TEACHING COMPUTERS WITH ILLUSIONS

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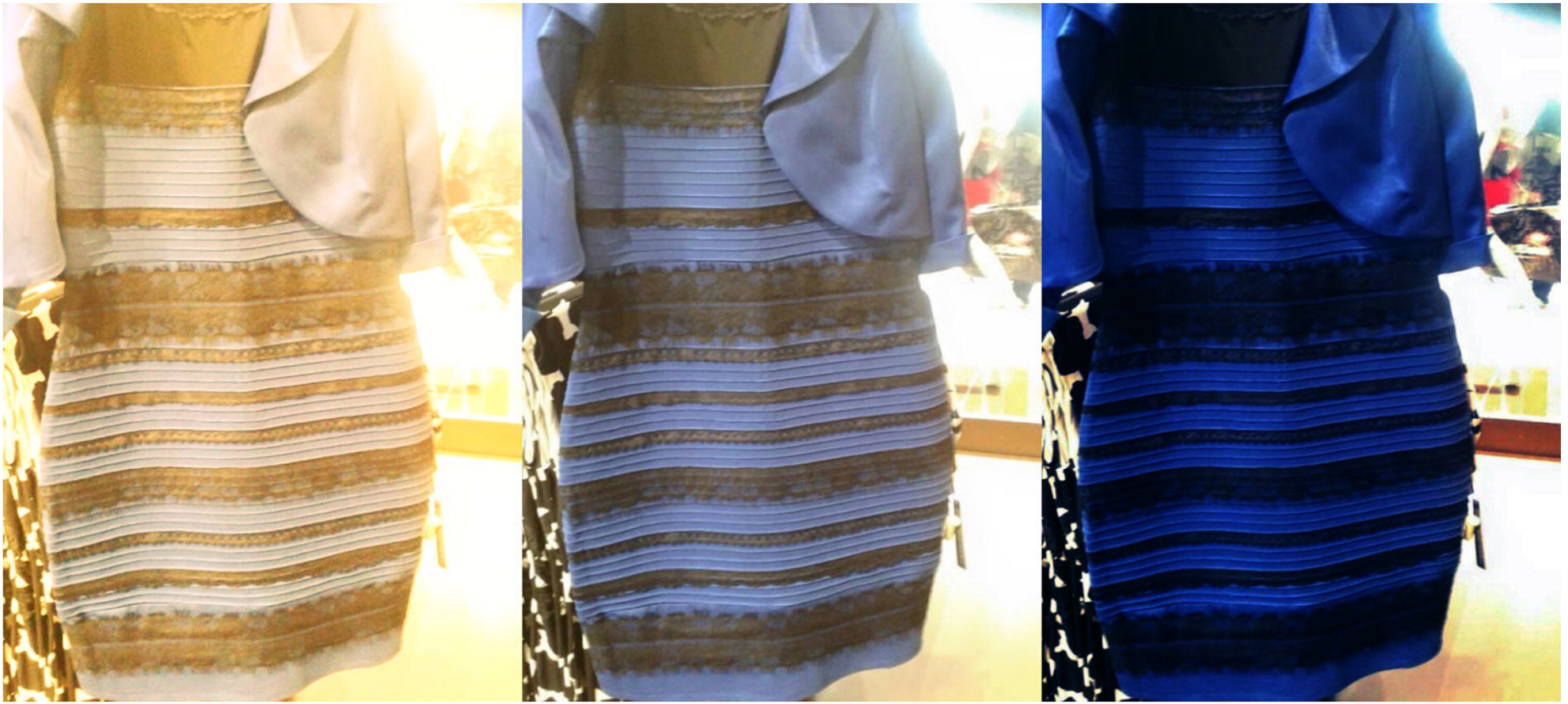
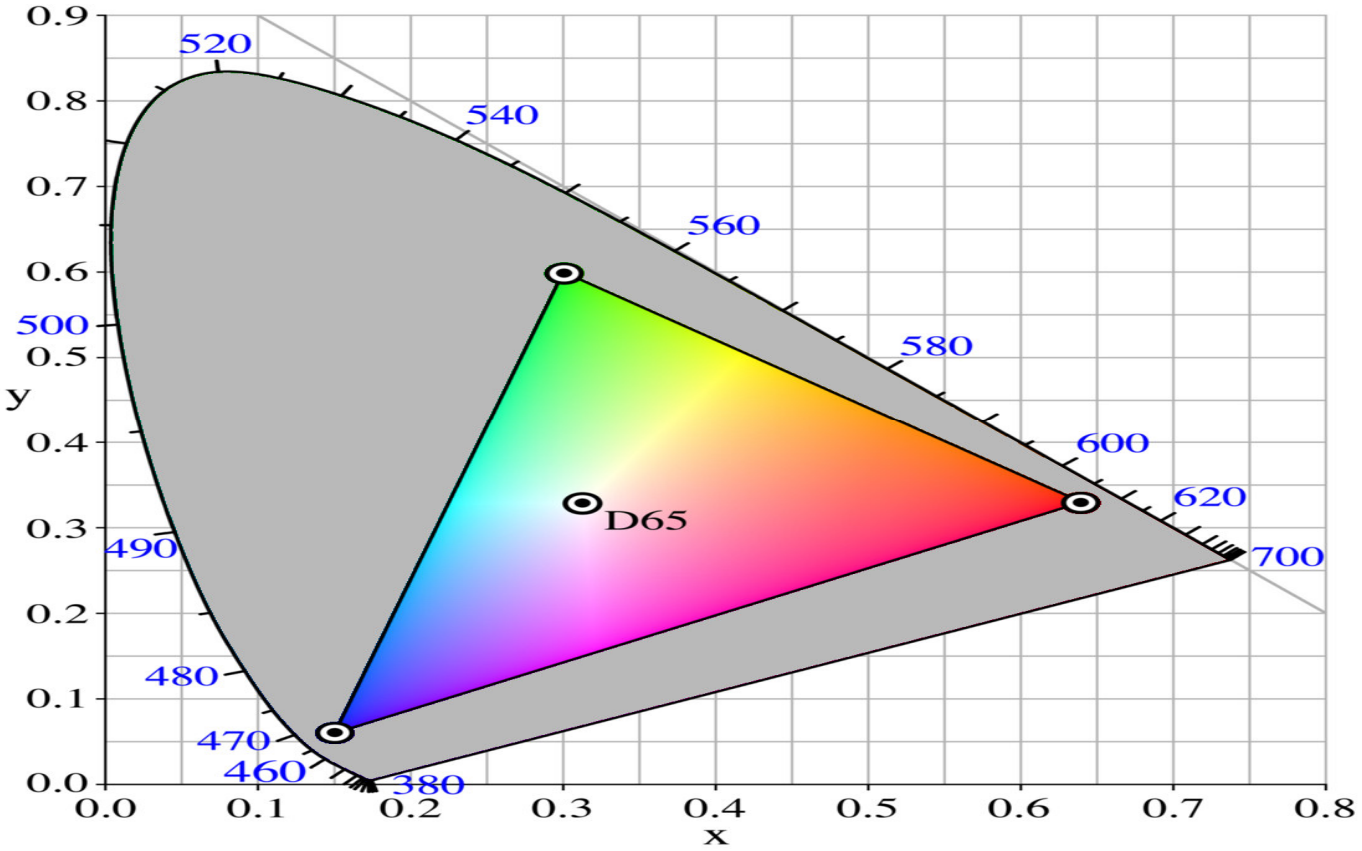
- WHAT COLOUR İS THE DRESS?



