From Pixels to Perception: When AI and Youth Co-Assess Urban Nature for Wellbeing

Ina Pelster (Institute of Psychology, University of Göttingen, Germany); Vivian Schader (Department of Psychology, LMU Munich, Germany); Katin Wilhelm (Department of Psychiatry, University of Oxford, UK)
Acknowledgement to Huanyuan Zhang-Zheng (Environmental Change Institute, School of Geography and the Environment, University of Oxford, UK); NeurOx YPAG & Lucienne Spencer (Department of Psychiatry, University of Oxford, UK)

Aim & Research Questions

Urban green space is key for youth mental health, but existing monitoring methods fall short. AI-based open-source tools can offer faster assessments for deliberate nature design. Following the E-Co-Flourishing framework, which connects ecological health with collective human wellbeing, it is essential to validate AI-based assessment with human perspectives to develop holistic, inclusive urban mental research tools.

→ Exploring if AI-based classification of visual green-space features reflects the aspects of urban nature that young people say matter for their wellbeing.

1. *How well do AI-assisted image categories reflect youth-perceived differences in urban green spaces?*
2. *Which visible features of green spaces do young people say matter most for their wellbeing and use?*
3. *Where do AI classifications align with these youth-identified features? Where do they miss them?*
4. *How can youth experiential input help refine future AI supported rapid assessment tools for everyday youth green spaces? What are current limitations and requirements for such tools?*

Why This Matters

- AI tools could assist urban nature planning.
- Youth perspectives are critical for evaluating wellbeing landscapes.
- Participatory human-AI-collaboration approaches may improve environmental decision-making.

Method

- Participants: Youth participants (N = 8; age from 16 to 23 years; all female)

Design
- Image evaluation task: assessing three Oxford Living Labs (meadow, park, hospital green space); observation and rating by participants (likability, diversity, comfort, and desired changes).
- AI comparison model: 360° eye level photos analysed using Ilastik (manually trained open-source AI) to classify and quantify visible features.
- Comparison of AI classifications and youth ratings in a group-discussion.

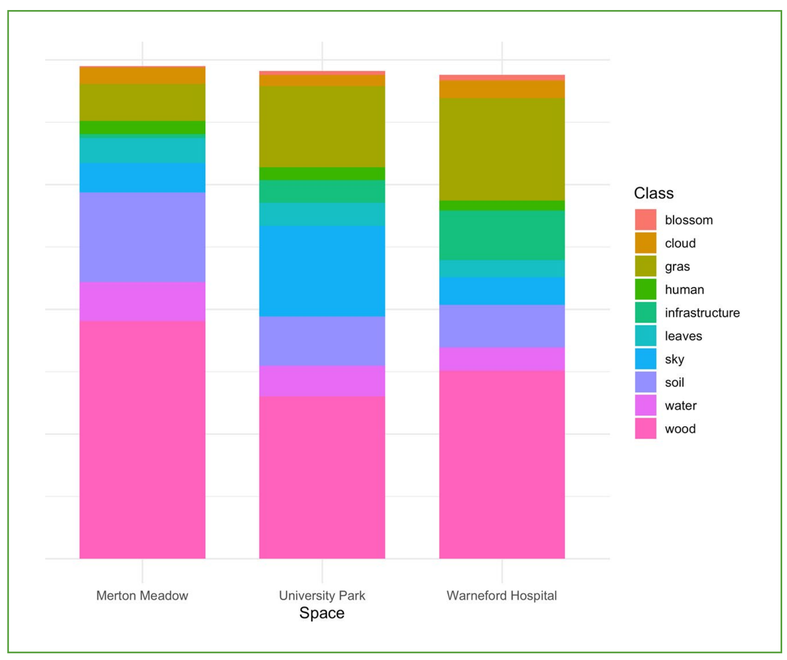
Data
- Quantitative wellbeing and place ratings
- Qualitative reflections

