# TECH DAY

### #STechDay2020



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TechShivaWolf

guenda-sciancalepore

### **Guenda Sciancalepore**

Cloud Solution Architect – Data & Al

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Level up your game using Azure and Reinforcement Learning!





### **Goal: getting the Agent out of the maze**



# TECH DAY

# What is Machine Learning?

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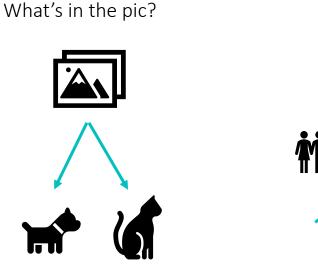


"Machine Learning is the study of computer algorithms that allow computer programs to automatically improve through experience."

Tom Mitchell



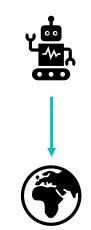
### **Machine Learning types**



What would you like?

Can I play with you?

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Supervised Learning

Unsupervised Learning

**Reinforcement Learning** 

# TECH DAY What is Reinforcement Learning?



### **Reinforcement Learning**

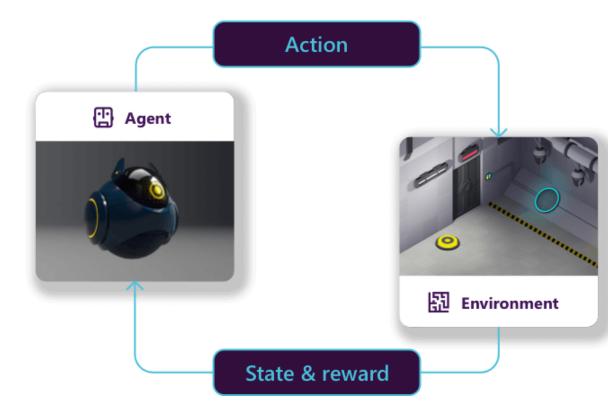
#### Main goal:

Taking suitable actions to maximize reward in a particular environment.

#### **Components of an RL agent:**

- Agent
- Environment (transitions and reward models)
- Actions (policies)
- Rewards (value function)





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### **Categories of RL Algorithms**

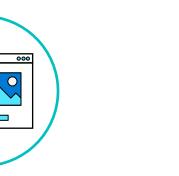
Model	Learns a transition and reward models of the environment to compute	Value Based	Learns a value function explicitly and computes the policy from that
Based Model Free	optimal policy Learns an optimal policy by interacting with the environment	Policy Based	Learns a policy directly without computing a value function
		Actor Critic	Learns both a policy (the actor) and a value function (the critic), which measures how good a policy is

# **Azure AI Platform**

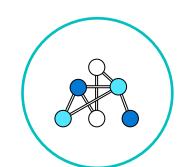
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**Azure Al** 







Al apps & agents

**Knowledge mining** 

**Machine learning** 

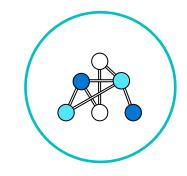
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**Azure Al** 







