APPEAL DECISION

Appeal No. 2016-11966

Kyoto, Japan
Appellant OMRON CORPORATION

Osaka, Japan
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The case of appeal against the examiner's decision of refusal No. 2012-53469, entitled "Image processing device, image processing method, and image processing program" (the application published on September 19, 2013, Japanese Unexamined Patent Application Publication No. 2013-186819) has resulted in the following appeal decision.

Conclusion

The appeal of the case was groundless.

Reason

No. 1 History of the procedures

The application was filed on March 9, 2012, and the summary of the procedures is as follows:

| | |
|---|---|
| Notice of reasons for refusal | : October 30, 2015 (drafting date) |
| Amendment | : January 7, 2016 |
| Examiner's decision of refusal | : May 2, 2016 (drafting date) |
| Appeal against the examiner's decision of refusal | : August 8, 2016 |
| Amendment | : August 8, 2016 |

No. 2 Decision to Dismiss Amendment

[Decisive conclusion of dismissal of amendment]

The amendment dated August 8, 2016 shall be dismissed.

[Reason]

1. The invention and the invention after amendment

The amendment (hereinafter, referred to as "the Amendment") includes amendment from the invention (hereinafter, referred to as "the Invention") which is described in Claim 4 in the scope of claims in a written amendment dated January 7, 2016,

"[Claim 4]

An image processing method for detecting an imaged object from a background difference image, which is generated by processing a frame image of an imaging area, the imaging area being taken with an infrared camera and input to an image input part,the image processing method comprising:

a background difference image generating step of determining whether each pixel of the frame image input to the image input part is a foreground pixel or a background pixel using a background model in which a frequency of a pixel value of the pixel is modeled, the background model being stored in a background model storage part, and generating a background difference image;

an object detecting step of setting a foreground region and detecting the imaged object based on the foreground pixel in the background difference image generated in the background difference image generating step;and

an object class determining step of determining that an object imaged in the foreground region is a person if the variance of the pixel value of each pixel located in the foreground region is a predetermined determination value or greater in each of the foreground regions in which an object is detected in the object detecting step.,

thereby obtaining the image processing method."

to the invention (hereinafter, referred to as "the invention after amendment") which is described in Claim 3 in the scope of claims in a written amendment dated August 8, 2016,

"[Claim 3]

An image processing method for detecting an imaged object from a background difference image, which is generated by processing a frame image of an imaging area, the imaging area being taken with an infrared camera and input to an image input part,the image processing method comprising:

a background difference image generating step of determining whether each pixel of the frame image input to the image input part is a foreground pixel or a background pixel using a background model in which a frequency of a pixel value of the pixel is modeled, the background model being stored in a background model storage part, and generating a background difference image;

an object detecting step of setting a foreground region and detecting the imaged object based on the foreground pixel in the background difference image generated in the background difference image generating step;and

an object class determining step of determining that an object imaged in the foreground region is a person if the variance of the pixel value of each pixel located in the foreground region is a predetermined determination value or greater in each of the foreground regions in which an object is detected in the object detecting step, <u>wherein</u>

<u>the object detecting step is performed so as to detect the object taken in the frame image input to the image input part for a predetermined object detection checking time,</u>

thereby obtaining the image processing method."

(The underlines indicate amended parts.)

2. Regarding presence/absence of new matters and purpose requirements of amendment

The Amendment relates to an "object detectin step" described in the Invention within the range of matters described in the specification originally attached to the application and the scope of claims or drawings; and restricts the scope of claims by adding, for restriction, the configuration of "the object detecting step is performed so as to detect the object taken in the frame image input to the image input part for a predetermined object detection checking time."

Therefore, the Amendment falls under the provisions of Article 17-2(3) (new matter) and Article 17-2(5)(ii) (purpose of amendment) of the Patent Act.