- Human sees with biology, computer sees with physical measurements.
- Work needs to be done to teach computers.



- Robots should see like we do.
- Why? To understand us correctly and perform exactly as we want.

“that is a cat sitting in a bed”

“ The boy is petting the elephant ”

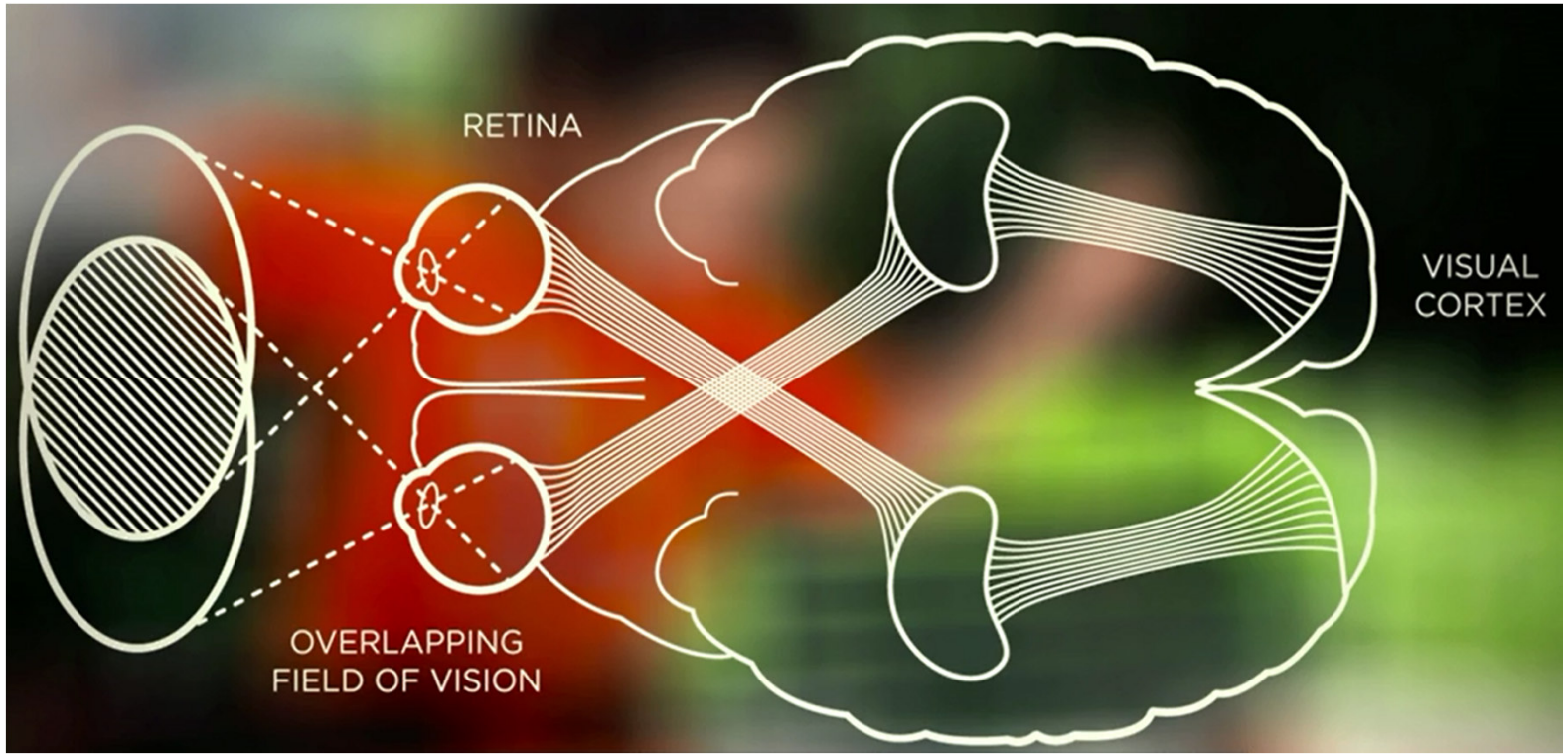
“ those are people that are going on the airplane “

