MAIA
Mapping and Assessment for
Integrated ecosystem Accounting

Modelling aesthetic ecosystem services using social media and computer vision

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Introduction

- The **aesthetic quality of the landscape** is a key source of cultural value in Europe.

- However, capturing this value is difficult at **large-scales** due to the high cost and complexity of survey methods.

- Now, the emergence of big data including **social media** and **computer vision** techniques enable new approaches.

- We explore the potential of Flickr images and computer vision to establish measures of **aesthetic ecosystem service supply**

Objectives

Aim: Develop aesthetic ecosystem service methods using big data from social media and computer vision

Questions:

1. Does multiplying the quantity of images with their quality capture peoples' aesthetic enjoyment of the landscape?

2. Can computer vision capture the aesthetic quality of the landscape in different European settings?

3. How does ecosystem service supply change at different measurement scales?

Methods

- Multiple scales: 1 and 25km^2 grid cells.

- Aesthetic service (utility) = quantity (density of Flickr images) * quality (image ratings).

- Image ratings generated using a computer vision model trained on British image dataset.

- Questionnaire in Spain to test accuracy of image ratings for Spanish landscapes.

- Filtering methods applied to only select images related to aesthetic enjoyment including non-urban filter, image rating filters and image content analysis.

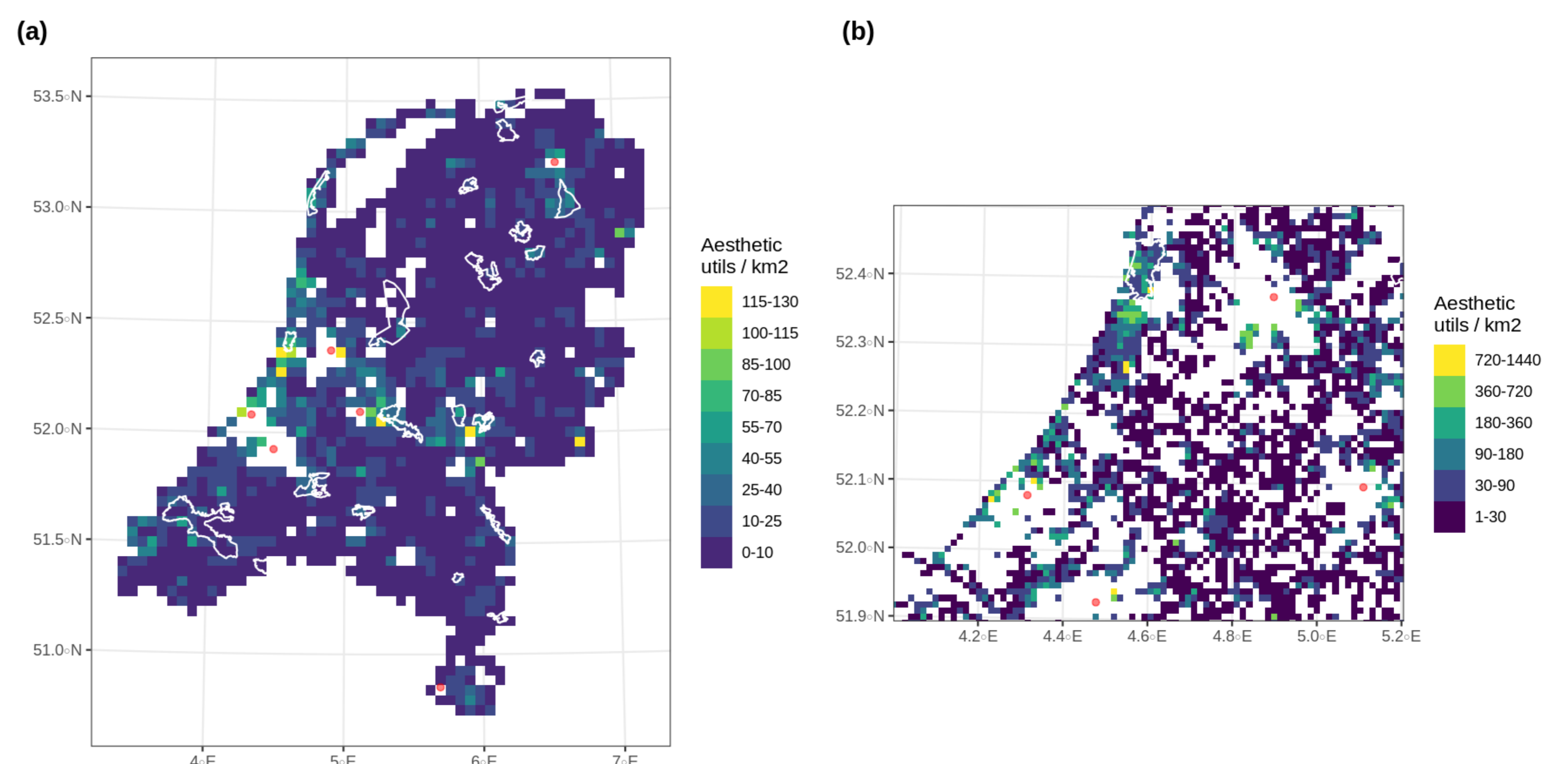- Comparison to environmental indicator model of landscape aesthetics in the Netherlands.

Figure 1. Aesthetic ecosystem service supply for **(a)** the Netherlands at 25km^2 and in **(b)** the Randstad area at 1km^2. Filters have been applied to exclude urban areas and only include images with natural attributes.

Results

- Aesthetic ecosystem service model applied in Great Britain, Spain and the Netherlands.

- The ratings generated by the computer vision model are being validated using alternative datasets in the Netherlands and Spain.

- Opportunity to re-train computer vision model using Spanish questionnaire results.

- Promising results show applying image filters methods better represents aesthetic utility such as only using images with natural elements.

Conclusion

- Flickr data and computer vision can be used to establish measures of aesthetic ES.

- Higher resolution analysis better captures the aesthetic benefits generated by natural ecosystems in the peri-urban environment.

- Strong experimental base on which to continue exploring aesthetic ES methods.

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