

## IMAGE DETECTION ALGORITHMS AND TECHNOLOGIES

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**Abstract.** The article is one of the current topics in the provision of better and innovative services in all areas. The article provides insight into the applications and how image recognition works in today's world.

**Keywords:** image recognition, digital image, pixel, neural network, detection, labeling, technologies.

Introduction. Today, users share large amounts of information in the form of images through apps, social networks and websites. With the proliferation of smartphones and high-definition cameras, the number of digital images and videos created has increased dramatically.

Image recognition allows machines to identify objects, people, creatures, and other variables in images. It is a subcategory of computer vision technology that deals with recognizing patterns and patterns in image data and then categorizing them by interpreting patterns of image pixels.

Image recognition involves various methods of collecting, processing and analyzing data from the real world. Because data is multidimensional, it produces numerical and symbolic information in the form of decisions.

### 1. Data collection

Image determine achieve artificial intelligence for machine vision models until not seen images recognize get learn for predetermined data with fed

There are some public data bases that include Pascal VOC and ImageNet. There are objects in the pictures, descriptions, millions of tagged images available - sports and pizza pulls mountains and cats.

I am collecting information, but difficulties will come along:



Image point of view from the point of view change Images different in the corners alignment or dimensions from the point of view difference do possible while machine learning model wrong prophecy do take coming can Image system alignment and appearance change The effect does not understand.

Deformation. Usually learning information is known to one object only known to form one to be possible about the biased imagination of the ladies.

Occlusion. Some image objects are complete, apparently an obstacle to do and to the system, partial information be given to take the coming one can Neuron network this change study the process one part recognition as needed

More for the head direct image segmentation our current reach

Interclass differences. Some objects shape, size and composition in terms of difference can be made, but still one for the class belongs can All other data on points have been image better again work for very important

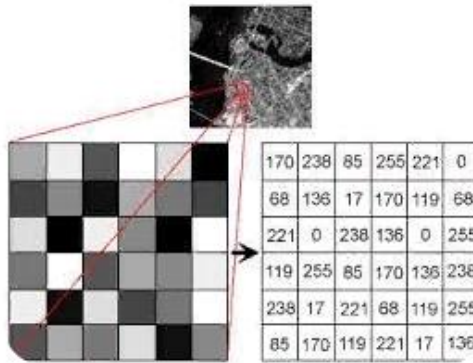
2. Picture information in advance again work

Information collection ready after, its exemplary teaching efficiency increase for one how many things to do need

Information explanation

In the picture, the regions of interest exist the service who the objects in need are tagged (or commented on) the computer to see the system to be defined is needed Otherwise, when performing in other words, this is a frame or to photographs tags an application is needed

Segmentation of responsibilities for annotation v7 annotation tools, in particular polygon explain from the tool and automatic explain from the tool used without easy and of course execution can Once assign the tab next in the staff software to supply to remembering will remain. paintings demonstration

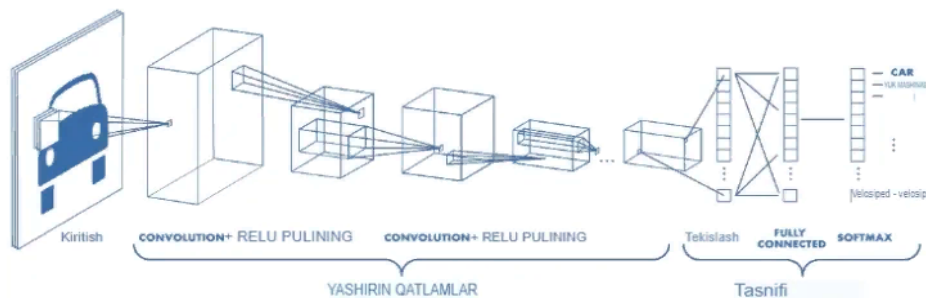


**Digital image**

Digital image pixel intensity showing matrix to the image have Image definition models given image data pixel location and this is the intensity. This information is to study the process one part as for him given the following in the image's patterns find through the image determine the help of ladies.

3. Exemplary architecture and study process

The unique working principle is due to the convolutional neural network (CNN) image deep learning with the best results.



**Image in defining convolutional neuron networks performance**

The full pixel matrix in CNN is not immediately given, since for a separate function model to obtain and high measured sparse from the matrix patterns, the definition will be difficult. Instead, complete the image filters or kernels using a feature called maps, small parts are divided.

Har one don't go away - go away layer convolution layers more complex, detailed functions-image described things visual images habitual occupies Such "increasing ongoing complexity and abstraction features of hierarchy is called hierarchy.

The corresponding small departments are normalized and their activation function is used. The corrected linear unit (ReLU) image definition of duty is considered appropriate by most. Layers of combining matrix sizes using a machine educational model is good at extracting functions to help give for decreases. Pictures classification in the problem to tags / classes peeking layer access image which belongs to the class what to assume does

#### 4. Image definition for traditional machine learning algorithms

Deep learning model teaching for the necessary what is parallel processing to give and wide consider the possibilities of work from output to traditional machine learning model image again work standards have been established

Let's study a lot about cars learning models quickly seeing Let's go:

Vector Cars Support

Sms images histograms Create through functions describes. They have an image around don't move and don't slide definition window from the technique they use Then the algorithm test the picture takes and around the game check for a trained histogram of the value of the picture of another part with compares

Functions of the bag

Functions of the bag such as the model measure the immutable feature of transform (SIFT) the sample image and its suitable recording image in the middle pixel by pixel the suitable one will come. Then the match of the trained model is found to see for from the image the target of the image is another in parts of the pixel function with adapt the action does

Computer understanding widely used some other passenger cars training models the following includes:

- Regression Algorithms
- For example based on algorithms
- Regularization Algorithms
- Solution Tree Algorithms
- Bayesian algorithms
- Clustering Algorithms

#### 5. Image definition for a famous deep learning model

Recently, most famous deep learning models are quickly seeing let's go:

YOLO (you only look like one)

This object definition algorithm trust from the account uses and each one fence in the box the border of the box through one how many objects explains. YOLO, as the name suggests, processes a frame only once using a fixed grid size and then determines whether there is an image in the grid box.

Single Shot Detector (SSD)

Single image detectors divide the image into standard bounding boxes in a grid of different aspect ratios. The feature map derived from the hidden layers of the neural networks used in the image is combined with different aspect ratios to naturally handle objects of different sizes. These types of object detection algorithms are flexible and accurate and are mainly used in face detection scenarios where there are few example images in the training set.



***The YOLO algorithm dense objects with to the image is used***

Other machine learning algorithms include fast RCNN (faster region-based CNN), which is one of the best models in the CNN family of region-based feature extraction models.

Results. The field of machines with computer vision, image and video understanding is one of the hottest topics in technology. Robotics and self-driving cars, facial recognition and medical image analysis all rely on computer vision. Computer to see in the center the image definition of this to the machines image what it means to understand and to him in the category to divide the opportunity of the ladies.

Image definition and definition of responsibilities for used leader convolutional neural network (CNN) architecture. convolutional neuron network one how many of the layers consists of become each one image small parts perception enough Neuron network each one image class visual functions about knowing takes and in the end how to recognize them learns

Conclusion. Thus, the combination of modern machine learning and computer vision has now made it possible to recognize many everyday objects, human faces, handwritten text and much more in images. We continue to see more and more industries and organizations adopt image recognition and other computer vision tasks to streamline operations and improve value for their customers.

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