3. Judgment on independent requirements for patentability

Since the Amendment is intended for restriction of the scope of claims, whether or not the invention after amendment is independently patentable at the time of filing of the patent application is examined below:

(1) The invention after amendment

The invention after amendment is one that is recognized as "the invention after amendment" in the section of "1. The Invention and the invention after amendment"; and is provided again with symbols (A) to (F) added for explanation by the body as follows. Hereinafter, they are referred to as configuration A to configuration F.

"(A) An image processing method for detecting an imaged object from a background difference image, which is generated by processing a frame image of an imaging area, the imaging area being taken with an infrared camera and input to an image input part,the image processing method comprising:
(B) a background difference image generating step of determining whether each pixel of the frame image input to the image input part is a foreground pixel or a background pixel using a background model in which a frequency of a pixel value of the pixel is modeled, the background model being stored in a background model storage part, and generating a background difference image
(C) an object detecting step of setting a foreground region and detecting the imaged object based on the foreground pixel in the background difference image generated in the background difference image generating step;and
(D) an object class determining step of determining that an object imaged in the foreground region is a person if the variance of the pixel value of each pixel located in the foreground region is a predetermined determination value or greater in each of the foreground regions in which an object is detected in the object detecting step, wherein
(E) the object detecting step is performed so as to detect the object taken in the frame image input to the image input part for a predetermined object detection checking time,
(F) thereby obtaining the image processing method."

(2) Cited Invention
(2-1) Description in Cited Document

National Publication of International Patent Application No. 2009-533778 (hereinafter, referred to as "Cited Document 1") that was cited in the reasons for refusal of the original examination describes the following matters with drawings as "Video Segmentation Using Statistical Pixel Modeling" (the title of invention). (The underlines have been added by the body for emphasis.)

A. "[Field of the Invention]
[0001]

[0001] The present invention relates to processing of video frames for use in video processing systems, for example, intelligent video surveillance (IVS) systems that are used as a part of or in conjunction with Closed Circuit Television Systems (CCTV) that are utilized in security, surveillance and related homeland security and anti-terrorism systems, IVS systems that process surveillance video in retail establishments for the purpose of establishing in-store human behavior trends for market research purposes, IVS systems that monitor vehicular traffic to detect wrong-way traffic, broken-down vehicles, accidents, and road blockages, and video compression systems. IVS systems are systems that further process video after video segmentation steps to perform object classification in which foreground objects may be classified as a general class such as animal, vehicle, or other moving but-unclassified object, or may be classified in more specific classes as human, small- or large- non-human animal, automobile, aircraft, boat, truck, tree, flag, or water region. In IVS systems, once such video segmentation and classification occurs, then detected objects are processed to determine how their positions, movements, and behaviors relate to user defined virtual video tripwires, and virtual regions of interest (where a region of interest may be an entire field of view, or scene). User defined events that occur will then be flagged as events of interest that will be communicated to the security officer or professional on duty. Examples of such events include a human or a vehicle crossing a virtual video tripwire, a person or vehicle loitering or entering a virtual region of interest or scene, or an object being left behind or taken away from a virtual region or scene. In particular, the present invention deals with ways of segmenting video frames into their component parts using statistical properties of regions comprising the video frames."

B. "[0003]

[0003] To make automatic object-oriented video processing feasible, it is necessary to be able to distinguish the regions in the video sequence that are moving or changing and to separate (i.e., segment) them from the stationary background regions. This segmentation must be performed in the presence of apparent motion, for example, as would be induced by a panning, tilting, rolling, and/or zooming observer (or due to other motion-related phenomena, including actual observer motion). To account for this motion, images are first aligned; that is, corresponding locations in the images (i.e., frames) are determined, as discussed above. After this alignment, objects that are truly moving or changing, relative to the stationary background, can be segmented from the stationary objects in the scene. The stationary regions are then used to create (or to update) the scene model, and the moving foreground objects are identified for each frame.

