

A large, abstract graphic in the background is composed of numerous blue and grey triangles of varying sizes, creating a polygonal, crystalline effect against a dark blue background.

Leverage the Power of Machine Learning on Windows

Kristen Chan

#insiderDevTour



HELLO !!

I am Kristen

Data Scientist E-Commerce / Telecom
R-Ladies Taipei Co-Organizer
D4SG Consultant
Microsoft MVP AI Platform

What we'll talk about today

Why AI and ML?

How can you get started?

What else?



As a developer,
why should you care about AI and ML?

Some problems are difficult to solve using traditional algorithms and procedural programming.

Examples



Classify if a customer is a retention risk



Identify objects in images and videos



Detect defects in an industrial process

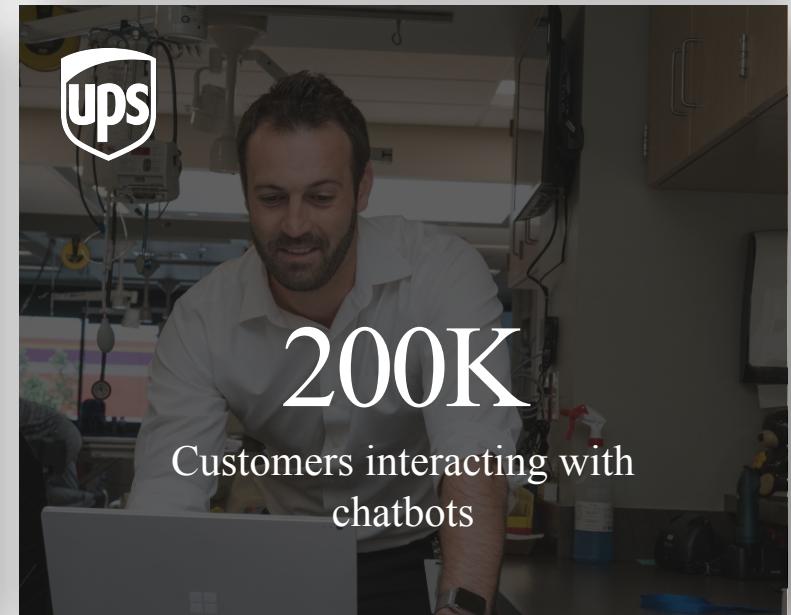
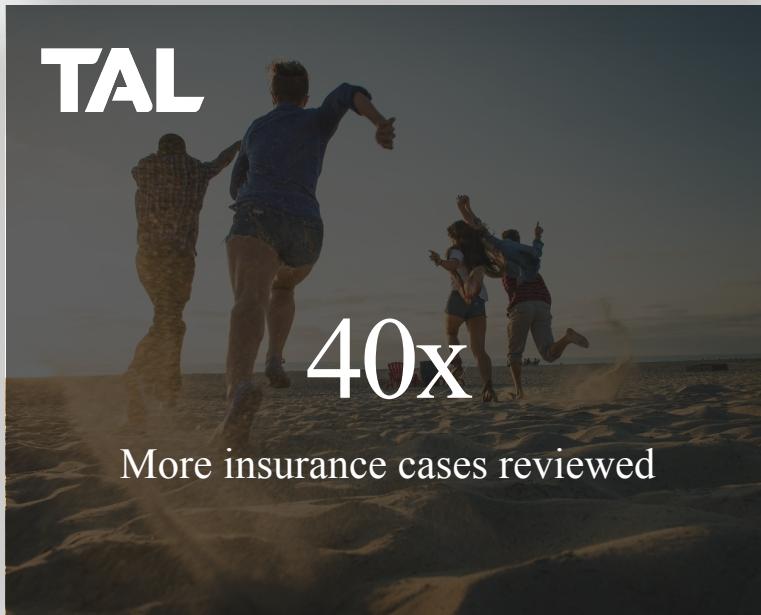
These examples are good candidates for *machine learning*.

