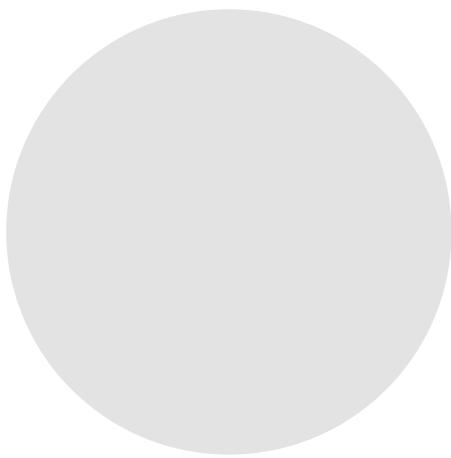


UiPath AI Center

Training

Student Guide





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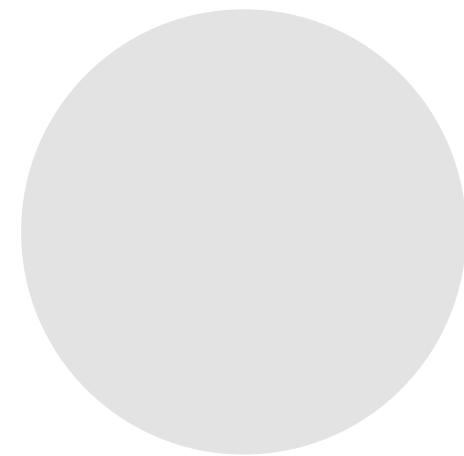
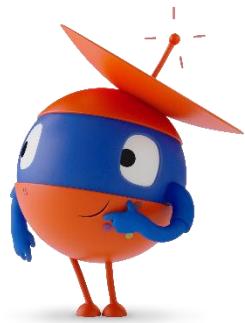
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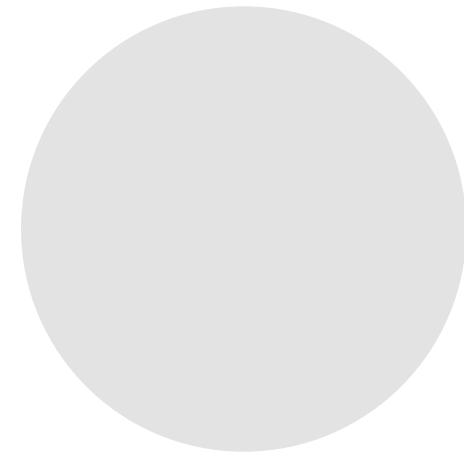
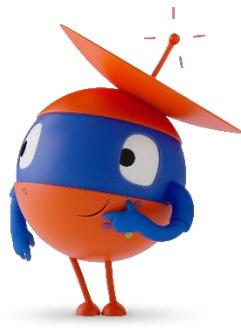
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Day 1



M1 - Course Overview



Welcome

UiPath AI Center Training

M1 | Course Overview



Welcome to Module 1! In this module, you will get an overview of the UiPath AI Center Training course.

About This Course

About This Course

- This course showcases how UiPath AI Center, the Machine Learning (ML) platform developed by UiPath, manages ML models and their deployment in the automation process.
- The focus is on understanding how to use AI Center features and integrate ML models, either out-of-the-box or custom ones, into the Robotic Process Automation (RPA) workflows to solve complex automation problems.
- During this course, you will learn how to train, manage, deploy, and consume ML models using AI Center.



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The focus is on understanding how to use AI Center features and integrate ML models, either out-of-the-box or custom ones, into the Robotic Process Automation (RPA) workflows to solve complex automation problems. During this course, you will learn how to train, manage, deploy, and consume ML models using AI Center.

Target Audience and Prerequisites

Target Audience and Prerequisites

Target audience

- RPA Developers
- Data scientists

Prerequisites

- Software development or RPA skills for 1-3 years
- Experience with ML recommended but not mandatory
- Knowledge of [Python](#) preferred but not mandatory
- Knowledge of [Orchestration process](#) recommended but not a must
- Submission of Diploma of Completion for UiPath Foundation Training
- Full availability during the course length: two days, six hours/day
- Active participation

UiPath Reboot Work.



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- The target audience for this course are RPA Developers and data scientists.
- Following are the prerequisites for this course:
 - Software development or RPA skills for 1-3 years
 - Experience with ML recommended but not mandatory
 - Knowledge of Python (<https://docs.python.org/3/>) preferred but not mandatory
 - Knowledge of Orchestration process (<https://docs.uipath.com/studio/v2021.10/docs/orchestration-process>) recommended but not a must
 - Submission of Diploma of Completion for UiPath Foundation Training
 - Full availability during the course length: two days, six hours/day
 - Active participation

Course Overview

Course Overview



Learning objectives

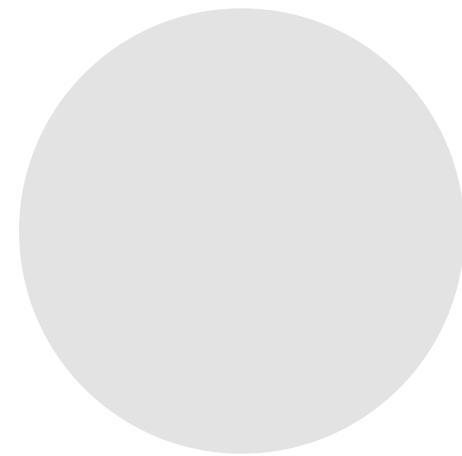
- Describe the AI Center platform and its role in accelerating AI and automation strategy.
- Recognize the power of ML to deliver intelligent automation scenarios.
- Explain how to effectively use ML skills within automation workflows.
- Explain how to deploy custom-built ML models and use the out-of-the-box ML models.
- Apply the knowledge of deploying, managing, and consuming ML models using AI Center.

Let's get started!

Let's get started!



M2 - Introducing UiPath AI Center – An Overview



Welcome

UiPath AI Center Training

M2 | Introducing UiPath AI
Center – An Overview



Welcome to Module 2! In this module, you will gain a high-level understanding of Artificial Intelligence (AI), Machine Learning (ML), AI Center and its use cases. You will also learn about AI in the context of Robotic Process Automation (RPA).

Lessons Covered in This Module

About This Module | M2 | Introducing UiPath AI Center – An Overview



Lessons covered in this module

- Lesson 1: Introduction to AI in the Context of RPA
- Lesson 2: What Is AI Center?
- Lesson 3: Identifying Use Cases

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This module is divided into three foundation lessons namely, Introduction to AI in the Context of RPA, What Is AI Center?, and Identifying Use Cases.

Learning objectives

About This Module | M2 | Introducing UiPath AI Center – An Overview



Learning objectives

- Define AI.
- Identify the subsets of AI.
- Describe the stages of ML.
- Identify the types of ML algorithms.
- Recognize the need to include AI in RPA.
- Describe the working of AI Center.
- Identify the use cases of AI Center.

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Lesson 1: Introduction to AI in the Context of RPA

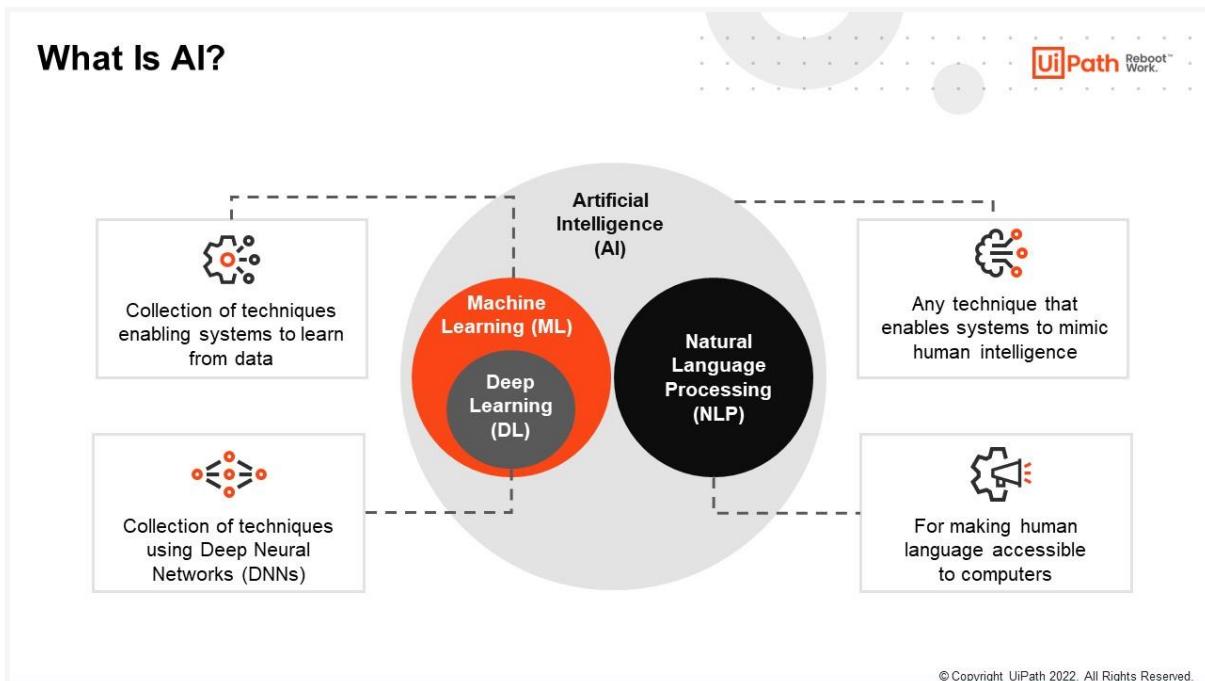
Introduction to AI in the Context of RPA

M2 | L1



In Lesson 1, you will gain a high-level understanding of AI and ML and the importance of combining RPA and AI.

What Is AI?



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AI refers to any technique that enables systems to mimic human intelligence. It also refers to the theory and development of computer systems to be able to perform tasks that normally require human intelligence and decision making. It consists of multiple sub-fields, but the most commonly used ones are Machine Learning (ML), Deep Learning (DL), and Natural Language Processing (NLP).

ML enables systems to learn from data. Systems learn from previous experience and information to deduce and predict future information. This learning happens by using algorithms that can learn to perform a specific task without being explicitly programmed.

DL refers to an area of ML, which uses specific types of ML algorithms called Neural Networks (NNs). NLP refers to a branch of AI that makes human language accessible to computers. For example, NLP enables computers to hear speech, read text, interpret the text/speech, measure sentiment, and determine the import segments of the text.

What Is ML?

What Is ML?

ML refers to a collection of approaches for estimating functions that enable describing, in a mathematical way, how an input relates to an output.

The diagram shows a flow from an 'Input' (a house icon) through a 'Function' (a large $f(x)$ icon) to an 'Output' (a square with an upward arrow). Below the icons are the labels 'Input', 'Function', and 'Output'.

Example: Determining how much a house is worth

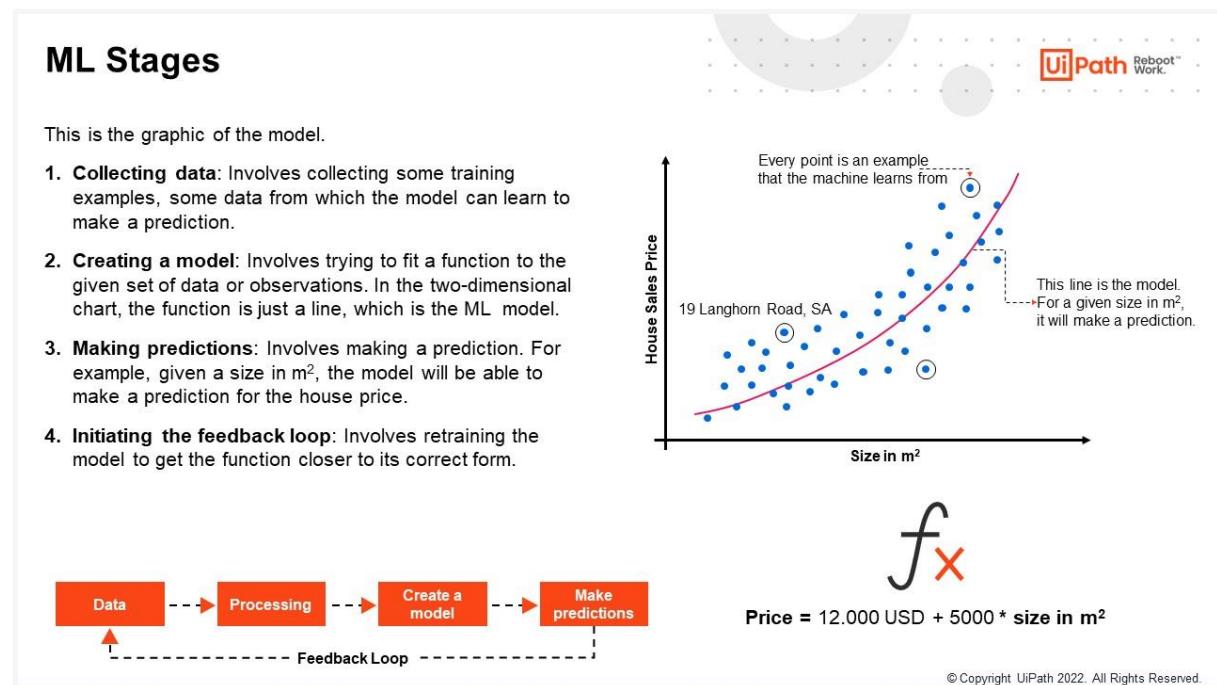
Price = 12.000 USD + 5000 * size in m²

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ML refers to a collection of approaches for estimating functions that enable describing, in a mathematical way, how an input relates to an output. For example, to determine the worth of a house, ML can provide the function that outputs the price.

To get this function, it is essential to look at the different houses and measure various features they have such as number of bedrooms and number of schools around. Equipped with these features, an ML algorithm can be used to model the house price, based on historical observations.

