Using Generative AI to create images for district council land use planning decisions

The following questions were asked during our live webinar with David Worden but due to time restrictions, we were unable to answer them in the session.

With NZ such a small place, and generating image for niche locations, results may be based on very few training images fed to the AI. Are you considering the copyright/stealing implications of image use?

Attribution, copyright, and intellectual property rights are one of the biggest challenges for the use of GenAI technologies. In our publications and presentations we acknowledge the use of the tool and use the images created under a Creative Commons license (which allows further use by others providing citations are made). In the future it may be possible that these tools make the source of their training images publicly available so that all elements of an image can be properly attributed.

How does it manage proprietary or confidential information?

Currently with GenAI tools we do not recommend that confidential or proprietary data be directly entered into prompts. Rather, we recommend using good data and expertise to help validate the accuracy or usefulness of the content produced.

How can this tech be used while still respecting Te Ao Māori? The whakapapa of the whenua and awa isn't just about the history but also about the future.

Much thought is currently being paid to issues of Māori data sovereignty and ethical adoption of GenAI technologies in Aotearoa, for example in the work of Dr Karaitiana Taiuru. As with any technology used in Aotearoa New Zealand, the use of GenAI should be done in a way that meets Te Tiriti commitments and is beneficial for tangata whenua and tangata tiriti. Our upcoming project will develop guidelines for ethical adoption of GenAI technologies with paramount importance being placed on Māori data sovereignty and respecting Te Ao Māori.

Can you upload background images and get AI to edit, or do you need to start from a generated image?

The GenAI tool (Midjourney) used in this project did not allow for the editing of existing images. Users did need to start from a generated image, but it was possible to use existing images to help 'train' the GenAI tool to understand the types of images a user was trying to create, such as our example using Google Earth imagery to capture the land use seen northeast of Prebbleton.

I've had a go using other tools, e.g. playgroundAI, but haven't been able to upload and edit existing photos well. Have you been able to show options for an existing space, or only generate new pictures?

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How difficult is it to edit images after generating them (e.g. remove child from the river)?

In general, specific elements of an image, such as the children seen playing in the river, could be removed using the tools built in *Region* editing function.

Can images be accurate as to dimensions where necessary - e.g. montages of an element infringing a rule?

This likely depends on the specific context in terms of how accurately it would depict an element meeting or infringing on a requirement. We have found that these tools are better at performing less specific visualisation tasks and can require much more time when it becomes important to have very high levels of detail or accuracy in an image. In cases where this is required, a human photo editor using image editing software may still be the best option.

What prompts do you use to get images you want? Can you share the text prompts used to generate the example images?

A wide range of prompts were used in this project as one of the main focuses of this work was to better understand what prompts were effective for generating images of Aotearoa New Zealand that could be useful from an ecological science perspective. For example, the first image in the Marshlands example used the prompt: [new residential development bordering a creek and wetland area, dslr, birds eye view, mid-day, Christchurch New Zealand] and the first image in the Port Hills staged implementation image used the prompt: [Port Hills Christchurch, birds eye view, pine trees, mid-day, dslr]. Note that the [dslr] prompt is commonly used to generate images in a photo-realistic style.

What prompts were used in order to create images where everything is the same except for a portion of the image, to create an iterative suite of alternatives? / How can parts of images be retained so the AI doesn't change them?

To edit elements of the image the Region editing function within Midjourney was used. By using this function, a user could highlight an area to provide further prompts for attributes they would like to see changed.

Can you comment on the environmental impact of using AI image/video generation? In terms of water usage, electricity etc to generate a single image/video?

The environmental impact of GenAI tools was a significant motivation for this project. Training and prompting GenAI tools is energy and water intensive. Image and video generation tools are especially energy intensive. Therefore, establishing whether the benefits to environmental researchers of using these tools can outweigh or offset the environmental impacts is critical. This technology has been promoted as being able to assist in facing some of society's biggest challenges such as climate change adaptation so, as environmental researchers, we are intent on understanding whether this technology will be helpful in meeting those goals.

Can you include other modelling into the GenAI, e.g. flood modelling?

Yes, to some extent. The usefulness and accuracy of the imagery can be strengthened by having good data to inform whatever land use changes or impacts you would like to see such as flooding. Flood modelling data could be used to validate, select, and improve upon imagery generated with the tool.

Was there any consideration of public response (or even awareness) of AI-generated images when they might expect actual photographs?

The public perception of the use of any GenAI content must be carefully considered. This is something we intend to better understand in upcoming research. For this particular project we did not test public acceptance of these images but our recommendation would be that, if GenAI images are used for public-facing content, that they carry a disclaimer highlighting the use of the technology.

The following questions were answered during the webinar:

- Do you see GenAI tools like this replacing the need for people in these research or urban design and planning roles?
- Did you use the free versions of the AI software, or paid/subscriptions services?
- Can the AI be taught to learn more, like information about mountain bikes, NZ vs North American houses, or rainfall received for your location?

If you are interested in joining the mailing list for the upcoming GenAI platform for climate change adaptation research please contact AI@landcareresearch.co.nz.

The answers provided during the webinar and in this document are the opinions of the author and do not necessarily reflect Manaaki Whenua's views.

Questions & Answers