

C APPENDIX



Introduction

In this survey we will ask you for your opinion on 3 methods for predicting Urban Perceptive AI (Artificial Intelligence) using pictures of Amsterdam.

The AI was tasked to predict housing prices based on pictures, after which the model was asked to explain *why* it made its prediction. We want to test which of the 3 methods are best, and if they provide information that could be useful to someone who works in policy-making at the municipality.

The responses from the survey will be collected and published in a research paper. All responses are aggregated, apart from optional textual responses. All data collected is anonymously.

- I agree to have this data collected, stored, and potentially published.
- I do not agree with one of the above.

Block 19

In the first 5 questions we will ask you to evaluate how well you can identify high or low housing prices in Amsterdam based on visual

elements. Each question will show two images, and you will be asked to pick the image with the **highest** average housing prices.

Preliminary questions

Which of these two images shows a neighbourhood with higher average housing prices?



Which of these two images shows a neighbourhood with higher average housing prices?





Which of these two images shows a neighbourhood with higher average housing prices?



Which of these two images shows a neighbourhood with higher average housing prices?





Which of these two images shows a neighbourhood with higher average housing prices?



Block 15

We will now show you 3 methods.

We refer to these methods as Method 1, Method 2, and Method 3. These will be presented in a random order.

Housing prices in Amsterdam can be grouped into groups ranging

from €0-€2566 p/m² to €11549 p/m².

You don't need to remember these, we will refer to these groups by using descriptive words such as **Lowest, Low, Average, Above Average, High** or **Very High**.

Method 1



In Method 1, the AI was given 2 sets of pictures: a set of pictures of **High/Very High** housing prices and a set of pictures of **Low/Lowest** housing prices. The AI was then asked to find what similar visual elements were present a lot in *only one* of the sets. It will show us a number of similar visual elements to explain what visual elements are an indication of either **Low/Lowest** or **High/Very High** housing prices.

As an example we show the image above, which is a set of visual elements that the model tells us is an indication of **High/Very High** housing prices.

We will now continue with the 6 questions regarding Method 1.



These visual elements were returned as an explanation of **High/Very High** housing prices.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I personally would have used the same visual elements for this decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Based on these visual elements, I think it makes sense to rely on the AI's decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



These visual elements were returned as an explanation of **High/Very High** housing prices.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I personally would have used the same visual elements for this decision.

Based on these visual elements, I think it makes sense to rely on the AI's decision.

These visual elements were returned as an explanation of **High/Very High** housing prices.

Strongly Disagree

Disagree

Neutral

Agree

Strongly Agree

I personally would have used the same visual elements for this decision.

Based on these visual elements, I think it makes sense to rely on the AI's decision.

These visual elements were returned as an explanation of **Low/Lowest** housing prices.

Strongly Disagree Disagree Neutral Agree Strongly Agree

I personally would have used the same visual elements for this decision.

Based on these visual elements, I think it makes sense to rely on the AI's decision.

These visual elements were returned as an explanation of **Low/Lowest** housing prices.

Strongly Disagree Disagree Neutral Agree Strongly Agree

I personally would have used the same visual elements for this decision.

Based on these visual elements, I think it makes sense to rely on the AI's decision.

These visual elements were returned as an explanation

of **Low/Lowest** housing prices.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I personally would have used the same visual elements for this decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Based on these visual elements, I think it makes sense to rely on the AI's decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

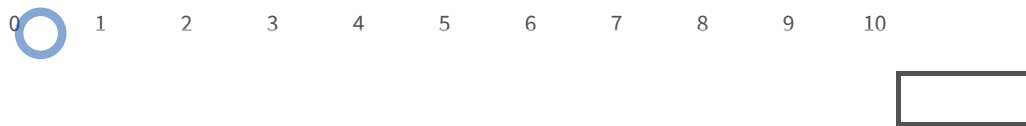
Method 1 - Trust



How would you rate your trust in the AI having a good understanding about the relationship between visual elements and

housing prices? With 10 meaning you trust the AI completely, and 0 meaning you do not trust the AI at all.

0 1 2 3 4 5 6 7 8 9 10



Method 2

In Method 2, the AI was trained to predict housing prices based on pictures of neighbourhoods using a Deep Network. After that an explainability method was used to infer what regions of the picture were important for the decision.

In the example above we see the same set of pictures twice. In the top row we see front, right, back, and left viewpoint images of a location in the city, and in the bottom row the AI is telling us which

regions in these images were important for predicting the **Lowest** housing prices. The bars on the side of the image show the importance of the highlighted regions for that particular image where a higher value means it was more important.

We will now continue with the 6 questions regarding Method 2.



The model predicted **Lowest** housing prices and explains its decision by showing us what regions it focused on.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I personally would have used the same visual elements for this decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Based on these visual elements, I think it makes sense to rely on the AI's decision.