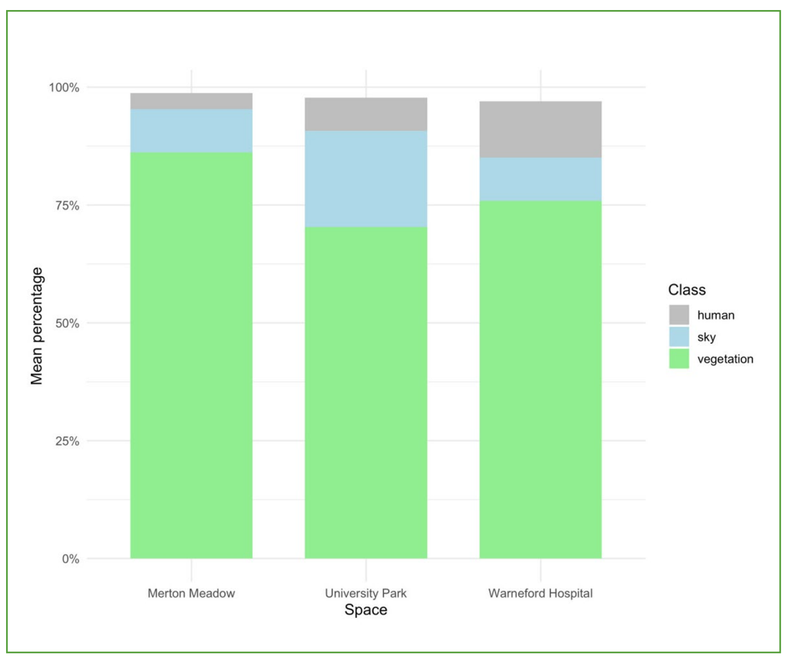
Analysis
- Mixed methods comparison using R for quantitative data
- Grounded Theory for qualitative evaluations

Example images used in youth and AI assessment task

Results

Ilastik: Quantitative Compositional Analysis





YPAG: Quantitative & Qualitative Questionnaires

- Visual Nature Elements Shaped Rankings: Places with higher proportion of vegetation compared to infrastructure were consistently ranked higher. Participants often referenced these (e.g., "I liked the various elements“). Visual composition is seemingly correlated with the perception of places. Places with higher proportions of wood were rated as more diverse regarding elements.
- Social Context Was Interpreted Differently: Participants’ responses to the presence of people in images ranged from "I didn't like that it was so crowded” to "I liked watching all those happy people.“ Social cues apparently influence wellbeing perception but might not have a universally positive or negative effect.
- Infrastructure Produced Contradictory Preferences: Built elements (paths, seating, etc.) generated mixed responses: "I liked that it was easily walkable” vs. "I would remove the pathway”. Infrastructure can either support accessibility or reduce perceived naturalness depending on preferences and design.

Conclusion

- Perceptions of Green Space Wellbeing as Multi-Dimensional: In this pilot sample, youth described wellbeing in relation to interacting visual, social, and imagined sensory factors.
- AI Analysis Can Help Surface Environmental Patterns: AI classification of visible features highlighted (partly unconsciously perceived) patterns that participants’ reflections also referenced.
- Human Perception Exceeds What AI Can Detect: Participants referred to imagined experiences (e.g., atmosphere, temperature, sound), suggesting wellbeing perceptions surpass visual features.
- Human–AI Comparison May Support Environmental Assessment: Comparing AI analysis with youth perspectives illustrates the potential value of Human–AI collaboration for understanding wellbeing in urban environments.

Limitations & Future Directions

- Integrate objective information (e.g., physiological markers) and diversify the sample.
- Refine AI models to include additional visual cues (e.g., surrounding holistic features) and evaluate pixel-wise vs. subjective human perception.
- Extend to blue spaces, include other sensory channels and pay attention to seasonal change.
- Explore interactions of personality and mental-health profiles with wellbeing-promoting spaces.