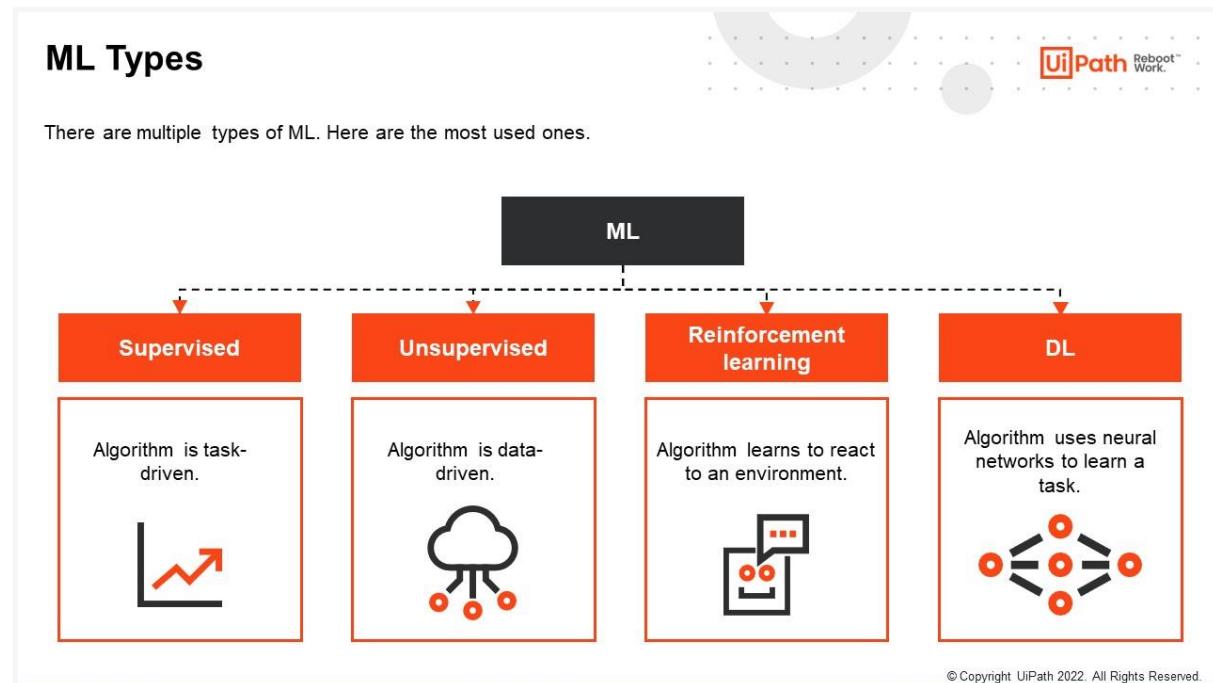
ML Stages



This is the graphic of the model.

- Collecting data:** For the model to be able to make a prediction, it is essential to teach it how to do that. Thus, the first stage starts with some training examples, some data from which the model can learn.
- Creating a model:** Given a set of data or observations, you now try to find a function that better fits the data. Now that there is the line (the ML model), you are ready to make predictions on new data.
- Making predictions:** Finally, given a size in m², the model will be able to make a prediction for the price of that house.
- Initiating the feedback loop:** Most of the times, you don't really know or have access to all the features that influence the price of a house. In addition, you don't have unlimited training examples. Therefore, you won't be able to know the exact form of the function that describes the house price. So, what you can do is estimate that true function and keep retraining the model to get the function closer to its correct form.

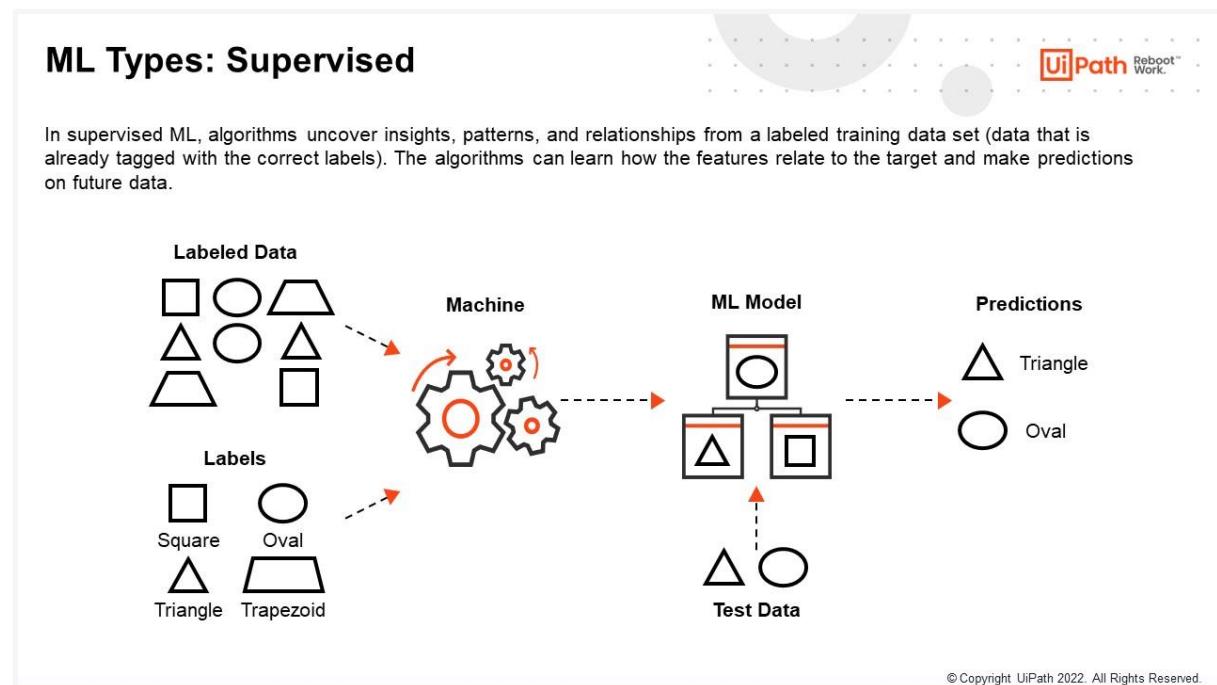
ML Types



- There are multiple types of ML, the most used ones being:
 - Supervised
 - Unsupervised
 - Reinforcement learning
 - DL

Note: For more information on types of ML, kindly visit <https://machinelearningmastery.com/types-of-learning-in-machine-learning/>.

ML Types: Supervised



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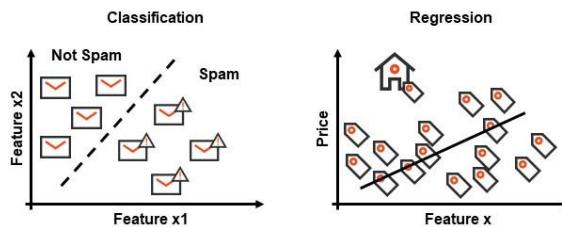
In supervised ML, algorithms uncover insights, patterns, and relationships from a labeled training data set (data that is already tagged with the correct labels). The algorithms can learn how the features relate to the target and make predictions on future data.

Types of Supervised ML Algorithms

Types of Supervised ML Algorithms

There are multiple techniques of supervised ML algorithms. The most used ones are:

- **Classification:** Labels each example by choosing between two or more different classes. Following are some examples:
 - Will a person default on a loan? Yes or no?
 - Is an email spam or not spam?
- **Regression:** Returns a numerical target. For example, it can predict the price of a home, based on features, such as square footage and zip code.

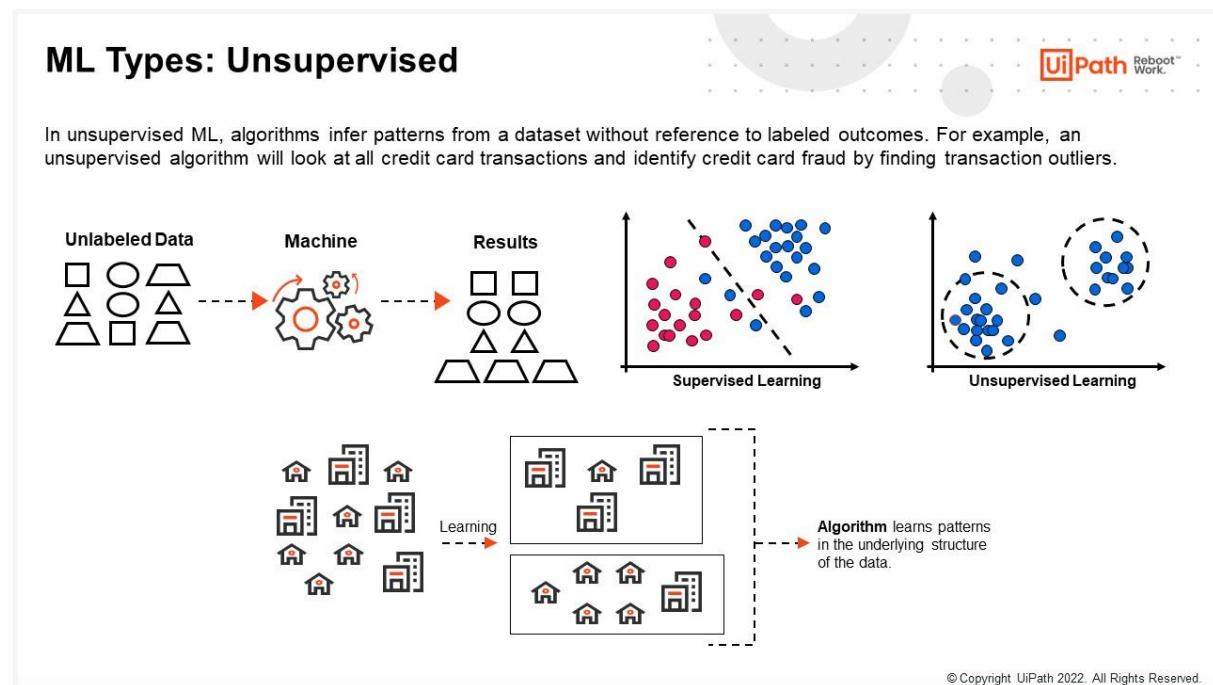


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There are multiple techniques of supervised ML algorithms. The most used ones are classification and regression. The classification algorithm classifies or labels each example by choosing between two or more different classes. For example, it will give a label as Yes or No if it has to find whether a person has defaulted on a loan.

Similarly, it will label an email as spam or not spam if it has to find whether an email is a spam or not spam. The regression algorithm returns a numerical target. For example, it returns the price of a home, based on features such as square footage and zip code.

ML Types: Unsupervised



In unsupervised ML, algorithms infer patterns from a dataset without reference to labeled outcomes. For example, an unsupervised algorithm will look at all credit card transactions and identify credit card fraud by finding transaction outliers.

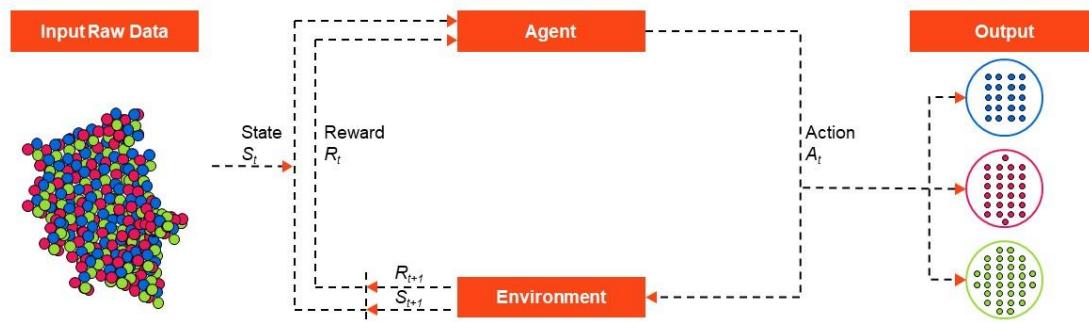
ML Types: Reinforcement

ML Types: Reinforcement



In reinforcement learning, algorithms learn by trying to react to external inputs and are trained using a system of rewards and punishments.

An example of this type of ML is a robot trying to learn how to shoot a basketball. Here, each time the ball goes into the basket, the robot realizes it did something good and remembers what it did. Similarly, each time it misses, it learns from that information as well.



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In reinforcement learning, algorithms learn by trying to react to external inputs and are trained using a system of rewards and punishments. They find the best possible behavior or path they should take in a specific situation. You can think of it as trial and error.

An example of this type of learning is a robot trying to learn how to shoot a basketball. Here, each time the ball goes into the basket, the robot realizes it did something good and remembers what it did. Similarly, each time it misses, it learns from that information as well.

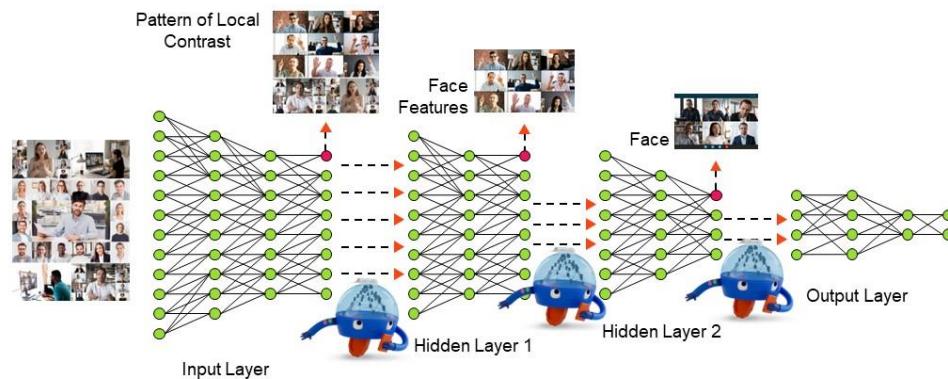
ML Types: Deep Learning (DL)

ML Types: Deep Learning (DL)



Deep learning (DL) algorithms are a type of algorithms that run data through several “layers” of neural network algorithms, each of which passes a simplified representation of the data to the next layer. Each layer can be thought of a transformation from input to intermediate outputs. Deep learning algorithms can either be supervised, unsupervised or semi-supervised.

The numerous layers allow for the algorithms to encode data in very complex ways. Some of these algorithms can be thought of as progressively transforming input data into something more composite and complex.



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Deep learning (DL) algorithms are a type of algorithms that run data through several “layers” of neural network algorithms, each of which passes a simplified representation of the data to the next layer. Each layer can be thought of a transformation from input to intermediate outputs. Deep learning algorithms can either be supervised, unsupervised or semi-supervised.

The numerous layers allow for the algorithms to encode data in very complex ways. Some of these algorithms can be thought of as progressively transforming input data into something more composite and complex. For example, a DL algorithm analyzing an image may have the lower layers identify edges, while the higher layers may identify the features relevant to a human such as text or faces.

