

Info Block 1

User preference towards nine novel Augmented Reality interfaces for pedestrian-vehicle interactions

Augmented Reality (AR) technology allows you to see virtual objects in the real world through the use of a device such as a mobile phone or headset. Current popular examples of AR include games such as Pokémon GO (Fig. 1), and apps that allow you to see furniture or decorative items virtually before purchasing them (Fig. 2). On the other hand, as its name suggests, Virtual Reality (VR) technology allows you to explore fully virtual objects in a virtual environment (Fig. 3).



Fig. 1: AR: Pokémon GO app on smartphone. | Fig. 2: AR: Viewing decorative items virtually on smartphone.



Fig. 3: A streetscape in Virtual Reality. In this case, all objects in the scene are virtual.

Info Block 2

In the future, AR technology will be more widely available through consumer products, such as smart glasses (Fig. 4), which could be used for everyday tasks, just as smartphones are used today.

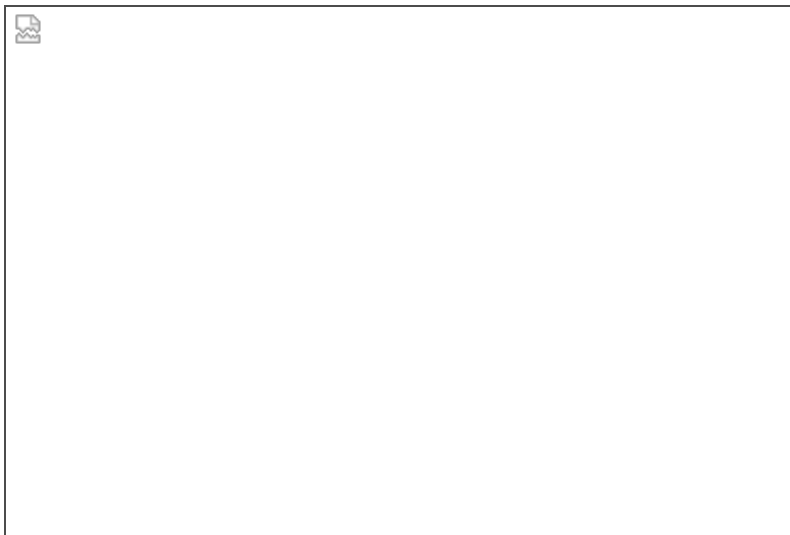


Fig.4: A person wearing AR glasses.

This research project investigates the opportunities of Augmented Reality applications in support of human-vehicle interactions in future urban environments, where self-driving cars will be common on the roads. As some of the vehicles will no longer have an active human driver behind the wheel, it would be challenging for pedestrians to understand the intentions of a vehicle approaching their point of crossing (Vid. 1).

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Vid.1: Driverless car approaching a crossing area. What will it do?

Therefore, some form of communication between these vehicles and other people on the road, especially pedestrians, may be needed. The scenario we are investigating looks at AR glasses as a platform to provide pedestrians with a service that would help them navigate through traffic. To this end, we will share with you several examples of such communication, in the form of AR interfaces that will indicate when the surroundings are safe for the pedestrian to cross. These interfaces will be presented in a virtual road environment that simulates the real world.

Information and disclaimer

Dear participant,

You are invited to participate in a research study conducted by Msc. Wilbert Tabone, Dr. ir. Joost de Winter, and Dr. ir. Riender Happee (Department of Cognitive Robotics, Delft University of Technology, The Netherlands), Dr. Maria Luce Lupetti (AiTech, Delft University of Technology, The Netherlands), Prof. Dr. Natasha Merat, Dr. Yee Mun Lee,

and MEng. Jorge Garcia de Pedro (Institute of Transport Studies, University of Leeds, The United Kingdom).

You are free to contact the investigator, Wilbert Tabone (w.tabone@tudelft.nl), if you have any questions about the study. You must be at least 18 years old to participate. In this study, you will be asked to rate a set of novel Augmented Reality (AR) interfaces projected at a street crossing. This survey will take approximately 30 minutes of your time.

We believe there are no known risks associated with this research study. The information collected through this survey is anonymous. Participants will not be personally identifiable in any dataset or research paper that will be published from this study. If you agree to participate and understand that your participation is voluntary, then continue. If you would not like to participate, then please close this page.

Q1 Have you read and understood the above instructions?

