Algorithms for skiascopy measurement automatization

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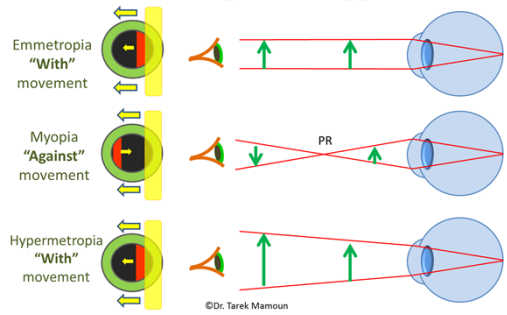
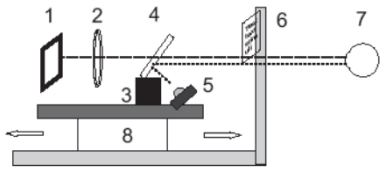
- Skiascopy or retinoscopy is an objective technique to measure the refracive state of the eye.
- Light beam is thrown ovet the eyes pupil and reflex motion is analyzed.
- Static – still distance (0,5m), putting lenses in from of the eye
- Or dynamic – distance is changed to get the neutralization.

The Movement of Red Reflex during Retinoscopy

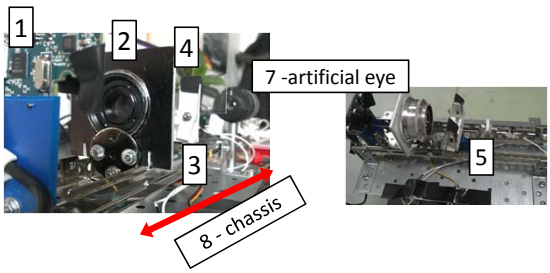


Schematics of retinoscope



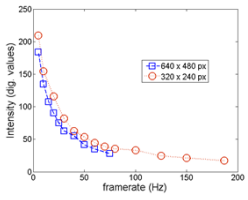
1- CCD matrix with electric circuit, 2- focusing optics, 3- servo motor, 4- semitransparent mirror, 5- IR LED, 6- accommodative stimuli, 7- subjects eye, 8- system stand with moveable chassis.

How it looks like?

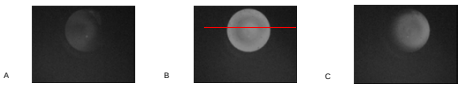


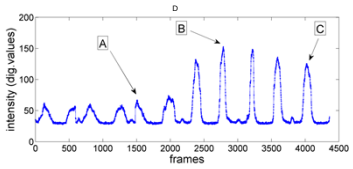
1- CCD matrix with electric circuit, 2- focusing optics, 3- servo motor, 4- semitransparent mirror, 5- IR LED, 7- artificial eye, 8- system stand with moveable chassis.

CCD matrix sensitivity to 850 nm light

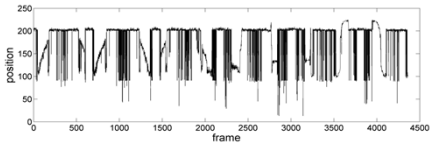


Reflex intensity information

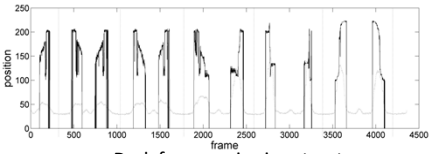




Position information

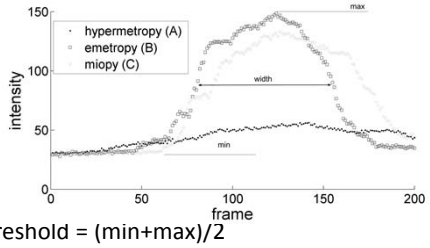


With dark frame noise



Dark frame noise is cut out

Reflex intesity

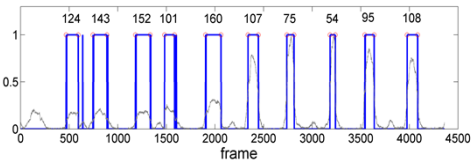


Threshold = (min+max)/2

S=1, if i > threshold

S=0, if i <= threshold

Halfwidth of reflex intensity



Width = count (1) in each sweep

Intensity halfwidth based algorithm

- iv – intensity value
- w – width (actually is the speed information)

For each sweep(i)

if ***iv***(i) < ***iv***(i-1) & ***w***(i) < ***w***(i-1), then step +

if step(i-1,-2, -3, -4) = -+-+, then break loop

else step –

End

Thank you for attention!

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