

CLAIMS

1. An image processing method for processing image data including an object using a neural network that performs learning to classify input data, comprising:
 - a step of defining a plurality of regions on the image data based on at least one characteristic element included in the image data;
 - a quantization step of performing quantization of a pixel coordinate of the image data for each of the regions;
 - a step of separating the pixel coordinate into each coordinate axis;
 - a mapping step of assigning, to the quantized pixel coordinate, any one of internal classifications internally included in the neural network for each of the regions, wherein the mapping step assigns different ones of the internal classifications for each of the separated coordinate axes;
 - a classification step of classifying the output value from the neural network into any one of coordinate values of the object on the coordinate axis;
 - a reproducing step of performing inverse-quantization of the quantization to a result of the classification step, thereby reproducing a position of the object on the coordinate system;
 - a step of shifting, towards a centre of the image data, the object reproduced by the reproducing step on the coordinate system
 - a learning step of performing learning of the neural network using the quantized pixel coordinate of the image data and using the internal classification assigned in the mapping step; and
 - an output step of acquiring an output value from the neural network after the learning is performed.
2. An image processing device that processes image data including an object using a neural network that performs learning to classify input data, comprising:
 - a region definer that defines a plurality of regions on the image data based on at least one characteristic element included in the image data;
 - a quantizer that performs quantization of a pixel coordinate of the image data for each of the regions;
 - a separator that separates the pixel coordinate into each coordinate axis;
 - a mapper that assigns, to the quantized pixel coordinate, any one of internal

classifications internally included in the neural network for each of the regions, wherein the mapper assigns different ones of the internal classifications for each of the separated coordinate axes;

a classifier that classifies the output value from the neural network into any one of coordinate values of the object on the coordinate axis;

a reproducer that performs inverse-quantization of the quantization to a result of the classifier, thereby reproducing a position of the object on the coordinate system;

a shifter that shifts, towards a centre of the image data, the object reproduced by the reproducer on the coordinate system; and

a learner that performs learning of the neural network using the quantized pixel coordinate of the image data and using the internal classification assigned by the mapper and acquires an output value from the neural network after the learning is performed.