

ROBOVERINE: A human-inspired neural robotic process model of active visual search and scene grammar in naturalistic environments

Raul Grieben*¹, Stephan Sehring*¹, Jan Tekülve¹, John P. Spencer² and Gregor Schöner¹

¹Faculty of Computer Science, Institute for Neural Computation, Ruhr University Bochum, Bochum, Germany

²School of Psychology, University of East Anglia, Norwich, United Kingdom

Raul.grieben@ini.rub.de

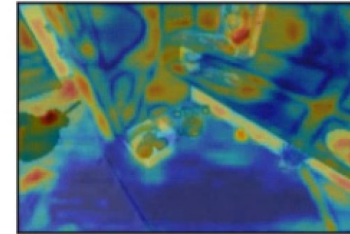
This work was supported by the Leverhulme Trust Research Project Grant (RPG-2021-350)

LEVERHULME
TRUST

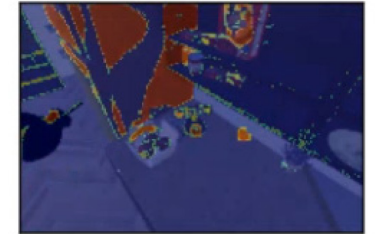
Human-inspired active vision and scene grammar for cognitive robotics



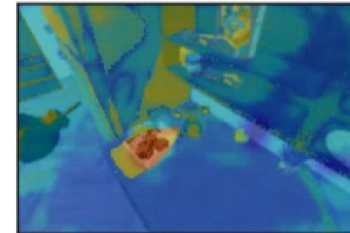
Saliency Map



Feature Guidance



Expl. FVF - Input



Expl. FVF - Activation



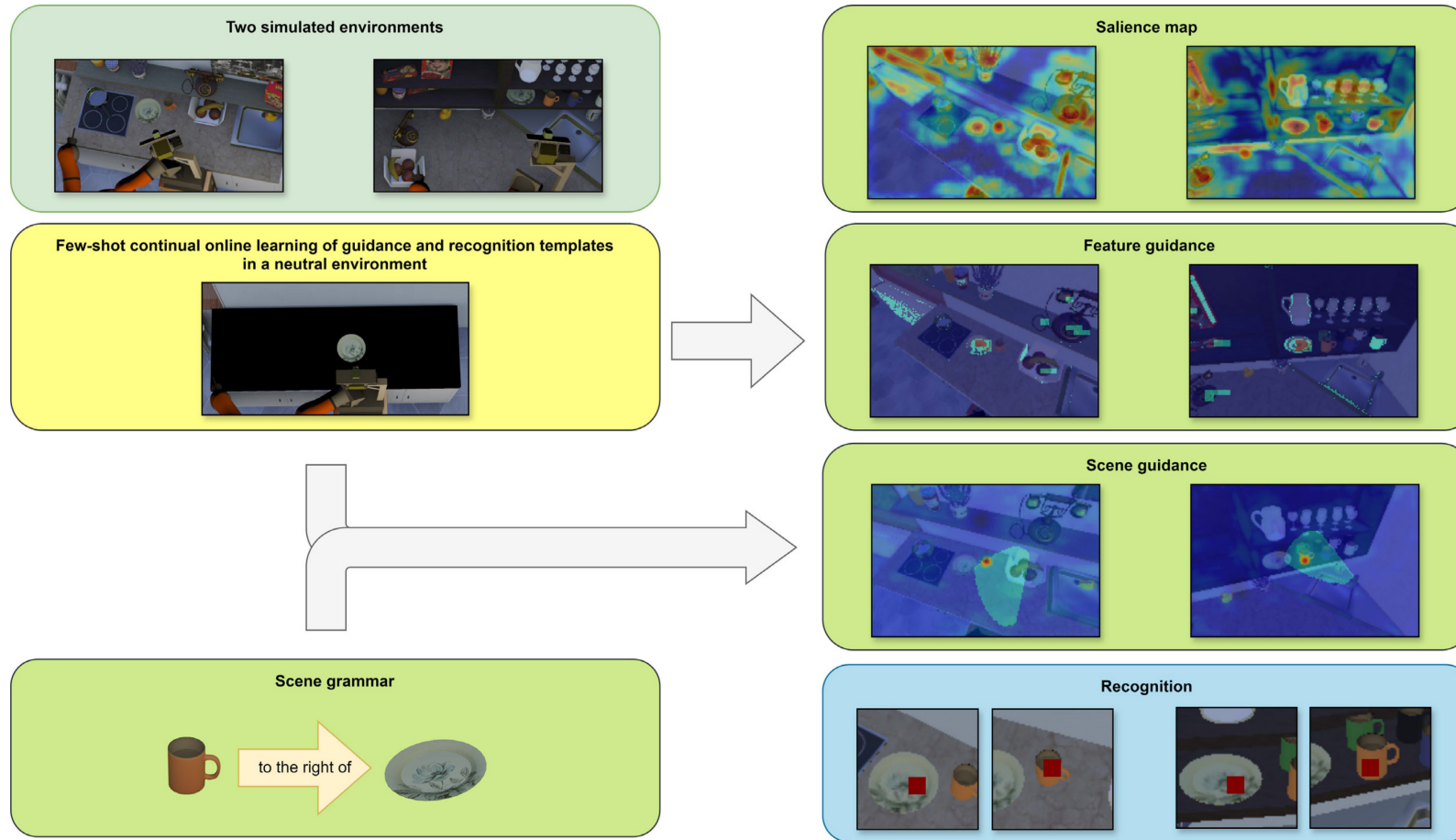
Att. FVF - Sig. Activation

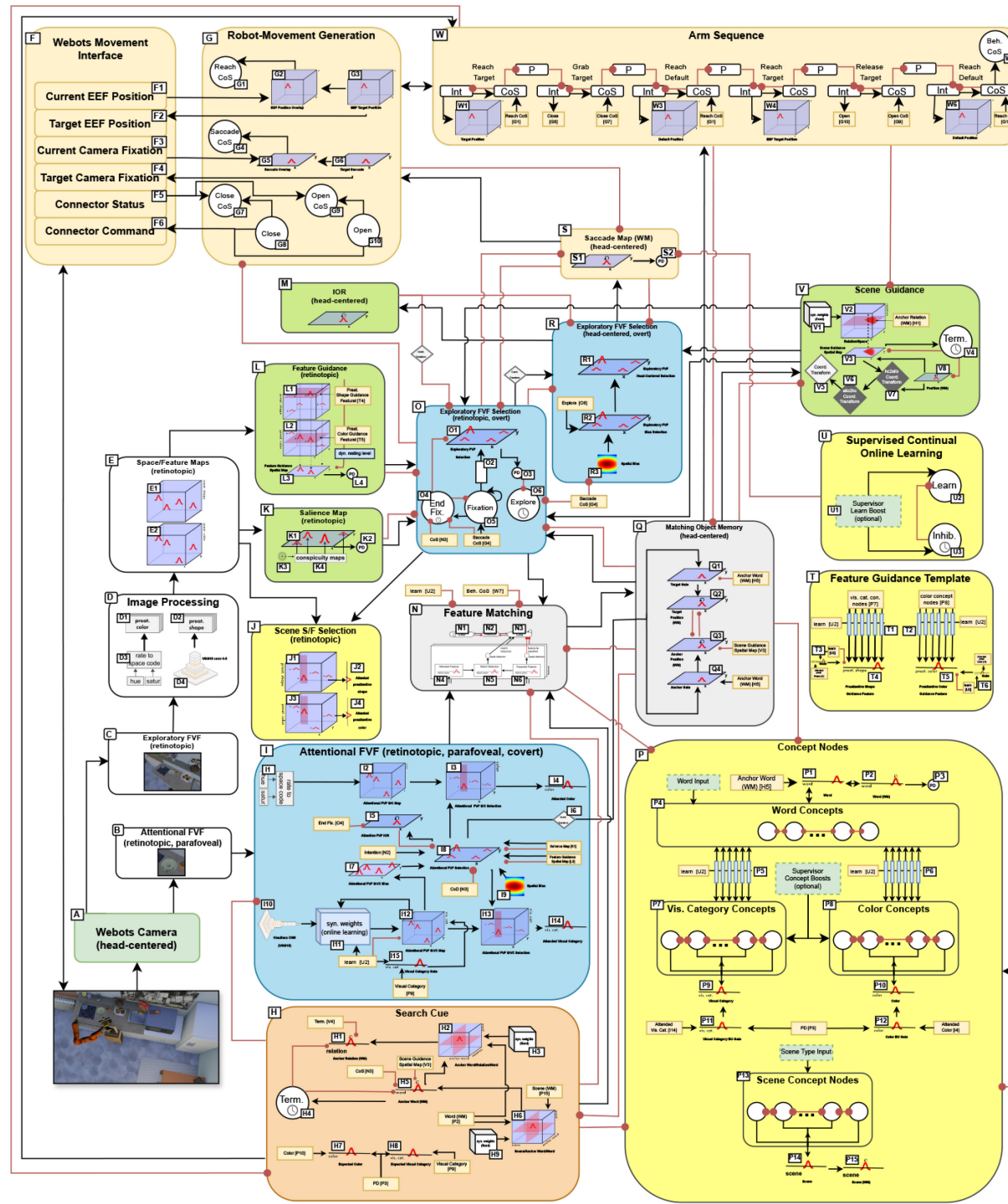


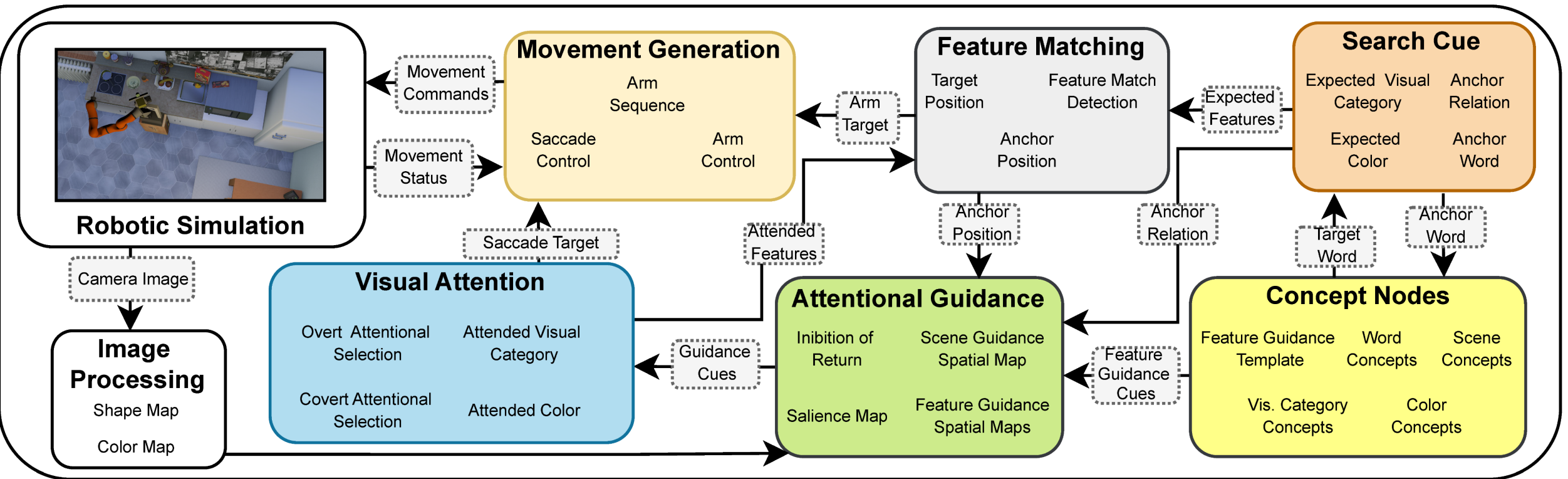
Challenges

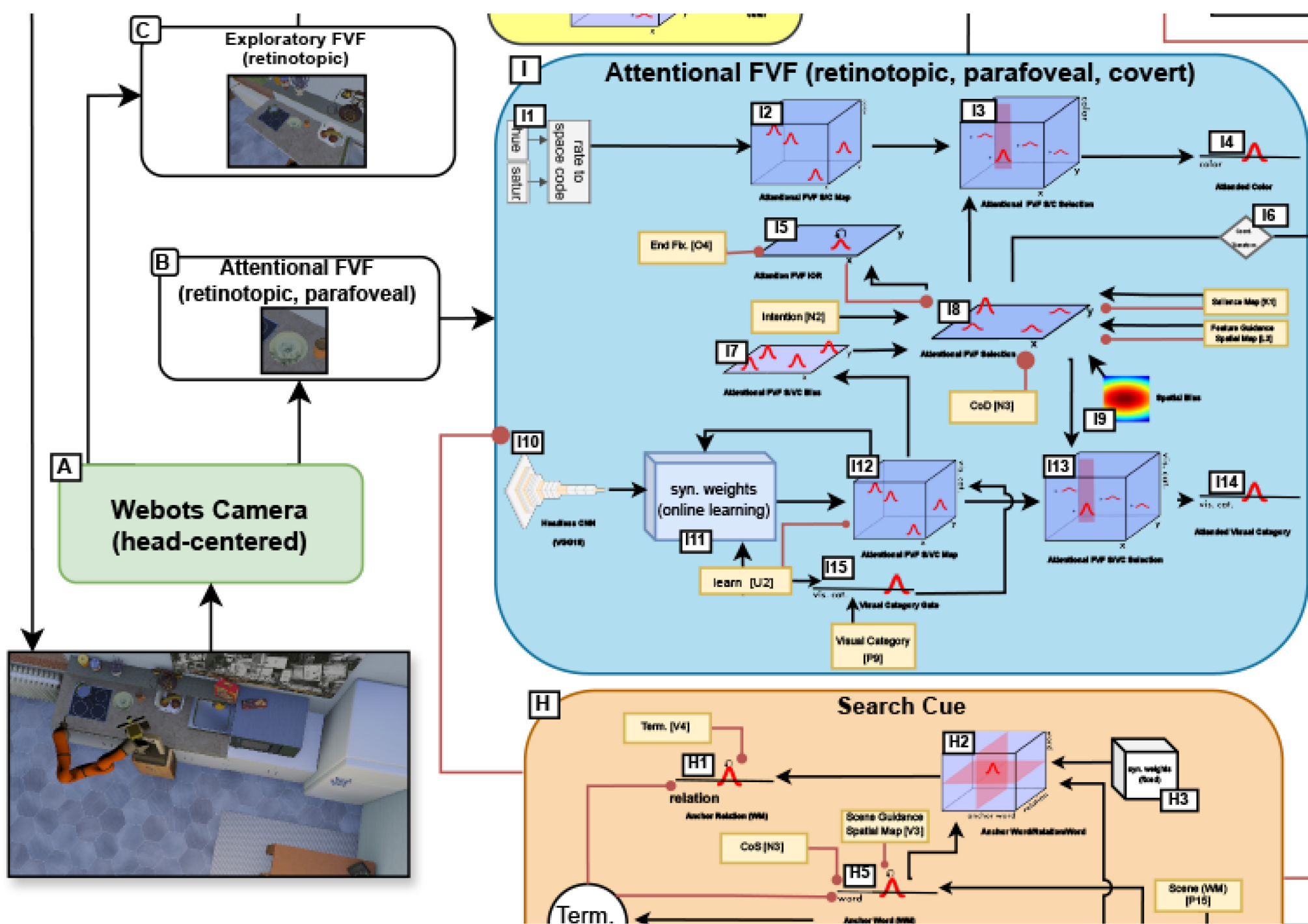
- Combine covert and overt attention:
 - Four coordinate systems: world, head, camera and image
 - Integrate space- and object-based inhibition of return
 - Find objects outside of the camera frame