- ☐ Yes
- ☐ No

Demographics

Q2 What is your gender?

- ☐ Male
- ☐ Female
- ☐ Non-binary / third gender
- ☐ Prefer not to say

Q3 What is your age?

Q4 What is your country of residence?

Q5 What is the highest level of education you have completed?

- ☐ University degree
- ☐ Trade/technical/vocational training
- ☐ None of these

Q6 Technology openness

	Completely disagree	Largely disagree	Slightly agree	Largely agree	Completely agree
I like to occupy myself in greater detail with technical systems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like testing the functions of new technical systems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I predominantly deal with technical systems because I have to.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I have a new technical system in front of me, I try it out intensively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy spending time becoming acquainted with a new technical system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is enough for me that a technical system works; I don't care how or why.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to understand how a technical system exactly works.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is enough for me to know the basic functions of a technical system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I try to make full use of the capabilities of a technical system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

AR and Mobility

Q7 Have you ever used a virtual reality headset (e.g., Oculus, HTC Vive, Steam VR)?

☐ Yes

☐ No

Q8 Have you ever used AR apps or played AR games such as Pokémon GO or similiar?

☐ Yes

☐ No

Q9 How willing would you be to use AR glasses?

Strongly
unwilling



Unwilling



Neutral



Willing



Strongly willing



Q10 How willing would you be to use AR glasses on the road as a pedestrian?

Strongly
unwilling

☐

Unwilling

☐

Neutral

☐

Willing

☐

Strongly willing

☐

Q11 How willing would you be to use AR glasses on the road if these warn you about how safe it is to cross in front of a self-driving car?

Strongly
unwilling

☐

Unwilling

☐

Neutral

☐

Willing

☐

Strongly willing

☐

Q12 Have you ever encountered a self-driving vehicle before?

- ☐ Yes
- ☐ No
- ☐ Not sure

Q13 What range best describes your daily walking time as a pedestrian on the road?

- ☐ 0/15min
- ☐ 15-30min
- ☐ 30-45min
- ☐ 45/60min
- ☐ 60min and above

Q14 What is your primary mode of transportation?

- ☐ Private vehicle
- ☐ Public transportation
- ☐ Motorcycle
- ☐ Walking
- ☐ Cycling
- ☐ Other

Mobility and Colourblindness Check

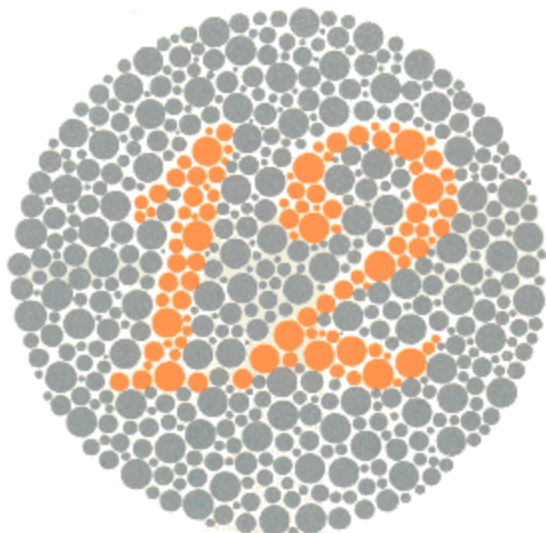
Q15 Do you have any constraints in personal mobility?

- ☐ Yes
- ☐ No

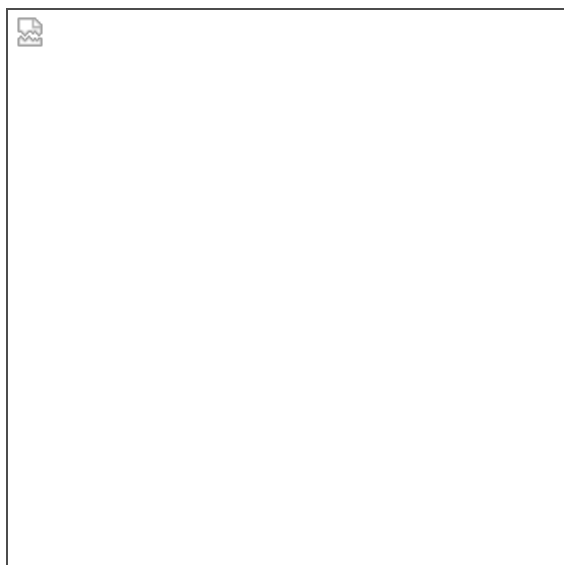
Test for colourblindness

Q16 Each of the six images below contains a circular plate made up of various coloured

