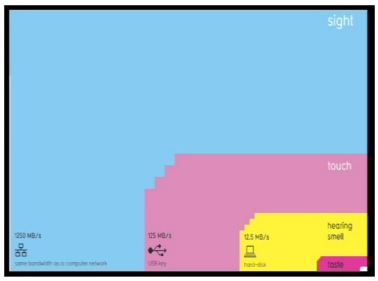
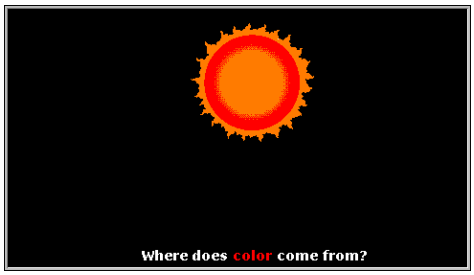
Luz / Cor / Percepção

Fernando Ribeiro

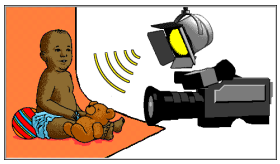


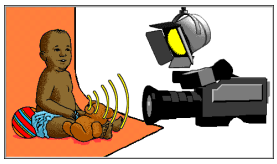
Visão

De onde vem a cor ?

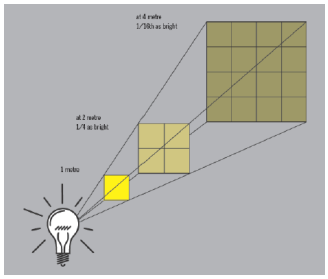


Imagem





Imagem



Inverse Square law

Imagem Digital

Objecto + Luz

Objecto Iluminado + Dispositivo Ampliação

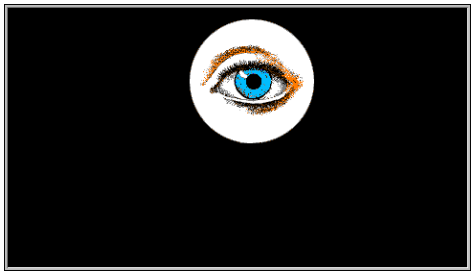
Imagem Óptica + Dispositivo Captura

Imagem Electrónica + Dispositivo Conversor

Imagem Digital

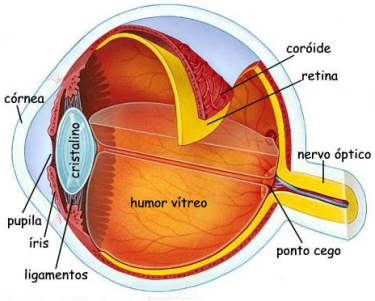
Fernando Ribeiro

Olhos

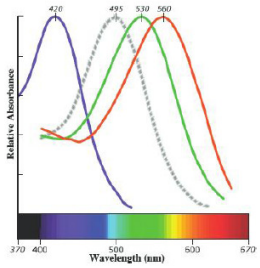


Fernando Ribeiro

Olho humano

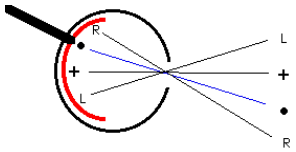


Características da visão

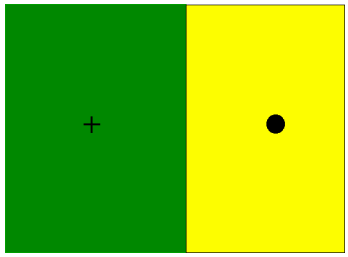


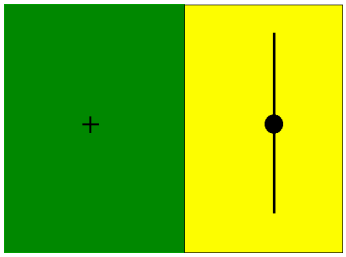
Sensitivity of the rods (shown in gray) and three kinds of cones (shown in red, green, and blue) as a function of wavelength (Dartnall et al., 1983). Human vision detects roughly the range from about 400 nm (blue) to 700 nm (red).

