Practical ML Tutorial: Part II

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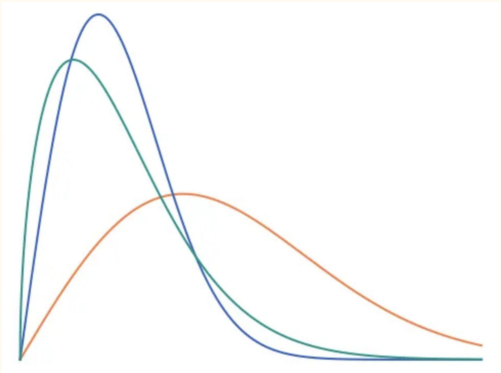
SEEMAPLD2023, George Williams

Agenda

Part I

- AI Trends
- ML Basics
- Survival Analysis
- Hands-On Programming



Part II

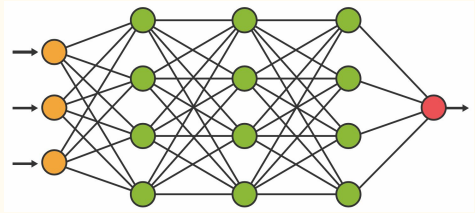
- AI Hardware
- PyTorch Basics
- Computer Vision
- Hands-On Programming

AI & ML Hardware

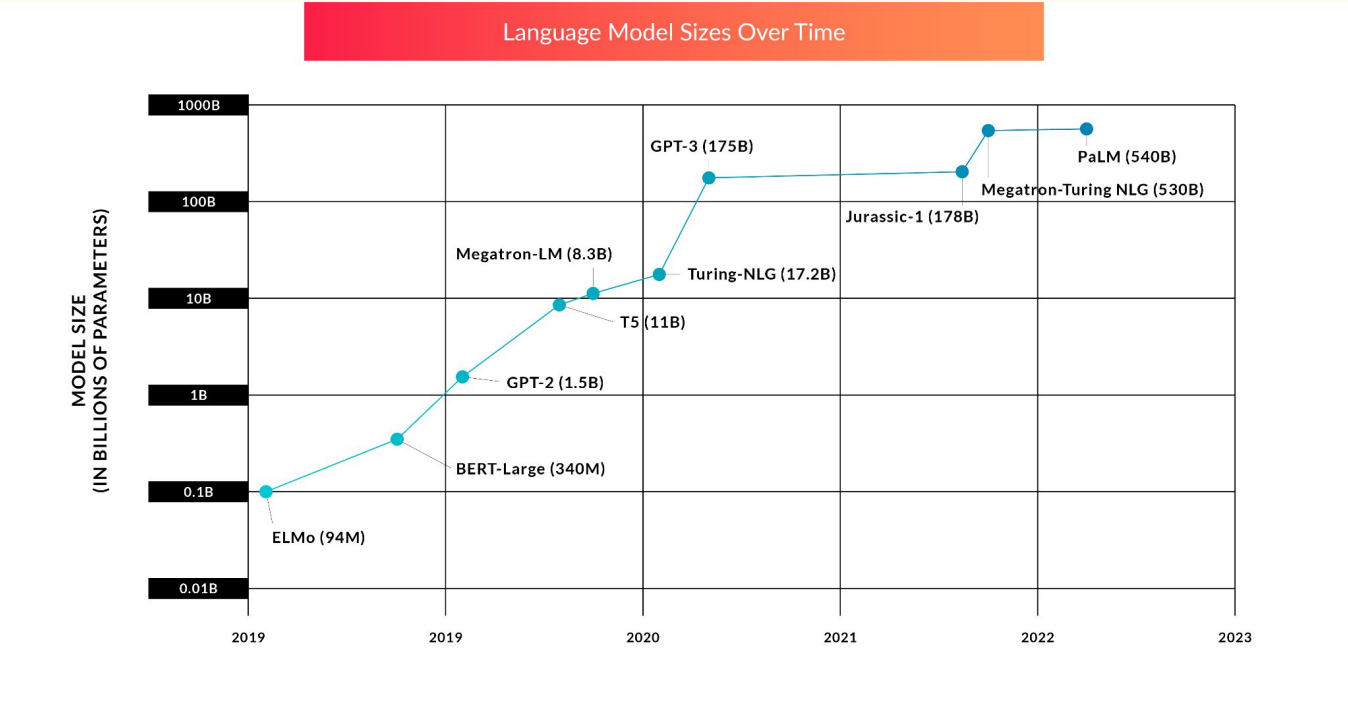
Extreme Industry Divergence...