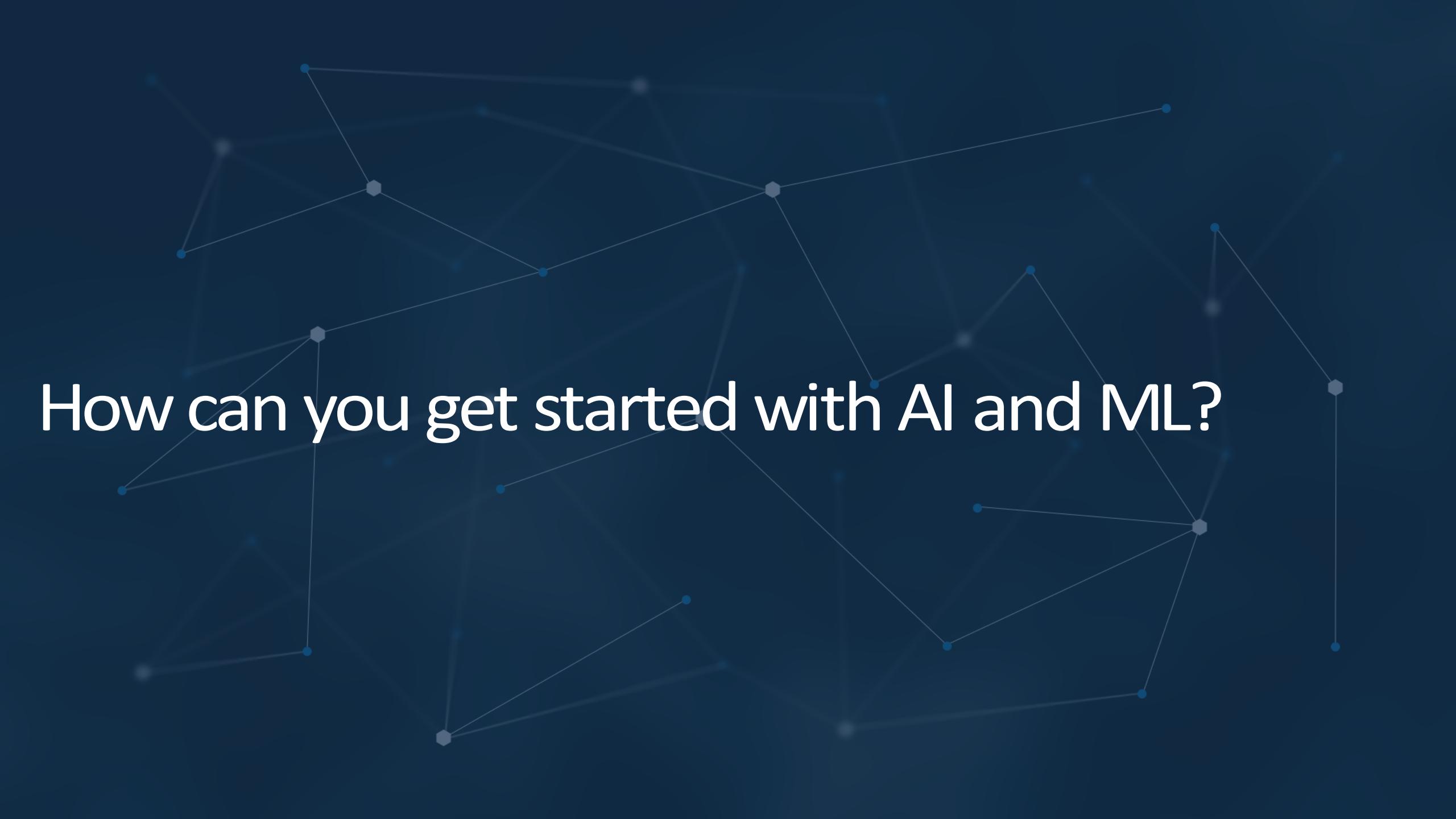
When can you use Machine Learning?

A repetitive decision or process

Solution lacks an explicit definition

A lot of training data is available

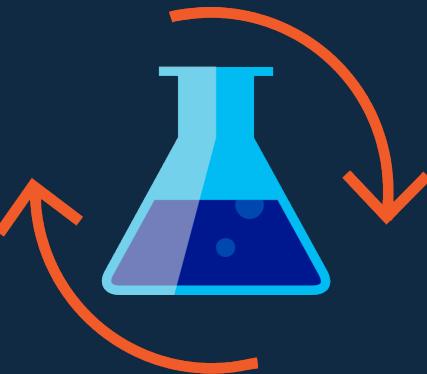




A network graph is overlaid on a dark blue background. The graph consists of several nodes, some of which are highlighted with a light gray hexagonal outline. These highlighted nodes are interconnected by thin white lines, forming a small cluster. The rest of the nodes are represented by small blue dots.

How can you get started with AI and ML?

Machine Learning Landscape



Prepare Your Data

Quickly launch and scale Spark on demand
Rich interactive workspace and notebooks
Seamless integration with all Azure data services

Build and Train

Broad frameworks and tools support
TensorFlow, Cognitive Toolkit, Caffe2, Keras, MxNET, PyTorch