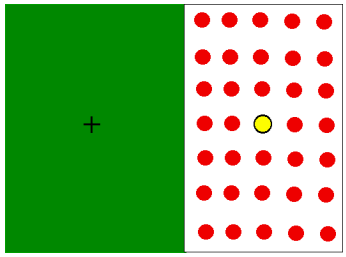
- O cérebro adiciona informação ao que o olho realmente vê, e não é pouca informação

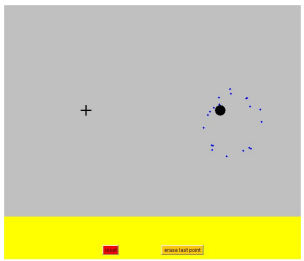


- Tapar um olho, olhar para a cruz, aproximar a cabeça até não se ver o circulo









Atenção ao flash…

Atenção ao flash…

Atenção ao flash…

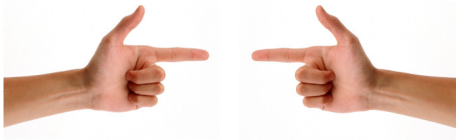
Onde ía a bola
quando apareceu o flash ?

CONCLUSÃO

O Cérebro prevê…

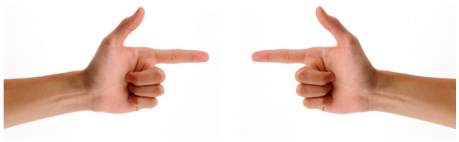
Profundidade

Profundidade



Profundidade

Com um olho fechado



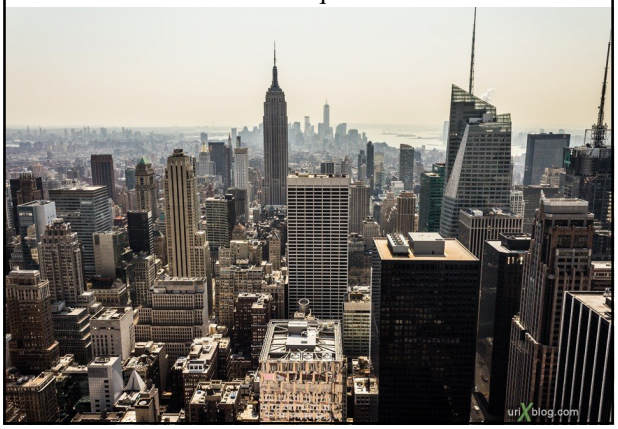
Profundidade

Profundidade

Olho esquerdo

Olho direito

Olho esquerdo



Olho direito

Profundidade

Profundidade

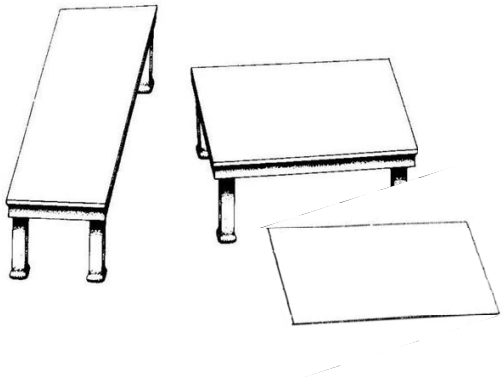
Olho esquerdo

Olho direito

Visão Raio-X

Visão Raio-X

Padrões



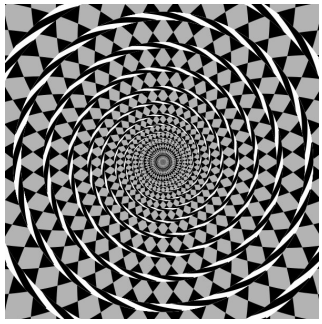