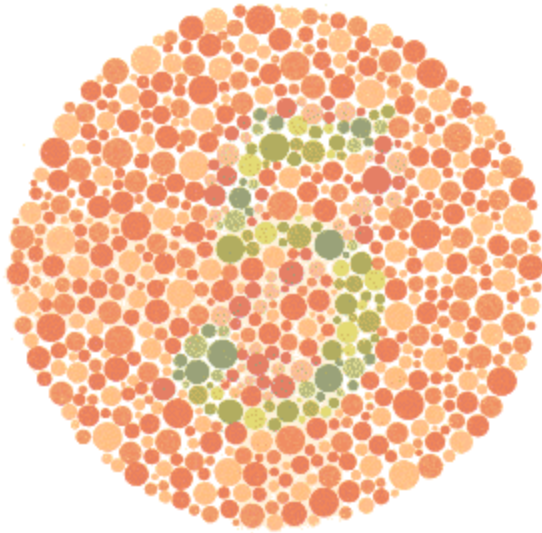
dots. A number can be seen in most of the plates, although in some plates, you will see nothing else than unrelated dots. For each image, type the number that you see, if any.



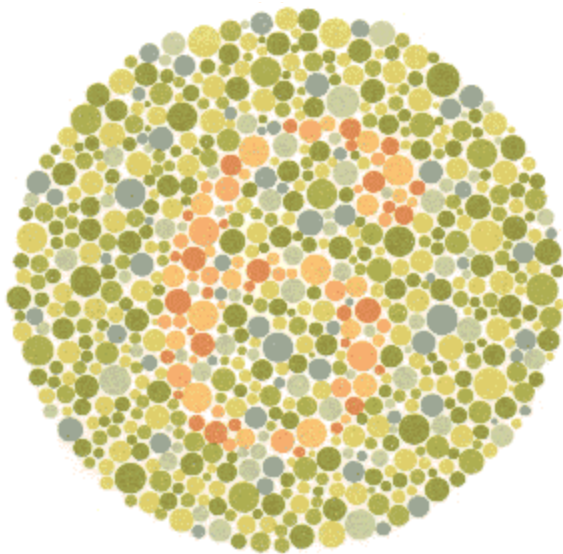
If you see a number in the image above, type it here. If you do not see any number, type 'N'.



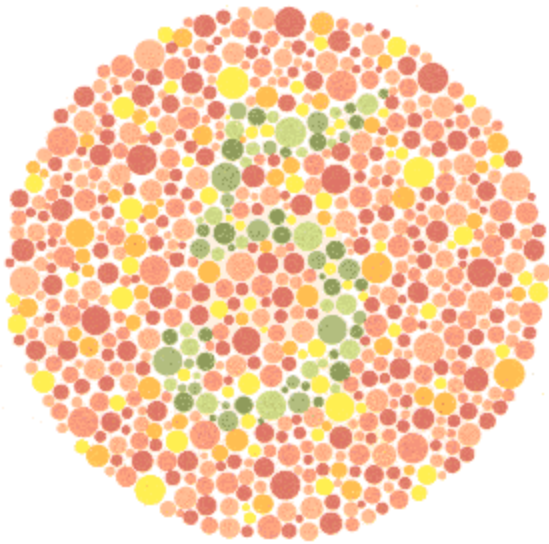
If you see a number in the image above, type it here. If you do not see any number, type 'N'.



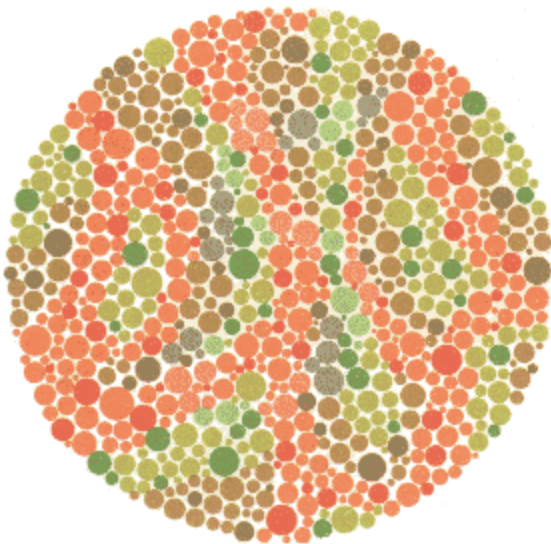
If you see a number in the image above, type it here. If you do not see any number, type 'N'.