Deploy

Docker containers
Windows AI Platform
Azure Machine Learning

Machine Learning for Developers

Azure Cognitive Services

Ink Recognizer

Windows AI platform

Sentiment Analysis

ML.NET

Price prediction

Enable Multi-Input



Increase Functionality



Machine Learning for Developers

Azure Cognitive Services

Ink Recognizer

Windows AI platform

Sentiment Analysis

ML.NET

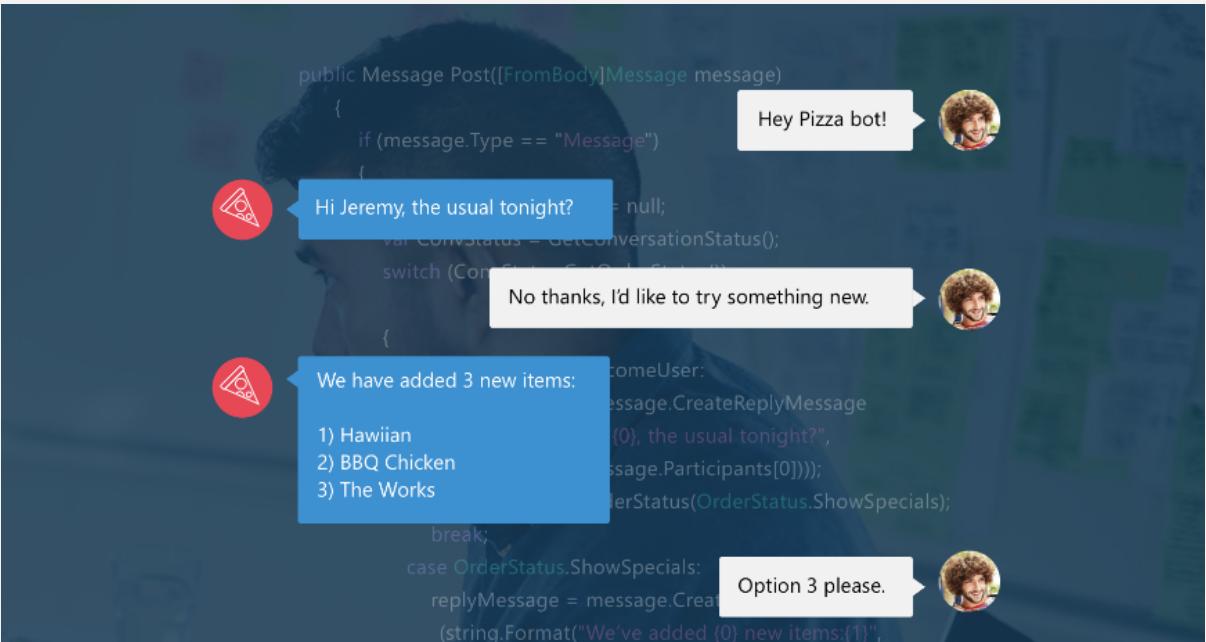
Price prediction

Enable Multi-Input



Increase Functionality

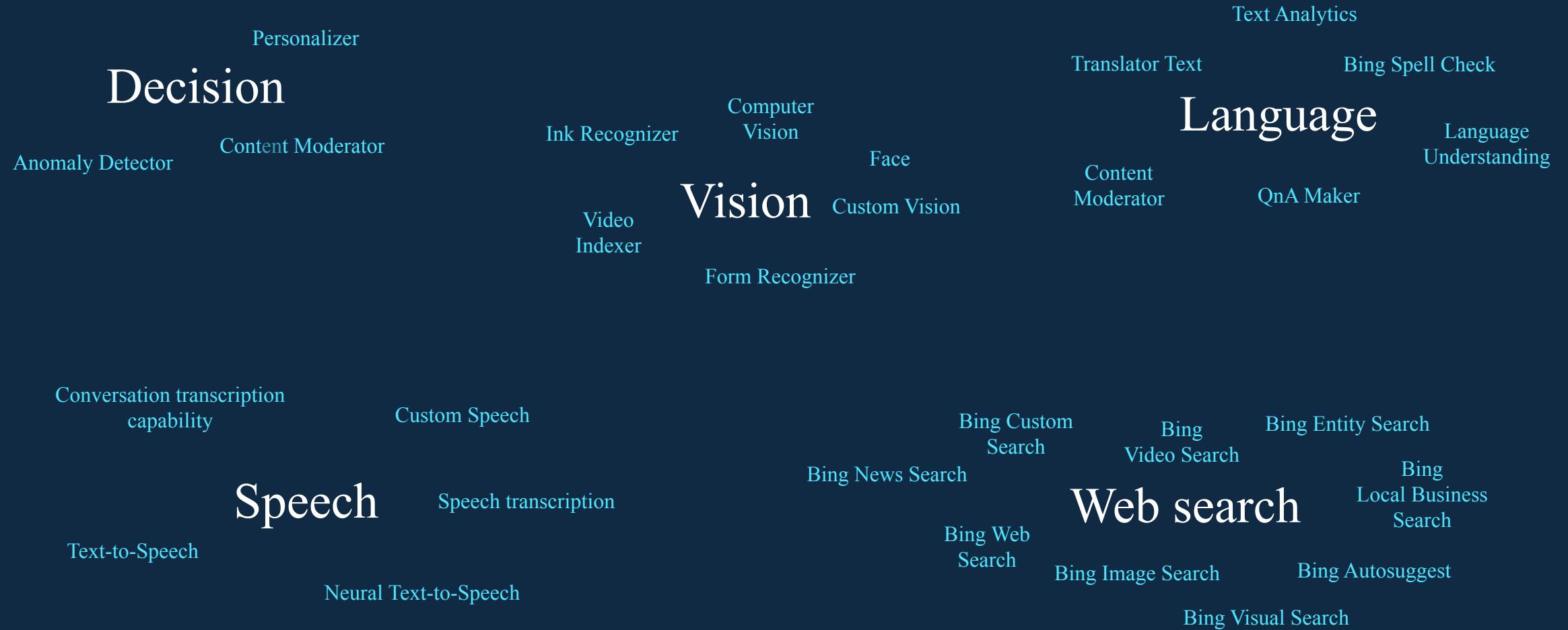




#insiderDevTour

Azure Cognitive Services

The most comprehensive pre-trained AI



Azure Cognitive Services

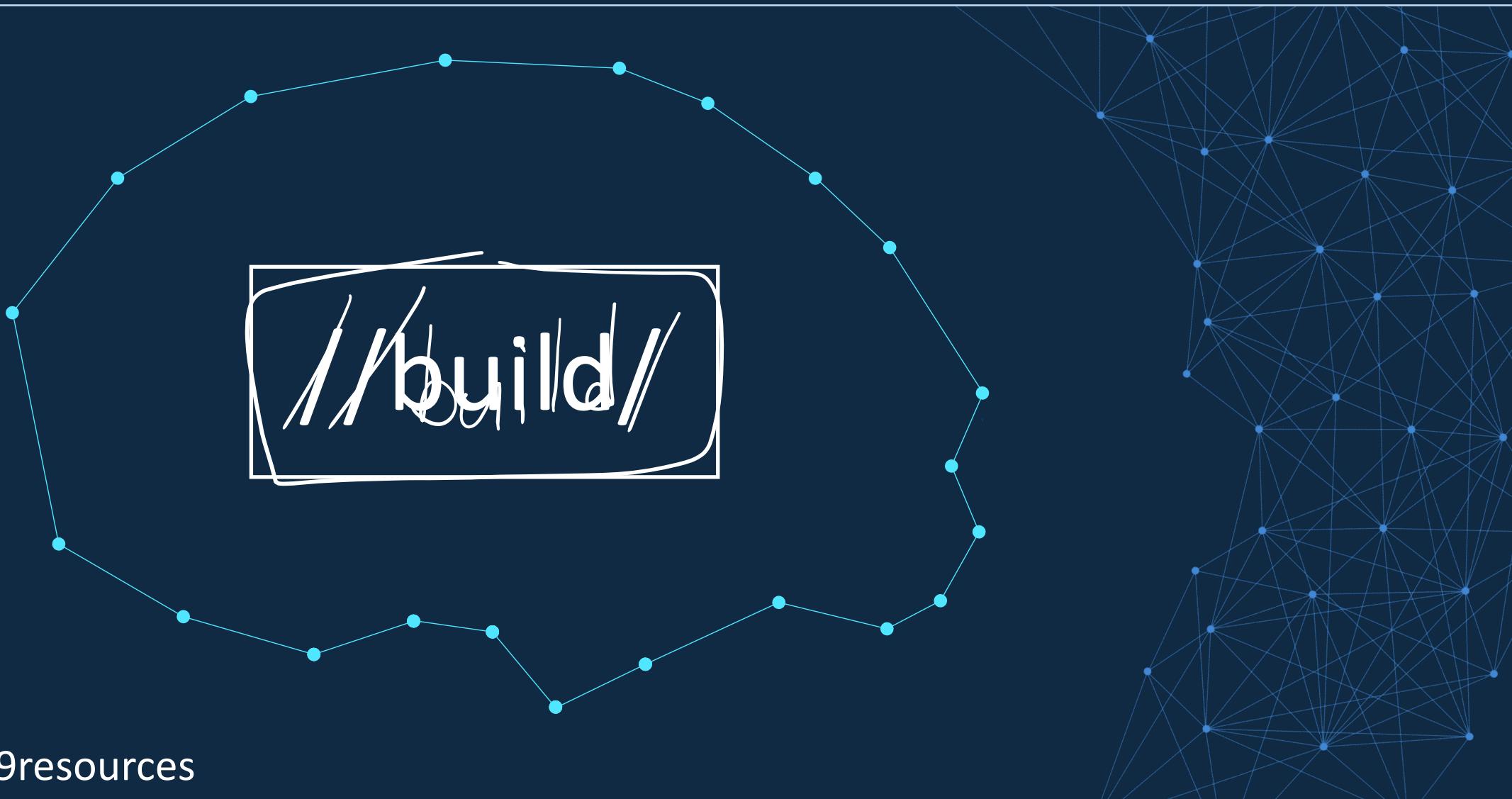
The most comprehensive pre-trained AI

Ink Recognizer



Azure Cognitive Services

Ink Recognizer





Demo

Machine Learning for Developers

Azure Cognitive Services

Ink Recognizer

Windows AI platform

Sentiment Analysis

ML.NET

