprising: a speech information obtainment means for obtaining a speech information on a conversation between a questioner and a respondent; a speech recognition means for converting the speech information into text through speech recognition and outputting a character string; and a dementia stage determination means for inputting, to a trained neural network, the character string that has been converted into text by the speech recognition means, and then determining a dementia stage of the respondent,

wherein the neural network is trained through machine learning using training data so as to output an estimated dementia stage in response to an input of the character string.



Inventive Step : Case Example 36

DEMENTIA STAGE ESTIMATION APPARATUS

○ The invention of Claim 1 has inventive step.

(Basis for Determination that there is No Reason for Refusal found)

The invention of Clam 1 and Cited Invention 1 are different from each other at the point below.

(Difference)

According to the invention of Claim 1, a speech information on a conversation between a questioner and a respondent is analyzed, and then a speech section by the questioner and a speech section by the respondent are specified, respectively. The speech information on a speech section by a questioner and a speech section by a respondent is converted into text through speech recognition, and a character string is obtained. Based on the result of the speech recognition of the speech section by the questioner, a question topic by the questioner is specified. The question topic by the questioner and a character string of the speech section by the respondent to the question topic are input to a neural network in an associated manner with each other. The neural network is configured to carry out machine learning and output a dementia stage. Meanwhile, according to Cited Invention 1, a neural network is configured to output a dementia stage, based on an input of a character string that has been converted into text through a speech recognition without a classification between a speech section by a questioner and a speech section by a respondent.

The difference is assessed as follows.

A person skilled in the art would conceive a modification of a training data, which is an input to a neural network for machine learning, through a certain pre-processing in order to improve an accuracy of estimation by the neural network.

However, there is no prior art found that discloses a specific technique related to dementia stage assessment, in which a speech information on a conversation between a questioner and a respondent is converted into text, a question topic by the questioner is specified in a character string in the text, the specified question topic and a response to the question by the respondent is associated with each other to assess a dementia stage. Further, it is not a common general technical knowledge at the time of filing.

Accordingly, a person skilled in the art cannot easily conceive training a neural network with a training data that has been obtained by specifying a question topic by a questioner and associating the specified question topic and a response to the question by a respondent with each other, to train the neural network in Cited Invention 1 with a speech information on a conversation between a questioner and a respondent. Further, it does not seem to be a mere design modification or matter of design choice of an identifier for improving an estimation accuracy in Cited Invention 1.

Furthermore, the invention of Claim 1 brings about a significant effect, that is, a highly accurate dementia stage estimation by specifying a question topic by a questioner and a response by a respondent (corresponding character string) to the question topic in an associated manner with each other. It is because a neural network can effectively learn know-how of a well-trained doctor from a training data.