Luz controlada / Imagens tratadas

Luz controlada

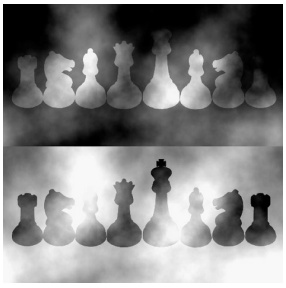
Imagens tratadas

É possível fotografar detalhes

Motion aftereffect



Brancas x Pretas

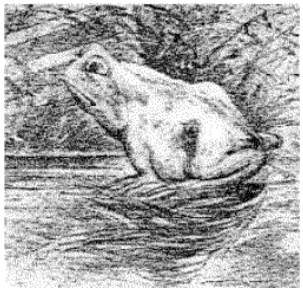


Ilusão de cor

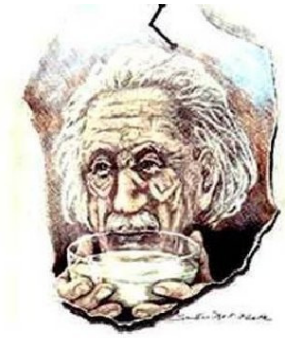
Distância à imagem

Distância à imagem

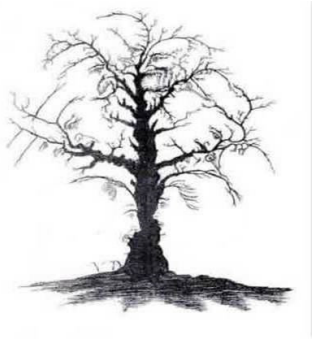
Distância à imagem



Distância à imagem

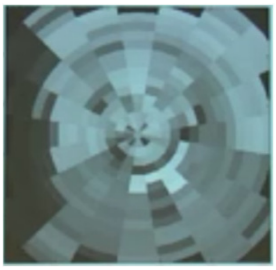


Distância à imagem



Distância à imagem

Distancia à imagem



Distancia à imagem

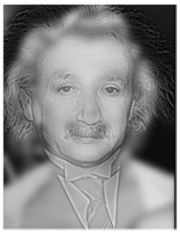
Distancia à imagem

Distancia à imagem

Distancia à imagem

Distancia à imagem

Distancia à imagem



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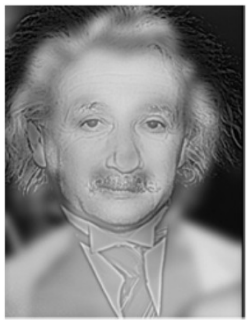
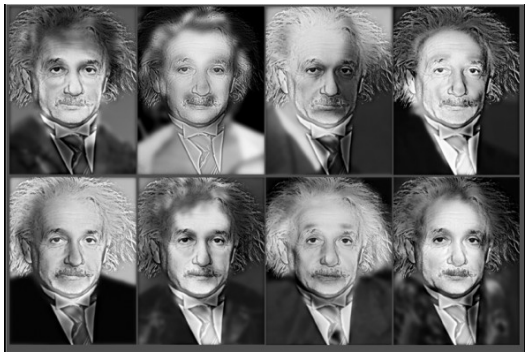


