AN ALGORITHM FOR PROCESSING AN IMAGE WITH NORMALITY USING GRAPHIC PROCESSOR UNITS

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Ключевые слова: Искусственный интеллект, машинное обучение, анализ изображений с использованием искусственного интеллекта, обработка изображений, методы и алгоритмы анализа.

Image processing and analysis are used in several image-related areas of human activity. According to many experts and scientists, the development of image processing methods has led to the emergence of new directions of science and technology with a bright future. Image processing is commonly referred to as image processing or digital image processing. This field is human it cannot be studied without knowing the visual system. Modeling the human visual system has made a significant contribution to the advancement of digital image processing.[1]

Nowadays, it is the main issue of heating the modern technology industry, including mechanical engineering and artificial intelligence (AI). In particular, computer vision or image processing technology is a key factor in the implementation of many innovative technologies, such as driverless cars, face recognition (Face ID) and prediction of medical outcomes.

Many industry – specific use cases of predictive modeling are being explored by experienced scientists to realize the potential of various underlying technologies and processes related to image recognition.

Introduces new concepts, problems and ways to solve them.

Image processing is a two – step process: first, preparing the image file for analysis, and second, selecting the variable to be analyzed or adjusting the algorithm to obtain the desired quality. Data preparation is essential to create a reliable and stable predictive model. Data operations such as standardizing continuous variables on a common scale, imputing missing values, and variable selection are also important to each algorithm. The same applies to image detection. The image processing step directly affects the desirability of the subsequent image recognition step.

Let's say, an auto insurance company, analyzes the smartphone picture of the accident site and pre-evaluates the accident in the client's car. Image processing at this point involves much more than converting the actual image file into binary or flat character tables. This is because there may be some features that differentiate between images with predicted values and images that do not.

To determine the necessary stages of image processing, we must pay attention to the following tasks:

- color model;
- the presence of several layers that support 3D in the image file;
- the ability to discard some areas of the image;
- the boundary of the image object that separates the target event (in this case, whether to claim full damage or insurance);
- that we need a training dataset to account for differences in camera angles;
- the logic of enriching the training data set by slightly changing some or all of the original images.

The above tasks can be compared with image processing tasks, they are used individually. In addition, we can combine these tasks to prepare a set of images for training models. Depending on the further modeling work, it is recommended to use image processing to enhance the signal (or vice versa to reduce the noise).

It is important to study and understand the different options for image processing operations and the importance of different image processing operations.

Change image size. In these algorithms, various interpolation methods are used, which allow correct filling of corrupted pixels of enlarged images (pixel values) or recalculation of pixel values when the image is reduced. Analysts should be empowered to test different approaches in an environment that allows rapid experimentation and rapid deployment after failure with a proven value approach combined with image recognition algorithms.

If we go back to the case of an auto insurance company and ask 100 customers to photograph the same accident, 100 different images will be produced without exception. When analyzing a set of images like this, in general, the more static the set of images, the easier it is to see differences between individual images and the easier it is to recognize image points. In this case, it may make sense for the insurance company to provide customers with a program that uses the same comparison criteria by consistently presenting traffic damage.

For example, in a high-tech or general production environment, if you are shooting in a production line facility, you can get a perfect angle of the images because the lighting and frame are constant. You can then use this image to identify subtle changes in the manufacturing process. These changes may be indicative of defects in the manufacturing process.

As another example, we can see public surveillance cameras to catch criminals and criminal activities. Normally, you can control the angle and frame of the surveillance camera while watching the crowd, but the light and lighting system is very slow.

Factors such as the data reception characteristics of technical devices and light levels at the time of photography affect image quality differently. If the image quality is bad, it needs to be improved. Because it is difficult to find facial features in low-quality images. There are various ways to improve image quality. For example, the image can be used to enhance borders, remove obstacles, increase clarity, etc

Conventional and deep algorithms:

It is wise to choose the simplest model for classification work. This is because the simpler the model, the more stable it is and the easier it is to explain to business stakeholders. However, in general, image recognition requires a more complex model due to the complexity of the image data. Therefore, deep learning algorithms such as convolutional neural networks (CNN) are essential for most real-world classification tasks in image recognition.

If you are familiar with CNN, you will know that this algorithm is the most successful in image recognition problems. In highly complex neural network environments, such as the human visual cortex, there is some degree of overlap between the receptive fields of individual neurons. Today, thanks to the power of modern computers, this complex architecture is closer than ever to human-level visual perception. At the same time, it is able to eliminate some errors and mistakes that can be harmful.

Innovation and results. Undoubtedly, image recognition is an exciting technology that opens up new horizons in information science and improves various business processes. Companies that successfully integrate the latest image processing and recognition technologies with a strong analytics operating environment will be the first to reap the benefits.

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