Active Vision

Age, Eye Movement and Motion Perception

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The Investigation

Overview
Visual images move primarily because we do. Yet little is known about active vision in older observers. Using smooth tracking eye movements as our target activity, we shall probe the link between age, action and motion perception.

Two main areas will be investigated: eye-movement control and sensitivity to visual motion.

Objectives
- Compare deliberate and reflexive tracking
- Investigate how tracking limits motion sensitivity (‘external noise’ – see graphic)
- Compare image-based and motor-based cues to visual motion
- Investigate whether motor-based cues limit motion sensitivity (‘internal noise’ – see graphic)

Plan
Eye-movement control
- Manipulate intent by instruction (‘follow’ = deliberate tracking, ‘fixate’ = reflexive)
- Manipulate stimulus contrast, blur, visual clutter
- Analyse accuracy and variability (external noise)

Motion sensitivity
- Measure motion thresholds for speed and direction discrimination (psychophysics)
- Compare motor-based and image-based cues by tracking or not tracking moving stimuli; relate to external noise measures
- Assess internal noise by simultaneously combining tracking with image motion

Clinical relevance
- Relate results to basic clinical indices (acuity, contrast sensitivity)

Resources
SPARC-funded post-doc (Andrew Kolarik)
PhD student (Emer O’Connor)

Potential Benefits
As the population ages there is increasing interest in how an active lifestyle can be maintained during old age. For the individual this promotes independence and healthy lifestyle. For society this reduces the need for specialised support services and allows older persons to engage within their communities. Understanding age-related changes to active vision will be key to successful implementation of these new demands. This knowledge will help integrate new technology with the user as well as detailing fundamental constraints imposed by visual function.

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