If you see a number in the image above, type it here. If you do not see any number, type 'N'.



If you see a number in the image above, type it here. If you do not see any number, type 'N'.



If you see a number in the image above, type it here. If you do not see any number, type 'N'.

Experiment Text

Augmented Reality Interface Evaluation

You will now view videos showing a particular AR interface at a road crossing as a car approaches from the right. Two clips for each interface will be shown to you. You are kindly asked to answer all the questions that follow.

Concept 1

Augmented Zebra Crossing

Non-Yielding State

No video with supported format and MIME type found.

Q17 The interface in the video above is intuitive for signalling ‘Please do **NOT** cross the road’

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Q18 The interface in the video above convinced me **NOT** to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Yielding State



Q19 The interface in the video above is intuitive for signalling ‘Please cross the road’

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Q20 The interface in the video above convinced me to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

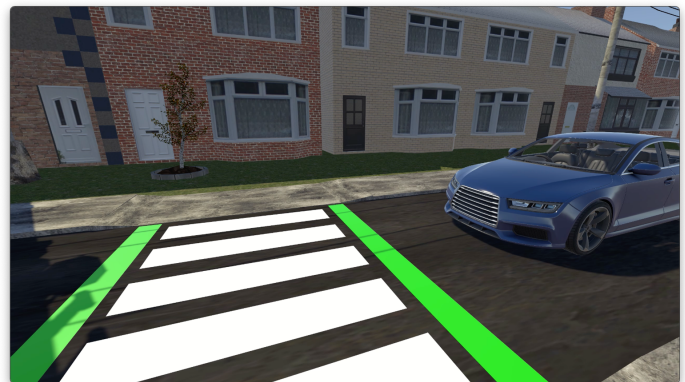
Strongly
agree

☐

Non-Yielding State



Yielding State



Q21 Please select an answer to the following questions:

Do you think that the interface was triggered too early or too late?	too early <input type="radio"/>	early <input type="radio"/>	neutral <input type="radio"/>	late <input type="radio"/>	too late <input type="radio"/>
Do you think that the interface is too small or too large?	too small <input type="radio"/>	small <input type="radio"/>	neutral <input type="radio"/>	large <input type="radio"/>	too large <input type="radio"/>
How clear (understandable) was the interface to you?	very unclear <input type="radio"/>	unclear <input type="radio"/>	neutral <input type="radio"/>	clear <input type="radio"/>	very clear <input type="radio"/>
How visually attractive is this interface to you?	very unattractive <input type="radio"/>	unattractive <input type="radio"/>	neutral <input type="radio"/>	attractive <input type="radio"/>	very attractive <input type="radio"/>

Q22 I found the interface to be:

useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	useless
pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unpleasant
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good
nice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	annoying
effective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	superfluous
irritating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	likable
assisting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	worthless
undesirable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	desirable
raising alertness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	sleep-inducing

Q23 Please add a few words to justify your choices above (eg. comment on the shape, colour, functionality, and the clarity of the interface).
Concept 2**Planes on Vehicle****Non-Yielding State**



The interface in the video above is intuitive for signalling 'Please do **NOT** cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me **NOT** to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Yielding State



The interface in the video above is intuitive for signalling 'Please cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me to cross the road

Strongly
disagree



Disagree



Somewhat
disagree



Neither
agree nor
disagree



Somewhat
agree



Agree



Strongly
agree



Non-Yielding State



Yielding State



Please select an answer to the following questions:

Do you think that the interface was triggered too early or too late?	too early <input type="radio"/>	early <input type="radio"/>	neutral <input type="radio"/>	late <input type="radio"/>	too late <input type="radio"/>
Do you think that the interface is too small or too large?	too small <input type="radio"/>	small <input type="radio"/>	neutral <input type="radio"/>	large <input type="radio"/>	too large <input type="radio"/>
How clear (understandable) was the interface to you?	very unclear <input type="radio"/>	unclear <input type="radio"/>	neutral <input type="radio"/>	clear <input type="radio"/>	very clear <input type="radio"/>
How visually attractive is this interface to you?	very unattractive <input type="radio"/>	unattractive <input type="radio"/>	neutral <input type="radio"/>	attractive <input type="radio"/>	very attractive <input type="radio"/>

