

associations using multivariable linear regression models. All analyses were corrected for multiple testing and adjusted for confounders.

Results Data from 6,446 participants were included in this study. We identified highly significant associations between volumetric brain MRI measures of subregions in the occipital lobe (intracalcarine cortex), parietal lobe (postcentral gyrus), cerebellum (lobules VI, VIIb, VIIIa, VIIIb and IX) and deep brain structures (thalamus, hippocampus, caudate, putamen, pallidum and accumbens) with the thickness of the innermost retinal sub-layers and total macular thickness (all $P < 3.3 \times 10^{-5}$). We did not observe statistically significant associations between brain IDPs and the thickness of the outer retinal sub-layers.

Conclusion Thinner inner and total retinal thicknesses are associated with smaller volumes of specific brain regions. These associations go beyond anatomically established retina-brain connections. Furthermore, the links between the normal variations in retinal and brain structures broaden our understanding of neurological ageing in general population.

OP-10 BIOINSPIRED INTELLIGENT VISUAL ATTENTION SYSTEM FOR THE HUMANOID ROBOT ICUB EXPLORING EVENT-DRIVEN SENSING AND NEUROMORPHIC HARDWARE

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Introduction Visual applications in robotics must meet strict requirements for power efficiency, low latency, and data processing capacity. Despite the remarkable performance achievements of traditional computer vision methods, they struggle to generalise effectively and often rely on vast datasets, increasing data processing and transfer. The proposed system leverages bioinspired visual attention mechanisms to process only relevant parts of the scene, further exploring event-based sensing and neuromorphic computing via Spiking Neural Networks (SNNs).

Aims This scientific challenge aims to connect bioinspired hardware with biologically plausible algorithms, thereby showcasing the potential of spike-based implementations for online robotics visual applications.

Methods The bioinspired saliency-based visual attention model processes events from event-driven cameras on the humanoid robot iCub, running on SpiNNaker neuromorphic hardware. Intensity, disparity, and motion are the bottom-up feature extraction channels competing for scene representation. These cues feed into a biologically plausible saliency-based proto-object model based on Gestalt perceptual grouping theories to detect only relevant scene parts. The model produces saliency maps with salient areas representing regions potentially containing objects, called 'proto-objects'.

Results The online system accurately generates saliency maps in ~16ms detecting salient proto-objects and disregarding clutter. The system has been qualitatively and quantitatively validated, achieving comparable results to the frame-based implementation, in online simple office scenarios, as well as when compared against the ground truth fixation maps from real human subjects (NUS3D dataset).

Conclusion This project is the first significant step towards more complex real-world robotic applications for vision, where bioinspiration sets the basis for fast, power-efficient

online robotic applications and innovative computer vision approaches.

Poster Presentations (P)

P-01 THE DEVELOPMENT OF A GLAUCOMA-SPECIFIC SYMPTOM QUESTIONNAIRE USING THE NOMINAL GROUP TECHNIQUE – A PILOT STUDY

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Introduction Few symptom-specific questionnaires exist within the glaucoma literature. Existing questionnaires have not used participant-led analyses, reducing patient influence and reports from lived experience. They also have not assessed the impact or severity of individual symptoms.

Aims To pilot use of the Nominal Group Technique (NGT), to generate a glaucoma-specific symptom list and facilitate development of a symptom questionnaire.

Methods Participants included one glaucoma (n=6, median [IQR] age: 77 [71, 79.5]) and one age-similar control group (n=10, median [IQR] age: 73 [66, 74]). The glaucoma group were asked to identify vision changes attributable to their glaucoma. The controls were asked to identify vision changes since the age of 50. Group discussions achieved a unique symptom list through group consensus via the NGT. Participants then individually ranked their symptoms based on frequency, severity, and activity-limitation. Lists were compared between groups, and common symptoms removed.

Results The final, glaucoma-specific symptom list consisted of 12 unique symptoms. Needing more light for near tasks was the most frequent and severe symptom, with the greatest impact on daily living. The second highest ranked symptom for all measures was sensitivity to bright light/sunlight. Some symptoms were not ranked by any participants, indicating some misunderstanding of task requirements.

Conclusion Indications that the ranking task was not fully understood suggest an important limitation of this methodology. In future, a hand count will determine frequency of symptoms. Participants will also indicate their single most severe and most activity-limiting symptom. Multiple sessions with glaucoma and control participants will inform development of the questionnaire.

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P-02 THE EFFECT OF VARYING STORAGE CONDITIONS ON THE MECHANICAL PROPERTIES OF PORCINE RETINA

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Introduction Accurate characterisation of the physical properties of the retina is essential for understanding the effects of age, disease mechanisms and developing effective surgical interventions. Ex vivo measurements have been used to do