Neutero: Neural Network based Image Inferring on Heterogeneous Hardware

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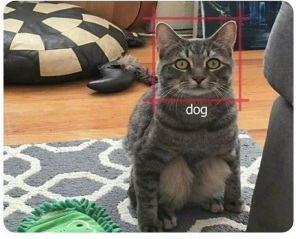
Some terminology

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

That AI today:

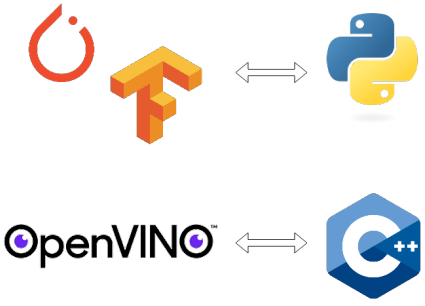


Source: pinterest.com

- 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

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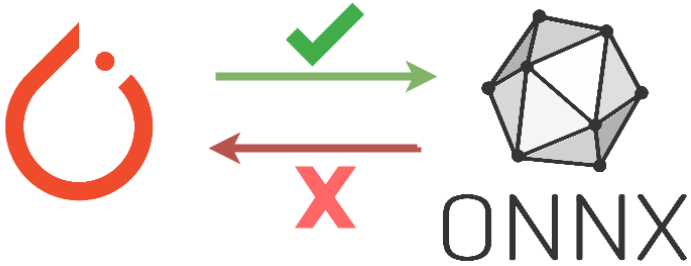
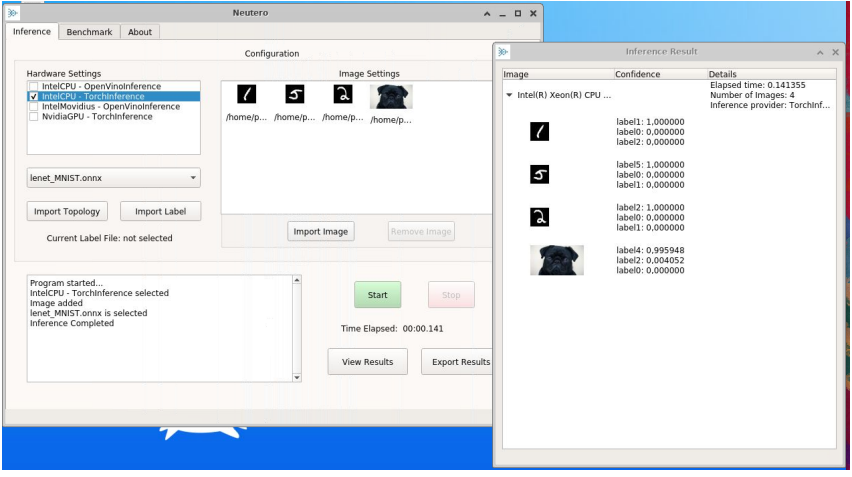
Problem 2



Our Solution: Neutero



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Who are we?

- **Rodi & Oğuz:** Back-end (Model) development
- **Yavuz:** Front-end (View) development
- **Li:** Testing, documentation, environment management
- **Umut:** Controller development, deployment

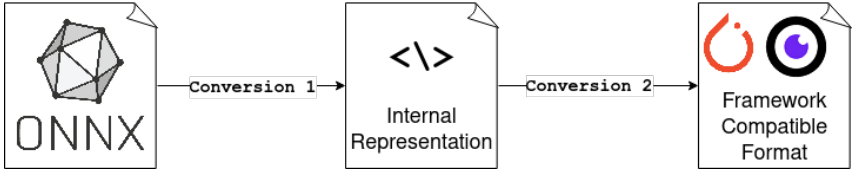
Demonstration

See our program in action!

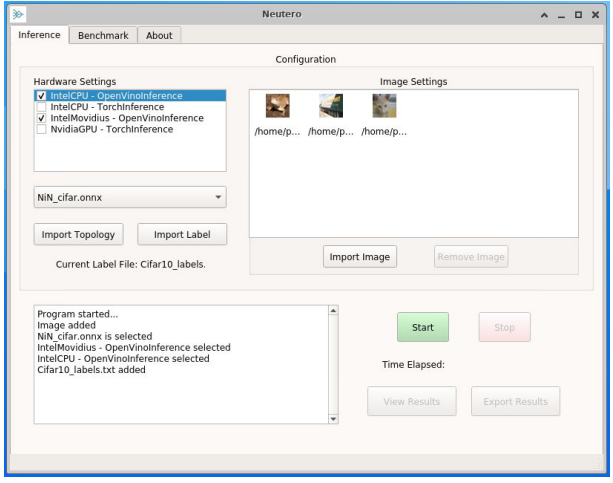
Tools we used

- C++
- Qt, Qt Creator
- ONNX
- `qmake`, `make`, `gcc`
- `lcov`, `gcov`

Inner Details (1)



Inner Details (2)



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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.

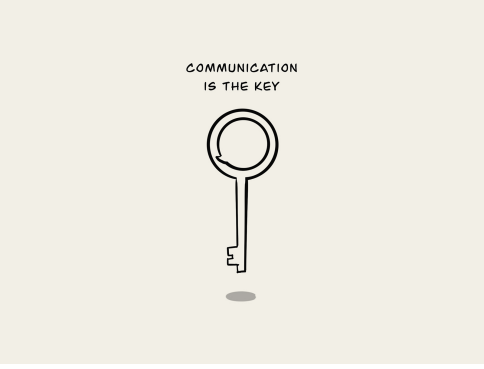
Unit Test Coverage Summary

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

Waterfall Model & Implementation Details

- Cautious planning in the Specification Phase
  - → Simple requirements
  - → Robust design
- Learning curve of C++ and Neural Networks are steep

Teamwork & Organization



Artist: "akkicha" at dribble.com

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Acknowledgements & License

Our project is available on GitHub under GPL v3 License.

Many thanks to our advisors Soyed Tuhin Ahmed and Christopher Münch.

The End

Thank you for your attention!