I found the interface to be:

useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	useless
pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unpleasant
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good
nice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	annoying
effective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	superfluous
irritating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	likable
assisting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	worthless
undesirable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	desirable
raising alertness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	sleep-inducing

Please add a few words to justify your choices above (eg. comment on the shape, colour, functionality, and the clarity of the interface).

Concept 3

Conspicuous Looming Planes

Non-Yielding State



The interface in the video above is intuitive for signalling 'Please do **NOT** cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me **NOT** to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Yielding State

No video with supported format and MIME type found.

The interface in the video above is intuitive for signalling 'Please cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me to cross the road

Strongly
disagree



Disagree



Somewhat
disagree



Neither
agree nor
disagree



Somewhat
agree



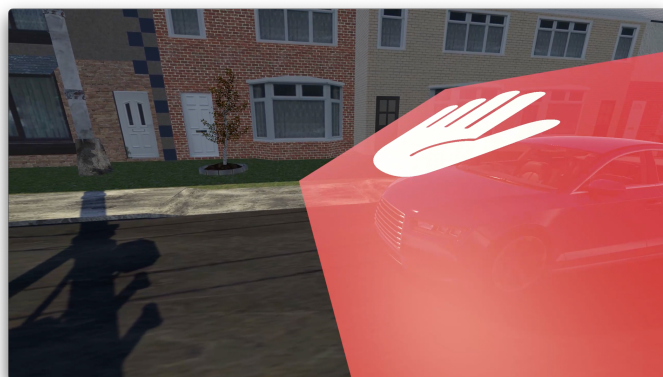
Agree



Strongly
agree



Non-Yielding State



Yielding State



Please select an answer to the following questions:

Do you think that the interface was triggered too early or too late?	too early <input type="radio"/>	early <input type="radio"/>	neutral <input type="radio"/>	late <input type="radio"/>	too late <input type="radio"/>
Do you think that the interface is too small or too large?	too small <input type="radio"/>	small <input type="radio"/>	neutral <input type="radio"/>	large <input type="radio"/>	too large <input type="radio"/>
How clear (understandable) was the interface to you?	very unclear <input type="radio"/>	unclear <input type="radio"/>	neutral <input type="radio"/>	clear <input type="radio"/>	very clear <input type="radio"/>
How visually attractive is this interface to you?	very unattractive <input type="radio"/>	unattractive <input type="radio"/>	neutral <input type="radio"/>	attractive <input type="radio"/>	very attractive <input type="radio"/>

I found the interface to be:

useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	useless
pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unpleasant
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good
nice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	annoying
effective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	superfluous
irritating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	likable
assisting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	worthless
undesirable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	desirable
raising alertness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	sleep-inducing

Please add a few words to justify your choices above (eg. comment on the shape, colour, functionality, and the clarity of the interface).

Concept 4

Field of Safe Travel

Non-Yielding State



The interface in the video above is intuitive for signalling 'Please do **NOT** cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me **NOT** to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Yielding State

No video with supported format and MIME type found.

The interface in the video above is intuitive for signalling 'Please cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

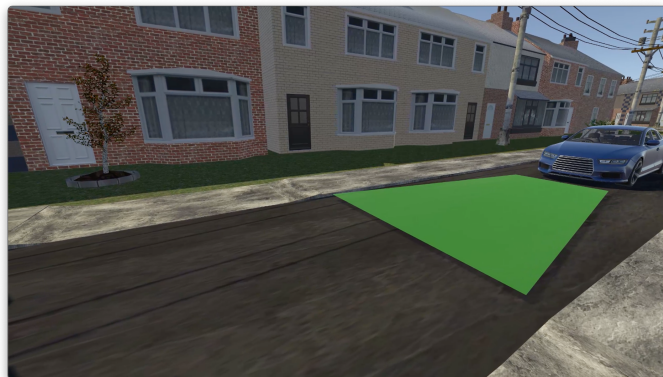
Strongly
agree

☐

Non-Yielding State



Yielding State



Please select an answer to the following questions:

