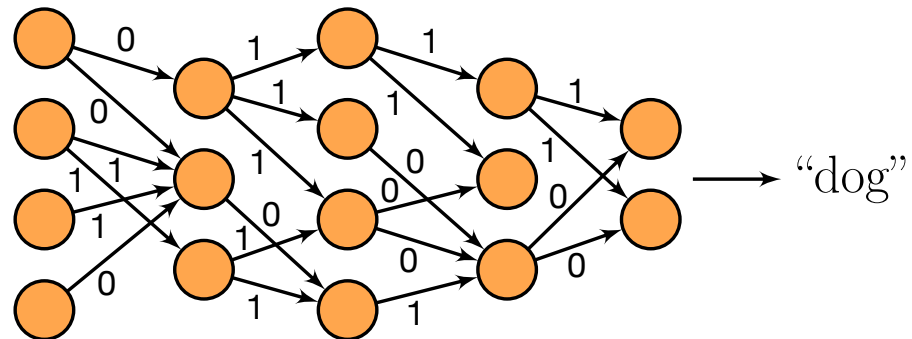# Training Weightless Neural Networks

Weightless neural networks present an innovative approach to hardware-centric deep learning by replacing traditional weight-based architectures with a lightweight, memory-efficient design. These networks leverage binary or ternary weight representations to significantly reduce computational complexity and energy consumption, making them ideal for deployment in resource-constrained environments. Recent advances have demonstrated the feasibility of training weightless neural networks by optimizing its activation functions rather than floating point weights, without compromising performance across simple tasks. In this project, we will explore methods to enhance weightless neural networks for hardware-aware training, focusing on optimizing their data and computation efficiency, and ensuring scalability across a wider range of applications.

Goals & Tasks

- Review of the state-of-the-art on resource-efficient DL architectures.

- Developing efficient training mechanisms to improve binarized, weightless networks.

- Simulating and benchmarking models on simple machine learning tasks.

Contact

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Qualifications

- Interest in resource-efficient DL.

- Experience with the Python based deep learning framework PyTorch.

- Registered to one of the following:

  ☐ **Bachelor Thesis**
  ✓ **Seminar Project**
  ✓ **Master Thesis**