Why RPA + AI?

Why RPA + AI?

- Although traditional RPA has enabled customers to automate rule-based, repetitive tasks throughout an organization, it still cannot handle many high-value and more complex use cases.
- UiPath wants to take RPA to the next level by integrating AI into automations to enable robots to do more complex automations and complete cognitive tasks.



Traditional RPA has already proven immense business values as the technology has enabled customers to automate rule-based, repetitive tasks throughout an organization. However, there are still many high-value and more complex use cases that cannot be tackled by traditional RPA.

UiPath wants to take RPA to the next level by integrating AI into automations. This will enable robots to do more complex automations and complete cognitive tasks, such as classifying emails and predicting sales.

Why RPA + AI? (Cont'd)

Why RPA + AI? (Cont'd)



For AI and data scientists, building an ML model is a partial step in solving a problem; making the model accessible to the business process and the people that need to use it is just as important.

Spending on AI systems is expected to reach \$97.90 billion in 2023, but only 4% of Chief Information Officers (CIOs) have implemented AI as of 2018.

~ [International Data Corporation \(IDC\)](#)

76% of enterprises struggle to scale from pilot.

~ [Accenture, an AI-powered organization](#)

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For AI and data scientists, building an ML model is a partial step in solving a problem; making the model accessible to the business process and the people that need to use it is just as important.

According to International Data Corporation (IDC)

(<https://www.businesswire.com/news/home/20190904005570/en/Worldwide-Spending-on-Artificial-Intelligence-Systems-Will-Be-Nearly-98-Billion-in-2023-According-to-New-IDC-Spending-Guide>), spending on AI systems is expected to reach \$97.90 billion in 2023, but only 4% of Chief Information Officers (CIOs) have implemented AI as of 2018.

According to Accenture, an AI-powered organization

(<https://www.accenture.com/cz-en/insights/artificial-intelligence/ai-investments>), 76% of enterprises yet struggle to scale from pilot.

Why RPA + AI? (Cont'd)

Why RPA + AI? (Cont'd)

- When conceptualizing RPA and AI, think of AI as the brain and RPA as the hands. It's when the two are combined that complex tasks can be completed.
- The combination of RPA+AI creates a broader set of problems to be solved.
- RPA can enable customers to easily integrate AI into workflows and automations.
- Data scientists can build models for various tasks and easily make them accessible in the required business context, thus enabling more complex automations.



vs.



AI

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When conceptualizing RPA and AI, it can be helpful to think of AI as the brain, and RPA as the hands. A disconnected brain can dream up concepts, but without hands it can't apply them. At the same time, hands without a brain can't handle advanced processes. It's when the two are combined that complex tasks can be completed. The combination of RPA+AI creates a broader set of problems to be solved.

RPA can enable customers to easily integrate AI into workflows and automations. Data scientists can build models for various tasks (that may or may not involve deep learning techniques) and easily make them accessible in the business context they are needed in, thus enabling more complex automations, such as classifying emails or predicting next quarter sales.

Lesson 2: What Is AI Center?

What Is AI Center?

M2 | L2



In Lesson 2, you will learn about AI Center, an ML platform from UiPath that is used for RPA and AI integration.

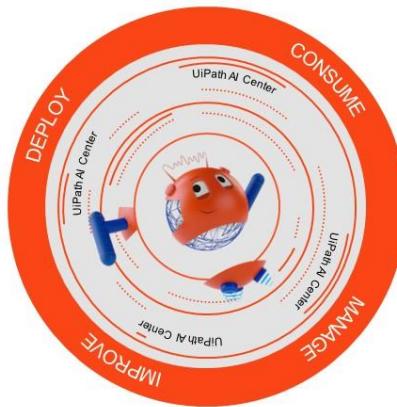
AI Center Overview

AI Center Overview



AI Center is an:

- ML platform from UiPath. It enables customers to deploy, consume, manage, and improve ML models. These models are developed in-house, by UiPath partners or out-of-the-box, from different research teams.
- End-to-end platform that helps accelerate AI and automation strategy.

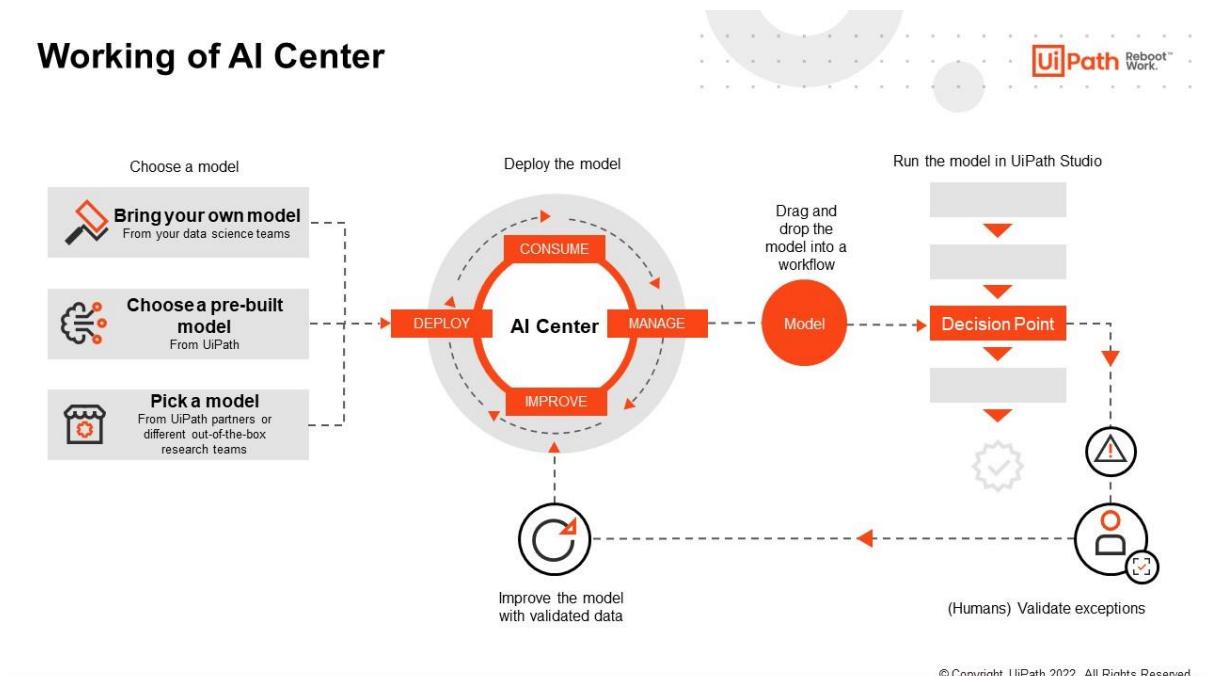


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AI Center is an ML platform from UiPath. It enables customers to deploy, consume, manage, and improve ML models. These models are developed in-house, by UiPath partners or out-of-the-box, from different research teams. AI Center is an end-to-end platform that helps accelerate AI and automation strategy.

Working of AI Center

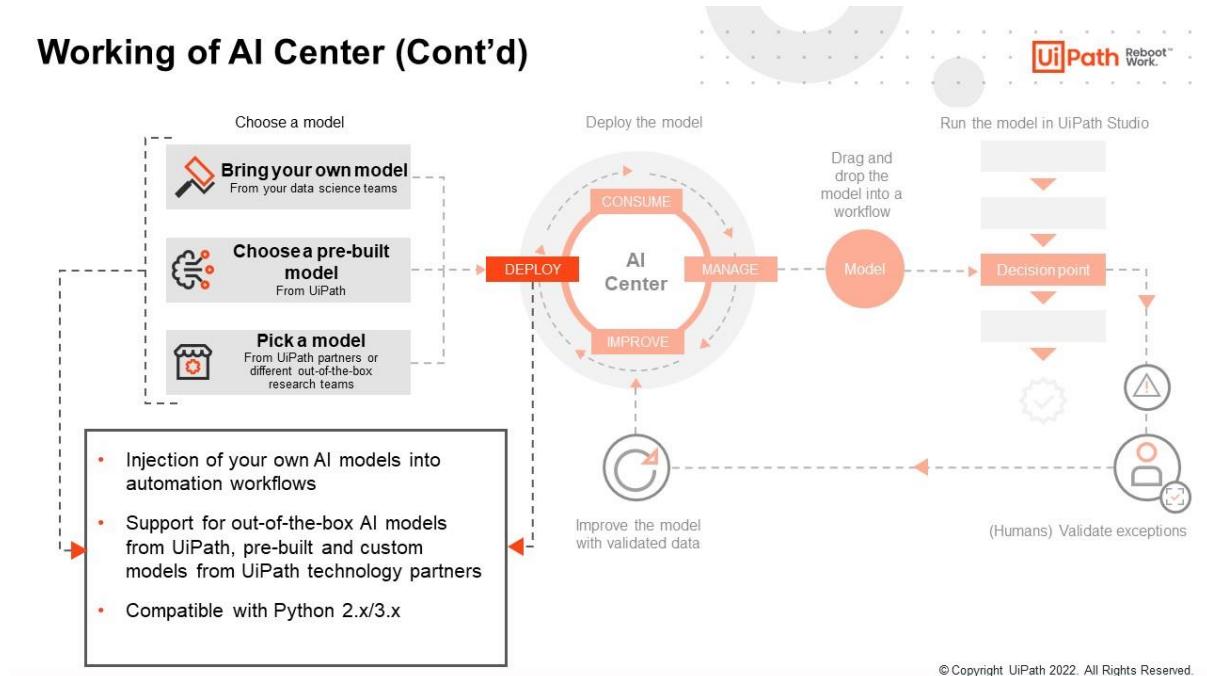
Working of AI Center



The diagram depicts how to deploy an ML model using AI Center in UiPath Studio. You start by choosing an AI model, which can be your own, a pre-built one, or the one from a UiPath partner and deploying it onto AI Center. Once a model is deployed, the RPA developers can then drag and drop the model into their workflows or business processes in UiPath Studio. This is where AI is included directly into business processes.

The AI Center offers many model management features such as versioning and taking a snapshot of the data the model was trained and evaluated for. This gives a comprehensive track of how the model is used, how it makes a prediction, and when it is updated. To enable a continuous learning system, it is essential to engage humans to validate the model's predictions. UiPath provides several tools to enable this engagement with the business users.

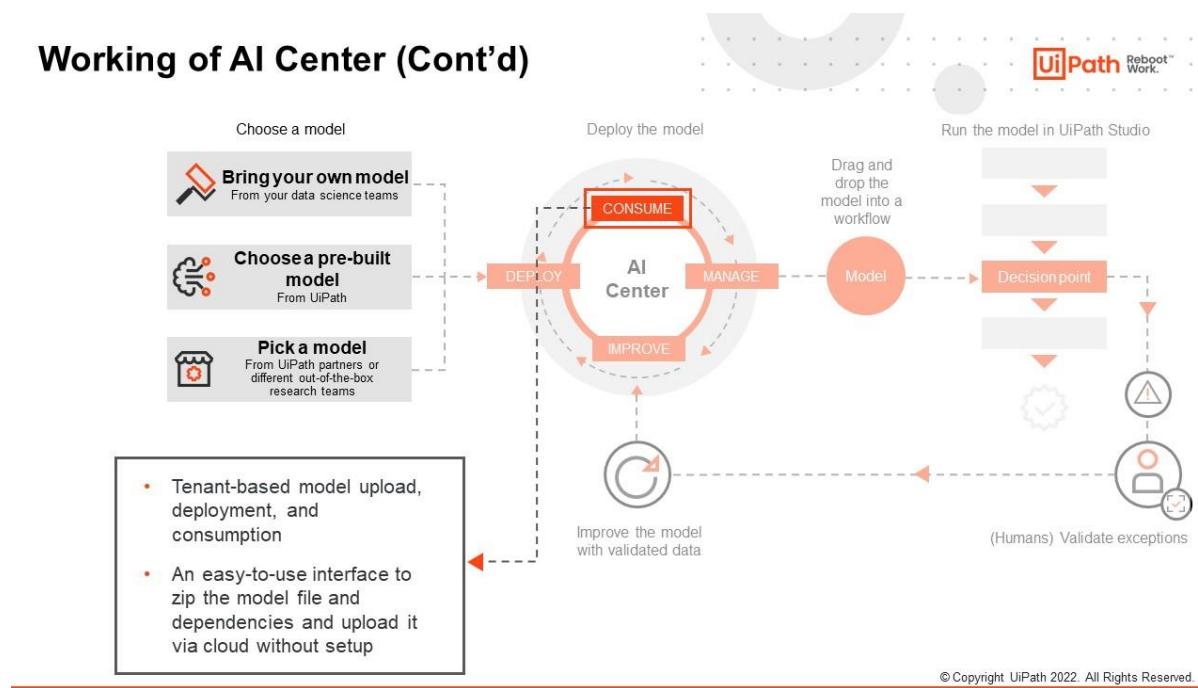
Working of AI Center (Cont'd)



There are different types of ML models that you can deploy in AI Center. AI Center enables you to inject your own AI models into its automation workflows, which are built by your data science teams. It also supports a myriad of out-of-the-box AI models from UiPath, GPU-hosted models, pre-built models from UiPath, and custom models from UiPath technology partners. You are ensured of compatibility with Python 2.x/3.x.

Working of AI Center (Cont'd)

Working of AI Center (Cont'd)

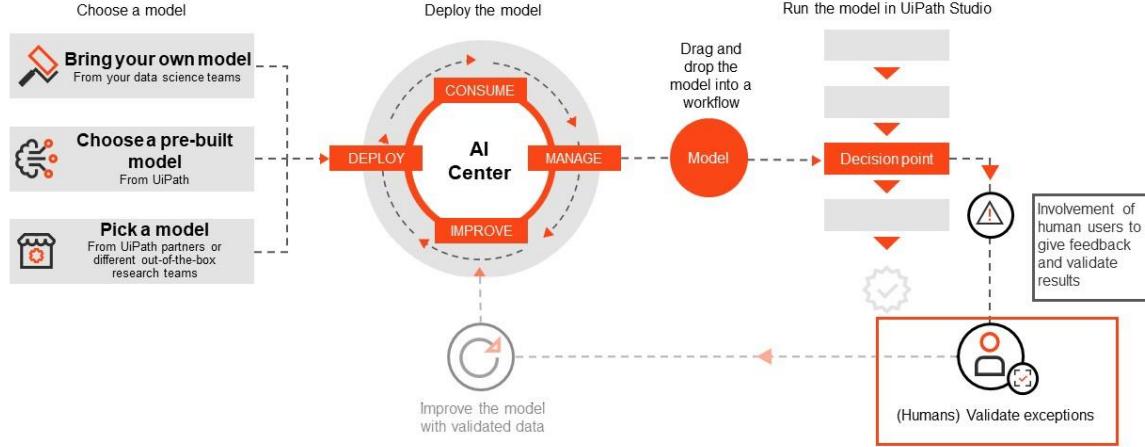


Once a model is deployed, a robot connected to a suitable tenant gets access to the model. The model is uploaded for consumption via an easy-to-use interface. Here, the model file and its dependencies are packed into a zip file before uploading via cloud without setting any infrastructure.

