PREV [[Computer Vision/Introduction]]

![[Pasted image 20240115100557.png]]

Lighting: ![[Pasted image 20240115100804.png]]

![[Pasted image 20240115100816.png]]  
This is a general model to calculate light emitted  
Diffuse Reflection  
 ![[Pasted image 20240115101121.png]]  
We must account for wavelength due to colour of the surface  
Specular reflection  
 ![[Pasted image 20240115101245.png]]  
 The reflected light have same angle, all energy reflected to input == output  
Ambient Illumination   
 accounts for general illumination that is complicated to model: many light sources, distant sources, reflection on many walls etc.  
 ![[Pasted image 20240115101514.png]]  
Combining all of these can lead to photorealistic graphics.

Optics: ![[Pasted image 20240115101639.png]] Human Optics: ![[Pasted image 20240115101804.png]] Cone cells use trichromatic vision, so computers model this via RGB. ![[Pasted image 20240115101948.png]] Rod cells: More sensitive to light. Camera Sensors: Two types of sensors: CCD, CMOS (more popular on phones) Sensors convert photons to electron charges and record the values ![[Pasted image 20240115102233.png]] ![[Pasted image 20240115102408.png]] Interpolation using neighbour pixels is used to get (R,G,B) values from bayer filter ![[Pasted image 20240115102515.png]] Representation in Computers: ![[Pasted image 20240115102609.png]] Each channel is typically either: 8 bits: 0 to 255 (most common) 16 bits: raw camera files Quantisation: ![[Pasted image 20240115102934.png]] Graphics vs Vision Vision is Image -> Object; Graphics is Object -> Image; somewhat inverse Training vision may involve label maps eg: ![[Pasted image 20240115103315.png]] Photorealistic games can be used to synthesise training data with existing semantic annotations, avoiding costs for labelling and categorising datasets etc.

NEXT [[Image Filtering I]]