Do you think that the interface was triggered too early or too late?	too early <input type="radio"/>	early <input type="radio"/>	neutral <input type="radio"/>	late <input type="radio"/>	too late <input type="radio"/>
Do you think that the interface is too small or too large?	too small <input type="radio"/>	small <input type="radio"/>	neutral <input type="radio"/>	large <input type="radio"/>	too large <input type="radio"/>
How clear (understandable) was the interface to you?	very unclear <input type="radio"/>	unclear <input type="radio"/>	neutral <input type="radio"/>	clear <input type="radio"/>	very clear <input type="radio"/>
How visually attractive is this interface to you?	very unattractive <input type="radio"/>	unattractive <input type="radio"/>	neutral <input type="radio"/>	attractive <input type="radio"/>	very attractive <input type="radio"/>

I found the interface to be:

useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	useless
pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unpleasant
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good
nice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	annoying
effective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	superfluous
irritating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	likable
assisting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	worthless
undesirable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	desirable
raising alertness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	sleep-inducing

Please add a few words to justify your choices above (eg. comment on the shape, colour, functionality, and the clarity of the interface).

Concept 5

Fixed Pedestrian Traffic Lights

Non-Yielding State



The interface in the video above is intuitive for signalling 'Please do **NOT** cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me **NOT** to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Yielding State



The interface in the video above is intuitive for signalling 'Please cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Non-Yielding State



Yielding State



Please select an answer to the following questions:

Do you think that the interface was triggered too early or too late?	too early <input type="radio"/>	early <input type="radio"/>	neutral <input type="radio"/>	late <input type="radio"/>	too late <input type="radio"/>
Do you think that the interface is too small or too large?	too small <input type="radio"/>	small <input type="radio"/>	neutral <input type="radio"/>	large <input type="radio"/>	too large <input type="radio"/>
How clear (understandable) was the interface to you?	very unclear <input type="radio"/>	unclear <input type="radio"/>	neutral <input type="radio"/>	clear <input type="radio"/>	very clear <input type="radio"/>
How visually attractive is this interface to you?	very unattractive <input type="radio"/>	unattractive <input type="radio"/>	neutral <input type="radio"/>	attractive <input type="radio"/>	very attractive <input type="radio"/>

I found the interface to be:

useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	useless
pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unpleasant
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good
nice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	annoying
effective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	superfluous
irritating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	likable
assisting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	worthless
undesirable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	desirable
raising alertness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	sleep-inducing

Please add a few words to justify your choices above (eg. comment on the shape, colour, functionality, and the clarity of the interface).

Concept 6

Virtual Fence

Non-Yielding State



The interface in the video above is intuitive for signalling 'Please do **NOT** cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me **NOT** to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Yielding State



The interface in the video above is intuitive for signalling 'Please cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

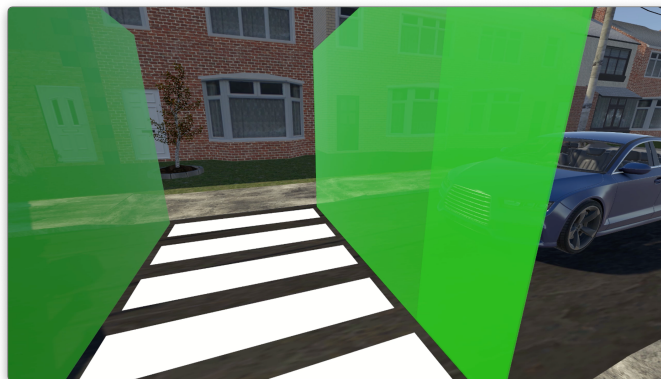
Strongly
agree

☐

Non-Yielding State



Yielding State



Please select an answer to the following questions:

Do you think that the interface was triggered too early or too late?	too early <input type="radio"/>	early <input type="radio"/>	neutral <input type="radio"/>	late <input type="radio"/>	too late <input type="radio"/>
Do you think that the interface is too small or too large?	too small <input type="radio"/>	small <input type="radio"/>	neutral <input type="radio"/>	large <input type="radio"/>	too large <input type="radio"/>
How clear (understandable) was the interface to you?	very unclear <input type="radio"/>	unclear <input type="radio"/>	neutral <input type="radio"/>	clear <input type="radio"/>	very clear <input type="radio"/>
How visually attractive is this interface to you?	very unattractive <input type="radio"/>	unattractive <input type="radio"/>	neutral <input type="radio"/>	attractive <input type="radio"/>	very attractive <input type="radio"/>

I found the interface to be:

useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	useless
pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unpleasant
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good
nice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	annoying
effective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	superfluous
irritating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	likable
assisting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	worthless
undesirable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	desirable
raising alertness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	sleep-inducing

Please add a few words to justify your choices above (eg. comment on the shape, colour, functionality, and the clarity of the interface).