The RPA developers then drag and drop the model into their workflows or business processes in UiPath Studio. This is the Consume phase wherein more automation occurs with robots learning the AI skills. In other words, AI is introduced directly into the business processes.

Working of AI Center (Cont'd)

Working of AI Center (Cont'd)

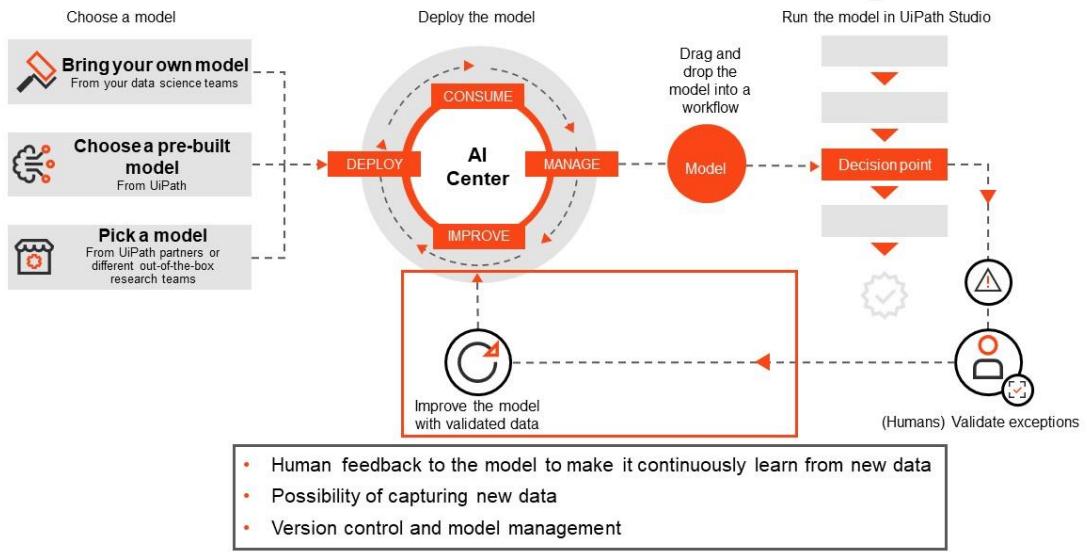


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In case of low confidence levels, human users can be involved to give feedback and validate the model results. The human validated data is pushed back to the AI Center project linked to the AI model. This results in a repeatable feedback loop.

Working of AI Center (Cont'd)

Working of AI Center (Cont'd)



The users can send the feedback from the process to the model to close the loop of the project and make the model continuously learn from new data. This is how new data points are captured to retrain the model. AI Center gives you the ability to retrain, manage, and version control your models so they can improve over time.

Note: Model training AI Center Cloud delivered as a Software-as-a-Service (SaaS) requires the cloud-based version of Orchestrator (Cloud Orchestrator).

Users Who Handle AI Center

Users Who Handle AI Center		
RPA Center of Excellence (CoE)	Data Scientist	Business User
<p>Challenges</p> <ul style="list-style-type: none"> Difficult to add AI capabilities to automations No access to the models of data science team No idea as to which model is the right fit <p>With AI Center</p> <ul style="list-style-type: none"> Automation of complex and cognitive processes Visibility into data science team's work ML model selection as per business needs 	<p>Challenges</p> <ul style="list-style-type: none"> No standard delivery mechanism for models No visibility into model performance Not sure when a model needs to be retrained Difficulty to gather additional data <p>With AI Center</p> <ul style="list-style-type: none"> Possibility of putting ML models into the hands of more people, faster Visibility into model use and performance Retraining of models with new data coming from business validation 	<p>Challenges</p> <ul style="list-style-type: none"> Misalignment between AI projects with business priorities No idea or awareness of how to apply AI to business problems for getting a solution No easy way or possibility to view business impact <p>With AI Center</p> <ul style="list-style-type: none"> Improved model's performance with domain expertise Exception handling, model predictions validation Decisions based on predictions
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- The three main users who handle AI Center are RPA Center of Excellence (CoE), a data scientist, and a business user.
- An RPA CoE member faces a couple of challenges. This user:
 - Finds it difficult to add AI capabilities easily to their automations.
 - Has no access to the models made by the data science teams.
 - Has no idea as to which model is the right fit.
- However, with AI Center, an RPA CoE member can:
 - Automate complex and cognitive processes.
 - Get visibility into the work of the data science team.
 - Select an ML model suited to business needs.
- A data scientist also faces a couple of challenges. This user:
 - Does not have a standard delivery mechanism for their models.
 - Has no visibility into model performance.
 - Is not sure when a model needs to be retrained.
 - Finds it difficult to gather additional data.

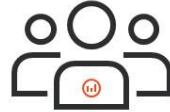
- However, with AI Center, a data scientist can:
 - Automate complex and cognitive processes.
 - Put ML models in the hands of more people.
 - Get visibility into model use and performance.
 - Retrain models with new data coming from business validation.
- Even a business user faces a couple of challenges. This user:
 - Faces issues regarding misalignment between AI projects with business priorities.
 - Has no idea of how to apply AI to business problems.
 - Has no easy way to view business impact.
- However, with AI Center, a business user can:
 - Improve model's performance with domain expertise.
 - Handle exceptions and validate model predictions.
 - Make decisions based on predictions.

Who Builds the ML Models?

Who Builds the ML Models?



UiPath
(Open-source Models)



Data Science Team of
a Customer
(Pre-built Models)



Open-source Models
(Pre-built Models)

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A model can come from UiPath, UiPath customer, or a UiPath partner. UiPath provides open-source models that customers will be able to deploy and use in their workflows. Additionally, the ML models are built by a customer's data science team (they may already have a model built), or by a partner.

Lesson 3: Identifying Use Cases

Identifying Use Cases

M2 | L3



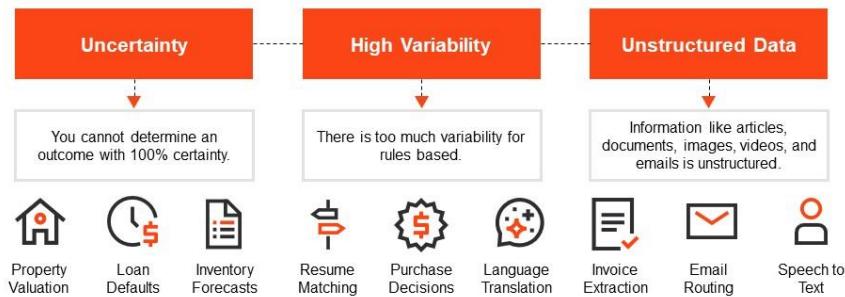
In Lesson 3, you will explore the use cases of AI Center.

Conceptualizing Use Cases

Conceptualizing Use Cases



With AI Center, the universe of automations expands tremendously. Organizations may need to identify and prioritize which of the many new opportunities they need to pursue first. One way to conceptualize these use cases for bringing AI into RPA workflows is to consider categorization. Here are the three categories to consider.



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With AI Center, the universe of automations expands tremendously. Organizations may need to identify and prioritize which of the many new opportunities they need to pursue first. One way to conceptualize these use cases is to group them into different categories. Examples for each category are provided in the illustration on the slide.

Use Cases in Different Industries

Use Cases in Different Industries				
Financial	Healthcare	Retail	Professional	General
Fraud Detection	Real time Pregnancy Risk Evaluation	Packaging Quality Evaluation	RFP Opportunities	Resume Matching
Personal Loan Approval	Patient Receivables Management	Inventory Management	Deal Guidance	Help Desk Answers
KYC – Entity Identification	Propensity of Claim Denial Prediction	Merchandising Planning	Data Extraction from Charts	Customer Churn Prediction
AML Alert Classification	Fraudulent Medical Claim Protection	Product Recommendation	Auditing – Anomaly Detection	Customer Complaints – Email Classification
ID Information Extraction	Readmission Prediction	Pricing Optimization	Legal – Win/Loss Rate Prediction	Quality – Visual Inspection

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Use Cases in Different Industries (Cont'd)

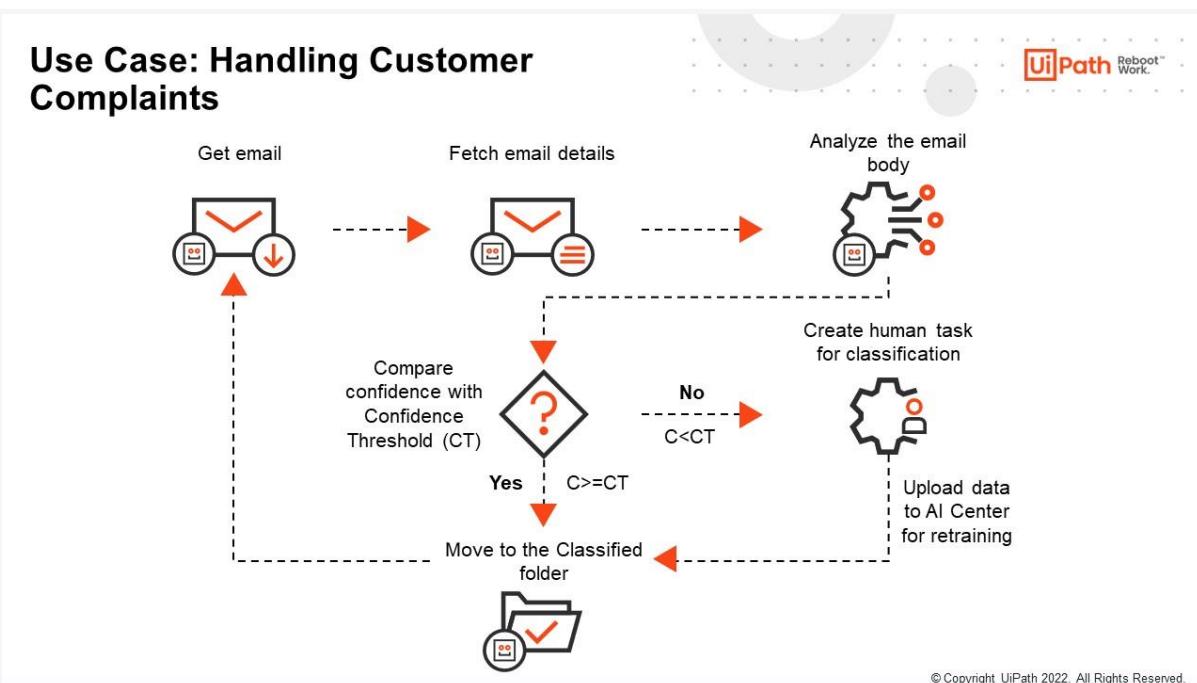
Use Cases in Different Industries (Cont'd)

UiPath Reboot Work.

[Demo or preview of AI Center](#)

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Use Case: Handling Customer Complaints



The diagram illustrates an RPA workflow handling the classification of customer complaints using an already deployed ML model. First, you get the email body and analyze it with the already deployed ML model. If the confidence that you receive is higher than the threshold, then you continue with the next steps of the automation (in this case, moving to the Classified folder). If the confidence is lower than the threshold, you add a human to the loop.

A human's role is to label these emails manually, via UiPath Action Center. The correctly labeled information is sent back to AI Center in order to retrain the already deployed model. This is how Action Center helps in sending feedback from the process to the ML model so that you can close the loop of the ML project and make your model continuously learn from new data.

Knowledge Checks

Knowledge Checks



Knowledge Check 1

Knowledge Check 1

01/05

1. What are the ML stages?

- Collecting data, creating a model, making predictions, initiating the feedback loop
- Collecting data, making predictions, initiating the feedback loop
- Collecting data, creating a model, initiating the feedback loop
- Collecting data, creating a model, making predictions



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Knowledge Check 2

Knowledge Check 2

02/05

2. Which are the main groups of users handling AI Center (Choose two)?

- RPA CoE
- Data Scientist
- Business User
- Solution Architect
- Citizen Developer



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Knowledge Check 3

Knowledge Check 3

03/05

3. Which one of the following is best suited to improve the model with validated data?

- Involvement of human users to give feedback and validate the results
- Involvement of attended robots to give feedback and validate the results
- Involvement of unattended robots to give feedback and validate the results
- Self-train the model on its own

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Knowledge Check 4

Knowledge Check 4

04/05

4. Match the terms to the order of their occurrence to showcase how AI Center enables the use of ML models.

Terms	Order of Occurrence
<input type="checkbox"/> Deploy	1
<input type="checkbox"/> Consume	2
<input type="checkbox"/> Manage	3
<input type="checkbox"/> Create	4

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Knowledge Check 5

Knowledge Check 5

05/05

5. What are the main features of AI Center?
- Consume, manage, improve, deploy ML models
 - Consume, manage, make decisions, deploy ML models
 - Make decisions, manage, improve, deploy ML models
 - Consume, manage, improve, make decisions



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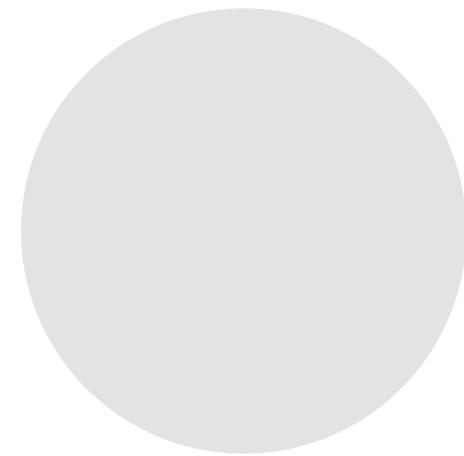
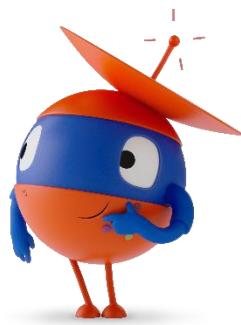
Key Takeaways

Key Takeaways

- AI refers to any technique that enables systems to mimic human intelligence.
- AI consists of multiple sub-fields, of which the main ones are ML, DL, and NLP.
- ML refers to a collection of approaches for estimating functions that enable describing, in a mathematical way, how an input relates to an output.
- Collecting data, creating a model, making predictions, and initiating a feedback loop are the four stages of ML.
- Supervised, unsupervised, reinforcement, and DL are the most used ML algorithms.
- UiPath wants to take RPA to the next level by integrating AI into automations to enable robots to do more sophisticated automations and complete cognitive tasks.
- AI Center is an ML platform from UiPath, which enables customers to deploy, consume, manage, and improve ML skills/models.
- Financial, healthcare, retail, professional, and general services are some of the sectors where AI Center plays a key role in integrating AI with RPA.