“ We have made famous megapixels cameras but we have not delivered sight to blind. “

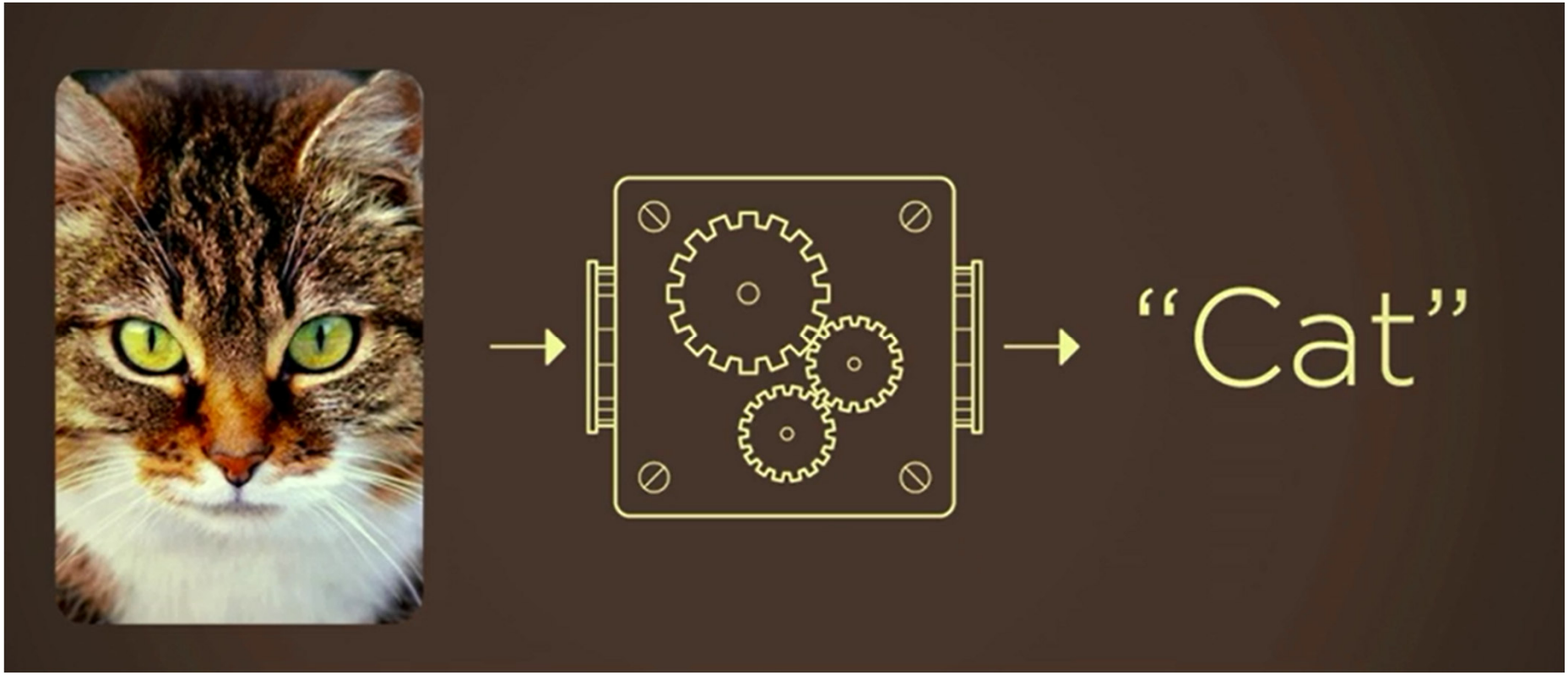
example , security cameras are everywhere , but they do not alert us when a child is drownşng in a swimming pool

Cameras takes pictures by converting lights into two

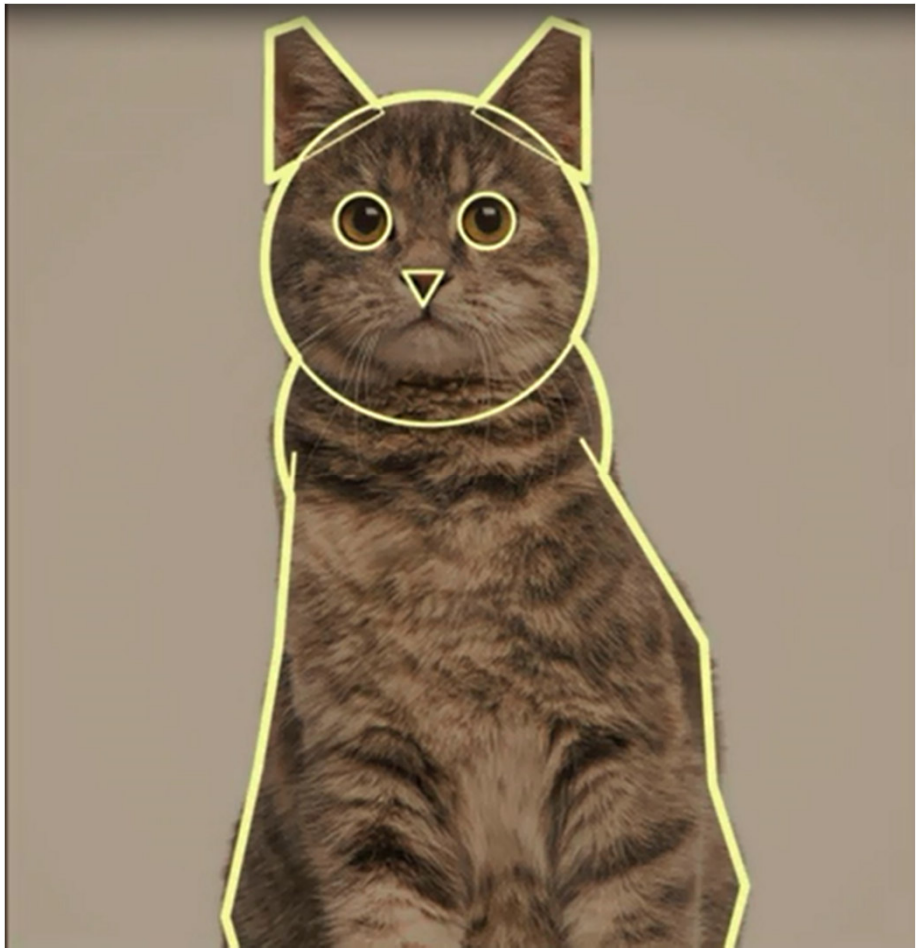
- just like to hear is not the same as to listen
- to take picture is not the same as to see



