Image Compression

Introduction

At present, image processing technology is becoming increasingly mature. In our daily life, we usually need to package a large number of files and then transfer them. However, most platforms have limitations on files size, so we must compress images before transmitting it. The most popular Image Compression methods are: Convolutional Neural Network, Dynamic Programming, Singular Value Decomposition, etc. We will explain the concept, practical application, necessity and feasibility of Image Compression. In the end, we will show an example to reflect the charm of Image Compression.

Redundancy between Pixels

no difference

These pixel values are almost indistinguishable, so let's use fewer values to record the area.

1.What is Image Compression ?

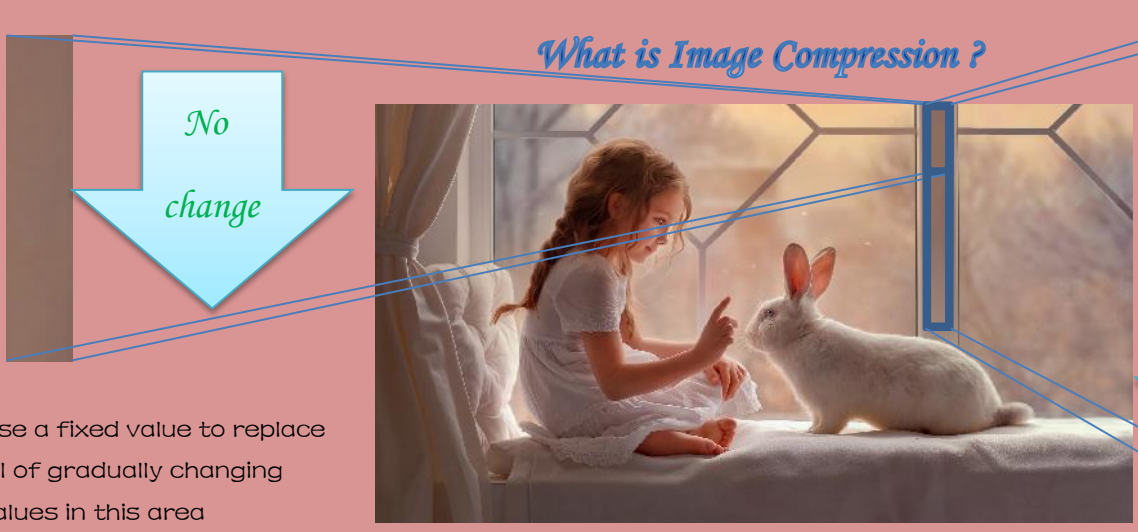
2.Why Image Compression ?

3.Why Can image be Compressed ?

4.How to Compress Images ?

You may think that horizontal or vertical scaling is image compression.

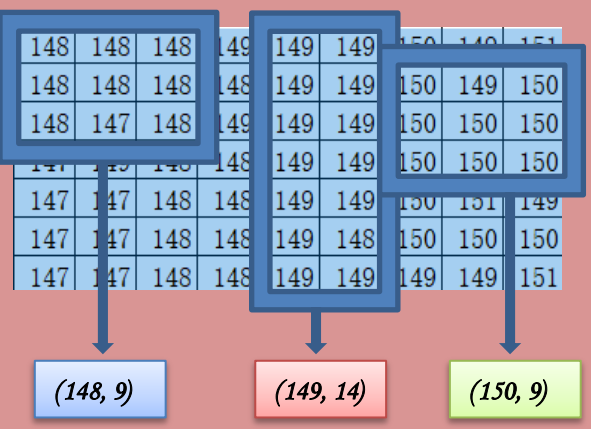
What is Image Compression ?



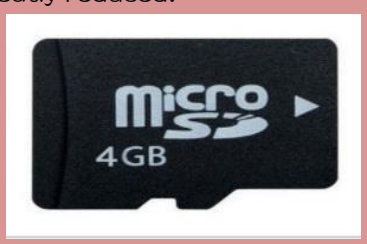
Use a fixed value to replace all of gradually changing values in this area

Original image

How to Achieve it ?



As shown in the figure on the left, it is absolutely necessary for us to record multiple values in an area with a pair of data. In this way, memory consumption can be greatly reduced.



Coding Redundancy

Decimal	Binary
1	0000000 1
7	00000 111
15	0000 1111
63	00 111111
255	11111111

When we encode the data into 8-bit binary codes, some code values are 0, which means it is useless encoding.

References

[1] 孔繁锵，周永波，沈秋，等. 基于卷积神经网络的端到端多光谱图像压缩方法[J]. 中国激光，2019，46(10).

[2] 胡乡峰，卫金茂. 基于奇异值分解(SVD)的图像压缩[J]. 东北师大学报(自然科学版)，2006，38(003):36-39.