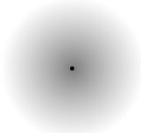
Distancia à imagem

Distancia à imagem



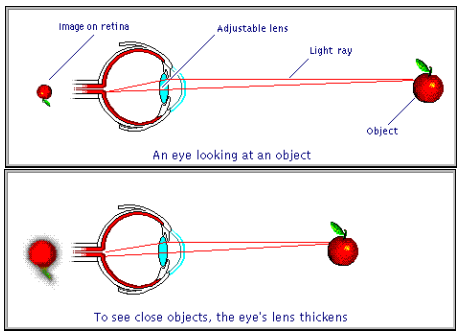
Memória visual

Memória visual



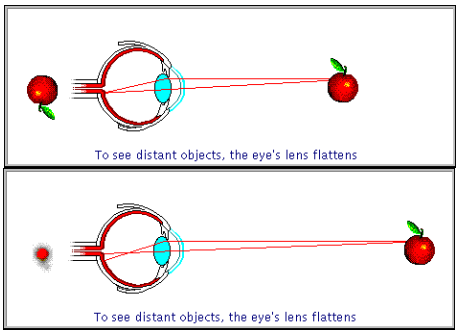
Memória visual

Olhos



Fernando Ribeiro

Olhos



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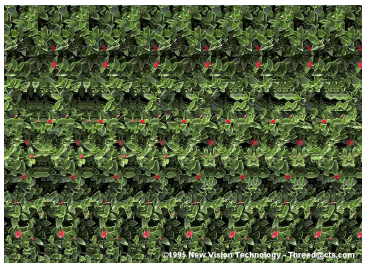
Estereograma



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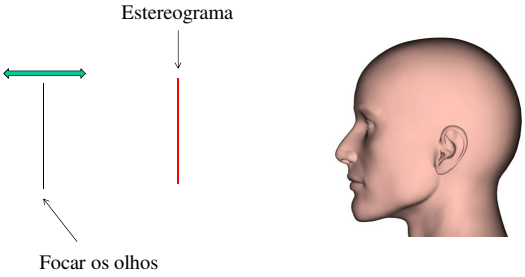
Ver Estereogramas



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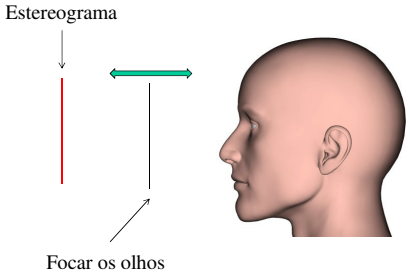
Ver Estereogramas



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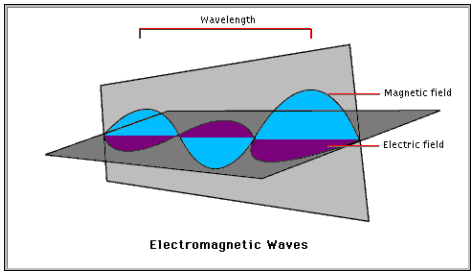
O que é a cor



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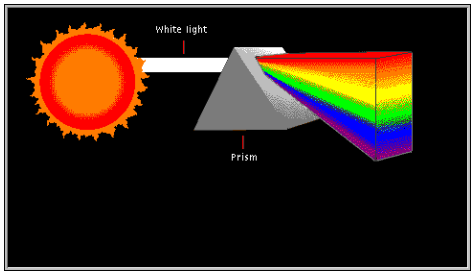
Separação da cor



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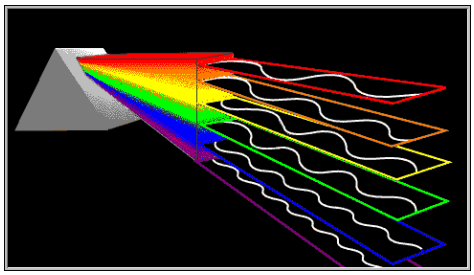
Distinção de Cor



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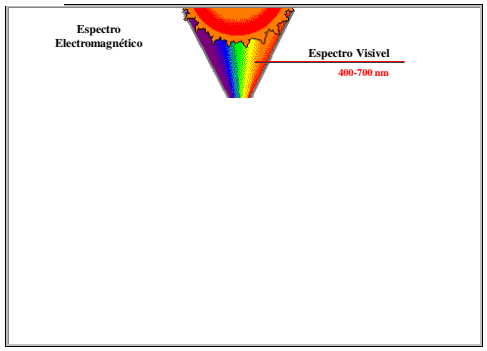
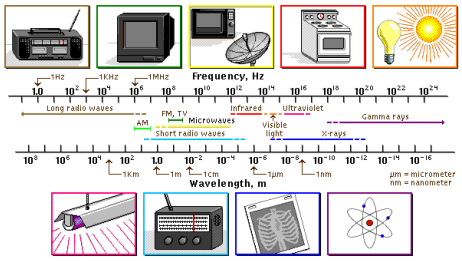
Comprimento de onda