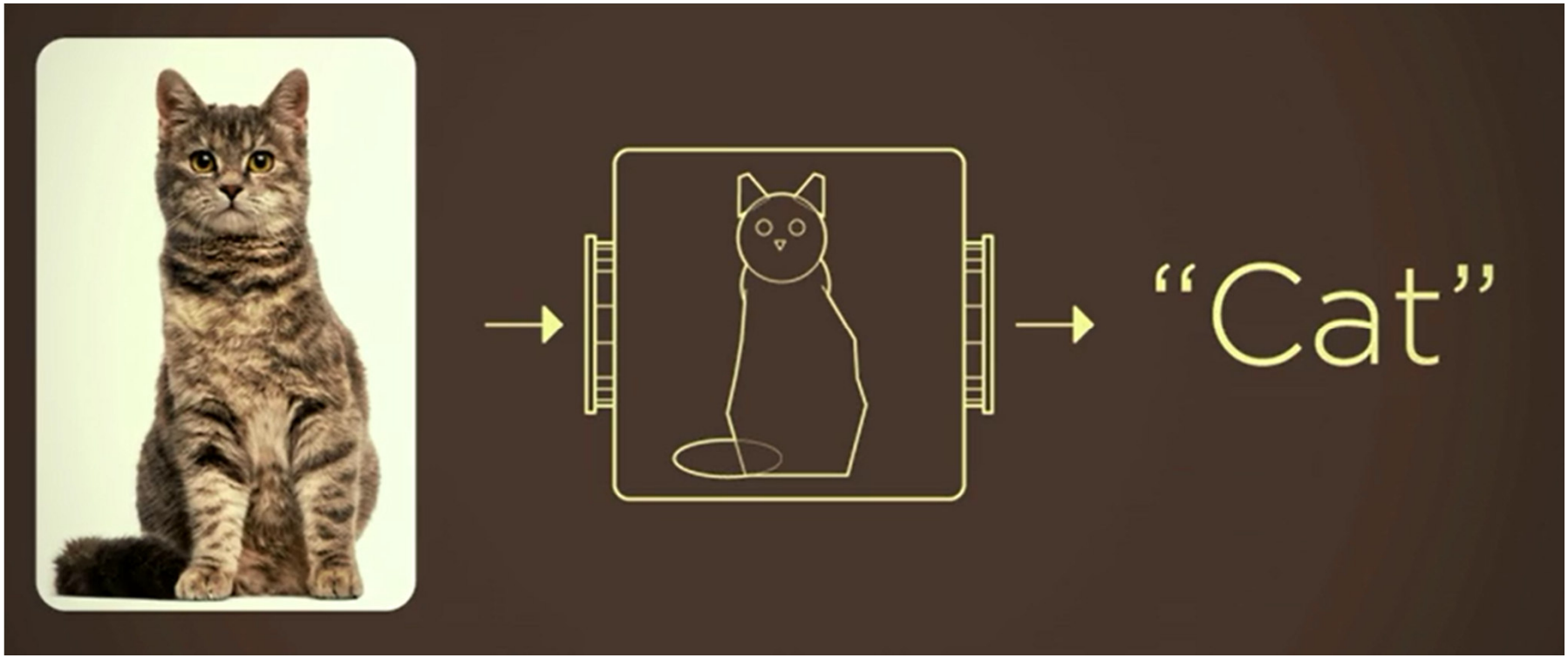
In fact that , it took 540 million years of hardwork to do this task and much of this effort went into developing the visual processing apparatus of brain.



First step towards this goal is to teach a computer to see objects , the building block of the visual world.

