【CLAIMS】

【Claim 1】

A method for recognizing an identification (ID) card of a user terminal using deep learning, the method comprising:

extracting an outline region of the ID card included in an input image using a first neural network model;

modifying an ID card image of the image to a reference form using at least a partial value of the extracted outline region; and

determining whether the modified ID card image is valid according to the presence of a recognition inhibitory factor in the modified ID card image using a third neural network model and recognizing text information in the valid ID card image,

wherein the extracting the outline region of the ID card comprises re-extracting the outline region of the ID card in a re-input image when the recognition inhibitory factor is present.

【Claim 2】

The method of claim 1, further comprising:

determining whether the ID card exists in the input image using a second neural network model,

wherein the extracting the outline region of the ID card comprises extracting the outline region when the ID

card exists.

【Claim 3】

The method of claim 2, further comprising:

enhancing an outer pixel value of the text information in the modified ID card image against periphery information,

wherein the recognizing the text information comprises recognizing the text information in the ID card image using the enhanced pixel value.

【Claim 4】

The method of claim 1, wherein,

wherein the recognizing the text information comprises recognizing the text information in the ID card image using a fourth neural network model.

【Claim 5】

The method of claim 1, wherein

the first neural network model configured to label at least one corner position of the ID card image, and perform learning through data generated by converting the labeled ID card image according to a predetermined condition.

【Claim 6】

The method of claim 1, wherein

the third neural network model configured to perform learning by collecting the ID card image including the recognition inhibitory factor as learning data.

【Claim 7】

An application stored in a user terminal for recognizing an identification (ID) card based on deep learning, the application comprising:

an outline extracting unit configured to extract an outline region of the ID card included in an input image using a first neural network model;

an image modifying unit configured to modify an ID card image of the image to a reference form using at least a partial value of the extracted outline region;

an inhibitory factor determining unit configured to determine whether the modified ID card image is valid according to the presence of a recognition inhibitory factor in the modified ID card image using a third neural network model; and

a text recognizing unit configured to recognize text information in the valid ID card image,

wherein the outline extracting unit is further configured to re-extract the outline region of the ID card in a re-input image when the inhibitory factor determining unit determines the modified ID card is invalid according to

the presence of the recognition inhibitory factor.

【Claim 8】

The application of claim 7, further comprising:

an ID card determining unit configured to determine whether the ID card exists in the input image using a second neural network model,

wherein the outline extracting unit is further configured to extract the outline region when the ID card exists.

【Claim 9】

The application of claim 8, further comprising:

a text enhancing unit configured to enhance an outer pixel value of the text information in the modified ID card image against periphery information,

wherein the ID card determining unit is further configured to recognize text information in the ID card image using the enhanced pixel value.

【Claim 10】

The application of claim 7,

wherein the text recognizing unit is further configured to recognize text information in the ID card image using a fourth neural network model.

【Claim 11】

A method of providing an identification (ID) card recognition service based on deep learning performed in a service providing server, the method comprising:

releasing an application including an ID card recognition model performing at least one convolution operation so that a user terminal uses the application for an image captured by the user terminal;

receiving a result of checking authenticity of an ID card through a certification agency server from the user terminal according to an ID card recognition result of the released ID card recognition model; and

providing a user request service according to the result of checking authenticity of the ID card,

wherein the ID card recognition model comprising:

extracting an outline region of the ID card included in an input image using a first neural network model;

modifying an ID card image of the image to a reference form using at least a partial value of the extracted outline region; and

determining whether the modified ID card image is valid according to the presence of a recognition inhibitory factor in the modified ID card image using a third neural network model,

wherein the extracting the outline region of the ID

card comprises re-extracting the outline region of the ID card in a re-input image captured by the user terminal when the recognition inhibitory factor is present.

【Claim 12】

The method of claim 11, wherein

the ID card recognition model configured to determine whether the ID card exists in the input image using a second neural network model and extract the outline region using the first neural network model when the ID card exists.

【Claim 13】

The method of claim 11, wherein

the ID card recognition model configured to enhance an outer pixel value of the text information in the modified ID card image against periphery information and recognize text information in the ID card image using the enhanced pixel value.

【Claim 14】

The method of claim 11, wherein

the ID card recognition model configured to recognize text information in the ID card image using a fourth neural network model.