

Vision 3D pour robots

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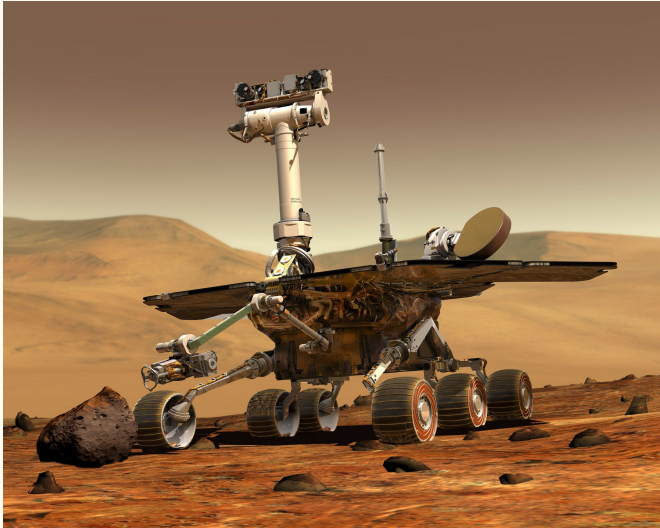
TP 3 - Stéréo Vision



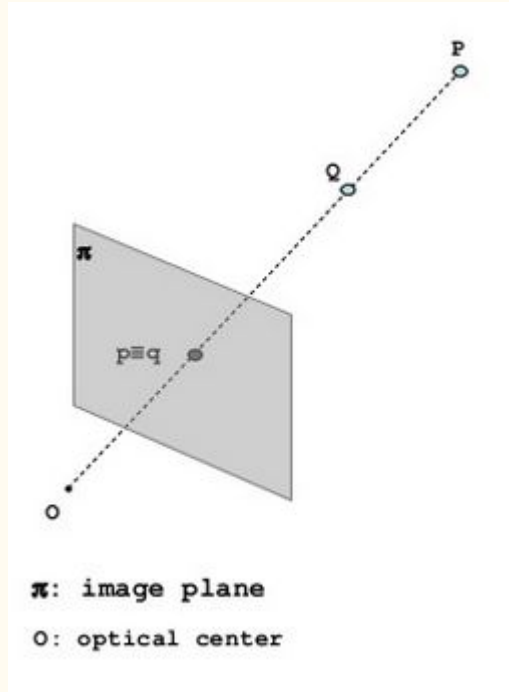
La stéréovision ou mesure stéréoscopique est une méthode de mesure qui consiste à se servir de la prise d'images (photographiques ou numériques) prises de différents points de vue, pour déterminer les dimensions, les formes ou les positions d'objets.



