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.NET Conf

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Azure Machine Learning & ML.NET: Better together

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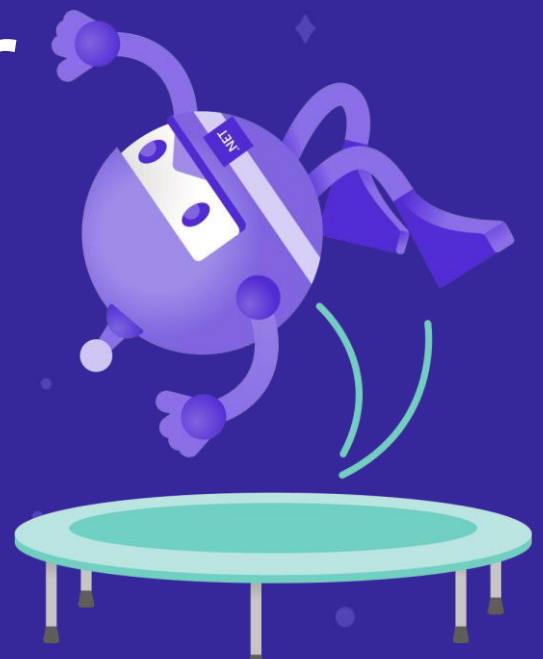


RELEASED

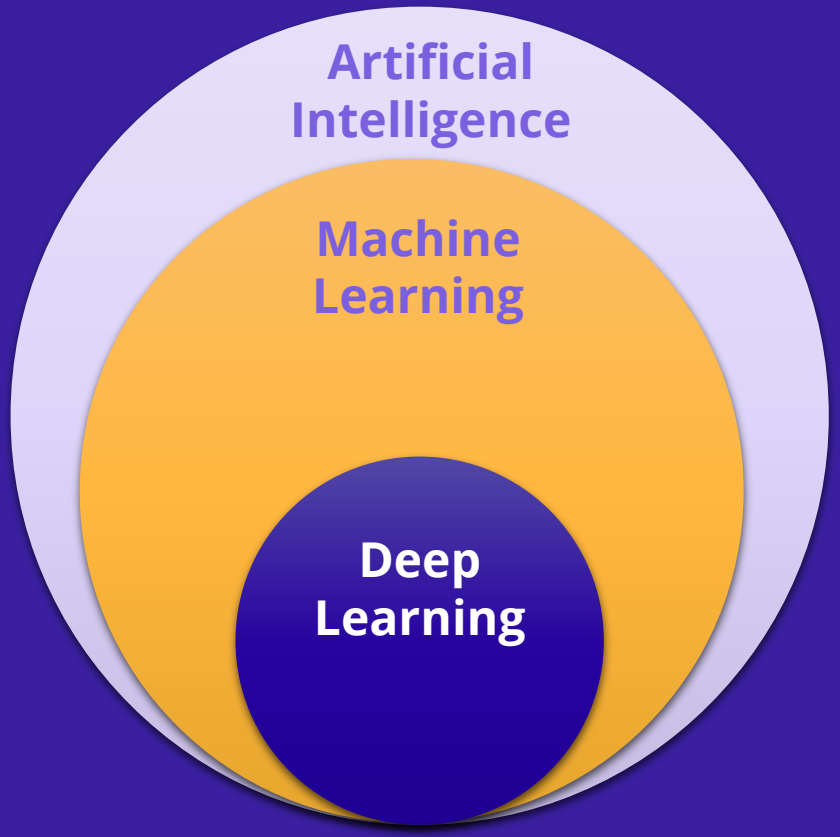
Today’s value proposition

- Implement a model with AutoML in Azure Machine Learning
- Export as ONNX
- Inference with the ONNX on .NET with ML.NET
- Use the best of both worlds, we want it all!

Agenda

- Quick refresher on AI
- Azure Machine Learning
- ONNX
- Generating an ONNX Model in Azure ML with AutoML & Notebooks
- ML.NET
- Consuming an ONNX Model with ML.NET

What is Machine Learning?