[0004]

[0004] It is not an easy thing to identify and automatically distinguish between video objects that are moving foreground and stationary background, particularly in the presence of observer motion, as discussed above. Furthermore, to provide the maximum degree of compression or the maximum fineness or accuracy of other video processing techniques, it is desirable to segment foreground objects as finely as possible; this enables, for example, the maintenance of smoothness between successive video frames and crispness within individual frames. Known techniques have proven, however, to be difficult to utilize and inaccurate for small foreground objects and have required excessive processing power and memory. It would, therefore, be desirable to have a technique that permits accurate segmentation between the foreground and background information and accurate, crisp representations of the foreground objects, without the limitations of prior techniques.

[Disclosure of the invention]

[Means for solving the problem]

[0005]

[0005] The present invention is directed to a method for segmentation of video into foreground information and background information, based on statistical properties of the source video. More particularly, the method is based on creating and updating statistical information pertaining to a characteristic of each region of the video and the labeling of those regions (i.e., as foreground or background) based on the statistical information. For example, in one embodiment, the regions are pixels, and the characteristic is chromatic intensity. Many other possibilities exist, as will become apparent. In more particular embodiments, the invention is directed to methods of using the inventive video segmentation methods to implement intelligent video surveillance systems..

C. "[0022]

"[0022] A "video camera" may refer to an apparatus for visual recording. Examples of a video camera may include one or more of the following: a video camera; a digital video camera; a color camera; a monochrome camera; a camera; a camcorder; a PC camera; a webcam; an infrared (IR) video camera; a low-light video camera; a thermal video camera; a closed-circuit television (CCTV) camera; a pan, tilt, zoom (PTZ) camera; and a video sensing device. A video camera may be positioned to perform surveillance of an area of interest."

D. Best Mode for Carrying Out the Invention

[0025]

[0040] As discussed above, the present invention is directed to the segmentation of video streams into foreground information, which corresponds to moving objects, and background information, which corresponds to the stationary portions of the video. The present invention may be embodied in a number of ways, of which four specific ones are discussed below. These embodiments are meant to be exemplary, rather than exclusive.

[0026]

[0041] The ensuing discussion refers to "pixels" and "chromatic intensity"; however, the inventive method is not so limited. Rather, the processing may involve any type of region (including regions comprising multiple pixels), not just a pixel, and may use any type of characteristic measured with respect to or related to such a region, not just chromatic intensity.

[0027]

1. First Embodiment - Two-Pass Segmentation

[0042] The first embodiment of the invention is depicted in FIG. 1 and corresponds to a two-pass method of segmentation. <u>As shown in FIG. 1, the method begins by obtaining a frame (or video) sequence from a video stream (Step 1). The frame sequence preferably includes two or more frames of the video stream.</u> The frame sequence can be, for example, a portion of the video stream or the entire video stream. As a portion of the video stream, the frame sequence can be, for example, one continuous sequence of frames of the video stream or two or more discontinuous sequences of frames of the video stream. As part of the alignment step, the scene model is also built and updated.

[0028]

[0043] After Step 1, in Step 2, it is determined whether or not all frames have already been processed. If not, the next frame is taken and aligned with the underlying scene model of the video stream (Step 3); such alignment is discussed above as well as in numerous other references.

[0029]

[0044] <u>The inventive method is based on the use of statistical modeling to determine whether a particular pixel should be classified as being a foreground object or a part thereof or as being the background or a part thereof.</u> Step 4 deals with the building and updating of a statistical model of the background, using each frame aligned in Step 3.

[0030] to [0033] Omitted

[0034]

[0049] Given this, <u>Step 4 works to create and update the statistical model by</u>

computing the value of Eqn. (4a) for each pixel, for each frame. In Step 4, the values for the pixels are also stored on a pixel-by-pixel basis (so as to allow each pixel to be received; i.e., not on a frame-by-frame basis); that is, an array of values is compiled for each pixel over the sequence of frames. Note that in an alternative embodiment, Step 4 only performs this storage of values.

[0035]

[0050] Following Step 4, the method returns to Step 2 to check whether or not all of the frames have been processed. If they have, then the method proceeds to Step 5, which commences the second pass of the embodiment.

