ML.NET

Bringing ML to .NET Developers

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https://dot.net/ml

Microsoft

Brought to you by (amongst others)

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Machine Learning made for .NET Developers

Covers many developer scenarios

Available in C#, F# and VB.NET

Open source and cross-platform

Windows, Linux, Mac

X64, x86 (some), ARM (some)

Proven and extensible

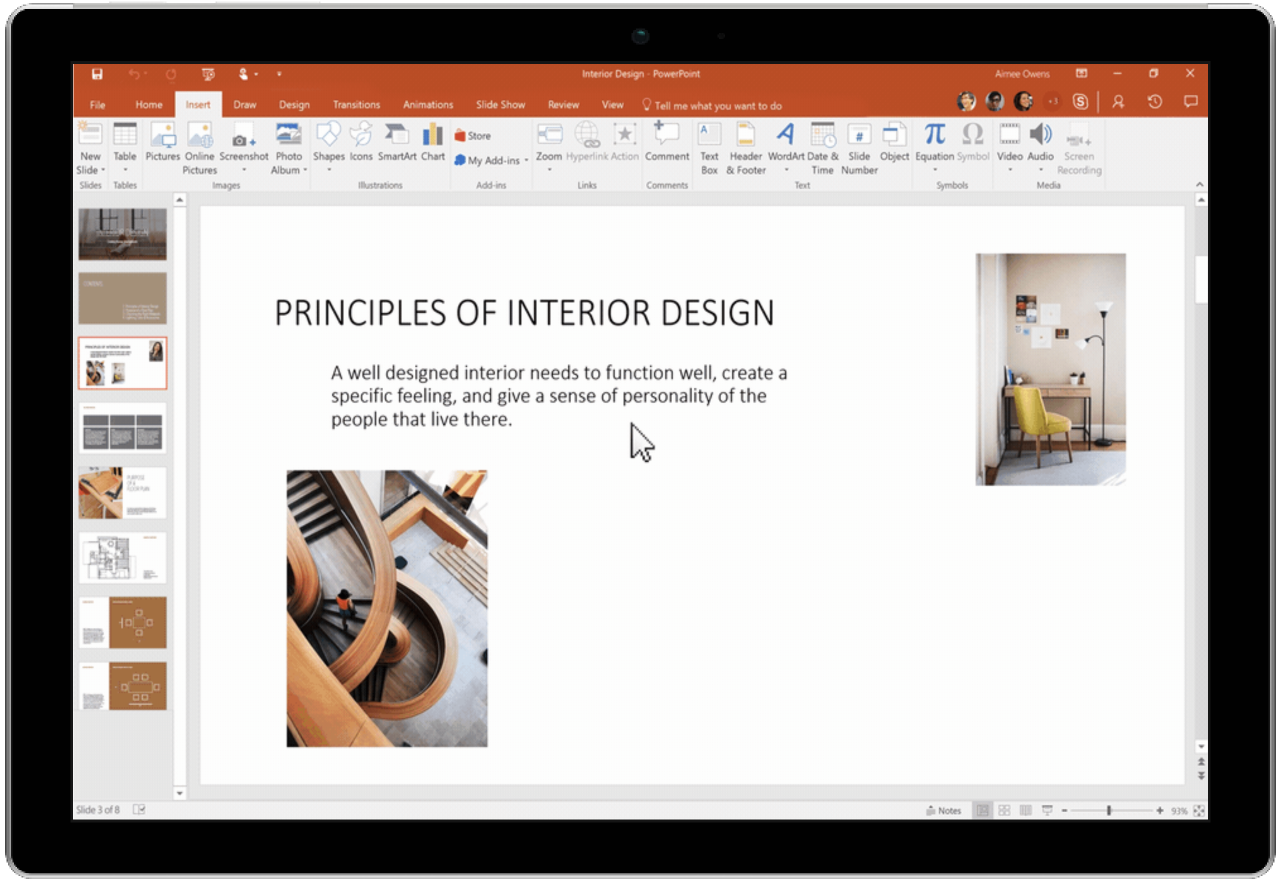
Development started ~10 years ago

Received contribution (and scrutiny) from all of MS

An open source and cross-platform machine learning framework

Example Use Case

PowerPoint Designer with ML.NET



PRINCIPLES OF INTERIOR DESIGN

A well designed interior needs to function well, create a specific feeling, and give a sense of personality of the people that live there.

