TheoristGPT

- Is it possible for AI to function as a theoretical physicist?
- What insights can AI gain from physics?
- How can physics unlock the mysteries of AI?

AI for Physics

Book: AI for Physics

Discovering Physical Concepts with Neural Networks

SciNet, a neural network, avoiding prior physical knowledge, effectively identifies relevant physical variables and laws in both quantum and classical mechanics from experimental data through various toy models. This innovative approach demonstrates the potential of neural networks in contributing to scientific discovery in physics.

AI Feynman: symbolic regression

AI algorithm for symbolic regression that enhances discovery of analytical expressions from data. Discovered 100 equations from the Feynman Lectures on Physics.

AI Feynman 2.0

Hidden Symmetries and Deep Learning

Employs neural networks to identify symmetries that become apparent only after specific coordinate transformations, enhancing our understanding of complex physical phenomena.

Decoding Quantum Field Theory with Machine Learning

It introduces a framework where simple, fixed local measurement protocols, combined with neural network-based data processing, can reveal a wide range of global properties of quantum fields, demonstrating the potential of machine learning in simplifying complex data analysis in QFT.

Deep Learning the Functional Renormalization Group

The paper applies deep learning, specifically a Neural Ordinary Differential Equation solver, to understand the dynamics of the functional Renormalization Group in the two-dimensional Hubbard model.

Physics for AI

Physics based Deep Learning

Understand neural networks through EFT

It establishes a theoretical framework where neural networks are examined through the lens of Wilsonian effective field theory, providing insights into their function and behavior. This approach allows

for a deeper understanding of neural networks, particularly in how they can be related to and analyzed through the principles of quantum field theory.