Price prediction

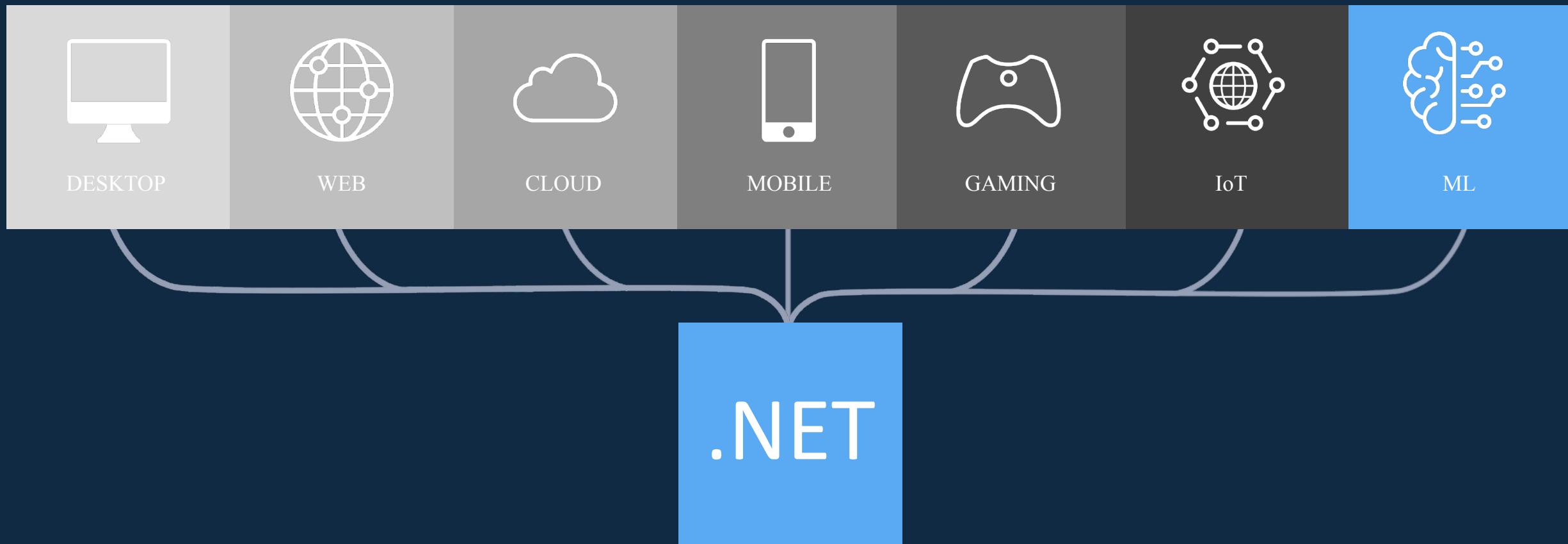
Enable Multi-Input



Increase Functionality



Your platform for building anything



ML.NET



Machine Learning framework for building custom ML Models

Proven at scale

Azure, Office, Windows

Extensible

TensorFlow, ONNX and Infer.NET

Cross-platform and open-source

Runs everywhere

Easy to use tools

CLI + UI-based tool for building models

ML.NET Tooling

ML.NET CLI global tool accelerates productivity

A large blue circle containing the text "AutoML".

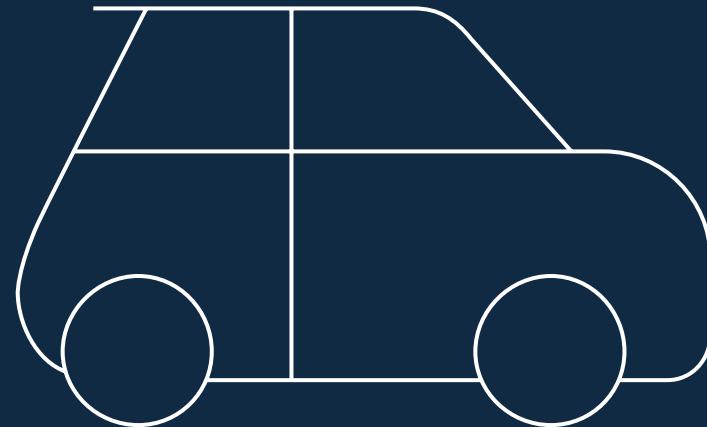
AutoML

A large blue circle containing the text "Model Builder".

Model
Builder

AutoML with ML.NET

ML.NET CLI global tool accelerates productivity



How much is the taxi fare for 1 passenger going from Cape Town to Johannesburg?

Getting started w/machine learning can be hard

ML.NET takes the guess work out of data prep, feature selection & hyperparameter tuning