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M3 - AI Center Deep Dive – Focus on Out-of-the-box Models



Welcome

UiPath AI Center Training

M3 | AI Center Deep Dive –
Focus on Out-of-the-box
Models



Welcome to Module 3! In this module, you will be introduced to the core concepts used in UiPath AI Center.

Lessons Covered in This Module

About This Module | M3 | AI Center Deep Dive – Focus on Out-of-the-box Models



Lessons covered in this module

- Lesson 1: Getting Started
- Lesson 2: Projects
- Lesson 3: Datasets
- Lesson 4: ML Packages
- Lesson 5: Pipelines
- Lesson 6: ML Skills
- Lesson 7: ML Logs
- Lesson 8: Consuming ML Skills
- Lesson 9: Analysis of the Output of Pipelines

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This module is divided into nine foundation lessons namely: Getting Started, Projects, Datasets, ML Packages, Pipelines, ML Skills, ML Logs, Consuming ML Skills, and Analysis of the Output of Pipelines.

Learning Objectives

About This Module | M3 | AI Center Deep Dive – Focus on Out-of-the-box Models

The logo for UiPath Reboot Work, featuring the brand name in a red box with a white outline, followed by the tagline "Reboot Work." in smaller text.

Learning objectives

- Define the core concepts of AI.
- Identify the different ways of managing projects in AI.
- Recognize the need to have datasets in the project.
- Explain what out-of-the-box packages are.
- Identify the types of pipelines.
- Explain the way of managing Machine Learning (ML) skills in a project.
- Identify the categories of ML log events.
- Explain how to consume an ML skill from UiPath Studio.
- Describe the different data extraction methodologies.
- Comprehend how to analyze the output of pipelines.

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Lesson 1: Getting Started

Getting Started

M3 | L1



In Lesson 1, you will gain a high-level understanding of the core concepts used in AI Center.

How to Access UiPath AI Center?

How to Access UiPath AI Center?

The steps to access UiPath AI Center are as follows:

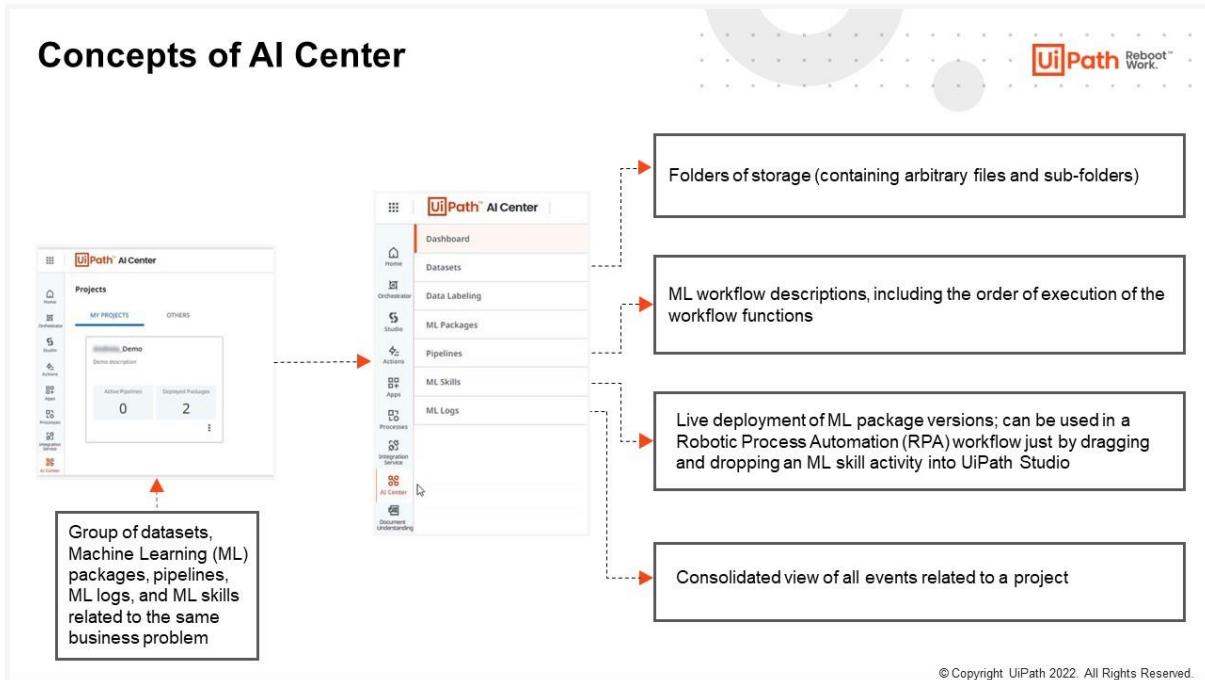
1. Navigate to <https://cloud.uipath.com/>.
2. Log in to UiPath Automation Cloud using your credentials. The Home page is displayed.
3. In the navigation bar on the left side of the Home page, click the **AI Center** icon. The Projects page is displayed.

The screenshot illustrates the user's journey through the UiPath Automation Cloud interface. It starts with the 'Orchestrator Services' section on the Home page, which includes four cards showing last update times: 20 hours ago, 47 days ago, 26 days ago, and 12 days ago. Below this is the 'License Allocation' section, which lists 'Attended - Named User' and 'RPA Developer - Named User'. On the far left, a vertical navigation bar features icons for Home, Orchestrator, Studio, Actions, Apps, Processes, Integration Service, and AI Center, with the 'AI Center' icon highlighted by a red box. A horizontal navigation bar at the top right includes Home, Orchestrator, Studio, Actions, Apps, Processes, Integration Service, and AI Center. The main content area transitions to the 'Projects' page under the 'AI Center' tab. This page displays a 'MY PROJECTS' section with a single project named 'Demo' (with a placeholder image), showing '0 Active Pipelines' and '2 Deployed Packages'. There is also an 'OTHERS' section. The bottom right corner of the screenshot contains the copyright notice: '© Copyright UiPath 2022. All Rights Reserved.'

The steps to access UiPath AI Center are as follows.

1. Navigate to <https://cloud.uipath.com/>.
2. Log in to UiPath Automation Cloud using your credentials. The Home page is displayed.
3. In the navigation bar on the left side of the Home page, click the **AI Center** icon. The Projects page is displayed.

Concepts of AI Center



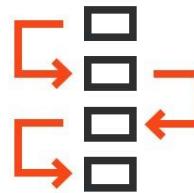
There are five core concepts involved in the AI Center, which are as follows:

- **Project:** Groups datasets, Machine Learning (ML) packages, pipelines, ML logs, and ML skills related to the same business problem.
- **Dataset:** Refers to a folder of storage (containing arbitrary files and sub-folders).
- **Pipeline:** Refers to the description of an ML workflow, including all the functions in the workflow and the order of executions of these functions.
- **ML Skill:** Refers to the live deployment of an ML package version; an ML skill activity can be used in a Robotic Process Automation (RPA) workflow simply by dragging and dropping it into UiPath Studio.
- **ML Log:** Is a consolidated view of all events related to a project.

Types of Pipelines

Types of Pipelines

- The pipeline includes the definition of the inputs required to run the pipeline and outputs obtained from it.
- A pipeline run is an execution of a pipeline based on the code provided by the user. This code is where the functions called in the pipeline are implemented.
- There are three types of pipelines.



Training

Takes an ML package and a dataset together to produce a new ML package version.

Evaluation

Takes an ML package version and a dataset to produce a set of metrics and logs.

Full

Runs a training pipeline (a data processing function) and immediately after, runs an evaluation pipeline.

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The pipeline includes the definition of the inputs required to run the pipeline and outputs obtained from it. A pipeline run is an execution of a pipeline based on the code provided by the user. This code is where the functions called in the pipeline are implemented.

There are three types of pipelines namely, training, evaluation, and full. At a high level, a training pipeline takes as input an ML package and a dataset together producing a new ML package version. An evaluation pipeline takes as input an ML package version and a dataset and produces a set of metrics and logs. A full pipeline essentially runs a training pipeline and immediately after, runs an evaluation pipeline.

Permissions

Permissions



The permission required to access AI Center: A tenant with AI Center enabled

 User-based roles can be assigned in Orchestrator to limit who has access to AI Center.

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To access AI Center, a tenant with AI Center enabled is required.

Note: User-based roles can be assigned in Orchestrator to limit who has access to AI Center.

Lesson 2: Projects

Projects

M3 | L2



In Lesson 2, you will learn in detail about projects, a core concept used in AI Center.

Projects Overview

Projects Overview

A project is an isolated group of resources you can use to build a specific ML solution. Here are these resources.



Datasets



ML Packages



Pipelines



ML Skills



ML Logs

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A project is an isolated group of resources you can use to build a specific ML solution. These resources are datasets, ML packages, pipelines, ML skills, and ML logs.

The Projects Page

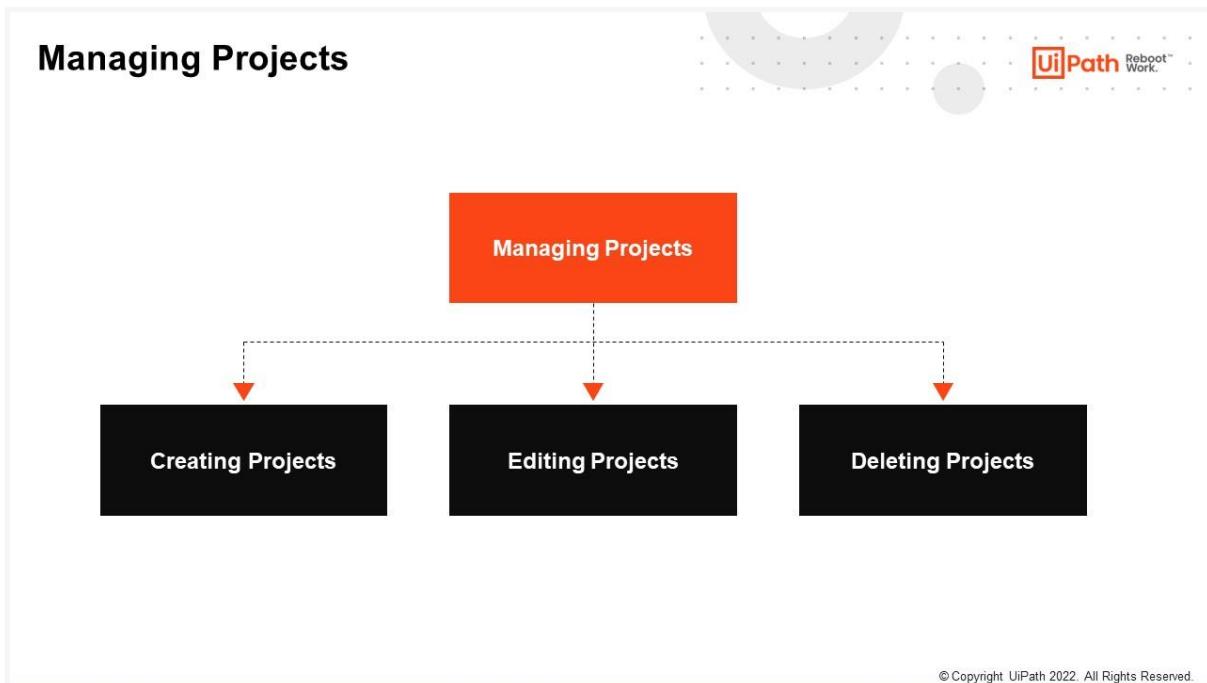
The Projects page contains a list of available projects. Each project is represented by a card, showing top-level information about the project.

The screenshot shows the 'Projects' section of the 'UiPath AI Center' interface. It includes a sidebar with icons for Home, Refresher, Studio, Automate, Apps, ML Services, Migration Planner, and U Center. The main area shows 'MY PROJECTS' with a card for 'Demo'. The card displays 'Demo description', 'Active Pipelines: 0', 'Deployed Packages: 2', and sections for 'Running/Scheduled Pipelines' and 'ML Packages'. A legend on the right maps these elements to their respective labels: Project Name, Project Description, Card, Running/Scheduled Pipelines, and ML Packages.

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- The Projects page contains a list of available projects.
- Each project is represented by a card, showing top-level information about the project. This information is:
 - Project name
 - Project description
 - Active Pipelines referring to the currently running or scheduled pipelines
 - Deployment Packages referring to ML packages belonging to this project that have been deployed as ML skills.

Managing Projects



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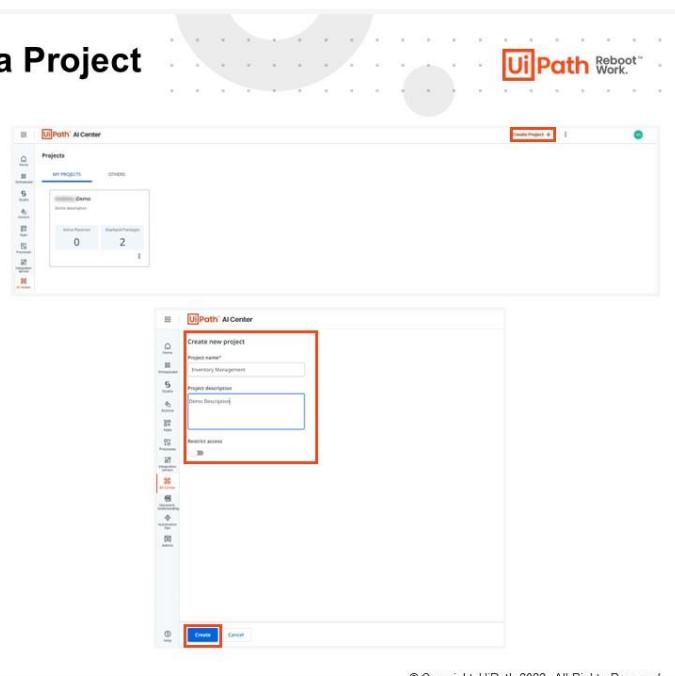
Managing a project in AI Center involves, creating, editing, and deleting it.

