

Neutero: Neural Network based Image Inferring on Heterogeneous Hardware

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Some terminology

90's Media: AI WILL DESTROY
THE WORLD IN A DECADE

That AI today:

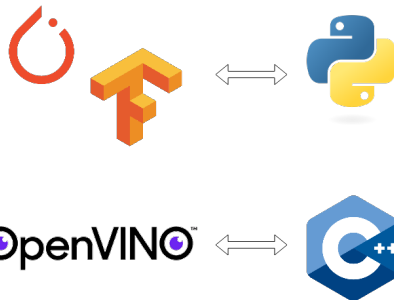


Source: pinterest.com

- Machine Learning, Neural Network and Image Recognition
- What is Image Inference?
- What we mean by “Heterogeneous Hardware”?

Problem 1

Different hardware require different frameworks, different frameworks use different programming languages.



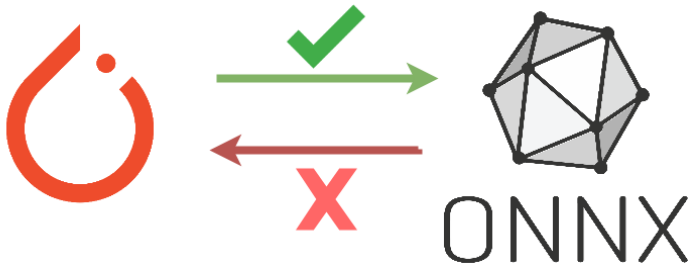
(Partial) Solution to Problem 1



Source: opensourceforu.com

ONNX: Open Neural Network eXchange

Problem 2



Our Solution: Neutero

The screenshot displays the Neutero application interface, which is divided into two main windows: the main configuration window and an 'Inference Result' window.

Main Configuration Window:

- Hardware Settings:** A list of hardware configurations with checkboxes. 'IntelCPU - TorchInference' is selected.
- Image Settings:** A section for adding images. It shows four image thumbnails with their file paths (e.g., /home/p...). Below this are 'Import Image' and 'Remove Image' buttons.
- Model Selection:** A dropdown menu showing 'lenet_MNIST.onnx'.
- Buttons:** 'Import Topology' and 'Import Label' buttons are present.
- Status:** A text area shows the progress: 'Program started...', 'IntelCPU - TorchInference selected', 'Image added', 'lenet_MNIST.onnx is selected', and 'Inference Completed'.
- Time Elapsed:** A green 'Start' button and a red 'Stop' button are shown, along with the text 'Time Elapsed: 00:00.141'.
- Buttons:** 'View Results' and 'Export Results' buttons are at the bottom.

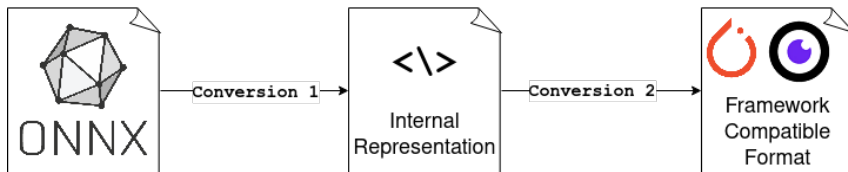
Inference Result Window:

This window displays the results of the inference process. It shows a table with columns for 'Image', 'Confidence', and 'Details'.

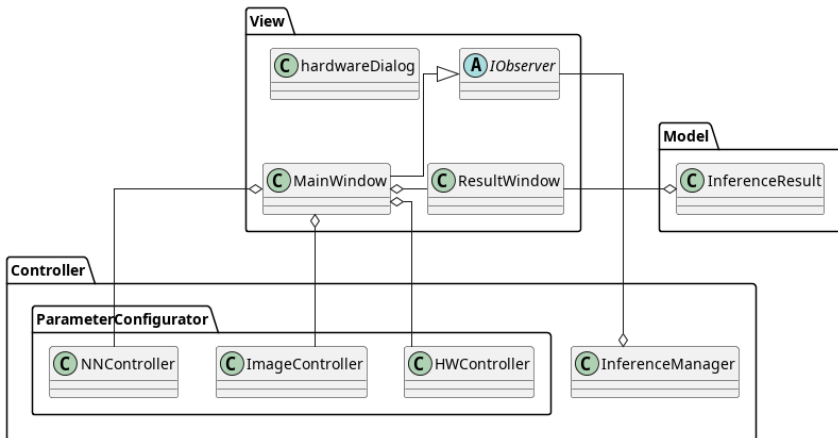
Image	Confidence	Details
Intel(R) Xeon(R) CPU ...		Elapsed time: 0.141355 Number of Images: 4 Inference provider: TorchInf...
	label1: 1.000000 label0: 0.000000 label2: 0.000000	
	label5: 1.000000 label0: 0.000000 label1: 0.000000	
	label2: 1.000000 label0: 0.000000 label1: 0.000000	
	label4: 0.995948 label2: 0.004052 label0: 0.000000	

See our program in action!

Inner Details (1)



Inner Details (2)



Some statistics

Main Project: 4416 lines (364 of them are comments)

Test Project: 890 non-comment lines

Total LOC: 5306 lines, 4942 non-comment lines

Total commits: 335 commits in 15 branches.

Unit Test Coverage Summary

	Line	Function
Model	92.0%	92.8%
Controller	83.6%	82.6%
Total	90.0%	90.1%

Thank you for your attention!