[0036]

[0051] In Step 5, the statistical background model is finalized. This is done by using the stored values for each pixel and determining their mode, the mode being the value that occurs most often. This may be accomplished, for example, by taking a histogram of the stored values and selecting the value for which the histogram has the highest value. The mode of each pixel is then assigned as the value of the background statistical model for that pixel.

[0037]

[0052] Following Step 5, the method proceeds to Step 6, which determines whether or not all of the frames have already been processed. If not, then the method proceeds to Step 7, in which each pixel in the frame is labeled as being a foreground (FG) pixel or a background (BG) pixel. Two alternative embodiments of the workings of this step are shown in the flowcharts in FIGs. 2A and FIG. 2B.

[0038]

[0053] FIG. 2A depicts a two decision level method. In FIG. 2A, the pixel labeling Step 7 begins with Step 71,where it is determined whether or not all of the pixels in the frame have been processed. If not, then the method proceeds to Step 72 to examine the next pixel. Step 72 determines whether or not the pixel matches the background statistical model; i.e., whether the value of the pixel matches the model for that pixel. This is performed by taking the absolute difference between the pixel value and the value of the background statistical model for the pixel (i.e., the mode) and comparing it with a threshold; that is,

[Mathematical 12]

$$\Delta = \left| x_{pixel} - m_{pixel} \right| \qquad (6)$$

is compared with a threshold θ. In Eqn. (6), xpixel denotes the value of the pixel, while

mpixel represents the value of the statistical background model for that pixel.
[0039]

[0054] The threshold θ may be determined in many ways. For example, the threshold θ may be taken to be a function of standard deviation σ (of the given pixel). In a particular exemplary embodiment, θ=3σ; in another embodiment, θ=Kσ, where K is chosen by the user. As another example, θ may be assigned a predetermined value (again, for each pixel) or one chosen by the user.
[0040]

[0055] <u>If Δ≤θ, then the pixel value is considered to match the background statistical model. In this case, the pixel is labeled as background (BG) in Step 73,</u> and the algorithm proceeds back to Step 71. Otherwise, <u>if Δ≥θ, then the pixel value is considered not to match the background statistical model, and the pixel is labeled as foreground (FG) in Step 74.</u> Again, the algorithm then returns back to Step 71. If Step 71 determines that all of the pixels (in the frame) have been processed, then Step 7 is finished."

(2-2) Cited Invention

In consideration of descriptions in A. to C. of the above (2-1), related drawings, and technical common sense in this field, the descriptions in Cited Document 1 are examined.
(i) Cited Document 1, as described in paragraph [0005] of the above B., includes the description on a video segmentation method in a video surveillance system for segmenting video into foreground information and background information on the basis of statistical information pertaining to a characteristic of each region (pixel) of the video. In addition, it describes that the segmentation method is implemented by assigning a label as foreground and background based on the statistical information. As described in paragraph [0003] of the above B., the segmented foreground information is identified as a foreground object. Note that the above statistical information is a background statistical model as described below.

Thus, it can be said that Cited Document 1 describes "a video segmentation method in a video surveillance system" for “segmenting video into foreground information and background information to identify foreground objects." Here, segmentation is performed by assigning labels as foreground and background based on the background statistical model.

It should be noted that the above A. describes that, for identified foreground objects, video processing is further performed so as to perform object classification into a human, a vehicle, etc.

(ii) The above C. provides an infrared (IR) camera as a video camera for surveillance. In addition, paragraph [0027] in the above D. describes that a frame sequence (two or more frames) is obtained from a video stream.

Thus, Cited Document 1 describes “obtaining a frame sequence from a video stream captured by an infrared (IR) camera.”

(iii) Paragraphs [0029] and [0034] in the above D. describe that a background statistical model is created and updated for each pixel for each frame of the obtained frame sequence.

Further, according to paragraph [0036] in the above D., the following is described: the statistical background model is finalized by determining a value that occurs most often from among the stored values for each pixel; for example, by taking a histogram of the stored values and setting as a value of the background statistical model the value for which the histogram has the highest value.