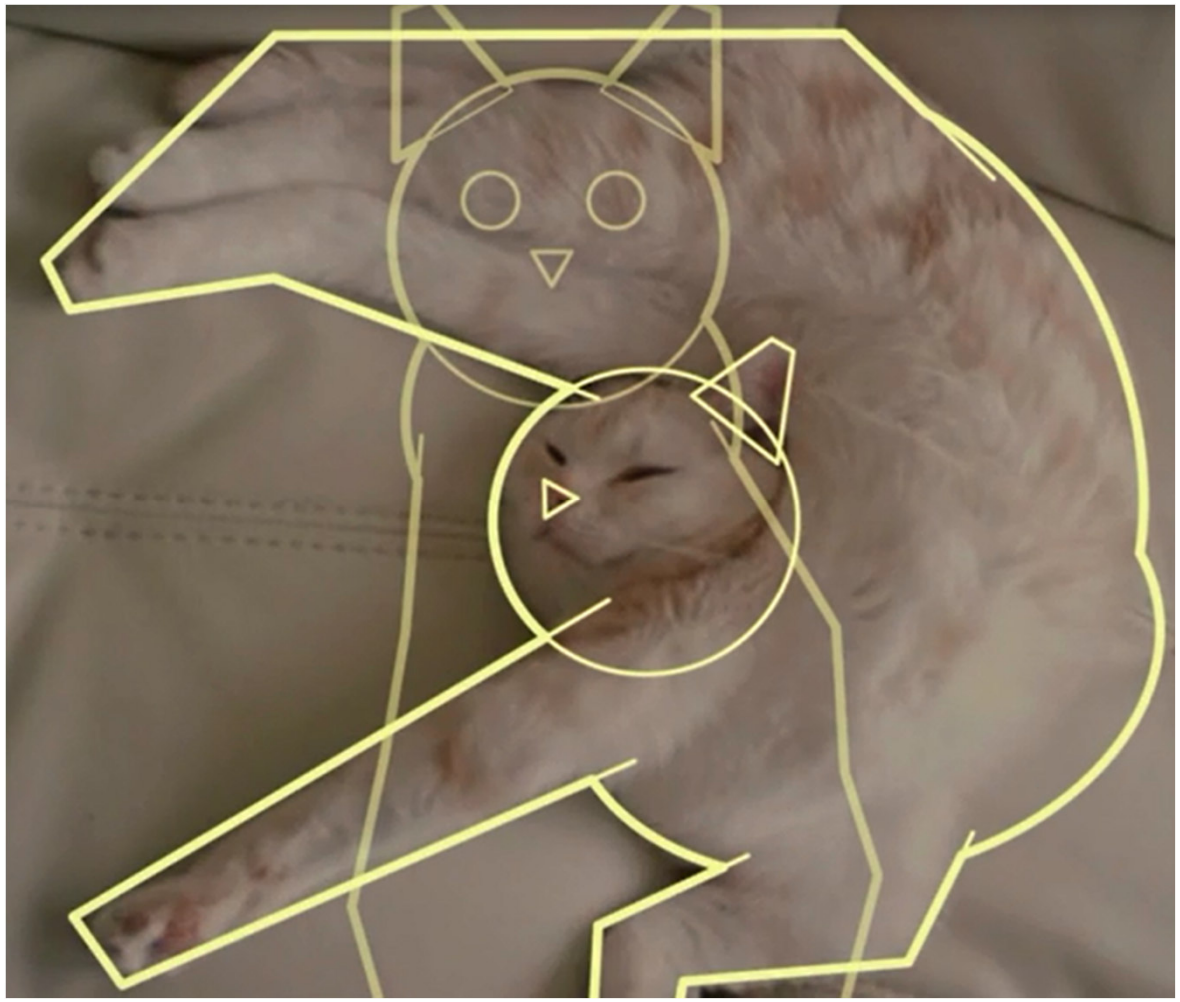


After all , a cat is just a collection of shapes and colors . . we tell the computer that a cat has a round face and chubbybody , two ears , and long tail.



Everything is OK ?

What about this cat ?



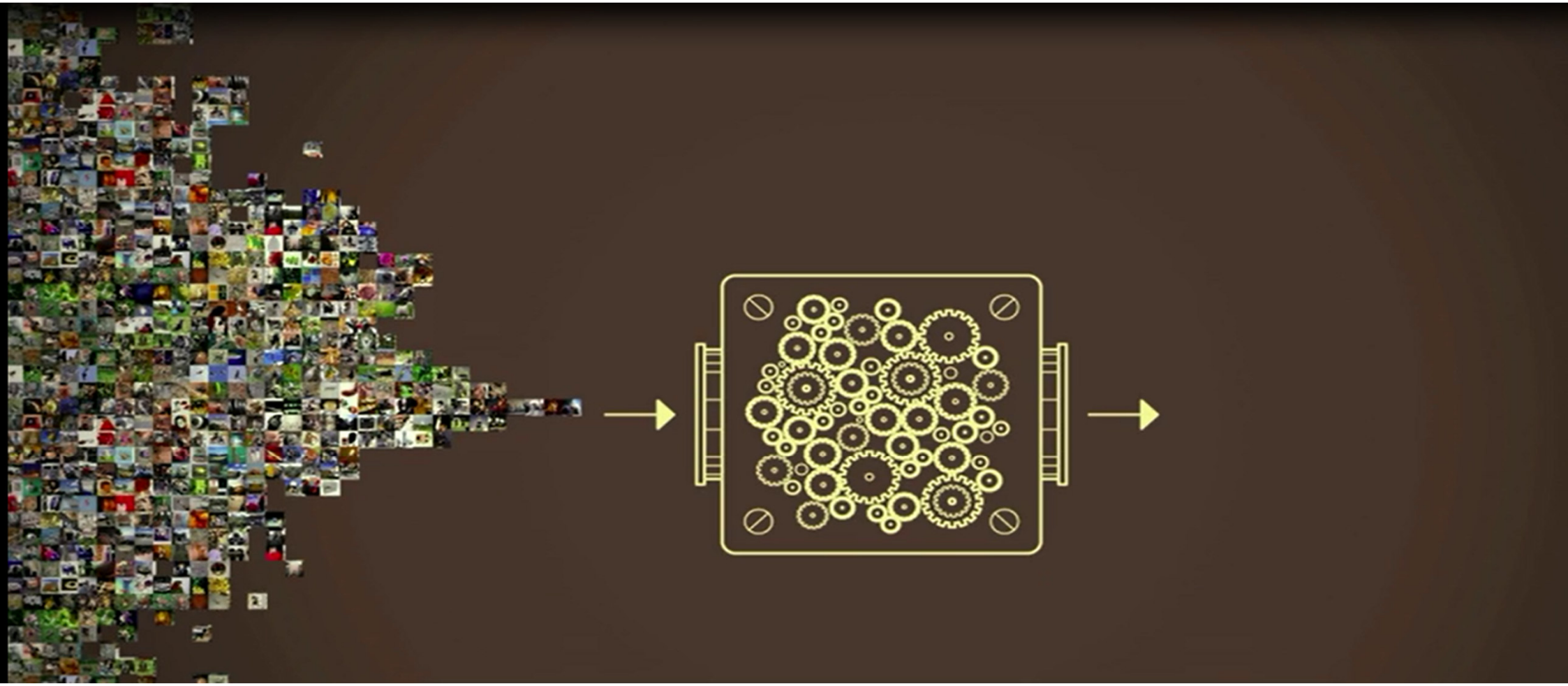
You have to add another shape and viewpoint to object model .