Managing Projects: Creating a Project

Managing Projects: Creating a Project

To create a new project:

1. Navigate to the Home page of UiPath Automation Cloud.
2. In the navigation bar, click the **AI Center** icon. The Projects page is displayed.
3. In the top-right corner, click the **Create Project +** button. The Create new project page is displayed.
4. In the Project name field, type a suitable project name (mandatory).
5. In the Project description field, type a suitable project description (optional).
6. To limit the project access for users, enable the **Restrict access** toggle button (optional).
7. Click **Create**. The new project is created, and its Dashboard page is displayed.



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To create a new project, perform the following steps:

1. Navigate to the Home page of UiPath Automation Cloud.
2. In the navigation bar, click the **AI Center** icon. The Projects page is displayed.
3. In the top-right corner, click the **Create Project +** button. The Create new project page is displayed.
4. In the Project name field, type a suitable project name (mandatory).
5. In the Project description field, type a suitable project description (optional).
6. To limit the project access for users, enable the **Restrict access** toggle button (optional).
7. Click **Create**. The new project is created, and its Dashboard page is displayed.

Note: Make sure that the project name you enter is relevant to the current use case, as it cannot be updated in the future. For more information on restricting access to a project, kindly visit <https://docs.uipath.com/ai-fabric/v0/docs/creating-a-new-project-and-assigning-users>.

Managing Projects: Editing and Deleting a Project

Managing Projects: Editing and Deleting a Project



AI Center enables you to edit and delete the existing projects.

- **Editing a project:** There are two ways to do so, which are as follows:
 - On the Dashboard page of the desired project, click **Edit project**.
 - On the Projects page, in the desired project card, click the vertical ellipsis menu and select **Edit**.
- **Deleting a project:** There are two ways to do so, which are as follows:
 - On the Dashboard page of the desired project, click **Delete project**.
 - On the Projects page, in the desired project card, click the vertical ellipsis menu and select **Delete**.



You will be able to edit the description of the project but not the name of the project. Also, you can only delete a project if it does not have a package currently deployed as a skill. Deleting a project removes all its running and scheduled pipelines, package versions, and pipeline data.

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AI Center enables you to edit and delete the existing projects.

- **Editing a project:** There are two ways to do so, which are as follows:
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 - On the Projects page, in the desired project card, click the vertical ellipsis menu and select **Delete**.

Note: You will be able to edit the description of the project but not the name of the project. Also, you can only delete a project if it does not have a package currently deployed as a skill. Deleting a project removes all its running and scheduled pipelines, package versions, and pipeline data.

The Dashboard Page

The Dashboard Page

- The Dashboard page provides a high-level view of the different entities grouped within a specific project, such as Datasets, ML Packages, and Pipelines.
- The page also provides detailed information about the project, such as the project creator, time of creation, and the project description.
- To navigate to the Dashboard page of the desired project, on the Projects page, click the desired project card.

The screenshot shows the 'Dashboard' page of the 'UiPath AI Center'. At the top, there's a header with the 'UiPath AI Center' logo and a 'Reboot Work.' button. Below the header, there's a circular progress bar. The main content area is divided into three sections: 'Datasets', 'ML Packages', and 'Pipelines'. Each section has a search bar and a table with columns like Name, Last modified, Deployment, and Duration. The 'Datasets' section contains entries for 'CC_Test', 'CC_Train', 'Robot Upload', and 'TC_Train'. The 'ML Packages' section contains entries for 'CC_Pk', 'ML_TC_Pk', and 'TC_Pk'. The 'Pipelines' section contains entries for 'ML_TC_Pk', 'TC_Pk', and 'CC_Pk'. At the bottom of each section, there are pagination controls and a 'Show Items' dropdown.

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The Dashboard page provides a high-level view of the different entities grouped within a specific project, such as Datasets, ML Packages, and Pipelines. It is where you can find information about the user who created the project, its creation time, and its description. To navigate to the Dashboard page of the desired project, on the Projects page, click the desired project card.

Best Practices

Best Practices

Here are a couple of best practices to better organize projects.



Organize each project to correspond to one business automation task.



Make sure the project has a specific name and a brief description summarizing its purpose.

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It is recommended that you organize each project to correspond to one business automation task. A project should have a specific name and a brief description summarizing its purpose.

Lab Exercise



Lab Exercise

M3 | L2



Please refer to Lab Exercise 1 of Day 1 in the Lab Guide.

Lab Exercise 1 (10 Minutes)



Lab Exercise 1 (10 Minutes)

[Create a project](#)

Create a project that includes your first and last name.

UiPath Reboot Work.

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Lesson 3: Datasets

Datasets

M3 | L3



In Lesson 3, you will get a high-level overview of what a dataset is and the importance of having a dataset to access new data points.

Datasets Overview

Datasets Overview

- A dataset is a folder of storage that includes arbitrary sub-folders and files.
- The purpose of a dataset is to allow ML models in the project to access new data points (either new files or folders uploaded from the application, or data from UiPath Robot at runtime).

```
graph LR; LM[Learning Models] --> NDR[New Data Points/Records]; NDR --> NF[New Files]; NDR --> NF[New Folders]; NDR --> DR[Data from UiPath Robot]
```

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A dataset is a folder of storage that includes arbitrary sub-folders and files. The purpose of having a dataset is to allow ML models in the project to access new data points, such as new files or folders uploaded from the application, or any data from UiPath Robot at runtime.

Creating a Dataset

Creating a Dataset

To create a new dataset:

1. On the Dashboard page, in the left navigation bar, click **Datasets**. The Datasets page is displayed.
2. In the top-right corner of the Datasets page, click **Create new**.
 - To upload a dataset folder from your local computer, in the top-right corner, click **Upload folder**.

The screenshot shows the 'Datasets' page in the UiPath AI Center. The left sidebar has options like 'Dashboard', 'Datasets' (which is selected), 'Data Labeling', 'ML Packages', 'Pipelines', and 'ML Models'. The main area shows a table with four rows of dataset information:

Name	Description	Created	Last modified
TC_Train		2022-05-17 01:40 pm	2022-05-17 01:40 pm
Robot Upload		2022-05-16 09:36 am	2022-05-16 09:36 am
CC_Test		2022-05-15 11:14 pm	2022-05-16 01:29 am

At the bottom right of the table, it says '1 - 4 of 4' and 'Show items: 5'. At the top right of the page, there are buttons for 'Create new' and 'Upload folder'. The top right corner of the page has the 'UiPath Reboot Work.' logo.

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To create a new dataset, perform the following steps:

1. On the Dashboard page, in the left navigation bar, click **Datasets**. The Datasets page is displayed.
2. In the top-right corner of the Datasets page, click **Create new**.
 - To upload a dataset folder from your local computer, in the top-right corner, click **Upload folder**.

Making Datasets Public/Private

Making Datasets Public/Private

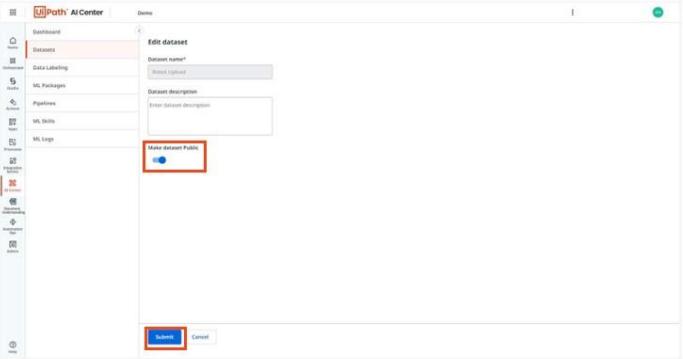


• AI Center enables you to make a dataset public.
 • Making a dataset public makes the dataset accessible via an endpoint (protected with an Application Programming Interface (API) key) from outside of the UiPath environment.
 • This enables you to call a dataset without the need to go through a robot connected to the specific tenant.

1

To make the dataset public:

1. Navigate to the Datasets page of the desired project.
2. From the table, select the desired dataset.
3. In the top-right corner, click **Edit dataset**.
4. To make the dataset accessible for all users, enable the **Make dataset Public** toggle button.
5. Click **Submit**.

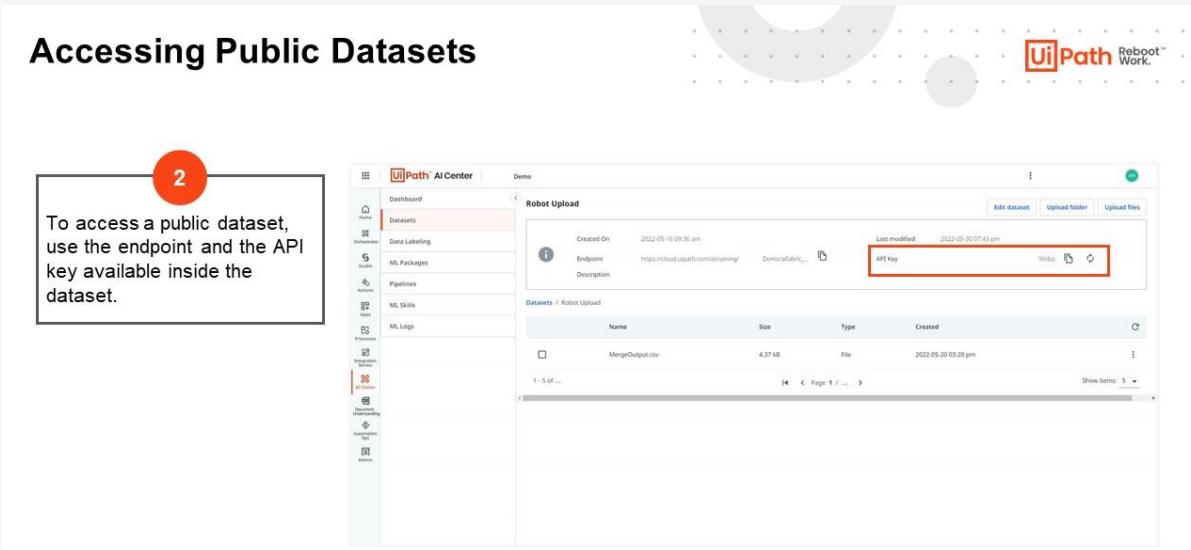


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- There are two privacy options available for dataset accessibility; you can either restrict access to a limited number of users or make them available to all users.
- By making a dataset public, the dataset will be accessible via an endpoint (protected with an Application Programming Interface (API) key) from outside of the UiPath environment. This means that you can call a dataset without the need to go through a robot connected to the specific tenant.
- To make the dataset public, perform the following steps:
 1. Navigate to the Datasets page of the desired project.
 2. From the table, select the desired dataset.
 3. In the top-right corner, click **Edit dataset**.
 4. To make the dataset accessible for all users, enable the **Make dataset Public** toggle button.
 5. Click **Submit**.

Note: You can also enable the Make dataset Public toggle button while creating a new dataset.

Accessing Public Datasets



The screenshot shows the UiPath AI Center interface. On the left, there's a sidebar with various options like Dashboard, Datasets, Data Labeling, ML Packages, Pipelines, ML Skills, ML Logs, and others. The main area is titled "Robot Upload" under "Datasets". It displays a table with one row of data:

Name	Size	Type	Created
MergeOutput.csv	4.37 MB	File	2022-05-20 03:01 pm

A red box highlights the "API Key" field in the top right corner of the "Robot Upload" section. The bottom right corner of the entire screenshot contains the copyright notice: "© Copyright UiPath 2022. All Rights Reserved."

To access a public dataset, use the endpoint and the API key available inside the dataset.

Exploring a Dataset

Exploring a Dataset

To explore a dataset:

1. Navigate to the Datasets page of the project.
2. Select a dataset to view the contents of that folder.

The screenshot shows the 'Datasets' page in the UiPath AI Center. On the left, there's a sidebar with various AI Center services like Dashboard, Datasets, ML Packages, Data Labeling, ML Forms, Pipelines, ML Skills, ML Logo, ML Metrics, ML Experiments, ML Monitoring, and ML Assets. The 'Datasets' option is selected. The main area is titled 'Datasets' and contains a table with three rows of data. The columns are 'Name', 'Description', 'Created', and 'Last modified'. The first row has a red box around the 'Archieve Upload' link in the 'Description' column. The second row is 'TC_Train' and the third is 'CC_Train'. At the bottom of the table, it says '1 - 4 of 4' and has a 'Show items' dropdown.

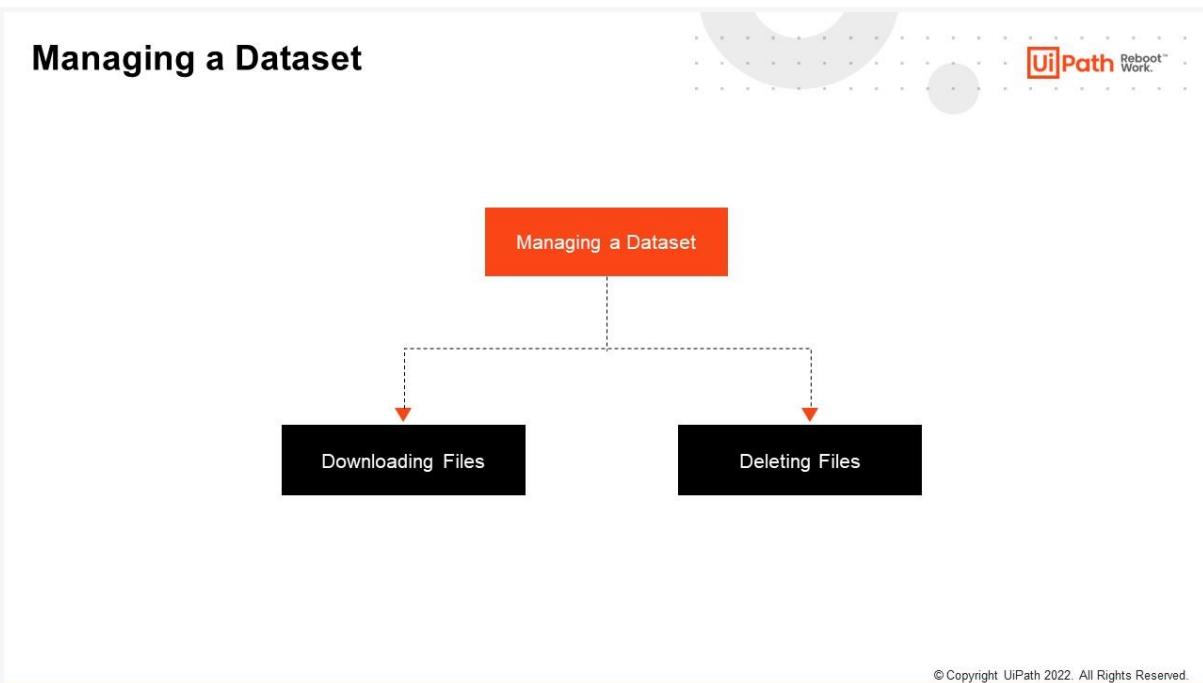
Name	Description	Created	Last modified
TC_Train	Archieve Upload	2022-05-17 01:40 pm	2022-05-17 01:43 pm
CC_Train		2022-05-16 09:36 am	2022-05-16 09:36 am
CC_Train		2022-05-15 11:14 pm	2022-05-24 01:39 am

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A dataset can be explored just like a file system. To explore a dataset, perform the following steps:

1. Navigate to the Datasets page of the project.
2. Select a dataset to view the contents of that folder.

Managing a Dataset



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Managing a dataset involves downloading and deleting files.

