

# 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:

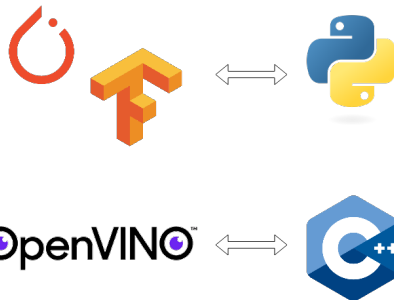


Source: [pinterest.com](https://www.pinterest.com)

- 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.



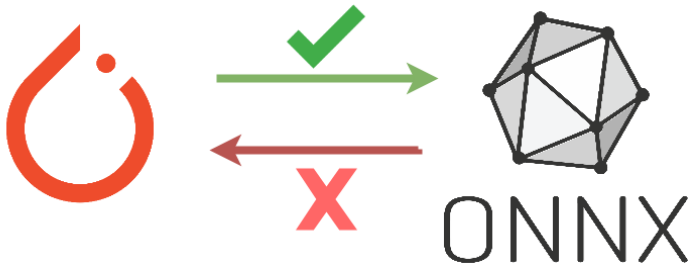
# (Partial) Solution to Problem 1



Source: [opensourceforu.com](https://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 respective file paths: `/home/p...`.
- Model Selection:** A dropdown menu showing 'lenet\_MNIST.onnx'.
- Buttons:** 'Import Topology', 'Import Label', 'Start', 'Stop', 'View Results', and 'Export Results'.
- Status Log:** A text area showing the progress: 'Program started...', 'IntelCPU - TorchInference selected', 'Image added', 'lenet\_MNIST.onnx is selected', and 'Inference Completed'.
- Time Elapsed:** A display showing '00:00.141'.

**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	

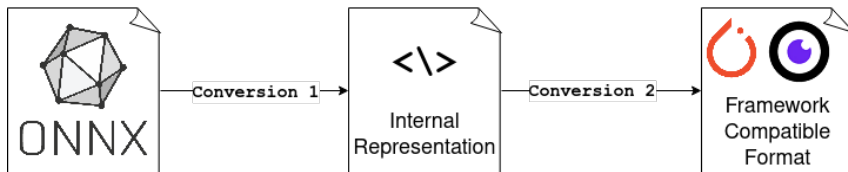


See our program in action!

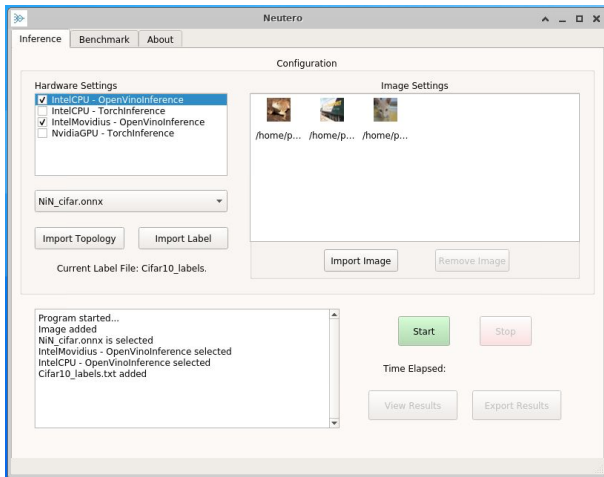




# Inner Details (1)



## 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%
<b>Total</b>	<b>90.0%</b>	<b>90.1%</b>







# The End

Thank you for your attention!