



Can Humans Recognize AI-Generated Images?

Experimental Procedure

This project follows the  [Scientific Method](#). Review the steps before you begin.

Working with Human Test Subjects

There are special considerations when designing an experiment involving human subjects. Fairs affiliated with Regeneron International Science and Engineering Fair (ISEF) often require an Informed Consent Form (permission sheet) for every participant who is questioned. Consult the rules and regulations of the science fair that you are entering, prior to performing experiments or surveys. Please refer to the Science Buddies documents [Projects Involving Human Subjects](#) and [Scientific Review Committee](#) for additional important requirements. If you are working with minors, you must get advance permission from the children's parents or guardians (and teachers if you are performing the test while they are in school) to make sure that it is all right for the children to participate in the science fair project. Here are suggested guidelines for obtaining permission for working with minors:

1. Write a clear description of your science fair project, what you are studying, and what you hope to learn. Include how the child will be tested. Include a paragraph where you get a parent's or guardian's and/or teacher's signature.
 2. Print out as many copies as you need for each child you will be surveying.
 3. Pass out the permission sheet to the children or to the teachers of the children to give to the parents. You must have permission for all the children in order to be able to use them as test subjects.
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1. Decide on a topic or theme for your pictures. For example, you could use pictures of animals, flowers, scenery, vehicles, or people.
 2. Take at least ten real pictures of the object/topic you decided on or find pictures online.
 - a. Make sure you label or organize the images so you do not lose track of them later (e.g. put all the real pictures in a folder on your computer).
 - b. If you are finding the pictures online, make sure they are from a legitimate source and you know they are real pictures (see references in the [Bibliography](#) for tips).
 3. Find or make at least ten AI-generated images of the same object/topic.
 - a. You can search online for an "AI image generator" and you will find many options available. Some services might be built-in to major search engines and others might have their own websites. Also note that some services might be free, or allow you to generate a limited number of images for free, but others might require a paid subscription.

- b. Follow the instructions for the website or program you decide to use to enter a prompt and generate an image. Since you will be comparing them to real images, make sure you generate "realistic" photos and not images that look like paintings or drawings.
 - c. Save the images, again making sure you keep track of which images are real and which are AI-generated.
4. Prepare all of the images for viewing by your volunteers. For example, you can label them 1 through 20 and put them in a random order in a different folder on your computer, or you could print them. Make sure *you* keep track of which images are real and which are AI-generated, but this information should not be visible to your volunteers.
 5. Prepare a data table like Table 1. In the second column, write whether each image is real or AI-generated.

Image number	Real or AI generated	Volunteer 1	Volunteer 2	Volunteer 3	Volunteer "real" responses	Volunteer "AI" responses	% of volunteers correct
1							
2							
3							
...							

Table 1. Example data table.

6. One at a time, show each picture to a volunteer. Ask them whether they think the picture is real or AI-generated and record their response in your data table.
7. Repeat the process for each volunteer.
8. For each image, add up the number of volunteers who said the image was real and enter this value in your data table.
9. For each image, add up the number of volunteers who said the image was AI-generated and enter this response in your data table.
10. Calculate the percentage of volunteers who correctly identified whether each individual image was real or AI-generated. Enter the percentage in your data table.
11. Create another data table like Table 2.
 - a. Tally up your volunteer responses for *all* of your real images and enter the values in the first row of your data table.
 - b. Tally up your volunteer responses for *all* of your AI-generated images and enter the values in the second row of your data table.
 - c. You can make a bar graph of this data that has four bars (one for real images that were correctly identified as real, one for real images that were incorrectly identified as AI-generated, etc.).

		Volunteer responses	
		Real	AI-generated
Actual image	Real		
	AI-generated		

Table 2. Data table for tallying responses.

12. Analyze your data.

- a. Overall, how good were your volunteers at correctly identifying real images as real?
- b. Overall, how good were your volunteers at correctly identifying AI-generated images as AI-generated?
- c. Are there large differences in your results between individual pictures? Were some pictures harder for your volunteers to correctly identify than others? Looking at the pictures, why do you think this occurred?

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You can find this page online at: https://www.sciencebuddies.org/science-fair-projects/project-ideas/ArtificialIntelligence_p011/artificial-intelligence/AI-generated-images?mode=procedure

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