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Flux: Elegant machine learning with Julia

Mike Innes[1]

1 Julia Computing

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Software

- Review
- Repository
- Archive

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Summary

Flux is library for machine learning (ML), written using the numerical computing language Julia (Bezanson et al. 2017). The package allows models to be written using Julia's simple mathematical syntax, and applies automatic differentiation (AD) to seamlessly calculate derivatives and train the model. Meanwhile, it makes heavy use of Julia's language and compiler features to carry out code analysis and make optimisations. For example, Julia's GPU compilation support (Besard, Foket, and De Sutter 2017) can be used to JIT-compile custom GPU kernels for model layers (Innes 2017).

The machine learning community has traditionally been divided between "static" and "dynamic" frameworks that are easy to optimise and easy to use, respectively (Innes and others 2017). Flux blurs the line between these two approaches, combining a highly intuitive programming model with the compiler techniques needed by ML. As a result of this approach, it already supports several features not available in any other dynamic framework, such as kernel fusion (Johnson 2017), memory usage optimisations, importing of models via ONNX, and deployment of models to JavaScript for running in the browser.

Flux has been used heavily for natural language processing, but can also support state-of-the-art research models in areas like computer vision, reinforcement learning and robotics.

References

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