Cut through the hype with ML.NET

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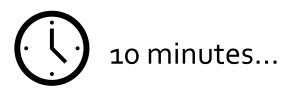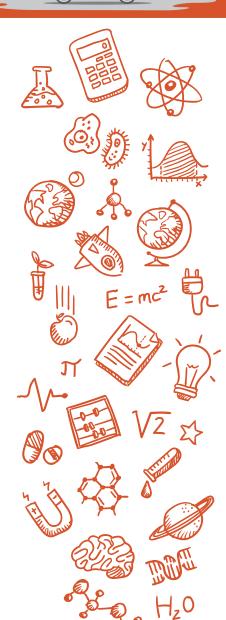arafattehsin.com/blog

AZURE
SYDNEY USER GROUP

GLOBAL AI
THE PODCAST

GLOBAL AI
ON TOUR

Agenda

- Microsoft AI Stack
- ML.NET
  - Use-cases
  - Workflow
  - Tools
  - CLI & Model Builder

10 minutes…

It's not enough just to sort of have AI capability that we can exercise — you also need the ability to democratize it so that every business can truly benefit from it.
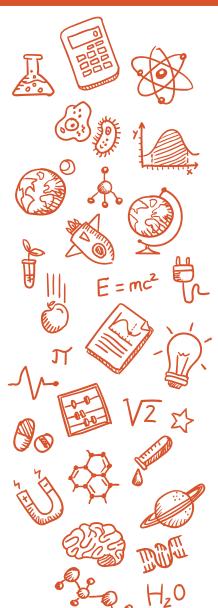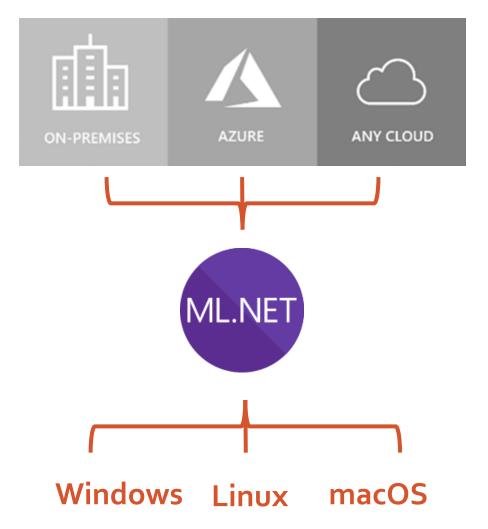
- Satya Nadella

Microsoft AI Stack

	Azure ML	**ML.NET**	**Cognitive Services**	**Lobe**	**AI Builder**	**WinML**
Create & Train Custom Models	Yes	Yes	Yes	Yes (Preview)	Yes	No
Model Cosumption	Web API, ONNX	API, TensorFlow, ONNX, ML.NET	API / SDK	API (Local) / ONNX / TensorFlow / Core ML etc.	Power Platform	ONNX
Level of ML knowledge	Intermediate to Beginner	Beginner	Beginner to not required	Not required	Not required	Not required

What is ML.NET

Windows   Linux   macOS

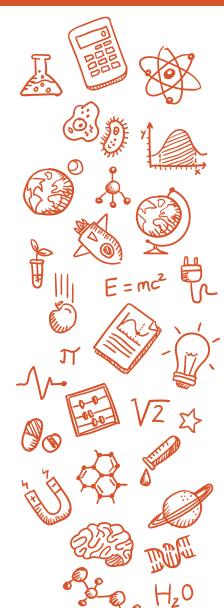An open source and cross-platform machine learning framework for .NET

Built for .NET Developers

- Utilitize the existing C# or F# Skills to integrate machine learning into your .NET apps

- No data science or sophisticated ML expertise is required

You may want to use ML.NET when you...

- ❑ Want to stay in .NET ecosystem

- ❑ Want to train a custom model without low-level complexities

- ❑ Want to consume a pre-trained model (ONNX runtime or TensorFlow)

Possibilities with ML.NET

Classification

- Sentiment Analysis
- Eligibility or Non-eligibility
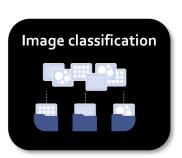- Will customer buy or not?
- Which type of transaction is this?

Forecasting

- Categories of products to be purchased
- Manufacturing flow management
- Weather forecasting

Regression

- Predicting the price of fuel
- How many houses are going to go on rent this month?

