Computer vision

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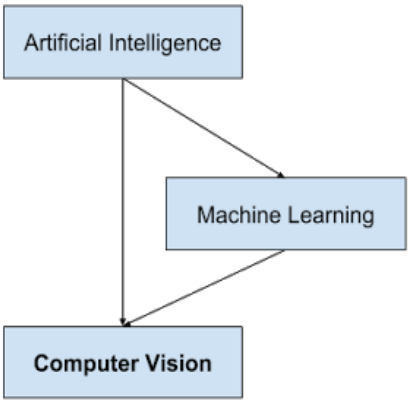
Abstract **: Computer vision being one of the most prominent cases. This review paper provides a brief overview of some of the most significant deep learning schemes used in computer vision problems, that is, Convolutional Neural Networks, Deep Boltzmann Machines and Deep Belief Networks. a brief account of their history, structure, advantages, and limitations is given, followed by a description of their applications in various computer vision tasks, such as object detection, face recognition, action and activity recognition, and human pose estimation.**

INTRODUCTION

CV, is defined as a field of study that seeks to develop techniques to help computers "see" and understand the content of digital images such as photographs Computer Vision, often abbreviated as and videos. The problem of computer simple because it is trivially solved by people, even very young children. This paper explains about evolution of computer technology and new methods that are under research stage which can change the computer environment and human view. deals with the extraction of high-dimensional data from the real world in order to produce numerical or symbolic information that the computer can interpret. The image data can take many forms, such as video sequences, views from multiple cameras, or multi-dimensional data from a medical scanner. As a technological discipline, computer vision seeks to apply its theories and models for the construction of computer vision systems. As a scientific discipline, computer vision is concerned with the theory behind artificial systems that extract information from images. a multidisciplinary field that could broadly be called a subfield of artificial intelligence and machine learning, which may involve the use of specialized methods and make use of general learning



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Computer vision is the science of endowing computers or other machine. with vision, or the ability to see. But what exactly does it mean to see? Mostcomputer vision scientists would agree that seeing is more than the process of recording light in a form that can be played back, like the recording of a video camera. But what, exactly, is needed in addition to the detection or recording of light in order to say that a device, be it natural or manufactured, is seeing? Perhaps we wish to say that vision is the interpretation of images that leads to actions or decisions, as in the navigation of an autonomous robot. But wouldwe then exclude as vision the process of gazing at the night sky or a beautifulocean vista, processes in which we may have no intention of making any decision?Processes such as recognition, interpretation, learning, or just enjoyment maybe occurring when we see that have no immediate bearing on a decision. On theother hand, something we see may affect a decision we make years later. Howdo we then know if we are currently seeing or not?

Since vision is a core component of intelligence, its definition encountersmany of the same philosophical issues raised when trying to define intelligenceitself. Like intelligence, there are many components to vision, including but notlimited to memory, retrieval, reasoning, estimation, recognition, and coordination with other senses. It would be odd to insist that all of the above elements be present before we would consider a system to have some degree of vision. Atthe same time, a system with only one of these abilities might not be promotedto the rank of having vision. To some extent, we define vision by the familiarprocesses of our own visual systems, and thus, there may be some subjective judgement about the degree to which a system can see by comparing it to ourown capabilities.We will leave the definition in the first sentence of this chapter as it is, andstrive to endow computer vision systems with as many capabilities as we canrather than dwelling on whether we have built a system that can truly see.

WORKING OF COMPUTER VISION

How exactly do our brains work, and how can we approximate that with our own algorithms? The reality is that there are very few working and comprehensive theories of brain computation; so despite the fact that Neural Nets are supposed to "mimic the way the brain works," nobody is quite sure if that's actually true.

The same paradox holds true for computer vision — since we're not decided on how the brain and eyes process images, it's difficult to say how well the

algorithms used in production approximate our own internal mental processes.

On a certain level Computer vision is all about pattern recognition. So one way to train a computer how to understand visual data is to feed it images, lots of images thousands, millions if possible that have been labelled and then subject those to various software techniques, or algorithms, that allow the computer to hunt down patterns in all the elements that relate to those labels.

So, for example, if you feed a computer a million images of cats (we all love them😄😻), it will subject them all to algorithms that let them analyze the colour in the photo, the shapes, the distances between the shapes, where objects border each other, and so on, so that it identifies a profile of what "cat" means. When it's finished, the computer will (in theory) be able to use its experience if fed other unlabeled images to find the ones that are of cat.

Let's leave our fluffy cat friends for a moment on the side and let's get more technical😉😻. Below is a simple illustration of the grayscale image buffer which stores our image of Abraham Lincoln. Each pixel's brightness is represented by a single 8-bit number, whose range is from 0 (black) to 255 (white**).**

ADVANTAGES OF CV

- Simpler and faster processes. You will be able to check your products faster, as protracted visual checks are replaced by fast computers.
- Reliability. Contrary to a human eye, cameras and computers never get tired. ...
- Accuracy. ...
- Wide range of use. ...
- Reduction of costs.

DISADVANTAGES OFCV

- **Spoiling**
- **Failing in image processing:**
- **Necessity of specialists**

COMPUTER VISION SYSTEM

The organization of a computer vision system is highly application dependent. Some systems are stand-alone applications which solve a specific measurement or detection problem, while other constitute a sub-system of a larger design which, for example, also contains sub-systemsfor control of mechanical actuators, planning, information databases, man-machine interfaces, etc. The specific implementation of a computer vision system also depends on if its functionality is pre-specified or if some part of it can be learned or modified during operation. There are, however, typical functions which are found in many computer vision systems.

· Image acquisition:

A digital image is produced by one or several image sensor which, besides various types of light-sensitive cameras, includes range sensors, tomanygraphydevices, radar, ultra-sonic cameras, etc. Depending on the type of sensor, the resulting image data is an ordinary 2D image, a 3D volume, or an image sequence. The pixel values typically correspond to light intensity in one or several spectral bands (gray images or colour images), but can also be related to various physical measures, such as depth, absorption or reflectance of sonic or electromagnetic waves, or nuclear magnetic resonance.

· Pre-processing:

Before a computer vision method can be applied to image data in order to extract some specific piece of information, it is usually necessary to process the data

in order to assure that it satisfies certain assumptions implied by the method. Examples

- Re-sampling in order to assure that the image coordinate system is correct.
- Noise reduction in order to assure that sensor noise does not introduce false information.
- Contrast enhancement to assure that relevant information can be detected.

· Feature extraction:-

Image features at various levels of complexity are extracted from the image data. Typical examples of such features are o Lines, edges and ridges.

- Localized interest points such as corners, blobs or points.More complex features may be related to texture, shape.

· High-level processing:

At this step the input is typically a small set of data, for example a set of points or an image region which is assumed to contain a specific object. The remaining processing deals with, for example:

- Verification that the data satisfy model-based and application specific assumptions.
- Estimation of application specific parameters, such as object pose or object size

CONCLUSION

The research of the foreign computer vision is being mainly researched and developed by the relevant department of information science at the beginning, until not begin to consider that deals with and cooperates with sports of the mechanical device to control and reach the best automation in image

when researchers begin to do the research of automation, the vision of the computer is raw because of answering. Computer vision to utilize several science and technology of computer is it deal with figure or image wait for vision behave to come mainly. Deal with and include computer graphics, the image is duplicated or the especially good effect is dealt with, three-dimensional space picture simulation, fictitious visual effect appear, the international image of the multimedia appears and computer animation, etc. It is very extensive that the vision of the computer is applied to the research on automation, and as perform algorithms under gradual progress and constant development, the use of the computer vision is more extensive.

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