Managing a Dataset (Cont'd)

Managing a Dataset (Cont'd)

To download and delete files:

1. Navigate to the required dataset folder.
2. In the extreme right side of the target file row, click the vertical ellipsis menu.
 - To download a file, select **Download**.
 - To delete a file, select **Delete**.



Download of folders and multiple files is not yet supported.

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To download and delete files, perform the following steps:

1. Navigate to the required dataset folder.
2. In the extreme right side of the target file row, click the vertical ellipsis menu.
 - To download a file, select **Download**.
 - To delete a file, select **Delete**.

Note: Downloading of folders and multiple files is not yet supported, but you can delete multiple files or folders by selecting multiple check boxes. In addition, you can upload a file or sub-folder at any depth in the dataset.

Lab Exercise



Lab Exercise

M3 | L3



Please refer to Lab Exercise 2 of Day 1 in the Lab Guide.

Lab Exercise 2 (15 Minutes)



Lab Exercise 2 (15 Minutes)

Create datasets and upload records

Create two different datasets with the names Train and Test by uploading the folders containing the provided Customer Complaints CSVs.



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Lesson 4: ML Packages

ML Packages

M3 | L4



In Lesson 4, you will get a high-level understanding of ML packages and their types. You will also gain an in-depth understanding of out-of-the-box packages.

ML Packages Overview

ML Packages Overview

- An ML package contains all the code and metadata needed to train and serve a ML model.
- An ML package can have multiple versions and is in some way analogous to a package in the UiPath RPA platform.
- An ML package version is in the majorVersion.minorVersion format.
 - The major version is updated when a big change, usually in the architecture, occurs in the package.
 - The minor version is updated while running a training or a full pipeline on top of a retrainable ML model.

```
graph LR; A[ML Packages Versioning  
(Format: majorVersion.minorVersion)] --> B[Version 1.0]; A --> C[Version 1.1]; A --> D[Version 2]
```

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An ML package contains all the code and metadata needed to train and serve a ML model. An ML package can have multiple versions and is in some way analogous to a package in the UiPath RPA platform. An ML package version is in the majorVersion.minorVersion format. The major version is updated when a big change, usually in the architecture, occurs in the package. The minor version is updated while running a training or a full pipeline on top of a retrainable ML model.

Types of ML Packages

Types of ML Packages

Based on the options available in AI Center, there are three types of ML packages.

Custom-built

You can create an ML package by uploading a local zip file with all the necessary files and metadata needed to train and serve a ML model.

Out-of-the-box

You can use an ML package created by UiPath or the open-source community.

Import

You can use the Import ML Package option to import an ML package that was exported from AI Center previously.

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Based on the options available in AI Center, there are three types of ML packages. A custom-built ML package enables you to create an ML package by uploading a local zip file with all the necessary files and metadata needed to train and serve a ML model. Use of out-of-the-box packages enables you to use an ML package created by UiPath or the open-source community. You have the Import ML Package option to import an ML package that was exported from AI Center previously.

Types of ML Packages (Cont'd)

Types of ML Packages (Cont'd)

Based on the requirements, there are two types of ML packages that you can upload. An ML package must adhere to a small set of requirements. Requirements are separated into components needed for serving a model (serving components) and training a model (training components).

Not Retrainable ML Package

- For serving only
- Deployable as an ML skill

Retrainable ML Package

- For both serving and training purposes
- Possible to run pipelines on top of this package and deploy it as an ML skill

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Based on the requirements, there are two types of ML packages that you can upload. An ML package must adhere to a small set of requirements. Requirements are separated into components needed for serving a model (serving components) and components needed for training a model (training components).

Not retrainable ML packages are used for serving only, meaning you can only deploy them as ML skills. Retrainable ML packages are used both for serving as well as training purposes, meaning you can run pipelines on top of such packages, as well as deploy them as ML skills.

Out-of-the-box Packages



Out-of-the-box Packages

- Out-of-the-box packages are ready-to-use packages built by the UiPath Data Scientists or provided by the UiPath Data Scientists/Engineers through the open-source data science community.
- To use the packages within the workflows in Studio, they must be deployed as ML skills in the Orchestrator tenant.
- Here are some of the available out-of-the-box packages.

ML Packages

 UiPath Document Understanding UiPath models to classify and extract information from images and pdfs.	 UiPath Image Analysis Curated Models from UiPath to analyze images	 UiPath Language Analysis Curated Models from UiPath to analyze language in Emails, Documents, Web Pages, Text Messages, Portals and more	 UiPath Task Mining UiPath Task Mining models to analyze captured data
---	--	--	---

Open-Source Packages

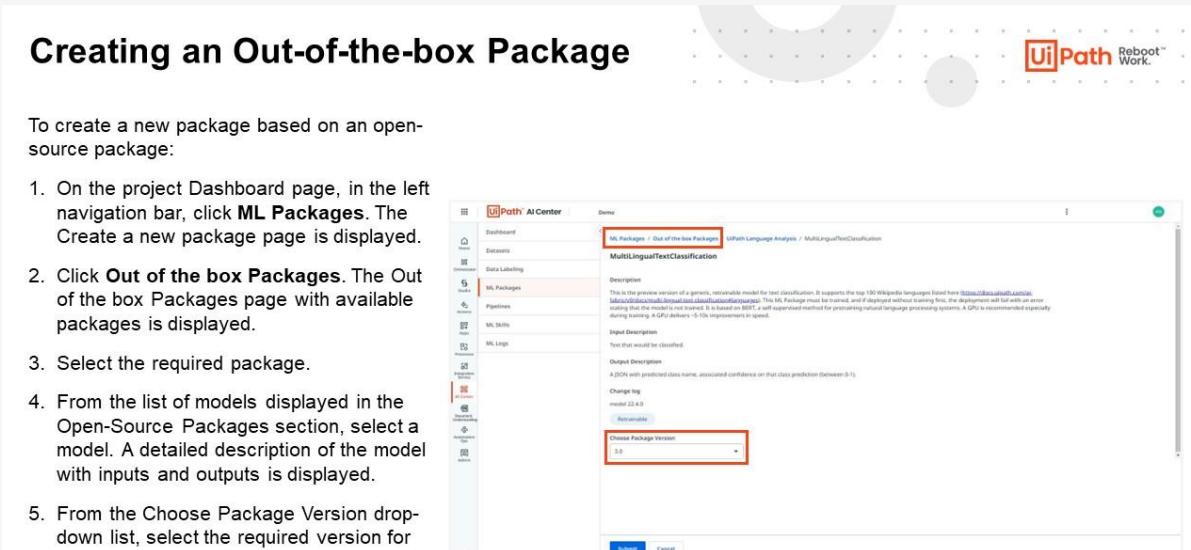
 Image Analysis Models for analyzing images including image classification and image moderation.	 Language Analysis Models for analyzing text including language detection, sentiment analysis, and named-entity recognition.	 Language Comprehension Models performing cognitively challenging tasks such as text summarization and question answering.	 Language Translation Models that use Neural Machine Translation to translate text from one language to another.
 Tabular Data Models for analyzing tabular data including classification and regression ML Packages.			

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The out-of-the-box packages are ready-to-use packages that are built by the UiPath Data Scientists or provided by the UiPath Data Scientists/Engineers through the open-source data science community. In order to be used within the workflows in Studio, you first must deploy them as ML skills in your Orchestrator tenant.

Note: For a full list of available out-of-the-box packages, kindly visit <https://docs.uipath.com/ai-fabric/v0/docs/out of the box-packages>.

Creating an Out-of-the-box Package



To create a new package based on an open-source package:

1. On the project Dashboard page, in the left navigation bar, click **ML Packages**. The Create a new package page is displayed.
2. Click **Out of the box Packages**. The Out of the box Packages page with available packages is displayed.
3. Select the required package.
4. From the list of models displayed in the Open-Source Packages section, select a model. A detailed description of the model with inputs and outputs is displayed.
5. From the Choose Package Version drop-down list, select the required version for the model.

To create a new package based on an open-source package, perform the following steps:

1. On the project Dashboard page, in the left navigation bar, click **ML Packages**. The Create a new package page is displayed.
2. Click **Out of the box Packages**. The Out of the box Packages page with available packages is displayed.
3. Select the required package.
4. From the list of models displayed in the Open-Source Packages section, select a model. A detailed description of the model with inputs and outputs is displayed. A detailed description of the model with inputs and outputs is displayed.
5. From the Choose Package Version drop-down list, select the required version for the model.

The ML Package Details Page

The ML Package Details Page

To view the ML package details page:

1. In the left navigation bar, click **ML Packages**. The Create a new package page is displayed with the existing **ML packages**.
2. Select the required package. The ML package details page is displayed with all available versions along with other necessary information.
3. To view more details about the input and output values of the desired ML package version, in the extreme right side in the row of this version, click the vertical ellipsis menu and select **Details**.

VERSION	CREATED TIME	CHANGE LOG	STATUS	TRAINING ENABLED	RECOMMEND GPU
3.1	2022-05-24 02:57 am	model 22.4.0	Undeployed	✓	X
3.0	2022-05-24 12:49 am	model 22.4.0	Undeployed	✓	X



You cannot edit the version values.

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To view the ML package details page:

1. In the left navigation bar, click **ML Packages**. The Create a new package page is displayed with the existing **ML packages**.
2. Select the required package. The ML package details page is displayed with all available versions along with other necessary information.
3. To view more details about the input and output values of the desired ML package version, in the extreme right side in the row of this version, click the vertical ellipsis menu and select **Details**.

Note: You cannot edit the version values.

The ML Package Details Page (Cont'd)

The ML Package Details Page (Cont'd)

Following is the information available in the ML package details page:

- All the versions available for a given package; when an ML package is uploaded, it is shown as version 1.0 (major version 1 and minor version 0). This differentiates between the ML packages uploaded by the user and ML packages retrained via pipelines (which will only change the minor version).
- The status of each ML package version, type, creation time, score of the evaluation pipelines, and duration of each pipeline run.

The screenshot shows the 'ML Packages' section of the UiPath AI Center interface. On the left is a sidebar with options like Home, Datasets, Data Labeling, ML Packages (which is selected and highlighted in orange), Pipelines, ML Skills, and ML Logs. The main area has a breadcrumb path 'ML Packages / [REDACTED]_MLTC_Pk' and a sub-path 'MLTC_Pk'. Below this, there are three tabs: VERSION, PIPELINE RUNS (which is selected and highlighted in blue), and ML LOGS. A 'Create new' button is visible in the top right of this section. The central part of the screen displays a table of pipeline runs. The columns are: Package Name, Type, Version, Status, Created, Duration, and Score. One row is visible, showing '[REDACTED]_MLTC_Pk' as the Package Name, 'Full' as the Type, '3.0' as the Version, 'Successful' as the Status, '2022-05-24 01:40 am' as the Created date, '76 m' as the Duration, and '0.9235588972' as the Score. At the bottom of the table, it says '1 - 1 of 1' and has navigation controls for pages and items.

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The ML package details page provides all the versions available for a given package. When an ML package is uploaded, it is shown as version 1.0 (this is major version 1 and minor version 0). This is to differentiate between ML packages that have been uploaded by the user and ML packages that have been retrained via pipelines (these will only change the minor version). The grid also provides other useful information like the status of each ML package version, its type, creation time, score of the evaluation pipelines, and duration of each pipeline run.

Deleting an ML Package

Deleting an ML Package

To delete an ML package:

1. Navigate to the desired ML package page.
2. In the VERSION tab, in the extreme right side of the row showing the package version to be deleted, click the vertical ellipsis menu, and select **Delete**.



You can delete an ML package only if it does not have a running pipeline associated with it and if it is not currently deployed.

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To delete an ML package:

1. Navigate to the desired ML package page.
2. In the VERSION tab, in the extreme right side of the row showing the package version to be deleted, click the vertical ellipsis menu, and select **Delete**.

Note: You can delete an ML package only if it does not have a running pipeline associated with it and if it is not currently deployed.

Setting the Right Expectations with Out-of-the-box ML Packages

Setting the Right Expectations with Out-of-the-box ML Packages



Here are some considerations to keep in mind about out-of-the-box ML packages.



There are circumstances where a model can be provided out of the box, but most of the time, such a model is not optimal for a particular challenge.



The operational ML models must be trained on specific datasets addressing specific problems.



Classifying emails can be completely different across industries.



Remember that a ML model is only solving the problem with the data it was trained on and generalizing from one application to another may result in sub-optimal performance.

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One key consideration that you should keep in mind about out-of-the-box ML packages is that there may be circumstances where a model can be provided out of the box, but most of the time, such a model is not optimal for a particular challenge. A good example of an out-of-the-box model is sentiment analysis, where understanding sentiment is similar across different industries and organizations.

For example, classifying "I hate New York City" as a negative sentiment is the same whether you are in banking or life sciences. However, in the business world, such examples are limited, and most operational ML models must be trained on specific datasets addressing specific problems.

