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Why did humans evolve the eyes we have today?

While scientists can’t go back in time to study the environmental pressures that shaped the evolution of the diverse vision systems that exist in nature, a new computational framework developed by MIT researchers allows them to explore this evolution in artificial intelligence agents.

The framework they developed, in which embodied AI agents evolve eyes and learn to see over many generations, is like a “scientific sandbox” that allows researchers to recreate different evolutionary trees. The user does this by changing the structure of the world and the tasks AI agents complete, such as finding food or telling objects apart.

This allows them to study why one animal may have evolved simple, light-sensitive patches as eyes, while another has complex, camera-type eyes.

“While we can never go back and figure out every detail of how evolution took place, in this work we’ve created an environment where we can, in a sense, recreate evolution and probe the environment in all these different ways. This method of doing science opens to the door to a lot of possibilities,” says Kushagra Tiwary, a graduate student at the MIT Media Lab and co-lead author of a paper on this research.