Which features?

Distance
Trip time
Car type
Passengers
Time of day
...

Which algorithm?

Gradient Boosted
Nearest Neighbors
SGD
Bayesian Regression
LGBM
...

Which parameters?

Criterion	Criterion 1	▲	
Parameter	Parameter 2	▲	
Min Samples	Min Samples Split	▲	
Min Samples	Min Samples Leaf	▲	
XYZ	XYZ	▲	

30%
Model

Getting started w/machine learning can be hard

ML.NET takes the guess work out of data prep, feature selection & hyperparameter tuning

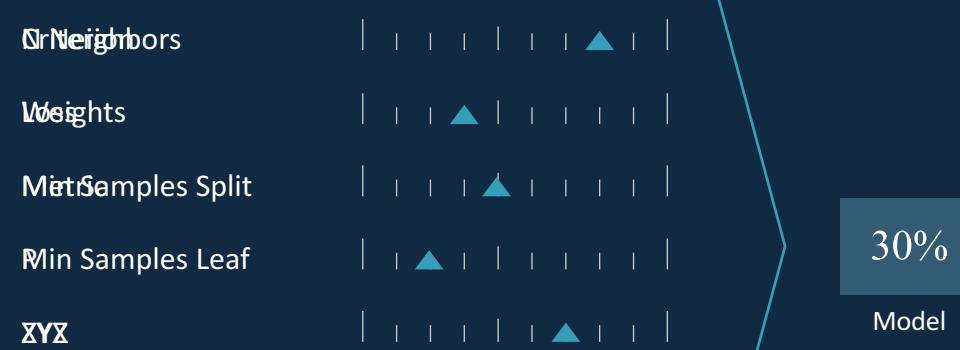
Which features?

Distance
Trip time
Car type
Passengers
Time of day
...

Which algorithm?

Gradient Boosted
Nearest Neighbors
SGD
Bayesian Regression
LGBM
...

Which parameters?



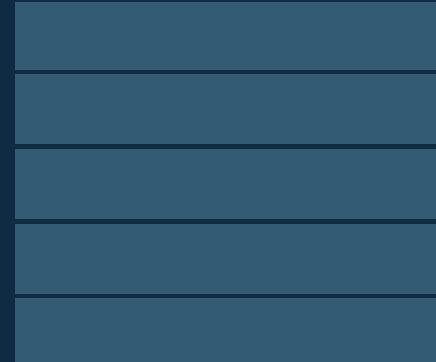
Getting started w/machine learning can be hard

ML.NET takes the guess work out of data prep, feature selection & hyperparameter tuning

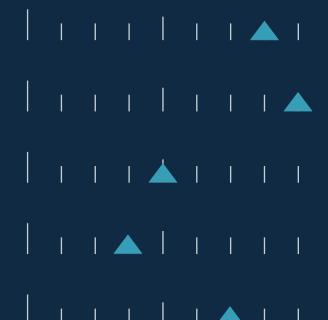
Which features?