- Integrate space- and object-based analysis
- Learn new objects with minimal human supervision
- Autonomous switching between exploration and visual search
- Learning while working (continual online learning)

Human-inspired active vision and scene grammar for cognitive robotics









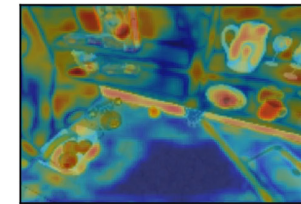
..... Input: Cup Input: Banana - - - Plate - - - Cup - - - Phone - - - Banana - - - Saccade CoS - - - CoS



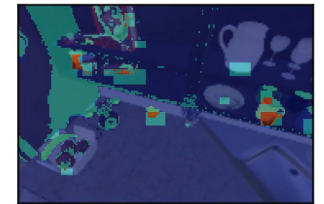
Scene



Saliency Map



Feature Guidance



Expl. FVF - Input



Expl. FVF - Activation



Att. FVF - Sig. Activation



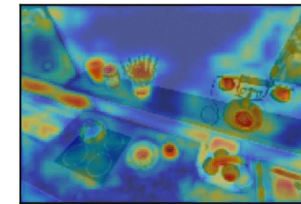
..... Input: Cup Input: Banana - - - Plate - - - Cup - - - Phone - - - Banana - - - Saccade CoS - - - CoS



Scene



Saliency Map



Feature Guidance



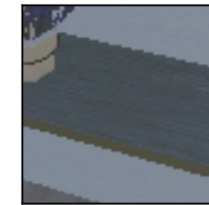
Expl. FVF - Input



Expl. FVF - Activation



Att. FVF - Sig. Activation



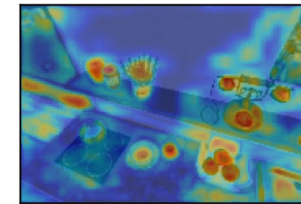
..... Input: Cup Input: Banana - - - Plate - - - Cup - - - Phone - - - Banana - - - Saccade CoS - - - CoS



Scene



Saliency Map



Feature Guidance



Expl. FVF - Input



Expl. FVF - Activation



Att. FVF - Sig. Activation