Tiny ML

Large ML

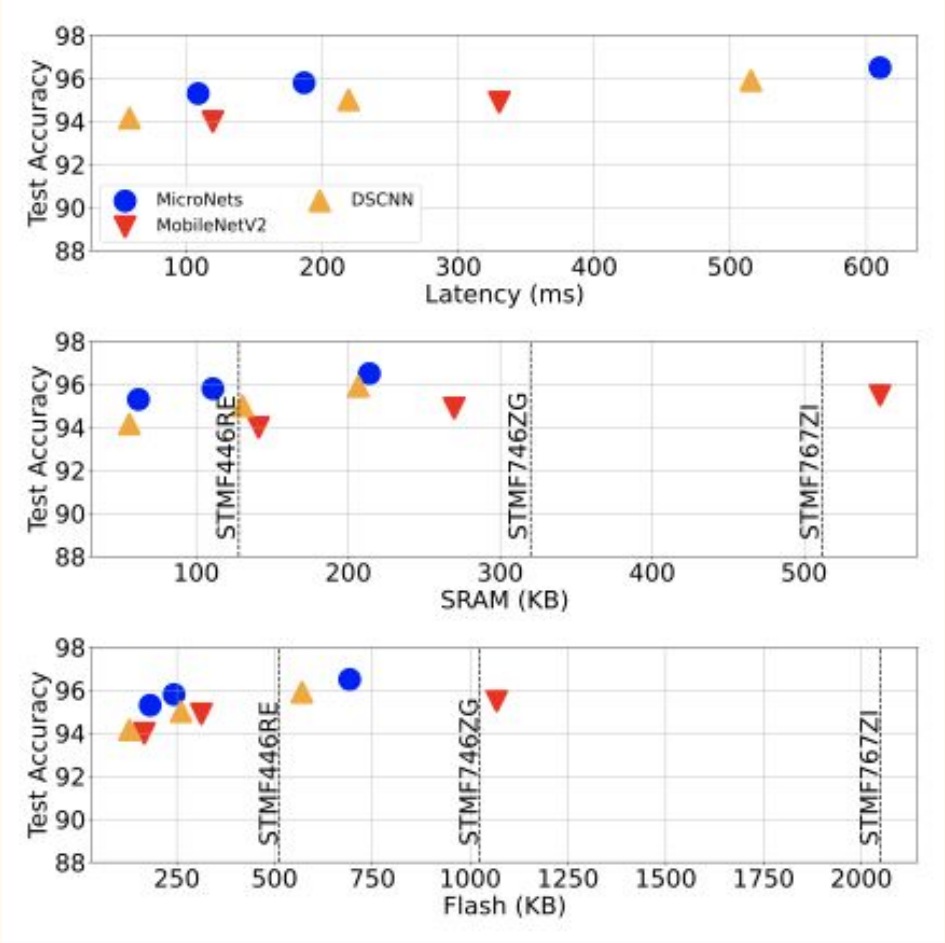


Large ML: Large Language Models



https://twosigmaventures.com/blog/article/the-promise-and-perils-of-large-language-models/

