A Visionary Approach to Artificial Intelligence

An Interview with **James Elder**, Human/Computer Vision Scientist
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One thing that's really exciting, a lot of fun, about studying vision is that it is so powerful that we don't actually think about it from day to day. We just use it. It's only when we pause and think, wait, how do I actually do this, that we start to think about just how complex the problem is.

We're interested in trying to build more intelligent artificial vision systems based on a better understanding of human vision. We call this biologically-inspired computer vision. The human visual system is a truly remarkable and very powerful system, so we're trying to understand that and then use that knowledge to build better systems.

What challenges are you facing?

The challenge for AI in general and for my lab in particular is to behave more like humans behave when faced with challenging problems. There are several principles that human perception uses that machine vision doesn't. One is that we always see in 3D. Even if you close one eye, you don't suddenly think the world has gone 2D, it's a 3D world still. And that's something that computer vision systems still can't really do. A second thing is that human vision is very attentive. We select which part of the scene we want to process. That's something we still need to work on in computer vision. A third thing is that human perception is very adaptive. We change environments, you know, it's suddenly been snowing outside, and many computer vision systems will

kind of fall apart because they weren't trained to deal with that potentially, or something has changed, but we adapt very quickly.

Vision in particular is a really cool thing to study because we experience it every moment of our lives, we can do this real diversity of tasks: recognizing people, appreciating beauty. It's kind of automatic, and yet there are, in secret, these billions of neurons working away.