Which algorithm?



Which parameters?

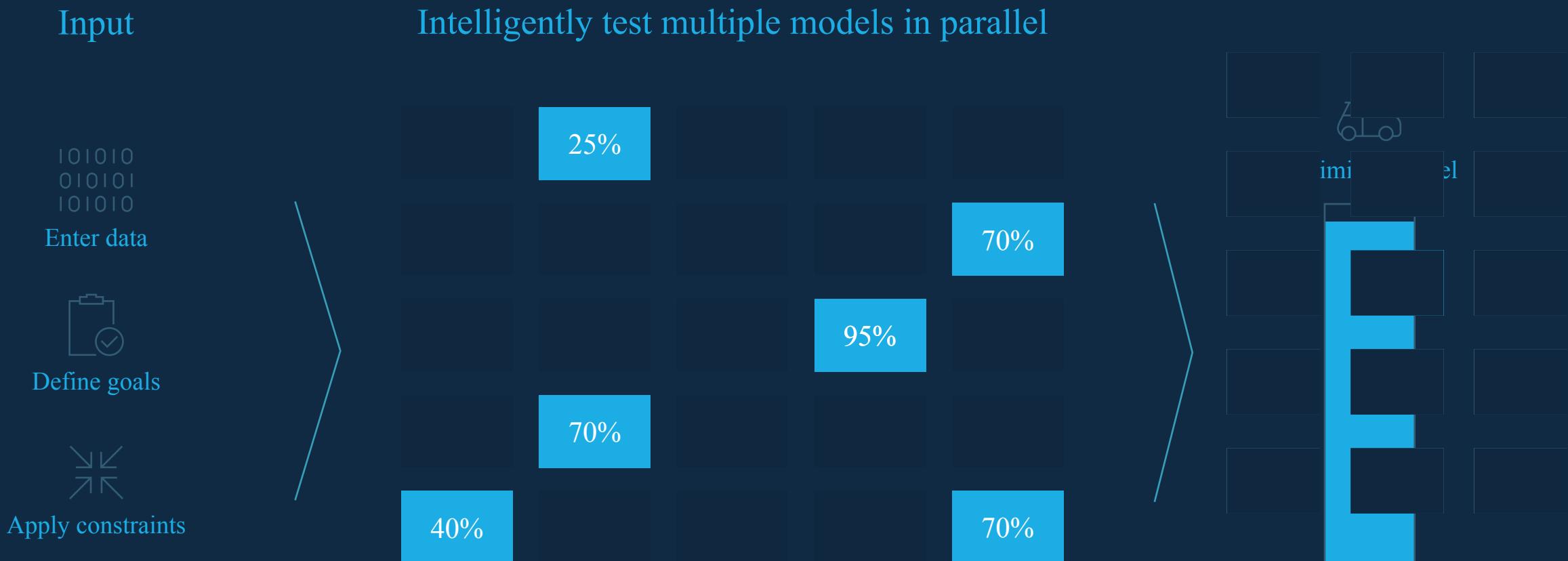


30%

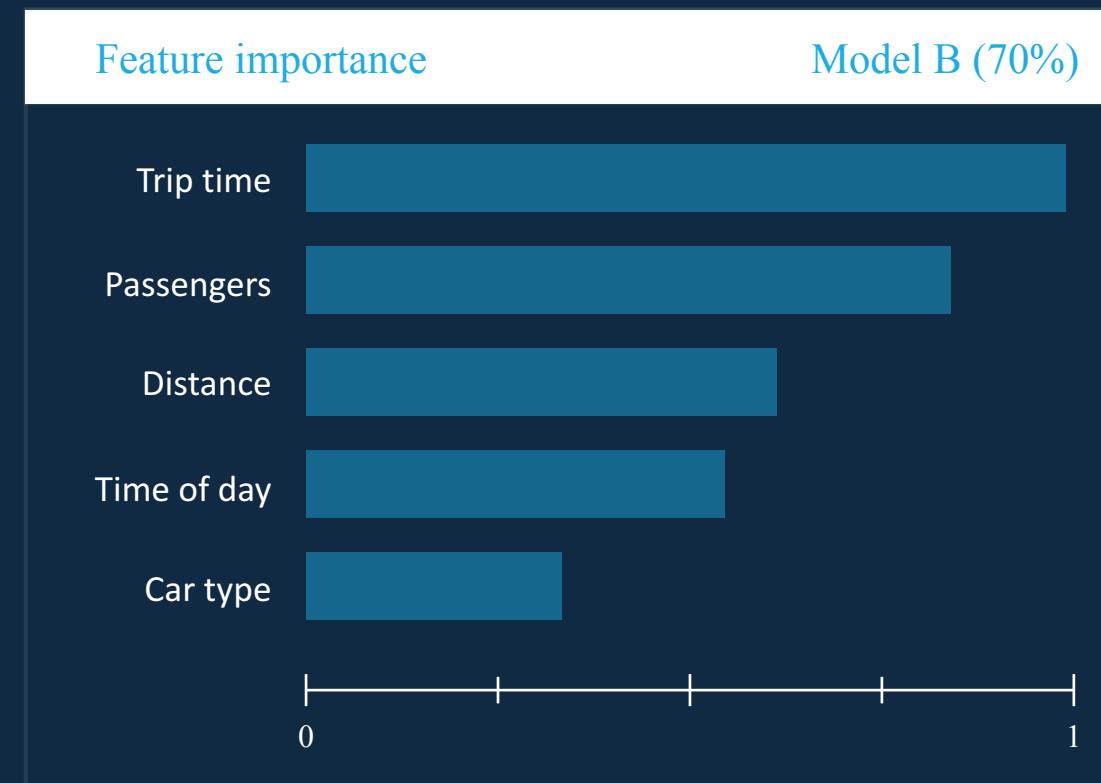
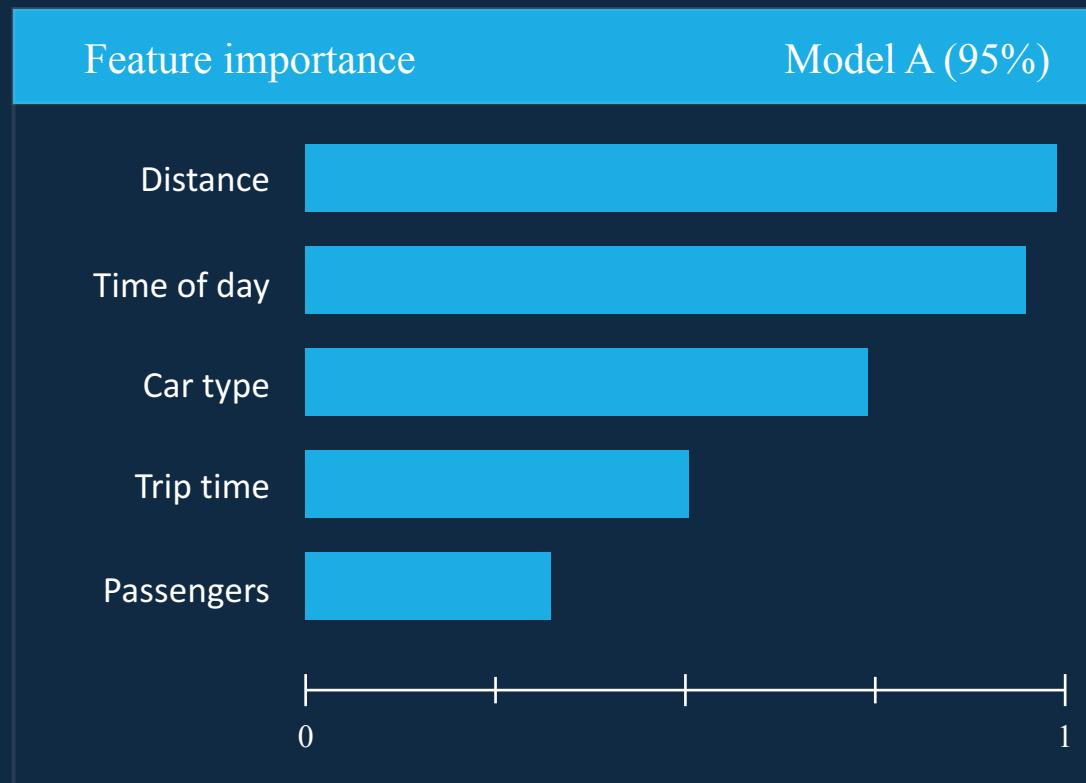
15%

Iterate

ML.NET accelerates model development



ML.NET accelerates model development with model explainability





Demo

```
# STEP 1: Load data
IDataView trainingDataView = mlContext.Data.LoadFromTextFile<TaxiTrip>( ... )
IDataView testDataView = mlContext.Data.LoadFromTextFile<TaxiTrip>( ... )
    # Display first few rows of the training data
ConsoleHelper.Show DataViewInConsole(mlContext, trainingDataView)

# STEP 2: Initialize user-defined progress handler that AutoML will invoke after each model
var progressHandler = new RegressionExperimentProgressHandler()

# STEP 3: Run AutoML regression experiment
ExperimentResult<RegressionMetrics> experimentResult = mlContext.Auto()
    .CreateRegressionExperiment(ExperimentTime)
    .Execute(trainingDataView, LabelColumnName, progressHandler: progressHandler)
    # Print top models found by AutoML
PrintTopModels(experimentResult)

# STEP 4: Evaluate the model on test data
RunDetail<RegressionMetrics> best = experimentResult.BestRun
ITransformer trainedModel = best.Model
    # Run best model on test data
IDataView predictions = trainedModel.Transform(testDataView)

# STEP 5: Save trained model to a .ZIP file
mlContext.Model.Save(trainedModel, trainingDataView.Schema, ModelPath)
```