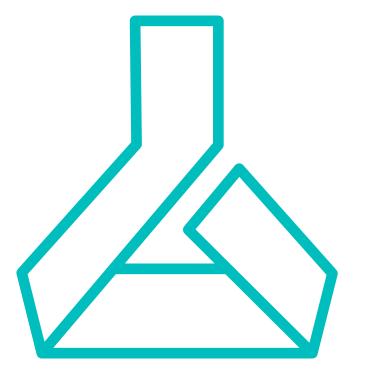
Al apps & agents

**Knowledge mining** 

**Machine learning** 





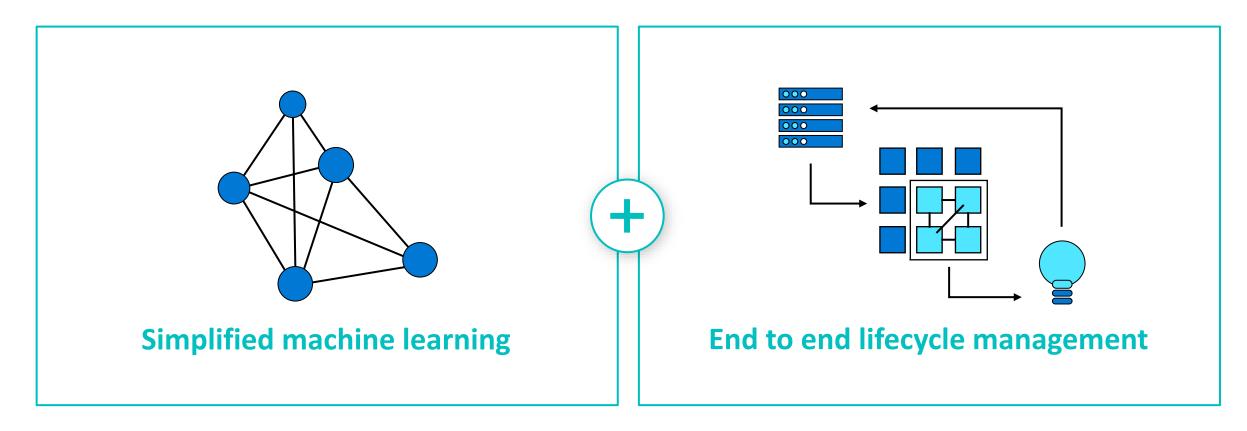


### **Azure Machine Learning**



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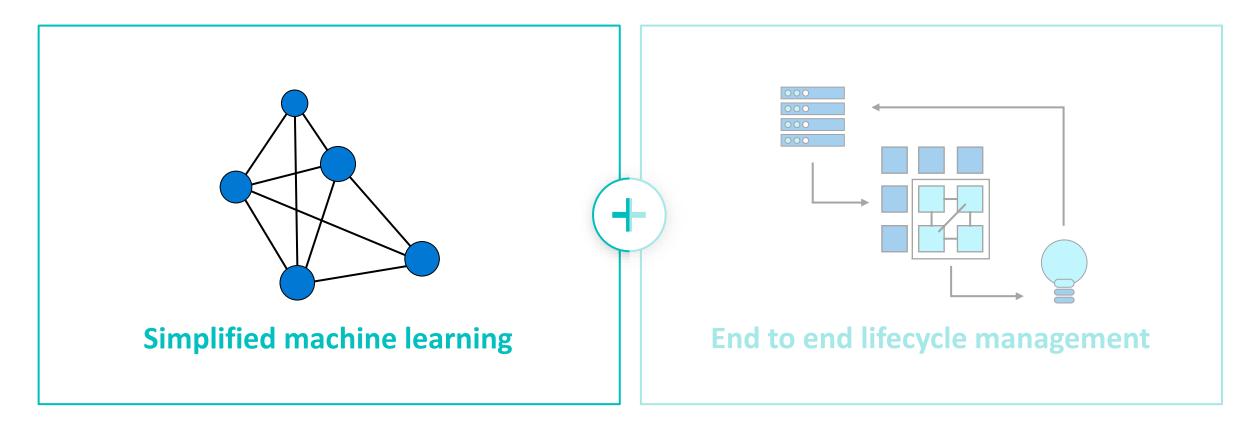
### **Azure Machine Learning Service**







### **Azure Machine Learning Service**



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### Simplify machine learning for any skill level

	¢	Sample 1 - Regression: Automobile Price Prediction (Basic)	CJUpyter distributed-pytorch-with-horovod Last Checkpoint: 5 minutes ago (autosaved)
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	Data Input and Output	See Seed Course in Dataset	
Getting Started	Data Transformation	values	Copyright (c) Microsoft Corporation. All rights reserved.
Create your first experiment with automated machine learning to	Machine Learning	🛃 Cean Massing Data	Licensed under the MIT License.
produce quality models with zero effort.	🖌 Evaluate		
	Evaluate Model	Sottoes VA	Distributed PyTorch with Horovod
Create experiment	Initialize Model     Classification	split the detact into taking set(0.1) and test set(0.2)	In this tutorial, you will train a PyTorch model on the MNIST dataset using distributed training via Horovod across a GPU cluster.
	A Regression		
	Boosted Decision		Prerequisites
	Decision Forest R	Tran Model	Go through the <u>Configuration</u> notebook to install the Azure Machine Learning Python SDK and create an Azure ML Workspace
What's Possible with Automated Machine Learning	Linear Regression		<ul> <li>Review the <u>tutorial</u> on single-node PyTorch training using Acure Machine Learning</li> </ul>
what's Possible with Automated Machine Learning	Neural Network R	Score Mode	In [ ]: # Check core SDK version number
Automate the process of algorithm selection, hyperparameter tuning, and best model selection	✓ Score	Ŭ	import azureml.core
with automated machine learning, and accelerate your productivity. Select your data and let automated ML do the rest to provide the best model from endless possible options.	Apply Transformation		<pre>print("SDK version:", azureml.core.VERSION)</pre>
	Score Model		Diagnostics
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#### Automated machine learning UI