Can computer understand that yes, it is a cat ?

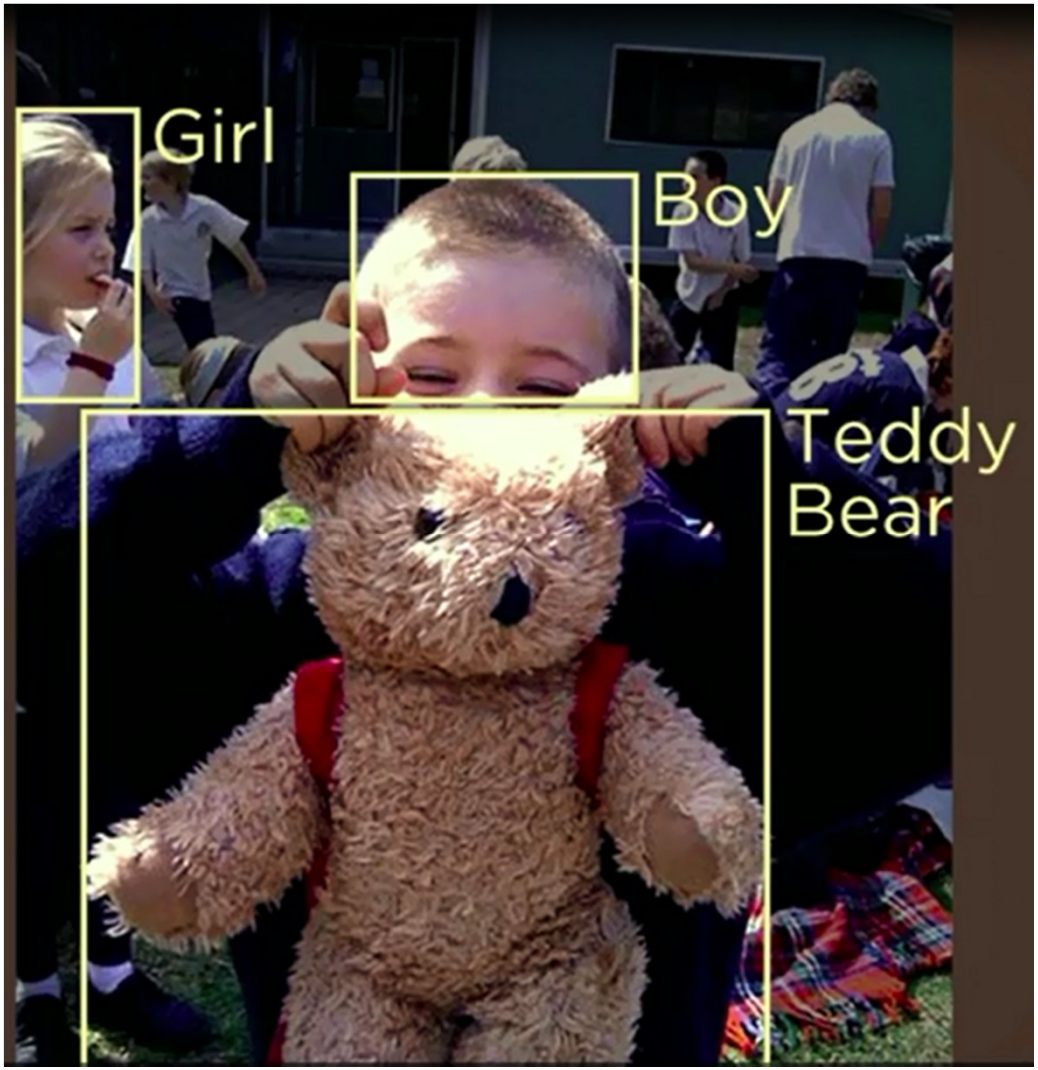
What about hidden cat ?

these silly cats ?

At 167 country , about 50 000 people helps to collect and clean data .