Concept 7

Phantom Car

Non-Yielding State



The interface in the video above is intuitive for signalling 'Please do **NOT** cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me **NOT** to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Yielding State



The interface in the video above is intuitive for signalling 'Please cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me to cross the road

Strongly
disagree



Disagree



Somewhat
disagree



Neither
agree nor
disagree



Somewhat
agree



Agree



Strongly
agree



Non-Yielding State



Yielding State



Please select an answer to the following questions:

Do you think that the interface was triggered too early or too late?	too early <input type="radio"/>	early <input type="radio"/>	neutral <input type="radio"/>	late <input type="radio"/>	too late <input type="radio"/>
Do you think that the interface is too small or too large?	too small <input type="radio"/>	small <input type="radio"/>	neutral <input type="radio"/>	large <input type="radio"/>	too large <input type="radio"/>
How clear (understandable) was the interface to you?	very unclear <input type="radio"/>	unclear <input type="radio"/>	neutral <input type="radio"/>	clear <input type="radio"/>	very clear <input type="radio"/>
How visually attractive is this interface to you?	very unattractive <input type="radio"/>	unattractive <input type="radio"/>	neutral <input type="radio"/>	attractive <input type="radio"/>	very attractive <input type="radio"/>

I found the interface to be:

useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	useless
pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unpleasant
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good
nice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	annoying
effective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	superfluous
irritating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	likable
assisting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	worthless
undesirable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	desirable
raising alertness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	sleep-inducing

Please add a few words to justify your choices above (eg. comment on the shape, colour, functionality, and the clarity of the interface).

Concept 8

Nudge Heads-Up Display

Non-Yielding State



The interface in the video above is intuitive for signalling 'Please do **NOT** cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me **NOT** to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Yielding State



The interface in the video above is intuitive for signalling 'Please cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me to cross the road

Strongly
disagree



Disagree



Somewhat
disagree



Neither
agree nor
disagree



Somewhat
agree



Agree



Strongly
agree



Non-Yielding State



Yielding State



Please select an answer to the following questions:

Do you think that the interface was triggered too early or too late?	too early <input type="radio"/>	early <input type="radio"/>	neutral <input type="radio"/>	late <input type="radio"/>	too late <input type="radio"/>
Do you think that the interface is too small or too large?	too small <input type="radio"/>	small <input type="radio"/>	neutral <input type="radio"/>	large <input type="radio"/>	too large <input type="radio"/>
How clear (understandable) was the interface to you?	very unclear <input type="radio"/>	unclear <input type="radio"/>	neutral <input type="radio"/>	clear <input type="radio"/>	very clear <input type="radio"/>
How visually attractive is this interface to you?	very unattractive <input type="radio"/>	unattractive <input type="radio"/>	neutral <input type="radio"/>	attractive <input type="radio"/>	very attractive <input type="radio"/>

I found the interface to be:

useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	useless
pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unpleasant
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good
nice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	annoying
effective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	superfluous
irritating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	likable
assisting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	worthless
undesirable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	desirable
raising alertness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	sleep-inducing

Please add a few words to justify your choices above (eg. comment on the shape, colour, functionality, and the clarity of the interface).

Concept 9

Pedestrian Traffic Lights Heads-Up Display

Non-Yielding State



The interface in the video above is intuitive for signalling 'Please do **NOT** cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me **NOT** to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Yielding State

Video playback aborted due to a network error.