Comprimentos de onda



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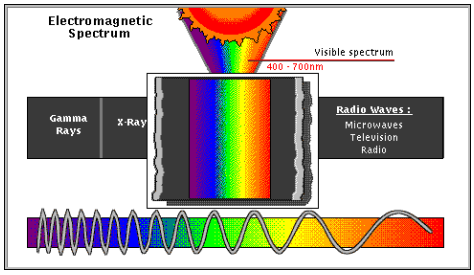
Comprimentos de onda (visivel)



Fernando Ribeiro

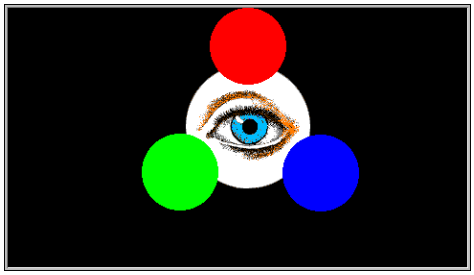
Grandeza LUX

Iluminação	Exemplo
120000 lux	Luz Solar em dia limpo e brilhante
25000 lux	Dia normal
200 lux	Dia muito enublado
0,25 lux	Lua cheia em noite limpa

10 Lux

AMBIENTE OU TRABALHO	LUX
Sala de espera	100
Garagem, residência, restaurante	150
Depósito, indústria (comum)	200
Sala de aula	300
Lojas, laboratórios, escritórios	500
Sala de desenho (alta precisão)	1.000
Serviços de muito alta precisão	2.000

Como vemos cor



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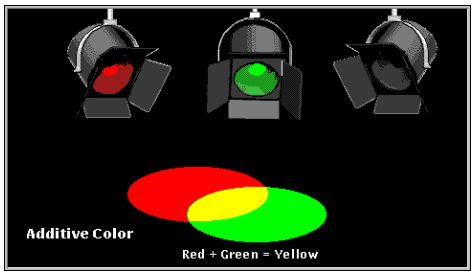
Cores aditivas (RG)



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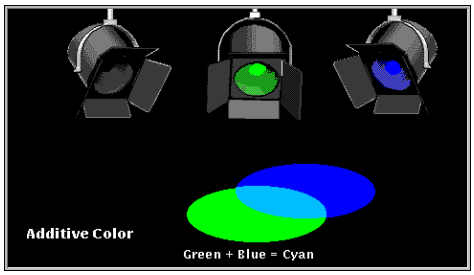
Cores aditivas (GB)



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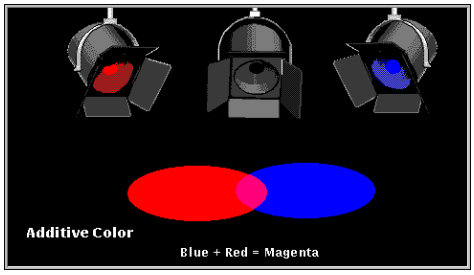
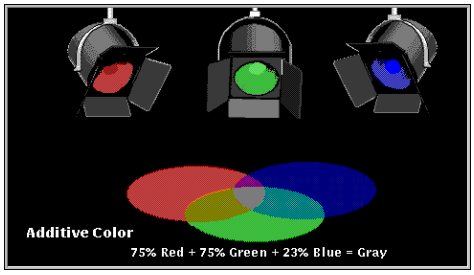
Cores aditivas (RB)



Fernando Ribeiro

Cores aditivas (combinações)



