

Image representation - GCSE Computer Science video for image representation

NARRATOR: Taking photos is an art form and she's clearly got the gift.

Let's find out the computer science behind 'image representation'.

A computer allocates a binary number to every single colour we see on a screen.

This number is for orange. This number is for yellow. And this number is for that horrible colour they always paint dentists' waiting rooms.

Ah, that's better!

Images on a screen are made up of tiny coloured blocks called pixels.

The word 'pixel' is short for picture element.

We can see pixels better when we zoom in.

Each pixel is represented as a binary number which tells the computer what colour to make it on the screen.

(DING) Better!

Colour depth tells us what range of colours are available in an image.

The greater the colour depth, the greater the number of colours available.

Starting with the most basic, to create a black-and-white image, the computer only needs two colours.

It can create those two options in binary with just a single digit or bit, using the number '1' for white and a '0' for black which means that a black-and-white image has a colour depth of 1-bit.

If we expand that binary number to two digits or two bits, then the computer can make four different numbers, giving us four different colour variations.

A colour depth known as grayscale.

Most of the images we see on our screens use a colour depth of 24-bit.

The highest 24-bit binary number that the computer can make is this, which gives over 16 million different colour variations.

Resolution is the measure of pixel density. It's the number of pixels crammed into an image and recorded as dots per inch, or DPI.

BBC Bitesize

Images on websites usually have a resolution of 72dpi which means a one-inch square image contains just over 5,000 pixels.

More pixels means more detail, means higher quality, which means a bigger file size.

Apart from the picture itself, the file contains information about the image called metadata which means data about data.

Metadata includes colour depth and resolution, but also file name, file format, which is usually JPEG or PNG.

The start of image and end of image markers, they tell the computer where the list of pixels starts and ends.

Dimension, which is the width and height of the image measured in pixels.

These dimensions tell the computer how to arrange the list of pixels.

The time and date of when the photo was taken, last edited or changed.

The camera settings used when the photo was taken.

And even GPS location, letting those government agents know exactly where you ate that amazing salad!