Allan Lin - Resume

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Projects

Continuous Sparse Attention

- Exploring the problem space of transformer memory complexity
- Tries to reduce memory and compute complexity from $O(n^2)$ to $O(nk)$, where k is a constant through a smooth functional approximation in the attention kernel
  Cuda, C++, Pytorch
  github: https://github.com/Aalanli/SparseAttn

Growing Neural Cellular Networks

- Continuously growing a neural network architecture by embedding a discrete graph into a metric space
- Exploring spiking neural networks, target propation, hebbian learning and other alternatives to back-prop.

- Cuda, C++, Pytorch, Rust, Julia*
  github: https://github.com/Aalanli/GrowNet

Continuous growable convolution

- Uses a continuous gated function approximation to convolution neural networks
- Addresses growing kernels in convolution neural networks
  Cuda, C++, Pytorch
  github: https://github.com/Aalanli/DDL

Object Detection with DETR, and DETR like models

- Exploration of one-stage object detection with DETR class models
- Explores bipartite set based loss on transformer with various convolution backbones
- Explores various information injection methods from backbone to upper attention layers
  Pytorch, Wandb

github: https://github.com/Aalanli/ARTR
wandb: https://wandb.ai/allanl/ARTR

Music Generation

- A mini music generation project on the MAESTROv3 dataset
- benchmarks some auto-regressive transformer architectures
  Pytorch, Jax, Wandb
  github: https://github.com/Aalanli/MusicGeneration
  wandb: https://wandb.ai/allanl/MusicGeneration

Experience

- C++, Python, Rust, Julia
  - C++ and rust for kernel development, python and julia for their ML frameworks, pytorch, zygote respectively.
- Cuda, Triton (open-ai), Bevy (game-engine), OpenCL, Pytorch, Jax, Tensorflow, Zygote
  - Experienced in frameworks for deployment of standard components, and gpu programming frameworks for development of custom operations
  - Some experience in game engines and rendering through the bevy game engine coupled with wgsl.