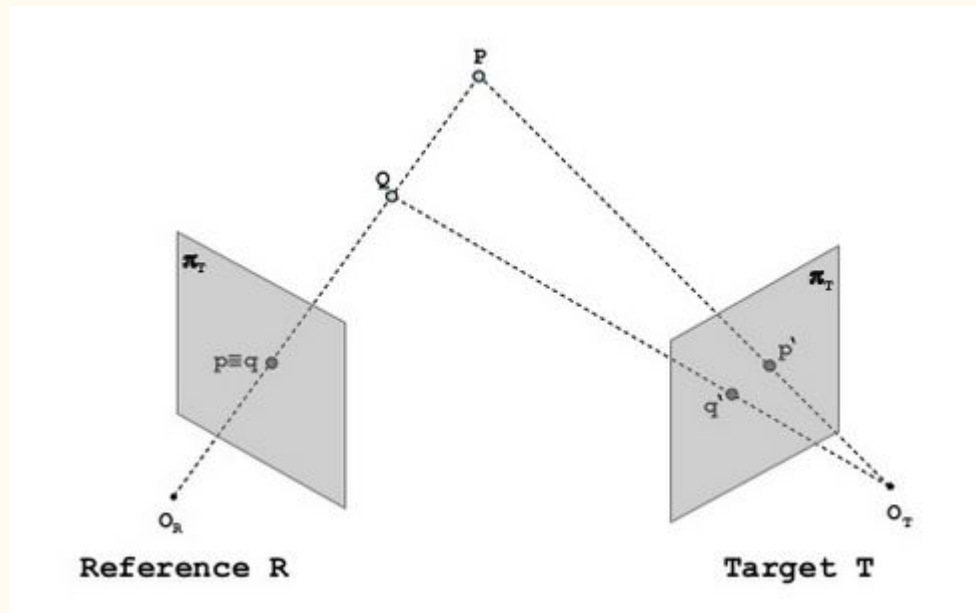
Exemples d'applications



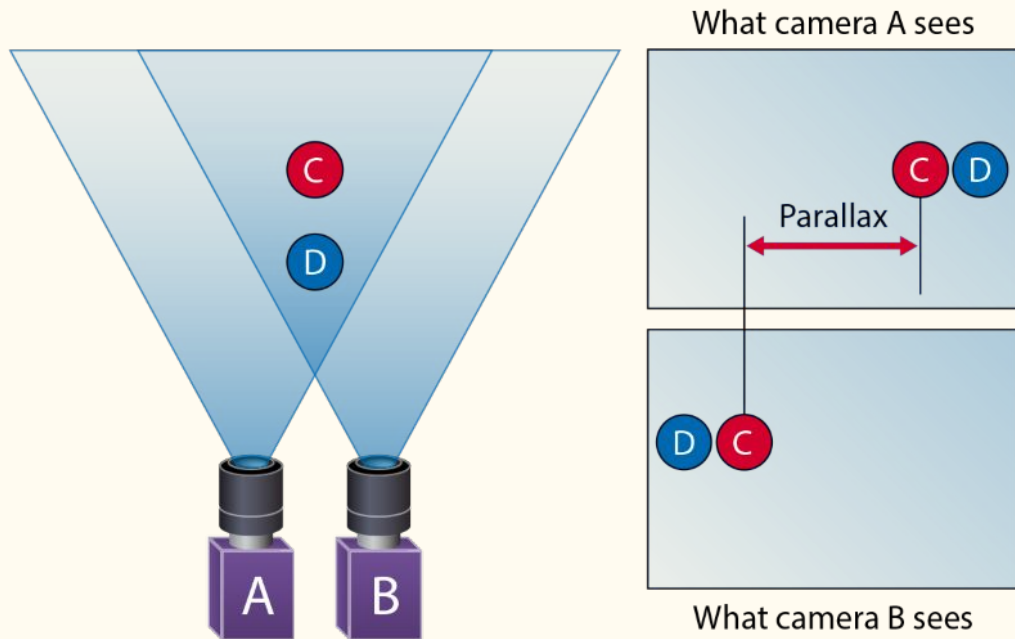
Capteur unique



Multi-capteurs



Le principe de la stéréo vision repose sur la **Parallaxe**

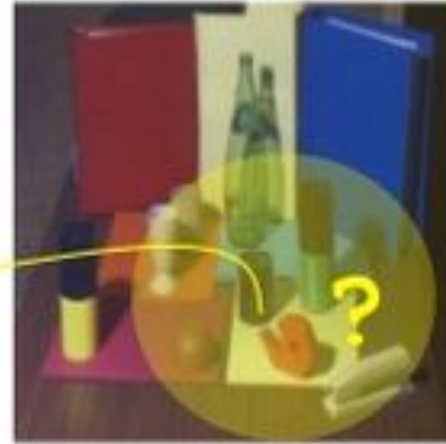




Retrouver les correspondances



Reference (R)



Target (T)

Contrainte de ligne épipolaire

Epipolar constraint

Reference R

Target T

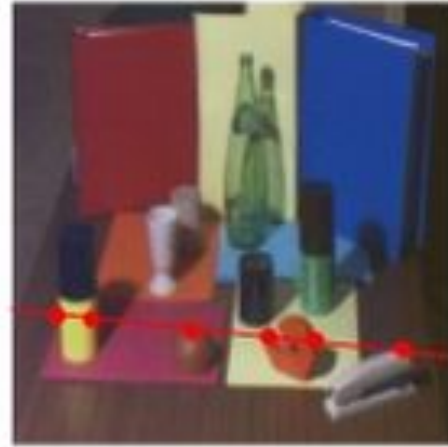
- Consider two points P and Q on the same **line of sight of the reference image R** (both points project into the same image point $p \equiv q$ on image plane π_R of the reference image)
- The epipolar constraint states that the correspondence for a point belonging to the (red) line of sight lies on the **green line on image plane π_T of target image**

Stefano Mattocia

Retrouver les correspondances

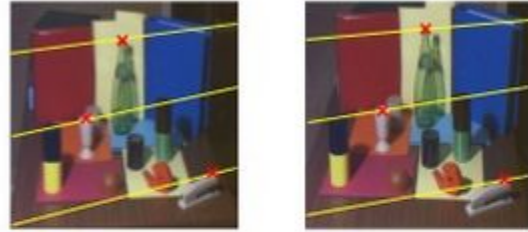


Reference (R)