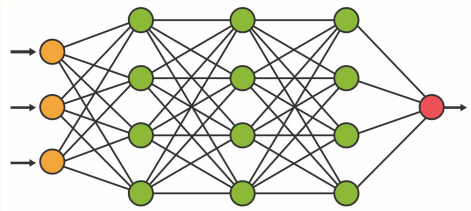
Tiny ML: AI At The Edge



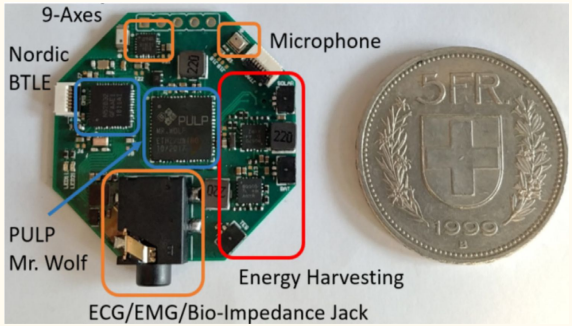
https://community.arm.com/arm-research/b/articles/posts/neural-network-architectures-for-deploying-tinyml-applications-on-commodity-microcontrollers

Extreme Hardware Divergence...

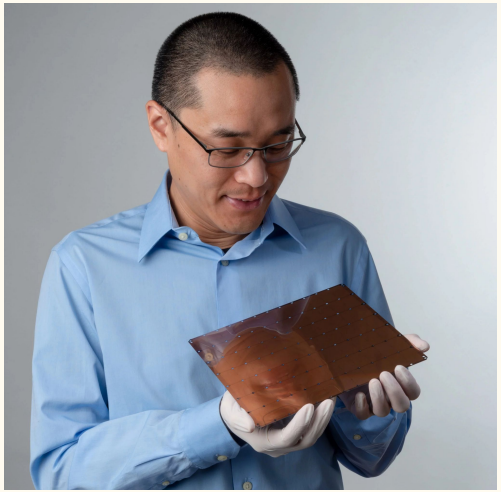
Tiny ML