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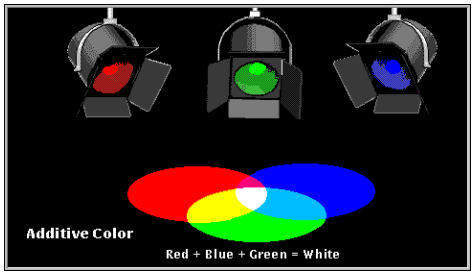
Cores aditivas (Branco)

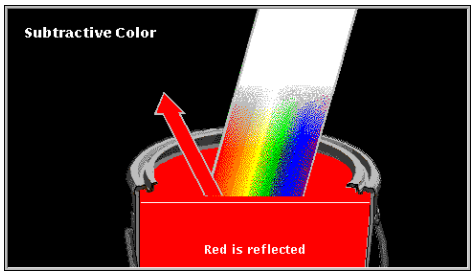


Fernando Ribeiro

Cores de Pigmentos

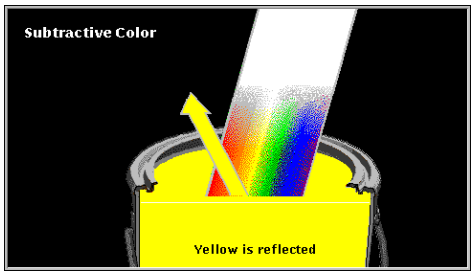
Fernando Ribeiro

Cores subtractivas (R)



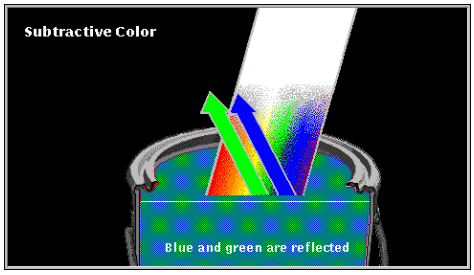
Fernando Ribeiro

Cores subtractivas (Y)



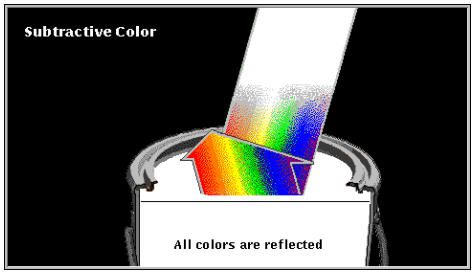
Fernando Ribeiro

Cores subtractivas (C)



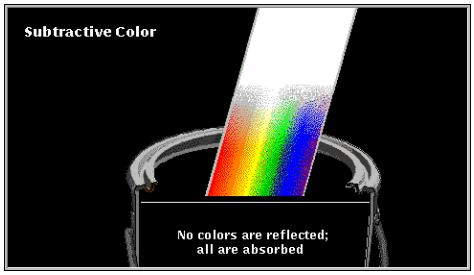
Fernando Ribeiro

Cores subtractivas (W)



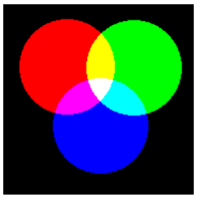
Fernando Ribeiro

Cores subtractivas (K)

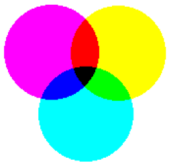


Fernando Ribeiro

RGB - CMY



Transmissivo



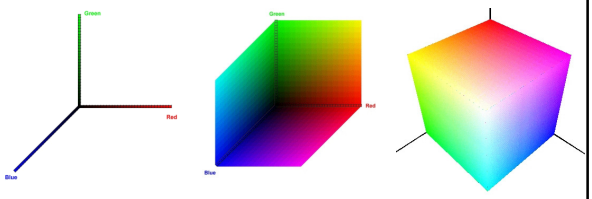
Reflectivo

Fernando Ribeiro

Impressão (CMYK)