#### Visual interface

#### **Machine learning notebooks**

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### Simplify machine learning for any skill level

Welcome to Automated Machine Learning		
	Sample 1 - Regression: Automobile Price Prediction (Basic)	CJUpyter distributed-pytorch-with-horovod Last Checkpoint: 5 minutes ago (autosaved)
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Create your first experiment with automated machine learning to produce quality models with zero effort.	and have very visual out	Copyright (c) Microsoft Corporation. All rights reserved. Licensed under the MIT License.
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#### Automated machine learning UI

#### Visual interface

#### Machine learning notebooks

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### Simplify machine learning for any skill level

Automated machine learning UI		Visual interface	Machine learning notebooks
	Score Model		
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Create your first experiment with automated machine learning to produce quality models with zero effort.	Machine Learning     Evaluate	Cean Missing Data 🗸 🗠	Licensed under the MIT License.
-	-00		Copyright (c) Microsoft Corporation. All rights reserved.
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### Simplify machine learning for any skill level

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Getting Started	▶ ➡ Data Transformation	which have may recarge	Copyright (c) Microsoft Corporation. All rights reserved.
Create your first experiment with automated machine learning to	Machine Learning	Chan Manny Data	Licensed under the MIT License.
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Create experiment	<ul> <li>Initialize Model</li> </ul>	Spit Cata     Spit Cata	Distributed PyTorch with Horovod
	<ul> <li>Classification</li> <li>Regression</li> </ul>		In this tutorial, you will train a PyTorch model on the MNIST dataset using distributed training via Horovod across a GPU cluster.
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			Prerequisites
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Automated		Visual interface	