Artificial Intelligence

The ability of a computer to perform tasks commonly associated with intelligent beings (reason, discover meaning, generalize, learn from past experience)

Machine Learning

Teaching computers to make predictions from data without being explicitly programmed

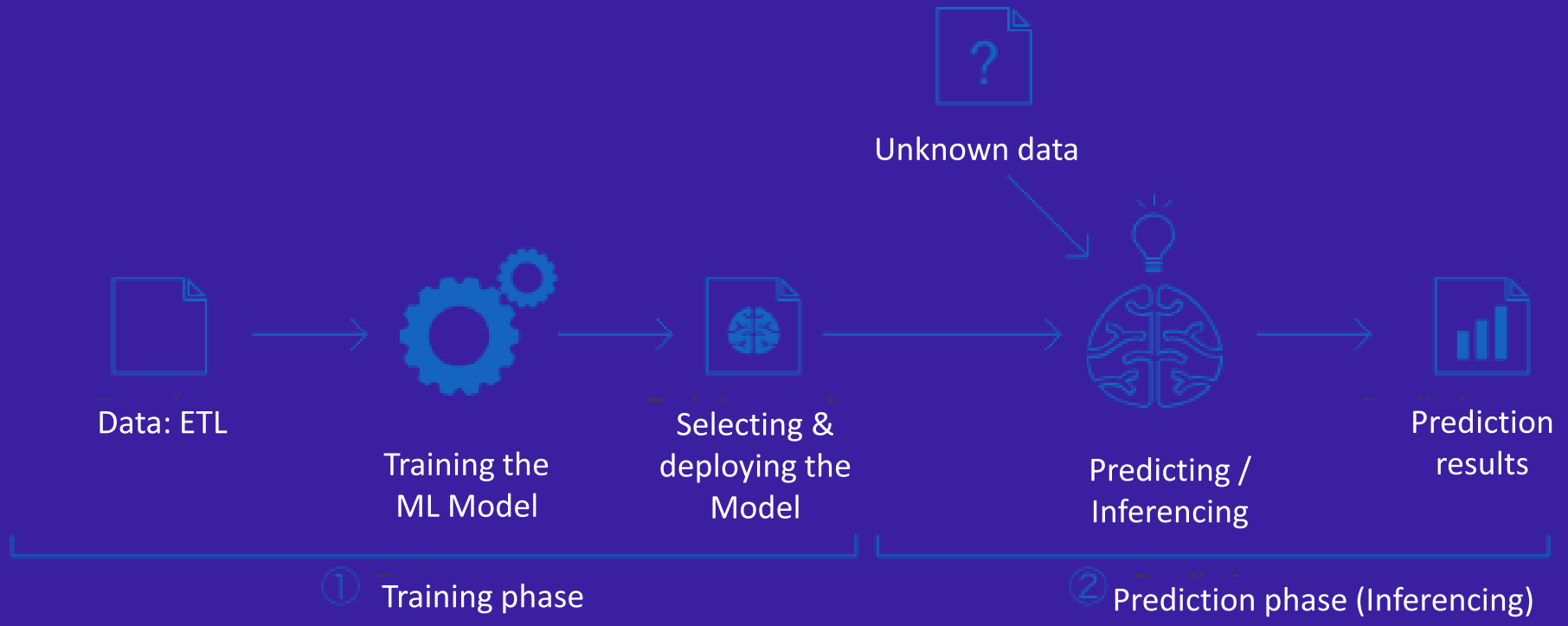
Deep Learning

Subset of ML based on artificial neural networks which imitate the way the human brain learns, thinks, and processes data.

What’s Machine Learning?

The Machine Learning Workflow

- The process of training a ML model and using it involves several steps which we can summarize on the following picture.