Fernando Ribeiro

Cubo RGB



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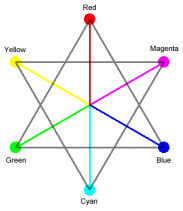
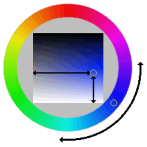
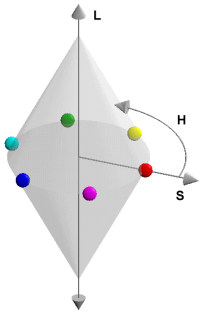
HLS



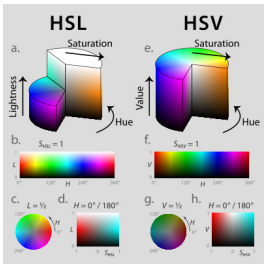


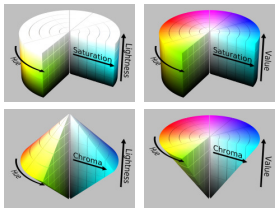


Fernando Ribeiro

HSL / HSV

HLS / HSB





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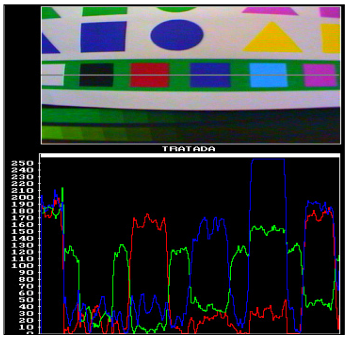
Cor (RGB)

R	G	B		
255	0	0	→	R
0	255	0	→	G
0	0	255	→	B
0	255	255	→	C
255	0	255	→	M
255	255	0	→	Y
0	0	0	→	K
255	255	255	→	W

Fernando Ribeiro

Espectro de onda - Histograma



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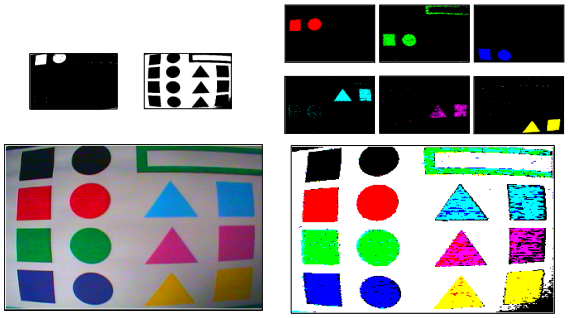
Filtro de cores



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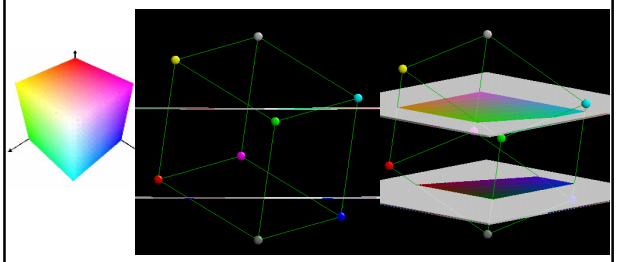
RGB x planos



Fernando Ribeiro

Profissões

Animais

O falcão consegue ver facilmente um coelho a 2 km de distância (cerca de 8 vezes melhor que um humano)

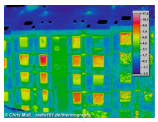
O camaleão consegue mover os olhos em separado (um para cada lado)

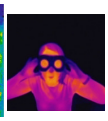
As moscas vêm 10 vezes mais imagens que os humanos (>200 imagens por segundo)

Animais

O pombo tem um ângulo de visão de cerca de 340 graus. Só o pescoço o estorva de ver para trás.

Há aranhas que podem ter até 8 olhos, e o escorpião 12.





Os mosquitos conseguem ver-nos (e picar-nos) mesmo quando apagamos a luz. Porquê ?

Nos Robôs

Leonardo

Nao

Minho Team

Aibo

câmara…