Large ML



InfiniWolf Deep Learning on MCU



Cerebras Wafer-Scale for Deep Learning

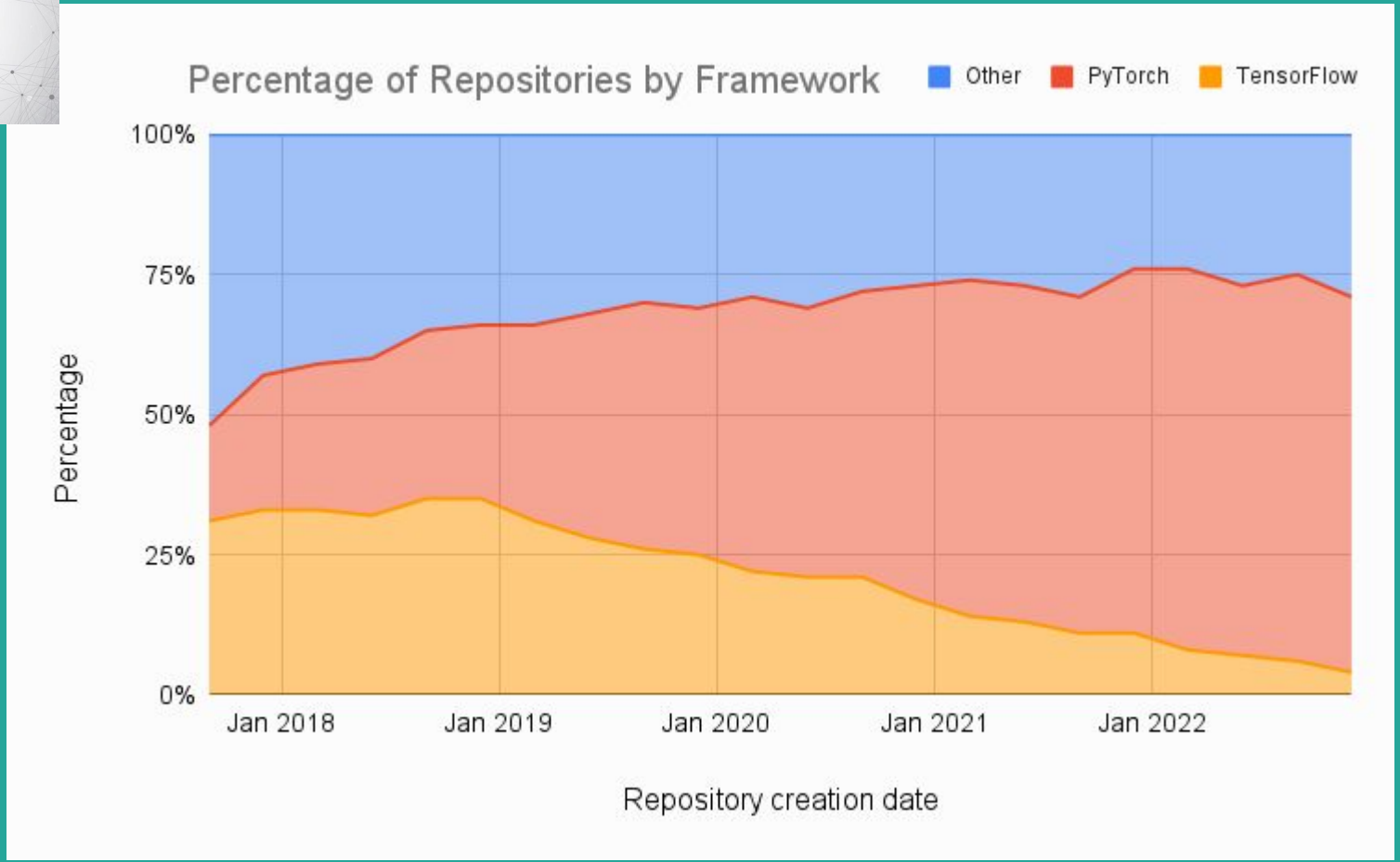
Jetson NANO

5-10 Watts Power Consumption!

GPU	NVIDIA Maxwell architecture with 128 NVIDIA CUDA® cores
CPU	Quad-core ARM Cortex-A57 MPCore processor
Memory	4 GB 64-bit LPDDR4, 1600MHz 25.6 GB/s
Storage	16 GB eMMC 5.1