ML.NET is used in many products

- Many MS products use ~~TLC~~ ML.NET.
- You have likely used ML.NET today ☺
- Why is that?
  - Many products are written in (ASP).NET
  - Using ML.NET is just like using any other .NET API

Using a model is just like using code

Standard software dependency

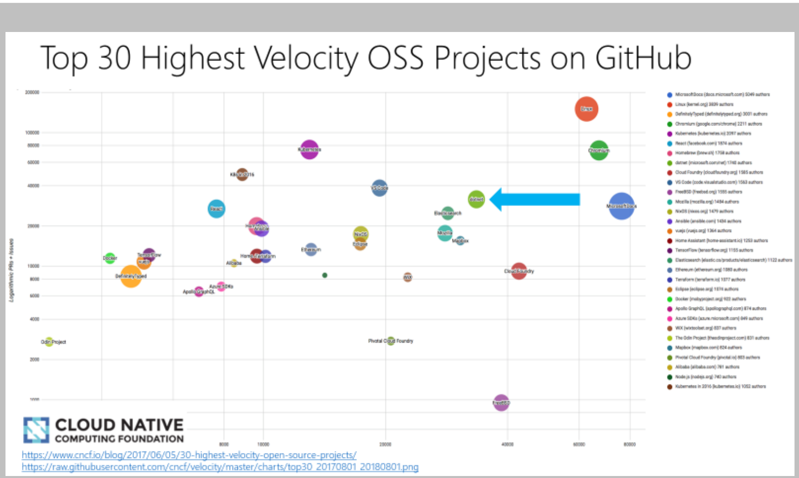
Resource shipped with the app.

```
var model    = mlContext.Model.Load(“mymodel.zip”);

var predFunc = trainedModel
  .MakePredictionFunction<T_IN, T_OUT>(mlContext);

var result   = predFunc.Predict(x);
```

Training: Think `sklearn`, but with a statically typed language

About .NET

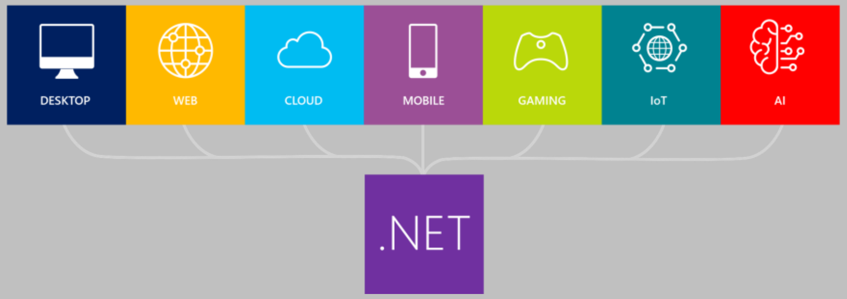
- .NET has cool stuff ML people care about
  - C#: Like Java, but from the future
  - F#: Like Python, but with static types and multithreading
  - Almost-free calls into native code
- .NET is OSS and cross platform
  - Windows (surprise!), Linux, macOS
  - Phones via Xamarin: Android, iOS
  - Interesting HW: Xbox, IoT devices, …
- Lots of developers build important stuff in .NET
  - 4M active; 450k added each month
  - 15% growth MoM in https://github.com/dotnet
  - Half the top-10k websites are built in .NET


Top 30 Highest Velocity OSS Projects on GitHub

https://www.cncf.io/blog/2017/06/05/30-highest-velocity-open-source-projects/
https://raw.githubusercontent.com/cncf/velocity/master/charts/top30_20170801_20180801.png