Machine Learning for Developers

Azure Cognitive Services

Ink Recognizer

Windows AI platform

Sentiment Analysis

ML.NET

Price prediction

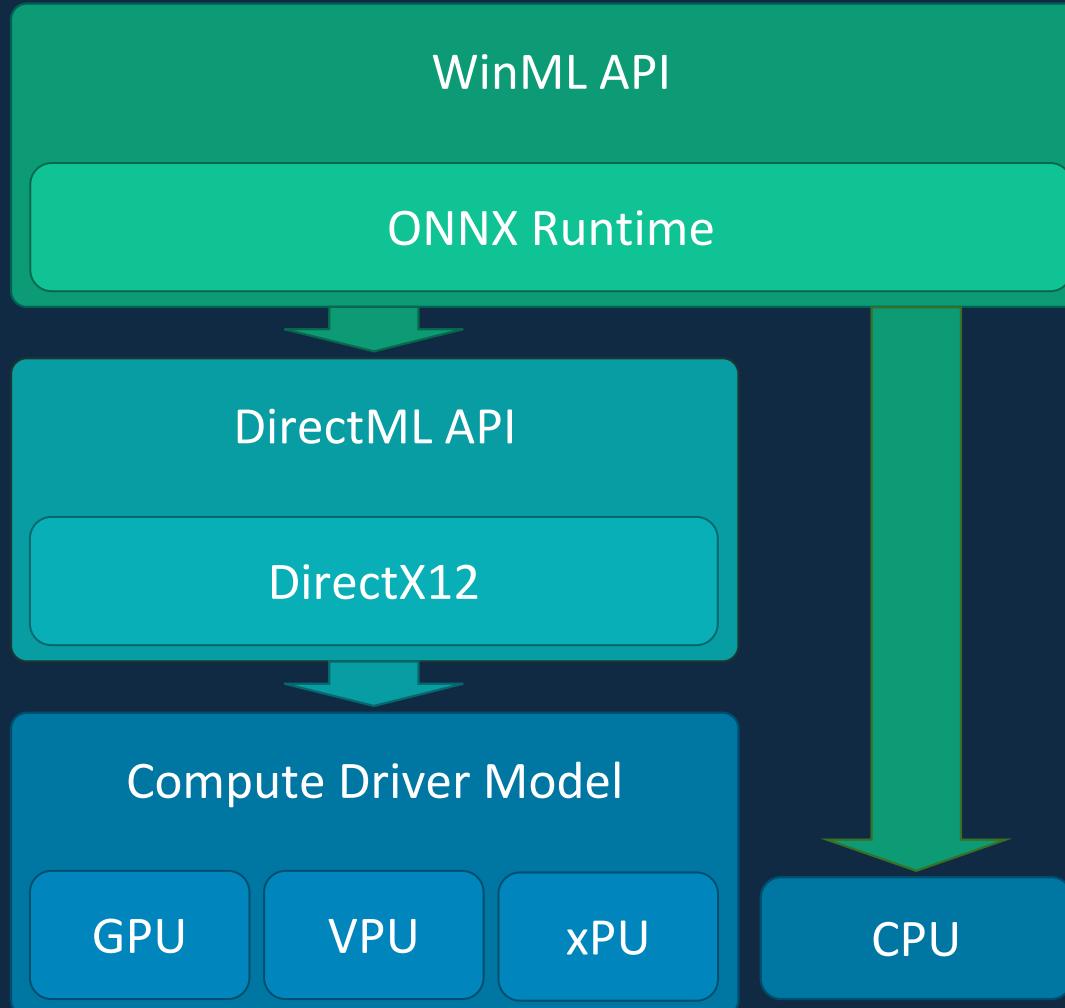
Enable Multi-Input



Increase Functionality



Windows AI platform



WinML

Practical, simple model-based API for ML inferencing on Windows

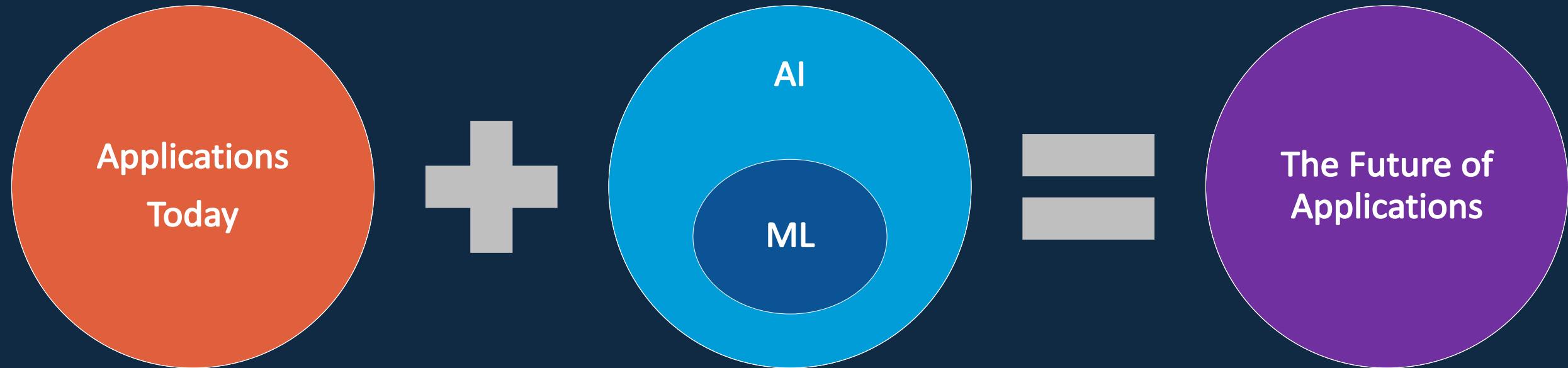
DirectML

Realtime, high control ML operator API; part of DirectX family

Compute Driver Model

Robust **hardware reach**/abstraction layer for compute and graphics silicon

The Power of Machine Learning



Learn more!

Check out the labs and resources!

aka.ms/insiderdevtour-labs





Insider Dev Tour

#insiderDevTour