Anomaly detection

- Data center temperature
- Intrusion or fraud detection in the transactions

Recommendation
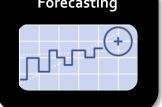
- List of the new retail products
- Phone apps
- Popular web services
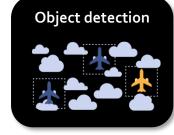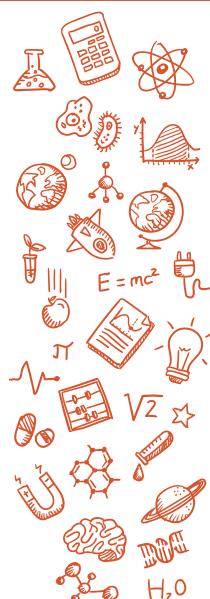
Ranking

- Search Capabilities
- Automatic synonym implementation

- Front or back side of the ID
- Type of desserts
- Broken swings in the park

Image classification

Object detection

- Number of people in a café
- Type of flowers

What tools do I have?
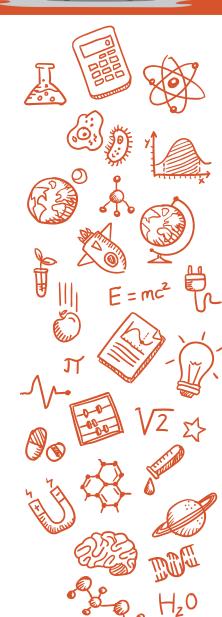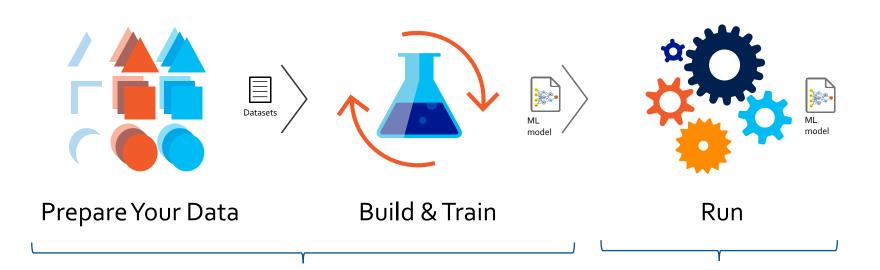
Machine Learning Workflow

Prepare Your Data — Datasets → Build & Train — ML model → Run — ML model
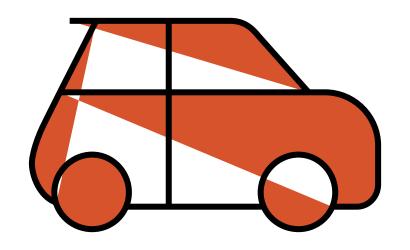
Model creation — App/tools for training the ML model

Model consumption — End-user app using the ML model

How much is this car worth?

Typical Model Creation

Which features?

Mileage	**Gradient Boosted**
Condition	Nearest Neighbors
Car brand	SVM
Year of make	Bayesian Regression
Regulations	LGBM
...	...

Which algorithm?

Parameter 1

Parameter 2

Min Samples Split

Min Samples Leaf

Others

Which parameters?

▲
▲
▲
▲
▲

30%

Model

Typical Model Creation

Which features?

| Mileage |
| Condition |
| Car brand |
| Year of make |

Regulations

...

Which algorithm?

| Gradient Boosted |
| Nearest Neighbors |

SVM

Bayesian Regression

LGBM

...

Which parameters?

