

~~Pixels~~ → **Spatial Resolution** (less pixels ⇒ lower quality)

Shades of grey/colours → **Amplitude resolution** [Brightness]

Frames per second → **Temporal resolution**

Nyquist's Theorem

- you need a certain number of pixels spanning an object to be able to tell that the object is there, in the image
- if you have **2 pixels** spanning the **smallest dimension** of an object in an image, you can detect that object
- **detect** an object → 2 pixels
- **recognise** an object → a lot more pixels
- if a signal is sampled at the Nyquist rate, little information is gained
- alternative way of specifying the **spatial resolution**

Noise sources

* anything that causes a change { - atmospheric disturbance

* anything within the imaging system that causes a change { - electrical interference
- optical aberration

Cameras' brightness depends on **signal to noise ratio**

- **noise** is defined as any deviation of the signal from its expected value - it may be observed as a **speckle** in the image where one would expect to see area of uniform colour/brightness (termed Gaussian noise)
- **salt and pepper noise** - its effect is to randomly introduce pixels of pure black and pure white into the image

HSV

Hue - Underlying colour of the sample

Saturation - the saturation/depth of the sample's colour

Value - the intensity of the sample/brightness

YCrCb

- part of the standard for digital video
- less detail in Cb, Cr so fewer pixels stored
- one Cb and one Cr pixel per four Y pixels