ETH
Eidgenössische Technische Hochschule Zürich
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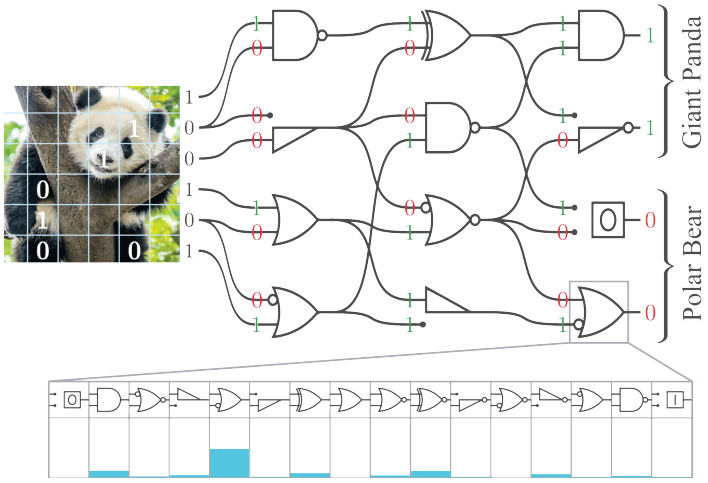
Distributed Computing

Prof. R. Wattenhofer

Deep Differentiable Logic Gate Networks

Recent research increasingly emphasizes the development of efficient neural network architectures. Deep Differentiable Logic Gate Networks combine logic gates like "AND" and "XOR" within a network framework. These architectures enable exceptionally fast execution speeds, reaching inference rates exceeding one million images per second on a single CPU core. To address the intrinsic non-differentiability of conventional logic gate networks, these models employ differentiable logic gate networks. By integrating real-valued logics with a continuously parameterized relaxation, they facilitate effective training through gradient descent. This project investigates how concepts from traditional deep learning can be adapted to train logic gate networks effectively.

Requirements: Strong Python programming skills, a solid understanding of machine learning and optimization techniques, and familiarity with neural network architectures are essential. Knowledge of gradient-based optimization methods and practical experience with efficient model design are highly desirable.



We will have weekly meetings to address questions together, discuss progress, and brainstorm ideas for further improvements.

Contact

In a few short sentences, please tell us why you are interested in the project and about your coding and background (i.e., your own projects or courses).

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