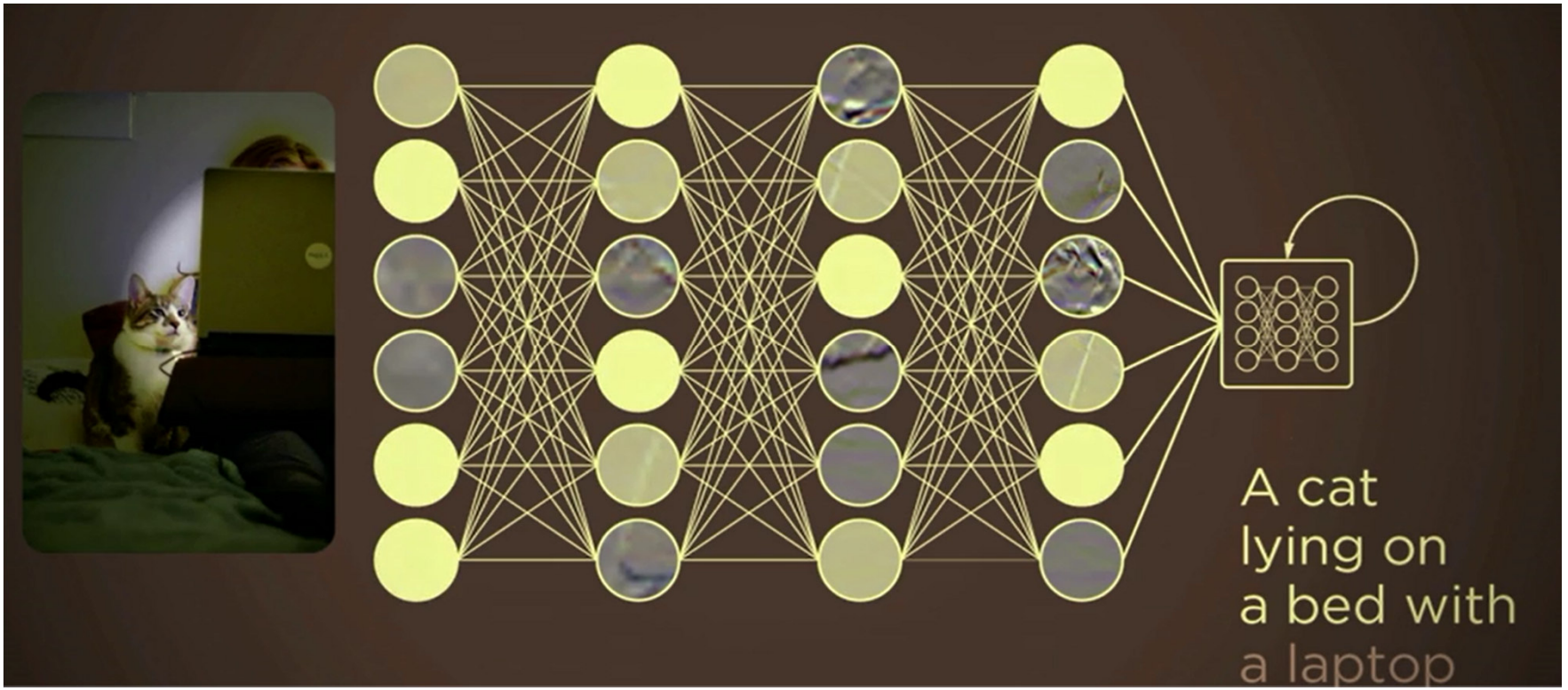


Imagenet project delivered a database of 15 million images in 2007.