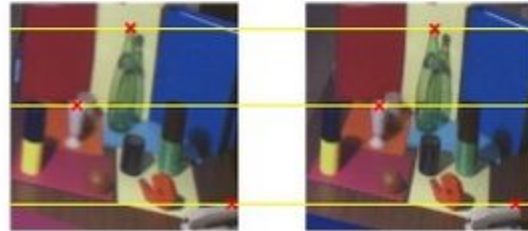
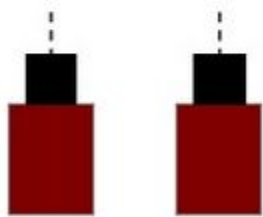


Target (T)

Systeme stéréo standard



Original stereo pair

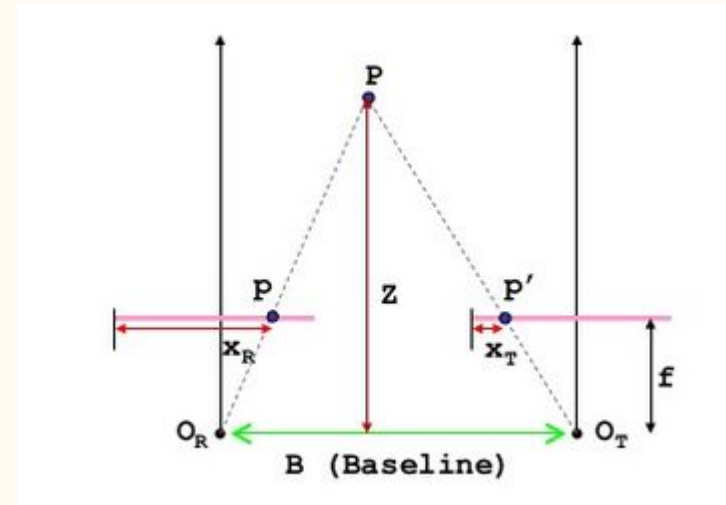


Stereo pair in standard form

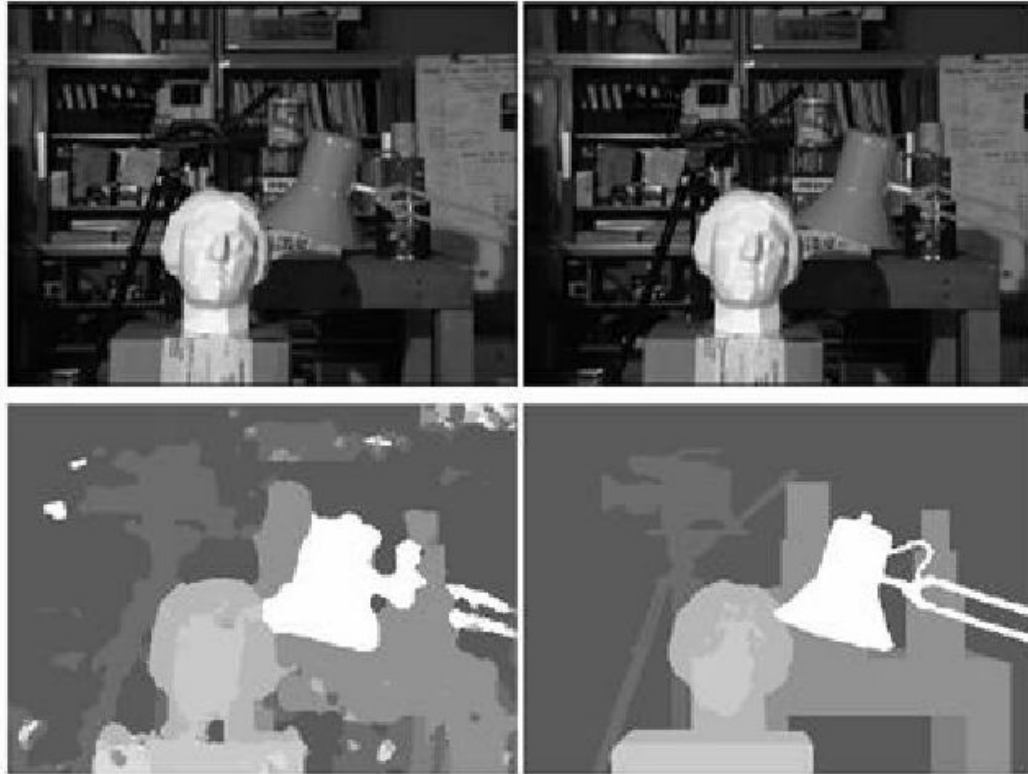
Disparité et profondeur

$$\frac{b}{Z} = \frac{(b+x_T) - x_R}{Z-f} \rightarrow Z = \frac{b \cdot f}{x_R - x_T} = \frac{b \cdot f}{d}$$

$x_R - x_r$ est la disparité



Carte de disparités



Anaglyphe



Wiggle GIF



A vous de jouer !