Thus, it can be said that Cited Document 1 describes that “a background statistical model” is “created and updated for each pixel for each frame of the obtained frame sequence” and “has a value that occurs most often for each pixel of the frame as a value of the model.”

(iv) According to paragraphs [0037] and [0038] in the above D., the following is described: the absolute difference (Δ) between the pixel value of each pixel of the frame and the value of the background statistical model for the pixel is taken and is compared with a threshold (θ); and if it is equal to or less than the threshold (Δ≤θ), then the pixel value is considered to match the background statistical model and the pixel is labeled as background; and if it exceeds the threshold (Δ>θ), then the pixel value is considered not to match the background statistical model and the pixel is labeled as foreground.

Thus, it can be said that Cited Document 1 includes the description of “assigning labels as foreground pixels and background pixels on the basis of an absolute difference between the pixel value of each pixel of a frame and the value of a background statistical model of the pixel.”

Cited Document 1 is as described in the above (i) to (iv) and discloses the following invention (hereinafter, referred to as "Cited Invention 1"). For explanation, symbols (a) to (c) have been added. Hereinafter, they are referred to as configuration a to configuration c.

<Cited Invention 1>

"(a) A video segmentation method in a video surveillance system including: obtaining a frame sequence from a video stream captured by an infrared (IR) camera; assigning labels as foreground pixels and background pixels on the basis of an absolute difference between the pixel value of each pixel in an obtained frame and the value of a background statistical model of the pixel; and segmenting video into foreground information and background information to identify foreground objects; wherein

(b) the background statistical model is created and updated for each pixel for each frame of the obtained frame sequence, and has a value that occurs most often for each pixel in the frame as a value of the model;

(c) thereby obtaining the video segmentation method in the video surveillance system."

(3) Comparison

The invention after amendment and Cited Invention 1 are compared.

(i) Regarding configuration A in the invention after amendment

Configuration A in the invention after amendment and configuration a in Cited Invention 1 are compared.

The "infrared (IR) camera" and "frame" in Cited Invention 1 clearly correspond to the "infrared camera" and "frame image" in the invention after amendment, respectively.

In addition, it is obvious that the frame obtained from the infrared (IR) camera in Cited Invention 1 becomes an image of the frame in the image range photographed by the infrared (IR) camera; that is, in the "imaging area" in the invention after amendment.

Further, in Cited Invention 1, "the video surveillance system" "obtains" a frame sequence; that is, two or more frames, from a video stream captured by the infrared (IR) camera; wherein it can be said that the video surveillance system "obtains" the frames; that is, the frames are input to the video surveillance system. In this case, it is obvious that the "system" as a device configuration has a configuration for input in order to input the frames; and the configuration for the input corresponds to the "image input section" in the invention after amendment.

In addition, in Cited Invention 1, "assigning labels as foreground pixels and background pixels on the basis of an absolute difference between the pixel value of each pixel in an obtained frame and the value of a background statistical model of the pixel; and segmenting video into foreground information and background information to identify foreground objects" are performed; and it can be said that the above "assigning labels" is performed by "processing" an image of the frame. Further, one that is obtained by "assigning labels as foreground pixels and background pixels" on the basis of an absolute difference between "the pixel value of each pixel" and "the value of a background statistical model of the pixel" corresponds to "a background difference image" in the invention after amendment. And further, since the "foreground object" in Cited Invention 1 is an "object" in the video, "segmenting video into foreground information and background information to identify foreground objects" corresponds to "detecting the imaged object" in the invention after amendment.

In addition, since, "the video segmentation method" in the video surveillance system in Cited Invention 1 is a method for performing "processing" such as assigning labels and segmentation for an "image" in a frame, "the video segmentation method" in the video surveillance system in Cited Invention 1 corresponds to “image processing method” in the invention after amendment.

As described above, configuration a in Cited Invention 1 corresponds to configuration A in the invention after amendment.

(ii) Regarding configuration B in the invention after amendment

Configuration B in the invention after amendment and configurations a and b in Cited Invention 1 are compared.