The model predicted **Low** housing prices and explains its decision by showing us what regions it focused on.

Strongly Disagree Disagree Neutral Agree Strongly Agree

I personally would have used the same visual elements for this decision.

Based on these visual elements, I think it makes sense to rely on the AI's decision.



The model predicted **Low** housing prices and explains its decision by showing us what regions it focused on.

Strongly Disagree Disagree Neutral Agree Strongly Agree

I personally would have used the same visual elements for this decision.

Based on these visual elements, I think it makes sense to rely on the AI's decision.



The model predicted **High** housing prices and explains its decision by showing us what regions it focused on.

Strongly Disagree Disagree Neutral Agree Strongly Agree

I personally would have used the same visual elements for this decision.

Based on these visual elements, I think it makes sense to rely on the AI's decision.



The model predicted **Very High** housing prices and explains its decision by showing us what regions it focused on.

Strongly Disagree Disagree Neutral Agree Strongly Agree

I personally would have used the same visual elements for this decision.

Based on these visual elements, I think it makes sense to rely on the AI's decision.



The model predicted **Very High** housing prices and explains its decision by showing us what regions it focused on.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I personally would have used the same visual elements for this decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Based on these visual elements, I think it makes sense to rely on the AI's decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Method2 - Trust





How would you rate your trust in the AI having a good understanding about the relationship between visual elements and housing prices? With 10 meaning you trust the AI completely, and 0 meaning you do not trust the AI at all.

0 1 2 3 4 5 6 7 8 9 10

Method 3



In Method 3 the AI has learned what parts of a picture are typical for a certain group of housing prices.

It predicts the group the picture belongs to, highlights the area that

was important for the prediction, and then shows other pictures that contain the same element.

In the example above we see that the model predicted the picture on the left to belong to the **Lowest** housing prices. It explains the prediction by highlighting an element in the picture it considers to be typical for pictures that belong to the **Lowest** housing prices. It then shows us what other pictures had that element.

We will now continue with the 6 questions regarding Method 3.



The AI predicted **Very High** housing prices and explains its decision by highlighting the element it considers to be typical for **Very High** housing prices. It then shows us other pictures that contain that element.

Strongly
Disagree



Disagree



Neutral



Agree



Strongly
Agree



I personally would have used the same visual elements for this decision.

Based on these visual elements, I think it makes sense to rely on the AI's decision.

The AI predicted **Very High** housing prices and explains its decision by highlighting the element it considers to be typical for **Very High** housing prices. It then shows us other pictures that contain that element.

Strongly Disagree Disagree Neutral Agree Strongly Agree

I personally would have used the same visual elements for this decision.

Based on these visual elements, I think it makes sense to rely on the AI's decision.



Above Average



The AI predicted **Above Average** housing prices and explains its decision by highlighting the element it considers to be typical for **Above Average** housing prices. It then shows us other pictures that contain that element.

Strongly Disagree

Disagree

Neutral

Agree

Strongly Agree

I personally would have used the same visual elements for this decision.

Based on these visual elements, I think it makes sense to rely on the AI's decision.



Lowest



The AI predicted the **Lowest** housing prices and explains its decision by highlighting the element it considers to be typical for

the **Lowest** housing prices. It then shows us other pictures that contain that element.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I personally would have used the same visual elements for this decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Based on these visual elements, I think it makes sense to rely on the AI's decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The AI predicted **Very High** housing prices and explains its decision by highlighting the element it considers to be typical for **Very High** housing prices. It then shows us other pictures that contain that element.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I personally would have used the same visual elements for this decision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Based on these visual elements, I think it makes sense to rely on the AI's decision.

The AI predicted the **Lowest** housing prices and explains its decision by highlighting the element it considers to be typical for the **Lowest** housing prices. It then shows us other pictures that contain that element.

Strongly Disagree Disagree Neutral Agree Strongly Agree

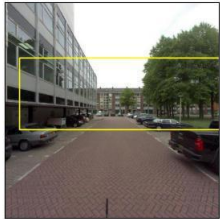
I personally would have used the same visual elements for this decision.

Based on these visual elements, I think it makes sense to rely on the AI's decision.

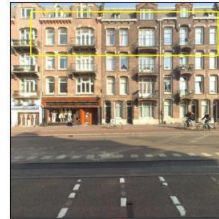
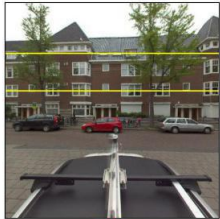
Method 3 - Trust



Above Average



Very High



Lowest



How would you rate your trust in the AI having a good understanding about the relationship between visual elements and housing prices? With 10 meaning you trust the AI completely, and 0 meaning you do not trust the AI at all.

0 1 2 3 4 5 6 7 8 9 10

Block 11

In the following 4 questions we used the 3 different AI methods to analyze pictures from the same groups of housing prices and/or neighbourhoods.

