

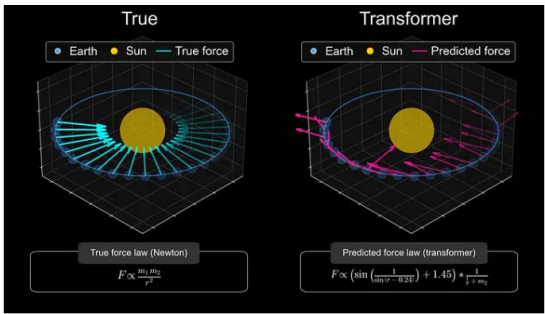
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Harvard and MIT Study: AI Models Are Not Ready to Make Scientific Discoveries

AI can predict the sun will rise again tomorrow, but it can't tell you why

Alberto Romero Follow 20 min read · Jul 15, 2025

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Source

A [study](#) by researchers at Harvard and MIT sheds light on one of the key questions about large language models (LLMs) and their potential as a path to artificial general intelligence (AGI): Can foundation AI models encode world models, or are they just good at predicting the next token in a sequence?

(This dichotomy between explanation and prediction is a fundamental scientific conundrum that goes beyond AI — more on that later.)

The authors trained a transformer-based AI model to make predictions of orbital mechanics (think: Kepler's discoveries of how planets move around the sun) and then wanted to test whether it had learned the underlying Newtonian mechanics (the laws of gravitation). They hypothesize that if the AI model makes correct predictions but *doesn't encode* Newton's laws, then it lacks a comprehensive world model.

This would be powerful evidence against the idea that AI models (as they are today) can understand the world, which would be a big setback to the AGI dream.

They chose orbital mechanics because it's historically accurate: Newton built on Kepler's discoveries to derive...

Critically, Newton realized this mechanistic explanation applied to many other things besides planets, like an apple falling from a tree.

That's the power of a world model. It allows you to go beyond the immediately observed phenomena and extrapolate the underlying cause to unobserved and seemingly unrelated scenarios. Humans do this all the time, since we are toddlers. If you see someone pour juice into a cup and then knock the cup over, you understand, even without seeing the spill, that the juice will be on the floor. You don't need to witness the outcome more than once to know it. That's because...

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Written by Alberto Romero

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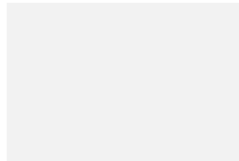
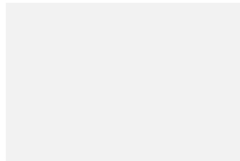


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