The "background statistical model” having "a value that occurs most often for each pixel in the frame as a value of the model" which is described in a later step of configuration b in Cited Invention 1 clearly corresponds to the "background model" "in which the frequency of a pixel value of the pixel is modeled" in the invention after amendment. In addition, the "background statistical model" in Cited Invention 1 is "created and updated for each pixel for each frame in the obtained frame sequence" as described in a former step in configuration b. Thus, the background statistical model is "created and updated" and therefore, it is obvious that the model is stored in a device configuration of the video surveillance system, and such storage configuration corresponds to the "background model storage section" in the invention after amendment.

Further, in Cited Invention 1, as described in configuration a, "assigning labels as foreground pixels and background pixels on the basis of an absolute difference between the pixel value of each pixel in an obtained frame and the value of a background statistical model of the pixel" is performed. This translates into assigning labels as foreground pixels and background pixels using the "background statistical model" for "the pixel value of each pixel in an obtained frame." Here, "assigning labels" is performed so as to discriminate (that is, "determine") between a foreground pixel and background pixel, and a "labeled" one corresponds to a "background difference image" in the invention after amendment, as mentioned in the above (i).

As described above, configurations a and b in Cited Invention 1 include "a background difference image generating step" of configuration B in the invention after amendment.

(iii) Regarding configuration C in the invention after amendment

In Cited Invention 1, the "labeled" one corresponds to "the background difference image generated in the background difference image generating step" in the invention after amendment, as examined in the above (i) and (ii).

Here, in Cited Invention 1, as described in configuration a, "segmenting video into foreground information and background information to identify foreground objects" is performed by "assigning labels," and as mentioned in the above (i), to "identify foreground objects" corresponds to "detecting ... object" in the invention after amendment.

As described above, configurations a and b in Cited Invention 1 include the "object detecting step" of configuration C in the invention after amendment.

(iv) Regarding configuration D in the invention after amendment

Configuration corresponding to Configuration D in the invention after amendment does not exist in Cited Invention 1.

(v) Regarding configuration F in the invention after amendment

Configuration corresponding to Configuration E in the invention after amendment does not exist in Cited Invention 1.

(vi) Regarding configuration F in the invention after amendment

As mentioned in the above (i), "the video segmentation method" in the video surveillance system in Cited invention 1 corresponds to "the image processing method" in the invention after amendment, and therefore, configuration c in Cited Invention 1 is identical with configuration F in the invention after amendment.

Accordingly, the invention after amendment and Cited Invention 1 are identical and different in the following points.

<Corresponding features>

"An image processing method for detecting an imaged object from a background difference image which is generated by processing a frame image in an imaging area which is captured with an infrared camera and input to an image input section, comprising:

a background difference image generating step of determining whether each pixel of the frame image input to the image input section is a foreground pixel or a background pixel using a background model which is stored in a background model storage section and in which the frequency of a pixel value of the pixel is modeled, and generating a background difference image; and

an object detecting step of setting a foreground region and detecting the imaged object on the basis of the foreground pixel in the background difference image generated in the background difference image generating step."

<The different features>

(The different feature 1)

In the invention after amendment includes "an object class determining step of determining that an object imaged in the foreground region is a person if the variance of the pixel value of each pixel located in the foreground region is a predetermined determination value or greater in each of the foreground regions in which an object is detected in the object detecting step"; whereas Cited Invention 1 does not include such a step as the "object class determining step."

(The different feature 2)

Regarding "the object detecting step," in the invention after amendment, a step "to detect an object captured in the frame image input to the image input section, continuously for a predetermined object detection recognition time" is performed; whereas in Cited Invention 1, such detection is not performed.

(4) Judgment by the body

[(4-1) Regarding the different feature 1

Paragraph [0001] (A. in "(2-1) Description in Cited Document") in Cited Document 1 describes, as mentioned in (i) in "(2-2) Cited Invention," that for identified foreground objects, video processing is further performed so as to perform object classification into a human, a vehicle, etc.