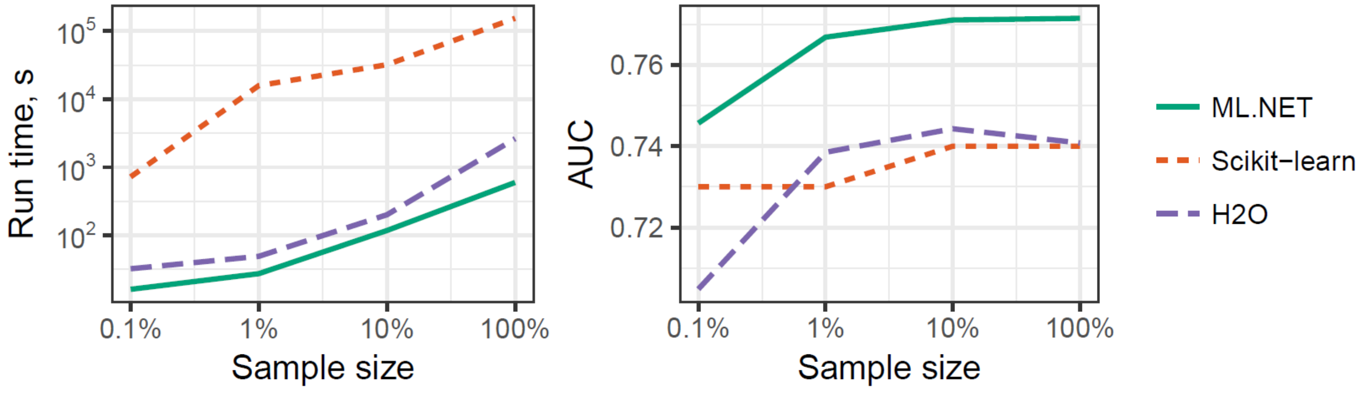
Our Mission

.NET is the platform for building **anything**



ML.NET is fast & good

- Core infrastructure: `IDataView`
    - Carefully designed to avoid memory allocations
    - Only required data is lazily materialized
- Carefully tuned defaults
    - Many ML tasks are more alike than we'd like to admit ☺

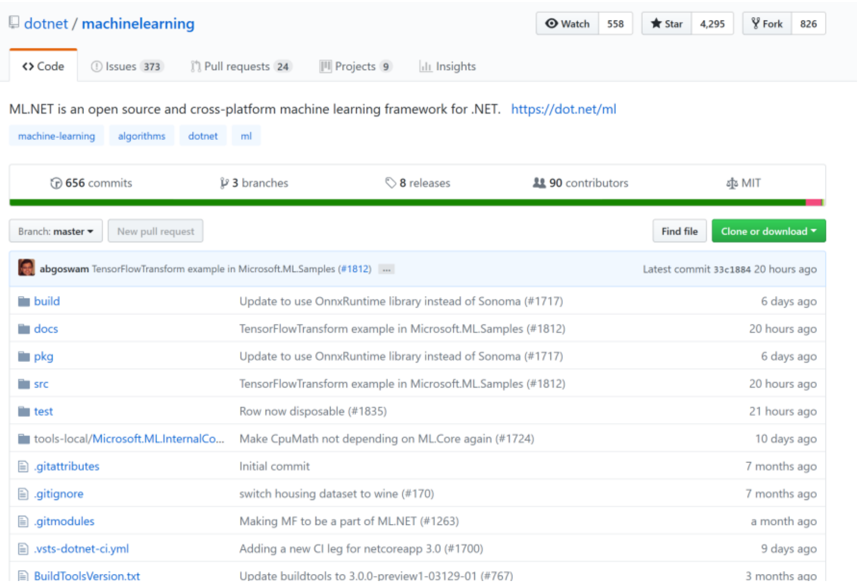


(a) Runtime

(b) Accuracy

GBDT Experiments done on Criteo, using default parameters

ML.NET’s journey to OSS



ML.NET is an open source and cross-platform machine learning framework for .NET. https://dot.net/ml

abgoswam TensorFlowTransform example in Microsoft.ML.Samples (#1812) … Latest commit 33c1884 20 hours ago

build	Update to use OnnxRuntime library instead of Sonoma (#1717)	6 days ago
docs	TensorFlowTransform example in Microsoft.ML.Samples (#1812)	20 hours ago
pkg	Update to use OnnxRuntime library instead of Sonoma (#1717)	6 days ago
src	TensorFlowTransform example in Microsoft.ML.Samples (#1812)	20 hours ago
test	Row now disposable (#1835)	21 hours ago
tools-local/Microsoft.ML.InternalCo…	Make CpuMath not depending on ML.Core again (#1724)	10 days ago
.gitattributes	Initial commit	7 months ago
.gitignore	switch housing dataset to wine (#170)	7 months ago
.gitmodules	Making MF to be a part of ML.NET (#1263)	a month ago
.vsts-dotnet-ci.yml	Adding a new CI leg for netcoreapp 3.0 (#1700)	9 days ago
BuildToolsVersion.txt	Update buildtools to 3.0.0-preview1-03129-01 (#767)	3 months ago

- Developed for almost a decade as an internal tool
- Open Sourced in May 2018 (at //build)
- MIT License, .NET Foundation
- Monthly releases ever since; 0.8 on Tuesday
- Please check it out, and leave feedback

Thanks for your time!
Let’s stay in touch!

ML.NET is ML for .NET

https://dot.net/ml
https://github.com/dotnet/machinelearning

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Poster here today

Poster tomorrow in the MLOSS workshop.

Of course, we are hiring (interns as well)