Azure Machine Learning

- Bring AI to everyone with an end-to-end, scalable, trusted platform

Boost your data science productivity

Increase your rate of experimentation

Deploy and manage your models everywhere

Built with your needs in mind

- Automated machine learning
- Managed compute
- Simple deployment
- DevOps for machine learning
- Support for open source frameworks
- Tool agnostic Python SDK

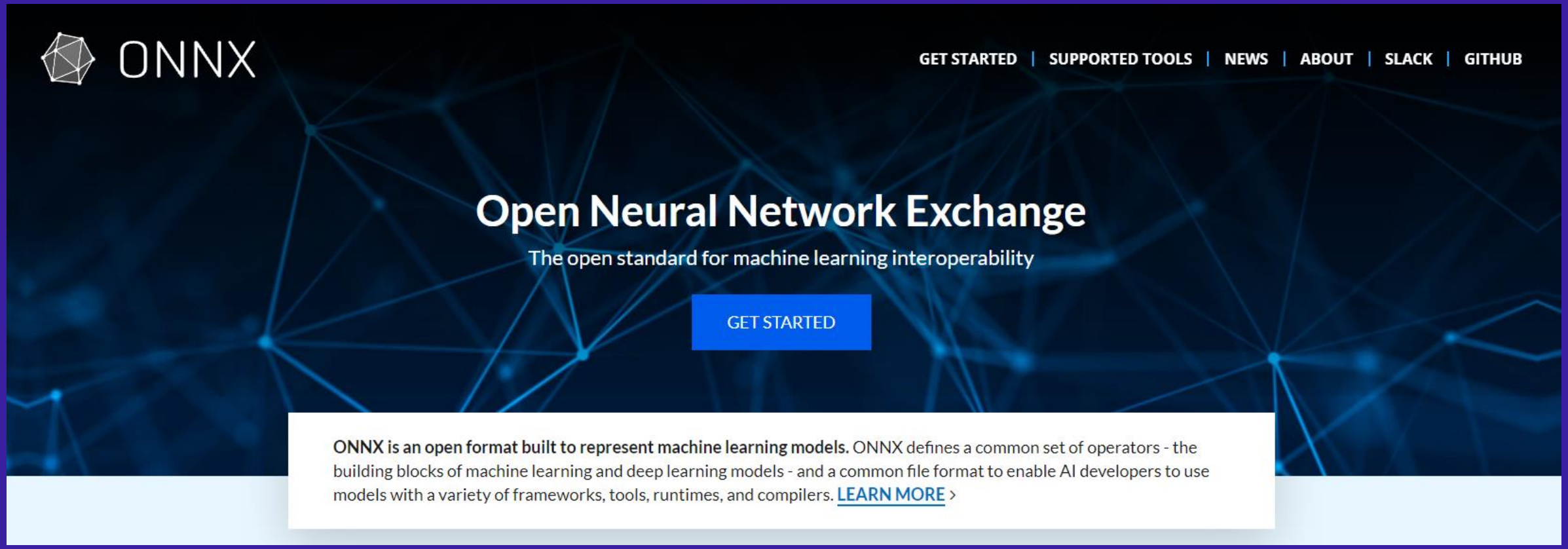
Seamlessly integrated with the Azure Portfolio

Demo

How do we get to Azure ML & Studio Overview

ONNX

Open Neural Network exchange



Demo

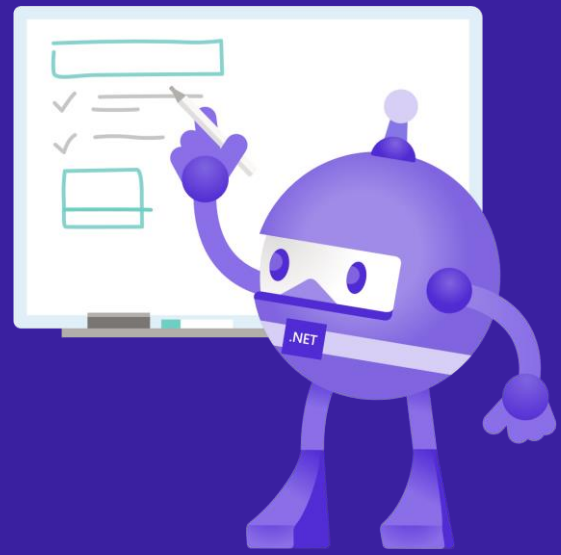
Let’s build an ONNX with Python Notebooks