On the other hand, Japanese Unexamined Patent Application Publication No. 2004-362265 which was cited as Cited Document 2 in the reasons for refusal of the original examination includes descriptions on an invention relating to an infrared image recognition device. For example, paragraph [0036] describes "Pedestrian determination processing is performed to determine whether or not the object is a pedestrian, from characteristics such as the shape, size, and luminance variance of the target image in the gray scale image." Similarly, Japanese Unexamined Patent Application Publication No. 2005-159392 which was cited as Cited Document 5 in the reasons for refusal of the original examination includes descriptions (refer to descriptions in paragraphs [0012], [0030], and [0031]) on an invention relating to a vehicle surroundings monitoring device for detecting pedestrians from an infrared image. For example, paragraph [0031] includes the description of:
"Similarly, (b) is a gray level histogram illustrating a typical pixel gray level distribution in the case of a pedestrian. In many cases, the intensity of light reflected from the clothing of a pedestrian is weak and the gray level value is small. Additionally, the light is not reflected in a uniform manner because a person has a three-dimensional shape and because the reflective characteristics of clothing and skin are different. Thus, in the case of a person, the reflection is non-uniform overall and the dispersion value is large. " Similarly, Japanese Unexamined Patent Application Publication No. 2003-284057 which was cited as Cited Document 6 in the reasons for refusal of the original examination includes descriptions (refer to descriptions in paragraphs [0015], [0045], [0047], and [0048]) on an invention relating to a vehicle surroundings monitoring device using an infrared camera. For example, paragraph [0047] describes "For this reason, the luminance dispersion Var_A3 in the AREA3 is high for a pedestrian, and low for an object, such as a wall. Accordingly, in step S47, it is determined if the object is a pedestrian by determining if the luminance dispersion Var_A3 of the mask area AREA3 is greater than the threshold value TH6. "

As described in those documents, it is a well-known technical matter (hereinafter, referred to as "the well-known technical matter 1") that when the variance of a pixel value of the target in an image photographed by an infrared camera is great, the target image is determined to be a person.

A person skilled in the art could easily conceive of applying the above well-known technical matter 1 to Cited Invention 1 on the basis of the above described matters in Cited Document 1, detecting the variance of the pixel value of each pixel for each segment region in a foreground object so as to classify the identified foreground object in Cited Invention 1, and determining, when detecting that the variance of the pixel value is great, that the foreground object is a person. It should be noted that to determine that the value is great depending on whether or not the value is equal to or greater than a predetermined determination value is merely a well-known and commonly used technique.

As described above, it can be easily conceived of by a person skilled in the art to provide "an object class determining step of determining that an object imaged in the foreground region is a person if the variance of the pixel value of each pixel located in the foreground region is a predetermined determination value or greater in each of the foreground regions in which an object is detected in the object detecting step" in Cited Invention 1.

(4-2) Regarding the different feature 2

Japanese Unexamined Patent Application Publication No. 2000-194961 which was cited as Cited Document 4 in the reasons for refusal of the original examination includes descriptions (for example, refer to descriptions in paragraphs [0009], [0018] to [0020]) on an invention for photographing a monitoring area to detect intruders, etc. For example, paragraph [0009] describes "<u>A predetermined number of current images which are continuously photographed are compared and verified</u> with the identical intruder detection reference image; <u>and thereby it can be determined that an intrusion abnormality has occurred when the current images exhibit a difference for a predetermined number of times</u>." In relation to this description, paragraphs [0018] to [0020] include a description in which first, when the size of difference continuously exceeds a predetermined reference value, it is determined that an abnormality has occurred. Here, it is obvious that "a predetermined number" of images are images of predetermined frames.