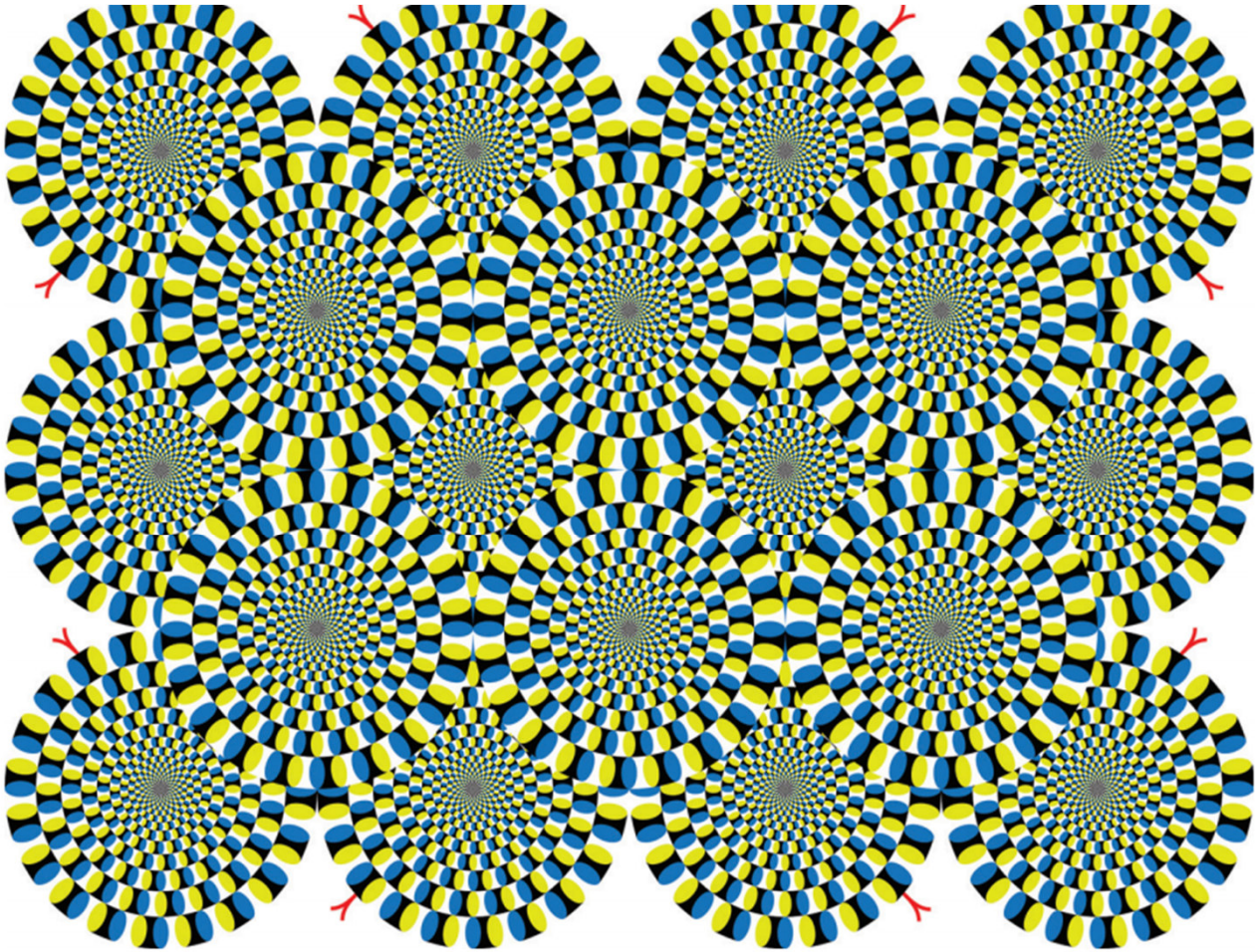


Here is a computer algorith tell us ; picture contains a boy and a teddy bear

With this result , the computer reach human ?



Computer says that , in this picture there is a cat .
Child says that , in this picture a cat lying on a bed with a laptop .



The rotating snakes illusion, as presented by Ritsumeikan University professor Akiyoshi Kitaoka.

Computer can realize this picture moving ?

- Machine vision is based on algorithms that can measure items in the environment and use them in driverless cars and elsewhere

- We have a very deep problem, being that we can’t get at the physical world

- A computer often fails to reconstruct a 3D shape from a projection drawing and delivers error messages, while humans can do this task very easily
- The computer examines every possibility in order to reconstruct a 3D object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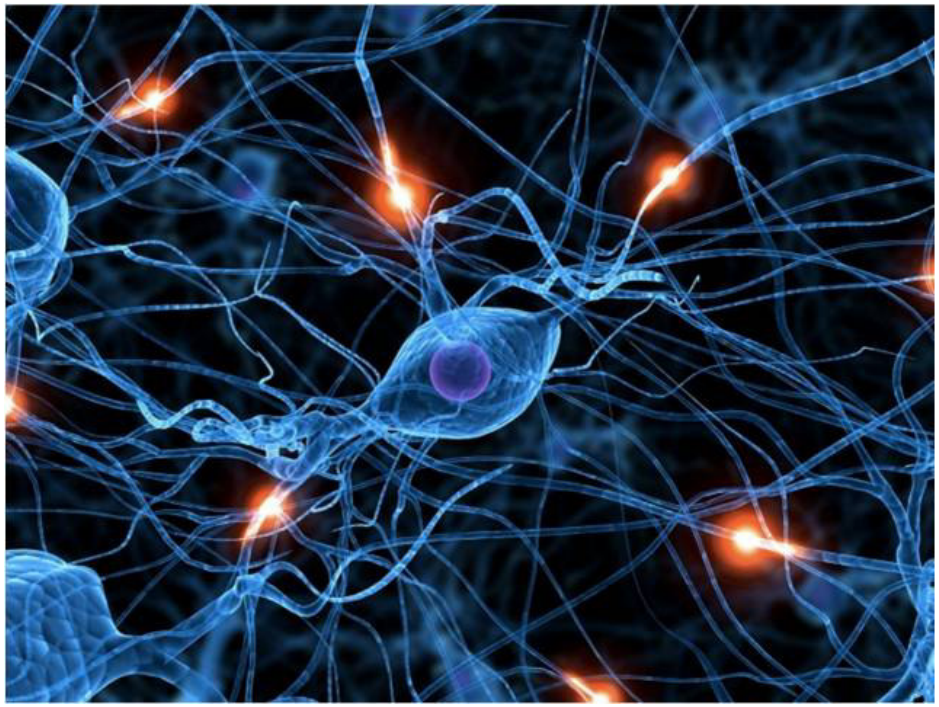
Illusion by Kokichi Sugihara

- There are different methods that can be used to “fool” computer algorithms so what systems and humans see is more closely aligned. One way to enhance artificial vision is to further study what our brains see



- Humans have used natural selection to incorporate in the neural networks in our brains every conceivable situation in the world with visual input, says Purves. “Once computers do that and evolve, in principal they should be as good as us, but it won’t be in visual measurements; they’re coming at [vision] from a very different way. There’s going to be a limit that will never get them to the level at which human beings operate.”

- Yet machines can continue to be improved. “If you want to make a really good machine, evolve it’’ through trial-and-error experiences and by compiling those experiences in their artificial neural circuitry, says Purves. “There’s no reason that can’t be done; you just have to feed them the information that we used to evolve a visual system.” He estimates that in 20 years’ time, machine vision could be as good as human vision, once vision scientists are able to figure out how to evolve an artificial neural network to “survive” in environments “that are as complicated as the world we live in.”

For example, a pornography company may produce images that appear to Google's image filters like rabbits, but which contain advertisements with nudity; or, a terrorist group could get past artificial intelligence filters searching for text embedded in images by making those images appear to the AI as pictures of flowers, he explains. Biometric security features are also potentially vulnerable; "a terrorist could wear a mask of transparent plastic film that has static printed on it that is not visible to humans, but could trick a facial recognition system into seeing an authorized security agent instead of recognizing a known terrorist," Clune says.

There is no good way yet to prevent networks from being fooled by nefarious means, Clune says, but when the technology improves, “security holes will be closed and they’ll become smarter and more effective,’’ he says. “They’ll also do a better job when they encounter substantially different situations than they were trained on.” Today robots can be trained on one type of image from the natural world, but if they encounter images that are too different, they break down and behave in strange and bizarre ways, Clune says. “They need to be able to see the world and know what they’re looking at.”