



Kepler 90 planet

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Kepler-90g's orbital period changes by 25.7 hours between two consecutive transits, caused by gravitational perturbations from other planets in the system. Additionally, changes in the depth and duration of transit events led to an exomoon being hypothesized to orbit this planet. However, this candidate moon was later found to be a false positive;

The planet orbits a G-type star named Kepler-90, its host star. The star is 1.2 times as massive as the Sun and is 1.2 times as large as the Sun. It is estimated to be 2 billion years old, with a surface temperature of 6080 K. In comparison, the Sun is about 4.6 billion years old; and has a surface temperature of 5778 K;

Our solar system now is tied for most number of planets around a single star, with the recent discovery of an eighth planet circling Kepler-90, a Sun-like star 2,545 light-years from Earth. The planet was discovered in data from NASA's Kepler Space Telescope.

The newly-discovered Kepler-90i - a sizzling hot, rocky planet that orbits its star once every 14.4 days - was found using machine learning from Google. Machine learning is an approach to artificial intelligence in which computers "learn." In this case, computers learned to identify planets by finding in Kepler data instances where the telescope recorded signals from planets beyond our solar system, known as exoplanets.

"Just as we expected, there are exciting discoveries lurking in our archived Kepler data, waiting for the right tool or technology to unearth them," said Paul Hertz, director of NASA's Astrophysics Division in Washington. "This finding shows that our data will be a treasure trove available to innovative researchers for years to come."

The discovery came about after researchers Christopher Shallue and Andrew Vanderburg trained a computer to learn how to identify exoplanets in the light readings recorded by Kepler - the minuscule change in brightness captured when a planet passed in front of, or transited, a star. Inspired by the way neurons connect in the human brain, this artificial "neural network" sifted through Kepler data and found weak transit signals from a previously-missed eighth planet orbiting Kepler-90, in the constellation Draco.

While machine learning has previously been used in searches of the Kepler database, this research demonstrates that neural networks are a promising tool in finding some of the weakest signals of distant worlds.

Other planetary systems probably hold more promise for life than Kepler-90. About 30 percent larger than Earth, Kepler-90i is so close to its star that its average surface temperature is believed to exceed 800 degrees Fahrenheit, on par with Mercury. Its outermost planet, Kepler-90h, orbits at a similar distance to its star as

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Earth does to the Sun.

"The Kepler-90 star system is like a mini version of our solar system. You have small planets inside and big planets outside, but everything is scrunched in much closer," said Vanderburg, a NASA Sagan Postdoctoral Fellow and astronomer at the University of Texas at Austin.

Shallue, a senior software engineer with Google's research team Google AI, came up with the idea to apply a neural network to Kepler data. He became interested in exoplanet discovery after learning that astronomy, like other branches of science, is rapidly being inundated with data as the technology for data collection from space advances.

"In my spare time, I started googling for "finding exoplanets with large data sets" and found out about the Kepler mission and the huge data set available," said Shallue. "Machine learning really shines in situations where there is so much data that humans can't search it for themselves."

Kepler's four-year dataset consists of 35,000 possible planetary signals. Automated tests, and sometimes human eyes, are used to verify the most promising signals in the data. However, the weakest signals often are missed using these methods. Shallue and Vanderburg thought there could be more interesting exoplanet discoveries faintly lurking in the data.

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