In addition, Japanese Unexamined Patent Application Publication No. 2008-21034 includes descriptions (for example, refer to descriptions in paragraphs [0036], [0095], and [0096]) on an invention for determining an object from a photographed image.  For example, paragraph [0095] describes "... for <u>an identical candidate object that is to be a determination candidate, which is detected from a plurality of successive images (e.g., a current image and images of several frames to be input thereafter),</u> ... may be determined to be a predetermined object. "  Further, Japanese Unexamined Patent Application Publication No. 2005-8127 includes descriptions (for example, refer to descriptions in [Claim 1] and [Claim 6]) on an invention for processing a photographed image to recognize a three-dimensional object as an oncoming vehicle.  For example, [Claim 6] describes "... wherein the oncoming-vehicle-detecting means detects the three-dimensional object continuously recognized in a plurality of frames as the oncoming vehicle."

As described in those documents, it is a well-known technical matter (hereinafter, referred to as "the well-known technical matter 2") that in object detection from video, an object continuously photographed for predetermined frames is taken as a detection target.  Here, being detected continuously for predetermined frames corresponds to being photographed in frame images for time taken for the predetermined frames; that is, continuously for a predetermined time.

A person skilled in the art could easily conceive of, on the basis of the well-known technical matter 2, recognizing a foreground object continuously for predetermined frames; that is, continuously over predetermined time, and taking the recognized foreground object as an identification target in Cited Invention 1.

As described above, "to detect an object captured in the frame image input to the image input section, continuously for a predetermined object detection recognition time" in Cited Invention 1 can be easily achieved by a person skilled in the art.

(4-3) Summary

As judged in the above (4-1) and (4-2), neither of the different features is remarkable.

In addition, the function and effect of the invention after amendment fall within a scope that can be predicted by a person skilled in the art based on Cited Invention 1, well-known technical matter 1, and well-known technical matter 2.

Accordingly, the invention after amendment could be easily made based on Cited Invention 1, well-known technical matter 1, and well-known technical matter 2; thus, the appellant should not be granted a patent for it independently at the time of patent application under the provisions of Article 29(2) of the Patent Act.

4. Concluding Remarks

As described above, the appellant should not be granted a patent for the invention after amendment independently at the time of filing of the patent application, and therefore, the Amendment does not fall under the provisions of Article 126(7) of the Patent Act which is applied mutatis mutandis pursuant to the provisions of Article 17-2(6) of the Patent Act.

Therefore, the Amendment shall be dismissed under the provisions of Article 53(1) of the Patent Act applied mutatis mutandis by replacing certain terms pursuant to Article 159(1) of the Patent Act.

No. 3 Regarding the invention

1. The Invention

The Amendment was dismissed as described above and therefore, the Invention is as recognized as "the Invention" in the section of "1. The invention and the invention after amendment" in the above "No. 2 Decision to Dismiss Amendment."

2. Described matters in Cited Invention 1 and Cited Documents

Cited Invention 1 and the well-known technical matter 1 are as recognized in the sections of "(2) Cited Invention" and "(4) Judgment by the body" in "3. Judgment on independent requirements for patentability" in sections of "No. 2 Decision to Dismiss Amendment" above.

3. Comparison / judgment

In comparison between the Invention and Cited Invention 1, the Invention is one which is obtained by omitting a configuration relating to the Amendment (a configuration relating to the above different feature 2) from the invention after amendment.

Accordingly, the Invention which is obtained by omitting the limitation relating to the Amendment from the invention after amendment is considered to have a difference of the different feature 1 from Cited Invention as examined in the section of "3. Judgment on independent requirements for patentability" in the section of "No. 2 Decision to Dismiss Amendment" above.  Therefore, it is judged that the Invention could be easily made based on Cited Invention 1 and the well-known technical matter 1, as judged in "(4-1) Regarding the different feature 1" of "(4) Judgment by the body" above.

4. Closing

As described above, the Invention could be easily made by a person skilled in the art based on Cited Invention 1 and well-known technical matter 1; thus, the appellant should not be granted a patent for the Invention in accordance with the provisions of Article 29(2) of the Patent Act.

Therefore, the appeal decision shall be made as described in the conclusion.

March 27, 2017

Chief administrative judge: WATANABE, Satoshi
Administrative judge: FUJII, Hiroshi
Administrative judge: WATANABE, Tsutomu