Language Models

Jan Drgona, Pacific Northwest National Laboratory

Neural Modules with Adaptive Nonlinear Constraints and Efficient Regularizations (NeuroMANCER) is an open-source differentiable programming library for solving parametric constrained optimization problems, physics-informed system identification, and parametric model-based optimal control. NeuroMANCER is written in PyTorch and allows for systematically integrating machine learning with scientific computing to create end-to-end differentiable models and algorithms embedded with prior knowledge and physics. The library is focused on research, rapid prototyping, and streamlined deployment. Strong emphasis is given to extensibility and interoperability with the PyTorch ecosystem with quick adaptability to custom domain problems. Our open-source repository contains numerous tutorial examples demonstrating the use of physics-informed neural networks for solution and parameter estimation of differential equations, learning to optimize methods with feasibility restoration layers and differentiable control algorithms for learning constrained control policies for nonlinear systems.