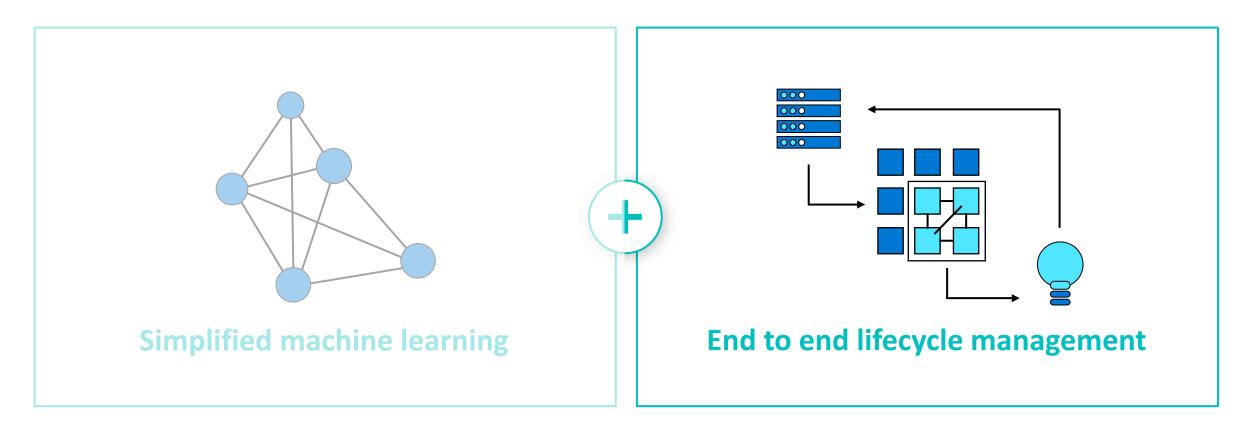
machine learning UI

#### Machine learning notebooks





### **Azure Machine Learning Service**





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### **DevOps**



Code reproducibility

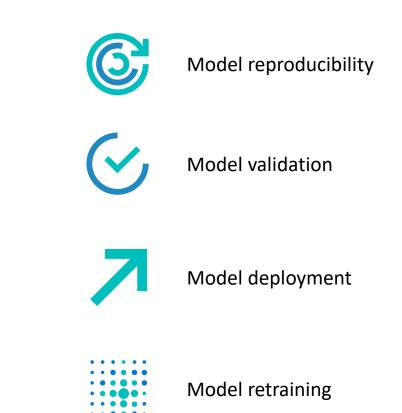


Code testing



App deployment

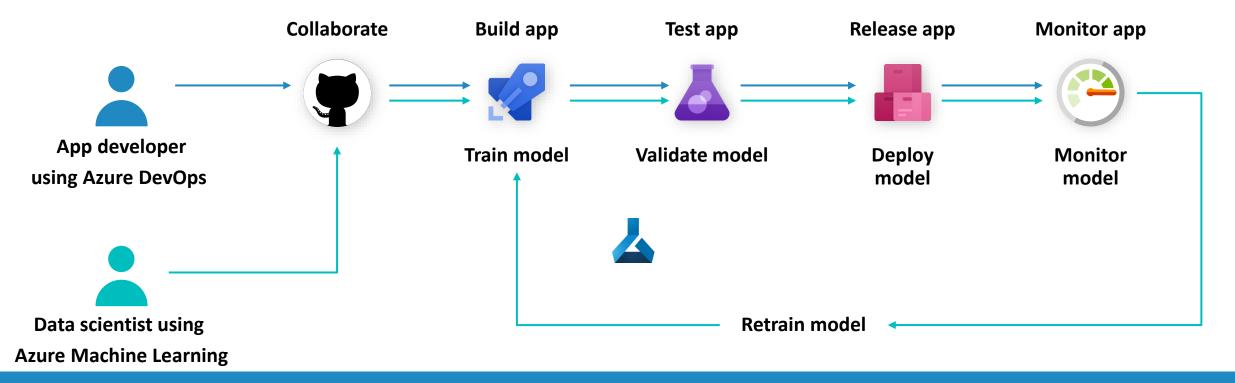
### **MLOps**







### **MLOPS with Azure Machine Learning**





Model validation

Model deployment



# TECH DAY

# Learning RL with Minecraft on Azure





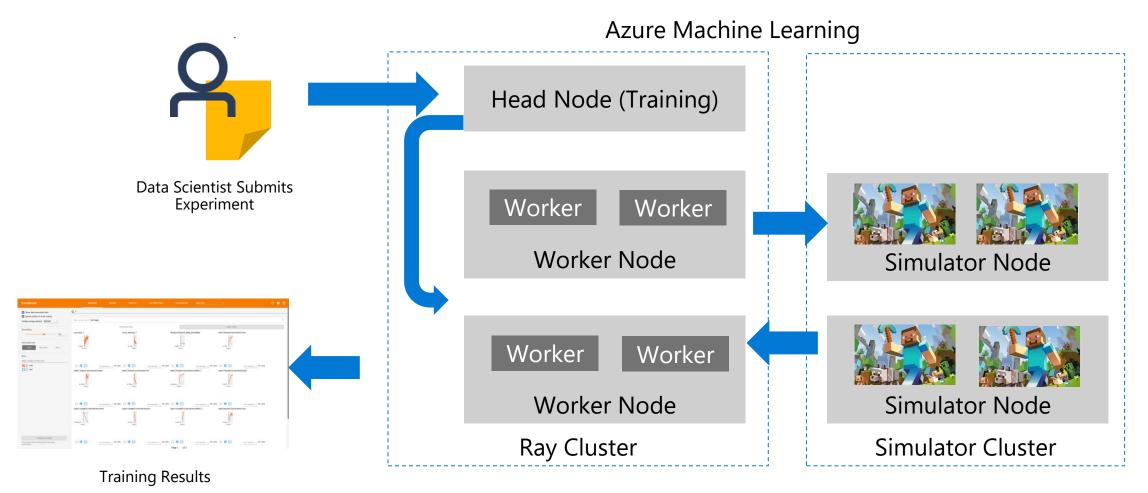


### **Goal: getting the Agent out of the maze**





### **Training Agents on Azure Machine Learning**



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### https://aka.ms/MinecraftRLDemo

On the right, you can see a video of the agent while he is training.

You can test your own Minecraft RL experiment using Azure Machine Learning Service.

Have fun 🙂



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TechShivaWolf

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### **Guenda Sciancalepore**

Cloud Solution Architect – Data & Al



# THANKS AND ....

# **SEE YOU SOON!**

ORGANIZATION

SPONSORS

SUPPORT







