Performance Optimization of the AI Feynman Symbolic Regression code

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Abstract

This report presents the AI Feynman programming code performance optimization.

I. Overview

AI Feynman [1] is a neural network package for reconstructing original numerical expression (formula) from the resulting dataset.

II. Program Design

The program code is organized into the preprocessing (*feature extraction*) and neural network *training* phases.

The *feature extraction* is given as a massive bruteforce evaluation of arbitrary basis function combinations. In order to maintain acceptable running times, this phase is implemented as a native code (Fortran). Moreover, each instance of bruteforce evaluation is limited by 30 seconds.

III. Optimization

AAA

IV. Preliminary results

AAA

References

[1] Udrescu, S.M., and Tegmark, M. 2020. AI Feynman: A physics-inspired method for symbolic regression. Science Advances, 6(16), p.eaay2631.