The interface in the video above is intuitive for signalling 'Please cross the road'

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

The interface in the video above convinced me to cross the road

Strongly
disagree

☐

Disagree

☐

Somewhat
disagree

☐

Neither
agree nor
disagree

☐

Somewhat
agree

☐

Agree

☐

Strongly
agree

☐

Non-Yielding State



Yielding State



Please select an answer to the following questions:

Do you think that the interface was triggered too early or too late?	too early <input type="radio"/>	early <input type="radio"/>	neutral <input type="radio"/>	late <input type="radio"/>	too late <input type="radio"/>
Do you think that the interface is too small or too large?	too small <input type="radio"/>	small <input type="radio"/>	neutral <input type="radio"/>	large <input type="radio"/>	too large <input type="radio"/>
How clear (understandable) was the interface to you?	very unclear <input type="radio"/>	unclear <input type="radio"/>	neutral <input type="radio"/>	clear <input type="radio"/>	very clear <input type="radio"/>
How visually attractive is this interface to you?	very unattractive <input type="radio"/>	unattractive <input type="radio"/>	neutral <input type="radio"/>	attractive <input type="radio"/>	very attractive <input type="radio"/>

I found the interface to be:

useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	useless
pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unpleasant
bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	good
nice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	annoying
effective	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	superfluous
irritating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	likable
assisting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	worthless
undesirable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	desirable
raising alertness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	sleep-inducing

Please add a few words to justify your choices above (eg. comment on the shape, colour, functionality, and the clarity of the interface).

Final Questions

Final Questions

Please indicate your agreement/disagreement to the following statements:

Q24 In future traffic, the communication from AR interfaces would be useful for crossing the road.

Strongly disagree

☐

Disagree

☐

Neither agree nor disagree

☐

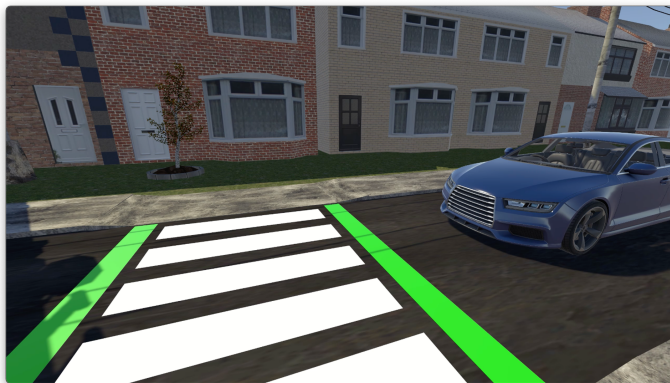
Agree

☐

Strongly agree

☐

Mapped to the street



Mapped to the vehicle



Q25 I prefer interfaces mapped to the street rather than on the vehicle.

Strongly
disagree

☐

Disagree

☐

Neither agree
nor disagree

☐

Agree

☐

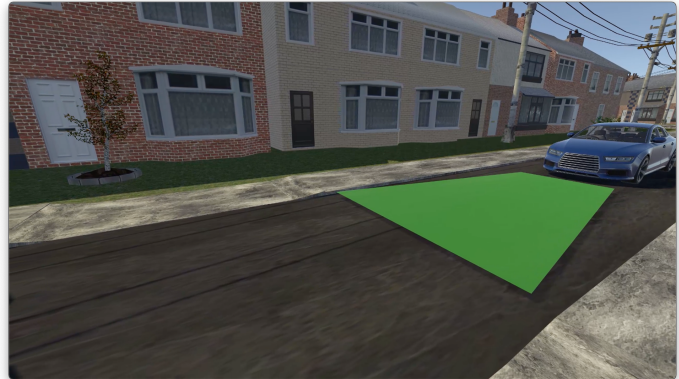
Strongly agree

☐

Interface with text



Interface with graphical elements



Q26 I prefer interfaces with text rather than interfaces with just graphical elements.

Strongly
disagree

☐

Disagree

☐

Neither agree
nor disagree

☐

Agree

☐

Strongly agree

☐

Interface which moves with head



Interface which stays fixed



Q27 I prefer interfaces that move around with my head rather than interfaces that stay fixed.

Strongly
disagree

☐

Disagree

☐

Neither agree
nor disagree

☐

Agree

☐

Strongly agree

☐

Q28 I would like to have the ability to customise these AR interfaces.

Strongly
disagree

☐

Disagree

☐

Neither agree
nor disagree

☐

Agree

☐

Strongly agree

☐

Q29 Now that I have seen these interfaces, if I own AR glasses, I am likely to use such interfaces as an aid for crossing in front of vehicles.

Strongly
disagree



Disagree



Neither agree
nor disagree



Agree



Strongly agree



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