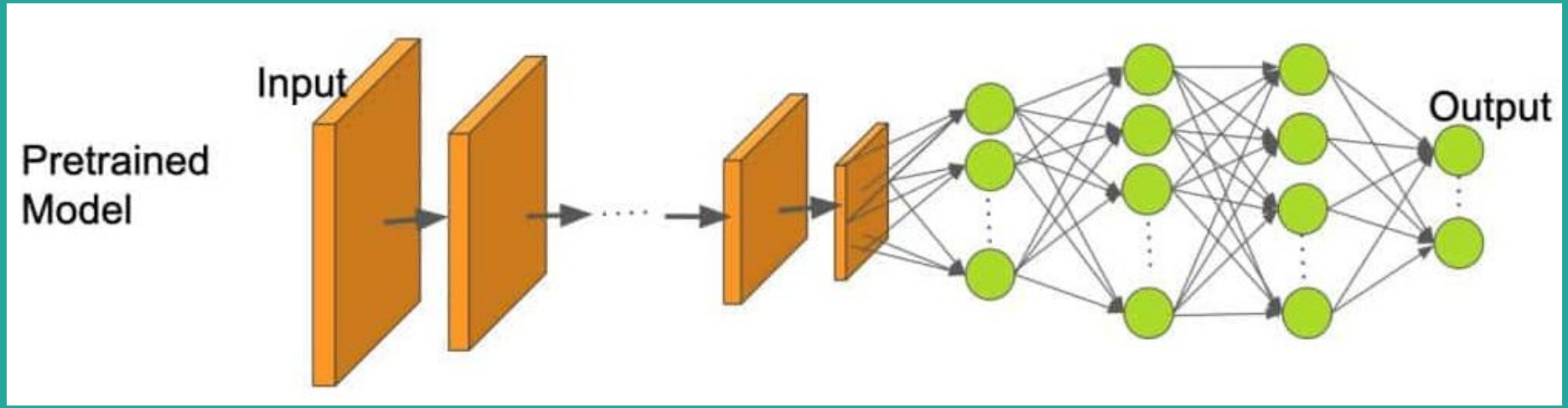
Deep Learning Frameworks

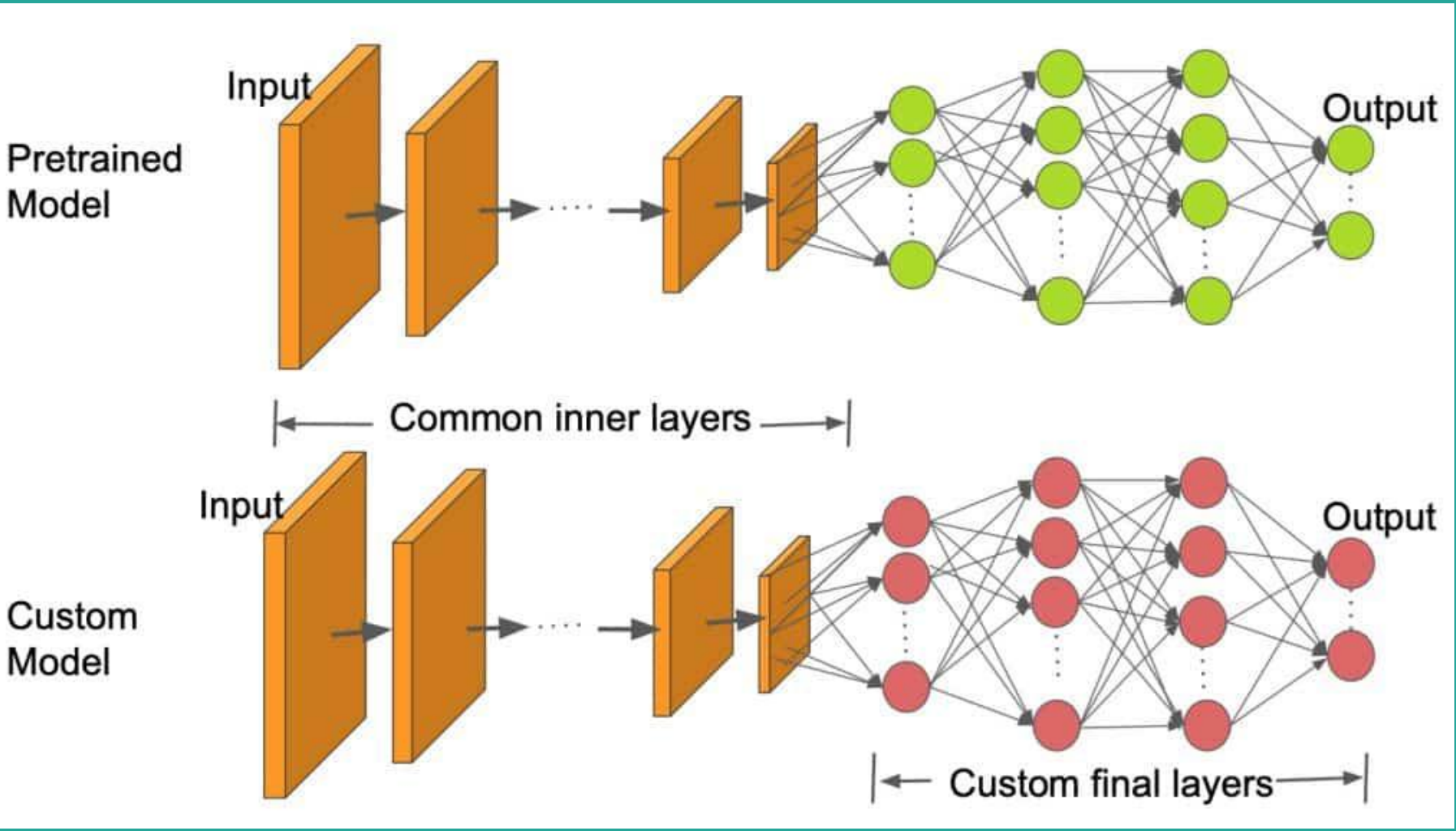
TensorFlow
vs
PyTorch

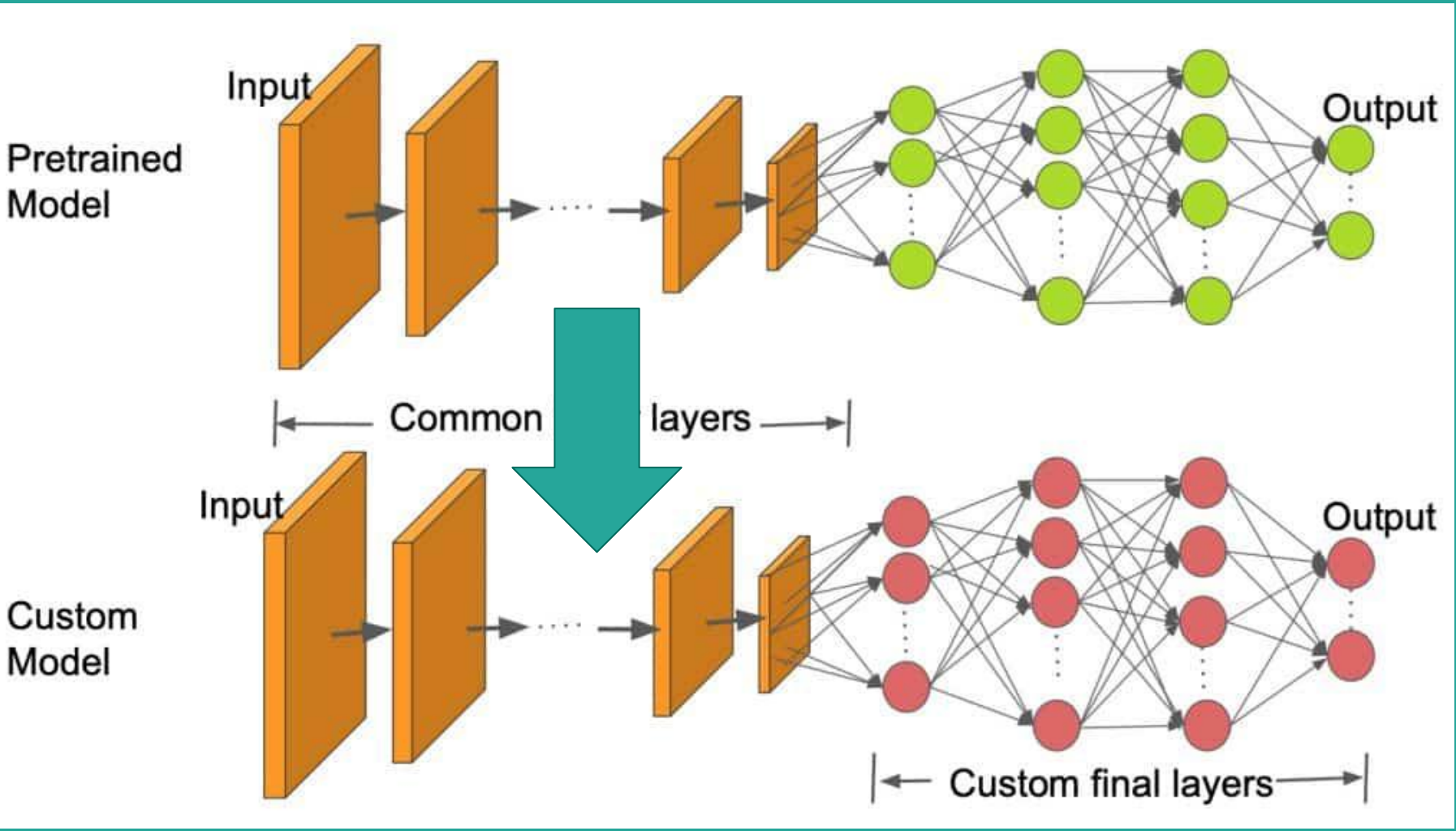


https://www.assemblyai.com/blog/pytorch-vs-tensorflow-in-2023/

Transfer Learning


Input
Pretrained
Model
Output


Pretrained Model
Input
Output
Common inner layers
Custom Model
Input
Output
Custom final layers


Pretrained Model
Input
Output
Common layers
Custom Model
Input
Output
Custom final layers

Let’s Continue Coding!