**You may write on the back of this sheet!**

**Assignment:**

1. Read the following article.
2. Write a 4 sentence summary of the article. Take care to include only factual information and not to include your opinion in the summary.
3. Write a 4 sentence reaction to the article. Do you agree with the information presented? How do you feel about the topic.
4. Create 3 multiple choice questions about the article. Circle the correct answer.
5. Create 3 True/False statements from the article. Identify if the statements are true or false.
6. Turn in this sheet and your completed assignment.

MEET THE HIGH SCHOOLER SHAKING UP ARTIFICIAL INTELLIGENCE



Since its founding by Elon Musk and others nearly two years ago, nonprofit research lab OpenAI has published dozens of research papers. One posted online Thursday is different: Its lead author is still in high school.

The wunderkind is Kevin Frans, a senior currently working on his college applications. He trained his first neural net—the kind of system that tech giants use to recognize your voice or face—two years ago, at the age of 15. Inspired by reports of software mastering Atari games and the board game Go, he has since been reading research papers and building pieces of what they described. “I like how you can get computers to do things that previously you would think were impossible,” Frans says, flashing his ready smile.

One of his creations is an interactive webpage that automatically colors in line drawings, in the style of manga comics.



Frans landed at OpenAI after taking on one of the lab’s list of problems in need of new ideas. He made progress, but got stuck and emailed OpenAI researcher John Schulman for advice. After some back and forth on the matter of trust region policy optimization, Schulman checked out Frans’s blog and got a surprise. “I didn’t expect from those emails that he was in high school,” he says.

Frans later met Schulman when he interviewed for an internship at OpenAI. When he turned up for work in San Francisco’s Mission District this summer, Frans was the only intern without a degree or studying in grad school. He started working on a tricky problem that holds back robots and other AI systems—how can machines tap what they’ve previously learned to solve new problems?

Humans do this without a second thought. Even if you’re making a recipe for the first time, you don’t have to re-learn how to caramelize onions or sift flour. By contrast, machine-learning software generally has to repeat its lengthy training process for every new problem—even when they have common elements.

Frans’s new paper, with Schulman and three others affiliated with the University of California Berkeley, reports new progress on this problem. “If it could get solved it could be a really big deal for robotics but also other elements of AI,” Frans says. He developed an algorithm that helped virtual legged robots learn which limb movements could be applied to multiple tasks, such as walking and crawling. In tests, it helped virtual robots with two and four legs adapt to new tasks, including navigating mazes, more quickly. A video released by OpenAI shows an ant-like robot in those tests. The work has been submitted to ICLR, one of the top conferences in machine learning. "Kevin's paper provides a fresh approach to the problem, and some results that go beyond anything demonstrated previously," Schulman says.

Frans grapples with challenging motion problems away from computers, too, as a black belt in Tae Kwon Do. Some of his enthusiasm for AI may come just from inhaling the air on his way to Gunn High School in Palo Alto, California, the heart of Silicon Valley. Frans says he works on his AI projects without help from his parents, but he isn’t the only computer whiz in the house. His father works on silicon-chip design at publicly listed semiconductor company Xilinx.

As you may have guessed, Frans is an outlier. Olga Russakovsky, a professor at Princeton who works on machine vision, says making research contributions in machine learning so young is unusual. In general, it’s harder for school kids to try machine learning and AI than subjects such as math or science with a long tradition of extra-curricular competitions and mentoring, she says. Access to computing power can be a hurdle as well. When Frans’s desktop computer wasn’t powerful enough to test one of his ideas, he pulled out his debit card and opened an account with Google's cloud-computing service to put his code through its paces. He advises other kids interested in machine learning to give it a shot. “The best thing to do is to go out and try it, make it yourself from your own hands,” he says.

Russakovsky is part of a movement among AI researchers trying to get more high schoolers tinkering with AI systems. One motivation is a belief that the field is currently too male, well-off, and white. “AI is a field that’s going to revolutionize everything in our society, and we can’t have it be built by people from a homogenous group that doesn’t represent society as a whole,” Russakovsky says. She cofounded AI4ALL, a foundation that organizes camps that give high-school students from diverse backgrounds a chance to work with and learn from AI researchers.

Back in Palo Alto, Frans has been thinking about helping the next generation of AI experts, too. He has a seven-year-old younger brother. “He’s interested in coding I think,” Frans says. “Maybe when he’s older I can help him.”