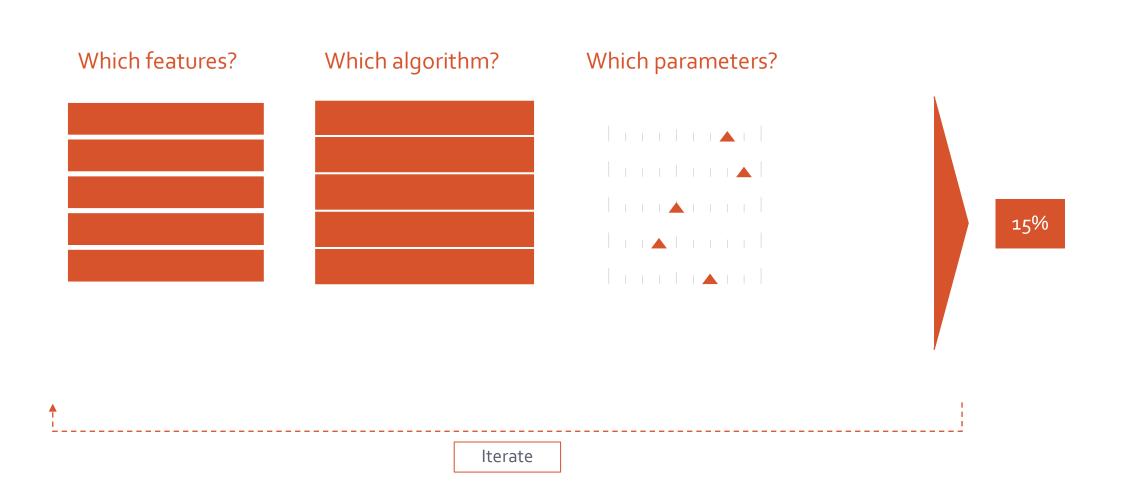N Neighbors

Weights

Min Samples Split

Min Samples Leaf

Others

30%

Model

Iterate

Typical Model Creation

Which features?

Which algorithm?

Which parameters?

30%
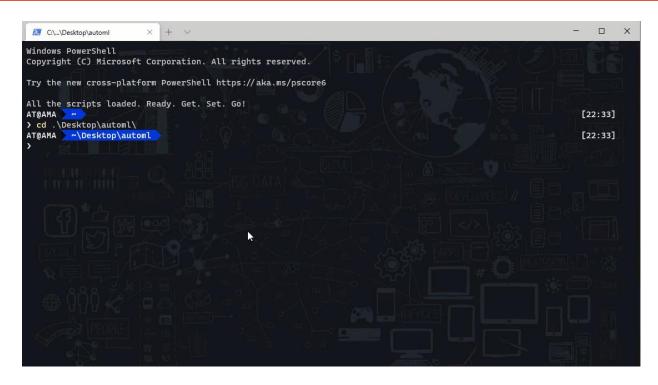
15%

Iterate
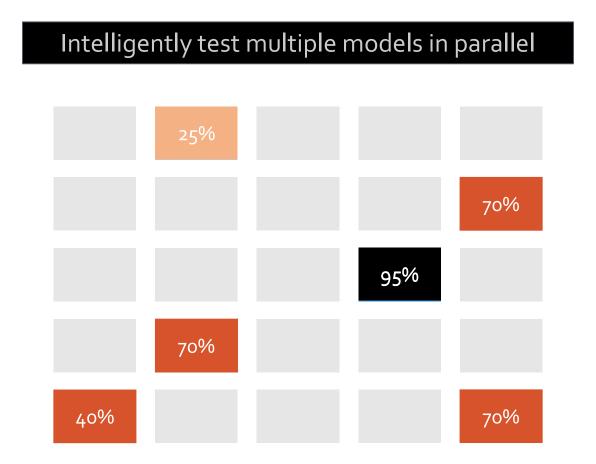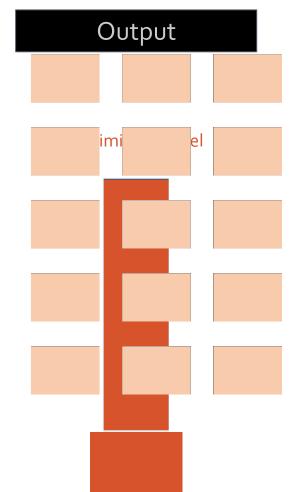
ML.NET CLI

- Use the CLI to easily build custom ML models with Auto ML

- Removes the overhead of implementation, feature engineering and tweaking of hyperparameters

- Cross platform (Windows, Linux, MacOS)

- Generate code for training & consumption

SentimentAnalyzer 1.2.2
7300+ downloads
BotBuilderCommunity and many more..

Model Builder

- No-code way to build custom ML models with AutoML

- Config based training with generated code-behind files

- Load from files and databases

- .mbconfig solves many problems

- Utilizes Azure ML Studio Experiments for resource intensive operations

Questions?

Resources

- ML.NET Docs
  https://docs.microsoft.com/en-us/dotnet/machine-learning/

- SentimentAnalyzer repo
  https://github.com/arafattehsin/CognitiveRocket/tree/master/Cognitive-Library/SentimentAnalyzer

- Blog Post
  https://www.arafattehsin.com/beyond-sentiment-analysis-object-detection-with-ml-net/

Let's connect…

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Projection of AI

AI value creation by 2030

$13 trillion

Industry	Value
Retail	$0.8T
Travel	$480B
Transport & Logistics	$475B
Automotive & Assembly	$405B
Basic Materials	$300B
Advanced Electronics/Semiconductors	$291B
Healthcare Systems and Services	$267B
High Tech	$267B
Telecom	$174B
Oil & Gas	$173B
Agriculture	$164B

Rate of Automation

Human — Machine

Year	Human	Machine
2025	53	47
2020	67	33