ONNX generation from Azure ML

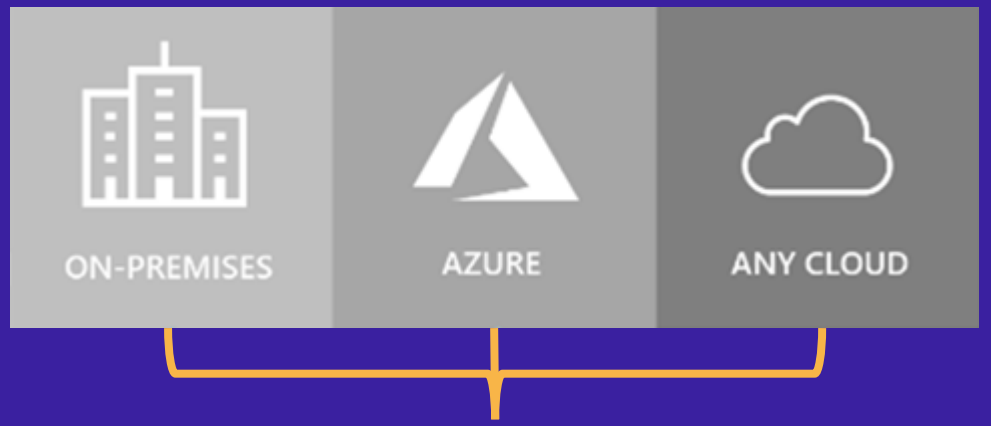
Only supported at the moment from Notebooks

Only the following changes are needed when adapting an existing Notebook that trains a model:

1. Add support for ONNX on the AutoML Configuration, AutoMLConfig:
   - enable_onnx_compatible_models=True,
2. Once the model is built, to export it as ONNX….
   1. First, retrieve the model
      - best_run, onnx_mdl = local_run.get_output(return_onnx_model=True)
   2. Second, convert and save it
      - from azureml.automl.runtime.onnx_convert import OnnxConverter
      - onnx_fl_path = "./best_model.onnx"
      - OnnxConverter.save_onnx_model(onnx_mdl, onnx_fl_path)



What is ML.NET?



ML.NET

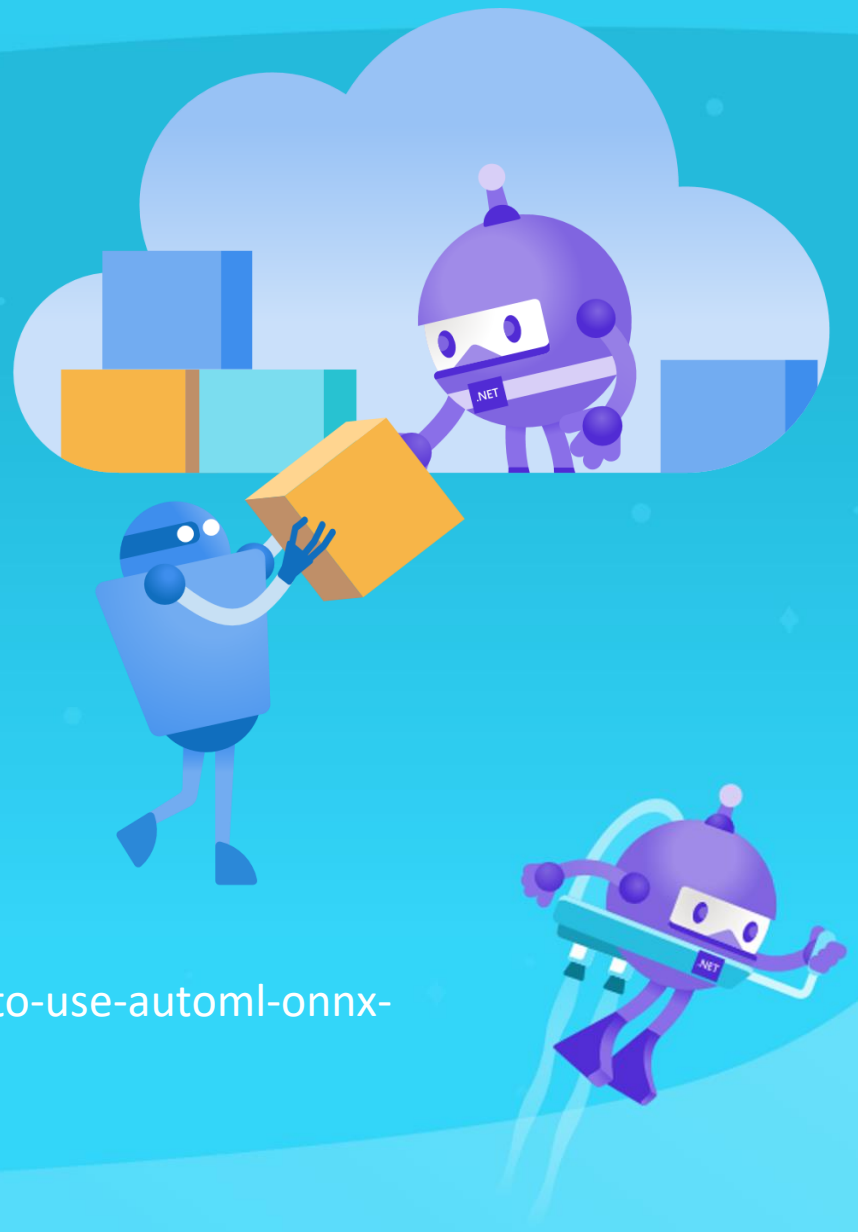
An open source and cross-platform machine learning framework for .NET