We will ask you to pick which of the methods is best at returning visual elements you would use for this decision.

Section 2 - 1

These three methods all explain what they consider to be important

visual elements for predicting **Above Average** housing prices.

Which of these methods does the best job at returning visual elements that you would use for this decision?

Method 2



Method 1



Method 3



Above Average

Other

Section 2 - 2

These three methods all explain what they consider to be important visual elements for predicting **Very High** housing prices.

Which of these methods does the best job at returning visual elements that you would use for this decision?

Method 2



Method 3



Very High



Method 1



Other

Section 2 - 3

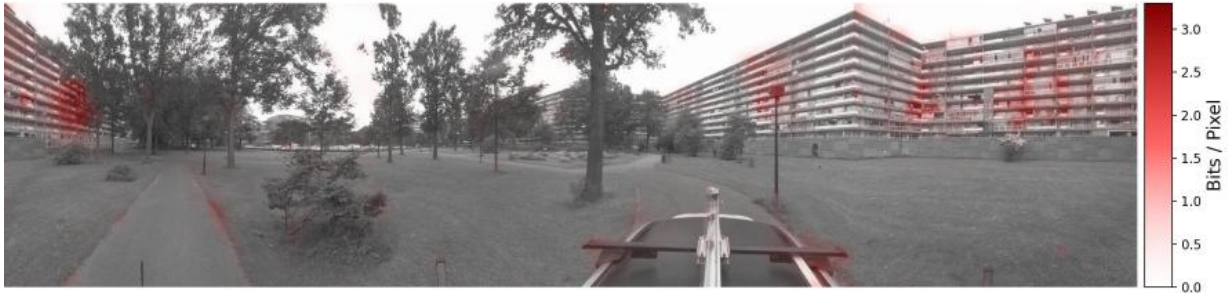
These three methods all explain what they consider to be important visual elements for predicting the **Lowest** housing prices.

Which of these methods does the best job at returning visual elements that you would use for this decision?

Method 1



Method 2



Method 3



Lowest

Other

Section 2 - 4

These three methods all explain what they consider to be important visual elements for predicting the the **Lowest** housing prices.

Which of these methods does the best job at returning visual elements that you would use for this decision?

Method 2



Method 3



Lowest

Method 1



Other



If, for your work, you needed to understand the relationship between visual elements and housing prices, would you use **Method 1**?

- I like this method, I would use this.
- I like this method, but it needs improving before I would use it.
- I don't like this method, it does not show visual elements I would use for this decision.
- I don't like this method, it shows visual elements I would use for this decision but I don't trust it.
- I don't like this method, it does not show visual elements I would use for this decision and I don't trust it.

If you would like to add any more comments please enter them here.

Block 6



If, for your work, you needed to understand the relationship between visual elements and housing prices, would you use **Method 2?**

- I like this method, I would use this.
- I like this method, but it needs improving before I would use it.
- I don't like this method, it does not show visual elements I would use for this decision.
- I don't like this method, it shows visual elements I would use for this decision but I don't trust it.
- I don't like this method, it does not show visual elements I would use for this decision and I don't trust it.

If you would like to add any more comments please enter them here.

Block 7



0



If, for your work, you needed to understand the relationship between visual elements and housing prices, would you use **Method 3?**

- I like this method I would use this.
- I like this method, but it needs improving before I would use it.
- I don't like this method, it does not show visual elements I would use for this decision.
- I don't like this method, it shows visual elements I would use for this decision but I don't trust it.
- I don't like this method, it does not show visual elements I would use for this decision and I don't trust it.

If you would like to add any more comments please enter them here.

Demographic questions

How would you rate your knowledge of **Artificial Intelligence?**
With 10 as being an expert and 0 as having no knowledge at all.

0 1 2 3 4 5 6 7 8 9 10

How would you rate your knowledge of **Computer Vision**? With 10 as being an expert and 0 as having no knowledge at all.

0 1 2 3 4 5 6 7 8 9 10

Do you work at a municipality?

- Yes, at the Amsterdam municipality.
- Yes, but not at the Amsterdam municipality.
- No

Would you describe your day-to-day work within the municipality as being more of a non-technical nature or more of a technical nature?

With 0 being completely non-technical and 10 being completely technical.

0 1 2 3 4 5 6 7 8 9 10

How would you rate your knowledge regarding the process of policy-making within the municipality? With 0 as having no knowledge, and 10 as being an expert.

0 1 2 3 4 5 6 7 8 9 10

Are you involved in policy-making within the municipality?

- Not at all.
- My job contributes to policy-making.
- My job *is* policy-making.

If you would like to add any comments feel free to add them here.

Do what extent would you characterize your research as being focused on **Responsible AI**? With 10 being completely focused on it and 0 being not focused on it at all.

0 1 2 3 4 5 6 7 8 9 10

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