Windows Linux macOS

Demo

Using ONNX on ML.NET

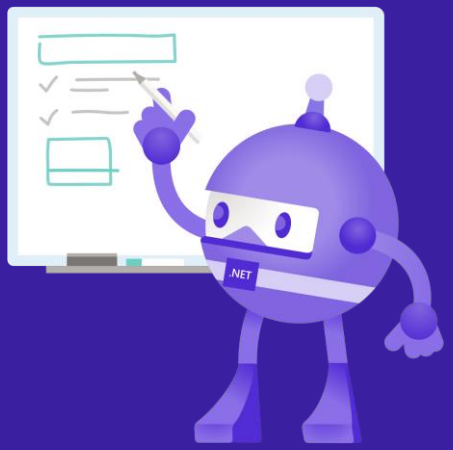
Based on:
https://docs.microsoft.com/en-gb/azure/machine-learning/how-to-use-automl-onnx-model-dotnet



Conclusions & take aways

Some points to remember and take away with you…

- Azure Machine Learning rocks
- The Designer is cool
- AutoML is also very cool
- Still no ONNX on AML no-code (but coming!)
- We can get the ONNX model with Notebooks! – And AutoML!!
- And run it from ML.NET
- We could also generate it on ML.NET and deploy it in Azure Machine Learning.
- The best is if you try it yourself!



Resources

Twitter

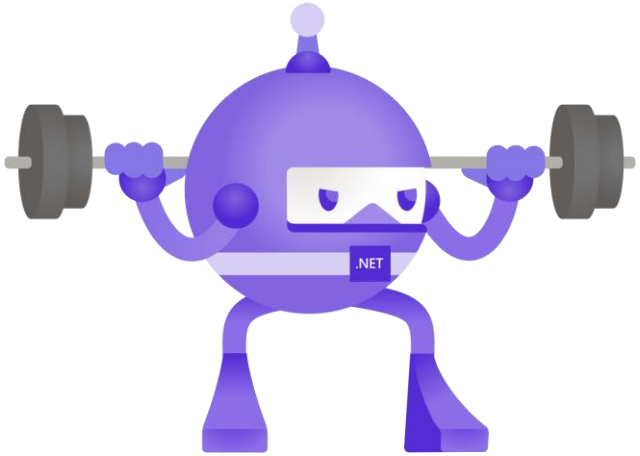
@joslat

LinkedIn:

https://www.linkedin.com/in/joslat/

Slides, code & links:

https://github.com/joslat/ONNX-with-ML.NET



Try it yourself!!
The resources to follow along are here!!

Thanks for joining!