Classifying emails can be completely different across industries. For example, a bank may want to classify emails into certain bins (credit reporting, money transfer, debt collection, and so on), while the categorizations of a company in life sciences would be completely different, so the model would need to be customized to the company/industry.

Always remember that a ML model only solves the problem with the data it was trained on and generalizing from one application to another may result in sub-optimal performance.

Lab Exercise



Lab Exercise

M3 | L4



Please refer to Lab Exercise 3 of Day 1 in the Lab Guide.

Lab Exercise 3 (20–30 Minutes)



Lab Exercise 3 (20–30 Minutes)

Create out-of-the-box ML packages

Using the information provided, create the following two out-of-the-box ML packages:

1. **Retrainable:** MultiLingualTextClassifier by accessing Out of the box Packages → UiPath Language Analysis → MultiLingualTextClassifier
2. **Non-retrainable:** Sentiment Analysis by accessing Out of the box Packages → Language Analysis → SentimentAnalysis

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Lesson 5: Pipelines

Pipelines

M3 | L5



In Lesson 5, you will learn what pipelines are and their types in detail.

Pipelines Overview

Pipelines Overview

- A pipeline is a description of an ML workflow that includes all the functions in the workflow and the order of execution of these functions. It also includes the definition of the inputs required to run the pipeline and the outputs to get from this pipeline.
- A pipeline run is an execution of a pipeline, based either on the code provided by the user or an out-of-the-box model. Once the execution is completed, a pipeline run will be associated with the outputs and logs.

```
graph LR; PR[Pipeline Run] --> UC[User Code]; PR --> OOBM[Out-of-the-box Model]; UC --> E[Execution]; OOBM --> E; E --> AOL[Associated Outputs and Logs]
```

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A pipeline is a description of an ML workflow that includes all the functions in the workflow and the order of execution of these functions. The pipeline also includes the definition of the inputs required to run the pipeline and the outputs to get from this pipeline.

A pipeline run, which is an execution of a pipeline, is based either on the code provided by the user or an out-of-the-box model. Once the execution is completed, a pipeline run will be associated with the outputs and logs.

Types of Pipelines

Types of Pipelines

There are three types of pipelines.

Training

It takes an ML package and a dataset as inputs to produce a new ML package version.

Evaluation

It takes the ML package version and a dataset as inputs to produce a set of metrics and logs.

Full

It essentially runs a data processing function, a training pipeline, and an evaluation pipeline in succession.

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There are three types of pipelines, which are as follows:

- **Training:** It takes an ML package and a dataset as inputs to produce a new ML package version.
- **Evaluation:** It takes the ML package version and a dataset as inputs to produce a set of metrics and logs.
- **Full:** It essentially runs a data processing function, a training pipeline, and an evaluation pipeline in succession.

Datasets for Pipelines

Datasets for Pipelines

While creating a pipeline, it is essential to select a dataset. According to the selected pipeline type, here are datasets to be specified.



Input dataset for training pipeline



Evaluation dataset for evaluation pipeline



Input and evaluation datasets for full pipeline run

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While creating a pipeline, it is essential to select a dataset. According to the selected pipeline type, the following datasets must be specified:

- **Training pipeline:** Specify the input dataset.
- **Evaluation pipeline:** Specify the evaluation dataset.
- **Full pipeline run:** Specify the input dataset and the evaluation dataset.

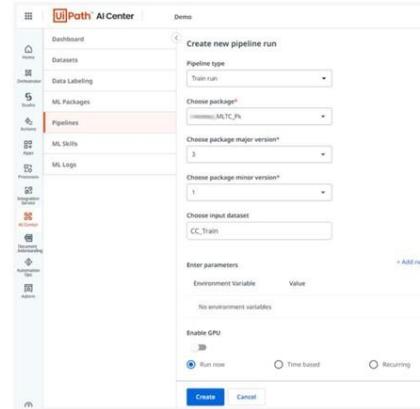
Training Pipeline: Creating a New Training Pipeline

Training Pipeline: Creating a New Training Pipeline

To create a new training pipeline:

1. On the project's Dashboard page, in the left navigation bar, click **Pipelines**. The Pipelines page is displayed.
2. In the top-right corner, click **Create new**. The Create new pipeline run page is displayed.
3. From the Pipeline type drop-down list, select **Train run** (mandatory).
4. From the Choose package drop-down list, select the required package (mandatory).
5. From the Choose package major version drop-down list, select the appropriate major version of the package (mandatory).
6. From the Choose package minor version drop-down list, select the appropriate minor version of the package (mandatory).
7. From the Choose input dataset drop-down list, select the required dataset (mandatory).
8. Click **Create**.

A training pipeline is used to train a new ML model.



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While creating a pipeline, it is essential to select a dataset. According to the selected pipeline type, the following datasets must be specified:

- A training pipeline is used to train a new ML model.
- To create a new training pipeline:
 1. On the project's Dashboard page, in the left navigation bar, click **Pipelines**. The Pipelines page is displayed.
 2. In the top-right corner, click **Create new**. The Create new pipeline run page is displayed.
 3. From the Pipeline type drop-down list, select **Train run** (mandatory).
 4. From the Choose package drop-down list, select the required package (mandatory).
 5. From the Choose package major version drop-down list, select the appropriate major version of the package (mandatory).
 6. From the Choose package minor version drop-down list, select the appropriate minor version of the package (mandatory).
 7. From the Choose input dataset drop-down list, select the required dataset (mandatory).

8. Click **Create**.

Training Pipeline: Understanding the Specifics

Training Pipeline: Understanding the Specifics

Here are the various mandatory and optional fields and controls for a training pipeline:

- **Input dataset (required):** Select the dataset/folder from which you want to import data for training. All files in this dataset/folder will be available locally at pipeline runtime as the argument passed to the `train()` function.
- **Parameters or environment variables:** These are as follows:
 - **artifacts_directory (default ‘Artifacts’):** Defines where the Artifacts folder is accessible locally for the pipeline.
 - **save_training_data (default ‘False’):** If set to True, the `data_directory` folder will be uploaded at the end of the pipeline run as an output of the pipeline under the directory, `data_directory`.

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Here are the various mandatory and optional fields and controls for a training pipeline:

- **Input dataset (required):** Select the dataset/folder from which you want to import data for training. All files in this dataset/folder will be available locally at pipeline runtime as the argument passed to the `train()` function.
- **Parameters or environment variables:** These are as follows:
 - **artifacts_directory (default ‘Artifacts’):** Defines where the Artifacts folder is accessible locally for the pipeline.
 - **save_training_data (default ‘False’):** If set to True, the `data_directory` folder will be uploaded at the end of the pipeline run as an output of the pipeline under the directory, `data_directory`.

Training Pipeline: Accessing Details

Training Pipeline: Accessing Details

To access the details of a training pipeline:

1. Navigate to the Pipelines page. A table showing the available pipelines is displayed.
2. Select the required training pipeline. A page showing the details of the selected pipeline is displayed.
3. To view the complete log list as the Logs section displays only a partial log list, click the download icon.

After a successful pipeline run, there will be two versions of an ML package: version 1.0 (what you uploaded) and version 1.1 (what you trained).

Type	Status	Version 1	Status	Created At	Duration	Name
PACKAGE_1	Running	0.2	Running	2022-01-21 10:45:45	00:00	
PACKAGE_2	Available	0.1	Available	2022-01-20 17:17:04	00:00	PACKAGE_2
PACKAGE_3	Pending	0.0	Scheduled	2022-01-20 17:17:04	00:00	PACKAGE_3

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Here are the various mandatory and optional fields and controls for a training pipeline:

- After a successful pipeline run, there will be two versions of an ML package: version 1.0 (what you uploaded) and version 1.1 (what you trained).
- To access the details of a training pipeline:
 - Navigate to the Pipelines page. A table showing the available pipelines is displayed.
 - Select the required training pipeline. A page showing the details of the selected pipeline is displayed.
 - To view the complete log list as the Logs section displays only a partial log list, click the download icon.

Training Pipeline: Outputs

Training Pipeline: Outputs

Every execution saves the following series of related files and folders.

- The ML package zip file is the new ML package (model) version automatically generated by the training pipeline.
- The _results.json file is a summary of the pipeline run execution, exposing all inputs and outputs, and execution times for a particular training pipeline.
- The Artifacts folder (visible only if non-empty) is a folder regrouping all artifacts (for example, learning-rate finder, training report) generated by the pipeline.



These files and folders are stored in the Outputs section of the pipeline details page.

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Every execution saves the following series of related files and folders.

The ML package zip file is the new ML package (model) version automatically generated by the training pipeline. The _results.json file is a summary of the pipeline run execution, exposing all inputs and outputs, and execution times for a particular training pipeline.

The Artifacts folder (visible only if non-empty) is a folder regrouping all artifacts (for example, learning-rate finder, training report) generated by the pipeline.

Note: These files and folders are stored in the Outputs section of the pipeline details page.

Evaluation Pipeline: Creating a New Evaluation Pipeline

Evaluation Pipeline: Creating a New Evaluation Pipeline

To create a new evaluation pipeline:

1. Navigate to the Create new pipeline run page.
2. From the Pipeline type drop-down list, select **Evaluation run** (mandatory).
3. From the Choose package drop-down list, select the required package (mandatory).
4. From the Choose package major version drop-down list, select the appropriate major version of the package (mandatory).
5. From the Choose package minor version drop-down list, select the appropriate minor version of the package (mandatory).
6. From the Choose evaluation dataset drop-down list, select the required dataset (mandatory).
7. Click **Create**.

An evaluation pipeline is used to evaluate a trained ML model on a specific dataset.

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- An evaluation pipeline is used to evaluate a trained ML model on a specific dataset.
- To create a new evaluation pipeline:
 1. Navigate to the Create new pipeline run page.
 2. From the Pipeline type drop-down list, select **Evaluation run** (mandatory).
 3. From the Choose package drop-down list, select the required package (mandatory).
 4. From the Choose package major version drop-down list, select the appropriate major version of the package (mandatory).
 5. From the Choose package minor version drop-down list, select the appropriate minor version of the package (mandatory).
 6. From the Choose evaluation dataset drop-down list, select the required dataset (mandatory).
 7. Click **Create**.

Evaluation Pipeline: Understanding the Specifics

Evaluation Pipeline: Understanding the Specifics

Here are the various mandatory and optional fields and controls for a training pipeline:

- **Evaluation dataset (required):** Select the dataset/folder from which you want to import data for evaluation. All files in this dataset/folder will be available locally at pipeline runtime as the argument passed to the `evaluate()` function.
- **Parameters or environment variables:** These are as follows:
 - **artifacts_directory (default ‘Artifacts’):** Defines where the Artifacts folder is accessible locally for the pipeline.
 - **save_test_data (default ‘False’):** If set to True, the `data_directory` folder will be uploaded at the end of the pipeline run as an output of the pipeline under the directory, `data_directory`.

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Here are the various mandatory and optional fields and controls for an evaluation pipeline:

- **Evaluation dataset:** Select dataset/older from which you want to import data for evaluation. Note that all files in this dataset/folder will be available locally at pipeline runtime as the argument passed to the `evaluate()` function.
- **Parameters or environment variables:** These are as follows:
 - **artifacts_directory (default ‘Artifacts’):** Defines where the Artifacts folder is accessible locally for the pipeline.
 - **save_training_data (default ‘False’):** If set to True, the `data_directory` folder will be uploaded at the end of the pipeline run as an output of the pipeline under the directory, `data_directory`.

Evaluation Pipeline: Accessing Details

Evaluation Pipeline: Accessing Details

To access the details of an evaluation pipeline:

1. Navigate to the Pipelines page. A table showing the available pipelines is displayed.
2. Select the required evaluation pipeline. A page showing the details of the selected pipeline is displayed.
3. To view the complete log list as the Logs section displays only a partial log list, click the download icon.

After a successful pipeline run, there will be another version of the ML package.

Pipeline Name	Type	Status	Created At	Run ID	Run Status	Logs
Metrics ML PK	Evaluation	Successful	2022-05-10 10:00:00	1234	Successful	View Logs
Metrics ML PK	Train	Successful	2022-05-10 11:00:00	5678	Successful	View Logs

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- After a successful pipeline run, there will be another version of the ML package.
- To access the details of an evaluation pipeline:
 1. Navigate to the Pipelines page. A table showing the available pipelines is displayed.
 2. Select the required evaluation pipeline. A page showing the details of the selected pipeline is displayed.
 3. To view the complete log list as the Logs section displays only a partial log list, click the download icon.

Evaluation Pipeline: Outputs

Evaluation Pipeline: Outputs

Every execution saves the following series of related folders and files.

- The Artifacts folder (visible only if non-empty) is a folder regrouping all artifacts (for example, evaluation report) generated by the pipeline.
- The Dataset folder (only if save_data was set to True) is a copy of Evaluation Dataset folder.
- The _results.json file is a summary of the pipeline run execution, exposing all inputs and outputs, and execution times for a particular evaluation pipeline.



These folders and files are stored in the Outputs section of the pipeline details page.

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Every execution saves the following series of related files and folders. The Artifacts folder (visible only if non-empty) is a folder regrouping all artifacts (for example, evaluation report) generated by the pipeline.

The Dataset folder (only if save_data was set to True) is a copy of Evaluation Dataset folder. The _results.json file is a summary of the pipeline run execution, exposing all inputs and outputs, and execution times for a particular evaluation pipeline.

Note: These folders and files are stored in the Outputs section of the pipeline details page.

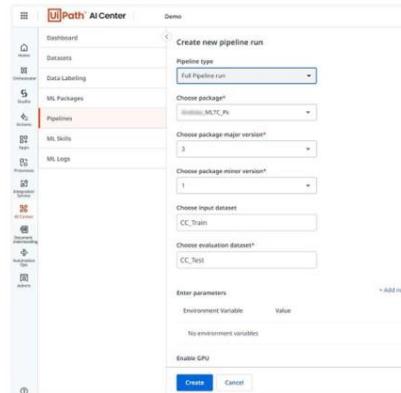
Full Pipeline: Creating a New Full Pipeline

Full Pipeline: Creating a New Full Pipeline

To create a new full pipeline:

1. Navigate to the Create new pipeline run page.
2. From the Pipeline type drop-down list, select **Full Pipeline run** (mandatory).
3. From the Choose package drop-down list, select the required package (mandatory).
4. From the Choose package major version drop-down list, select the appropriate major version of the package (mandatory).
5. From the Choose package minor version drop-down list, select the appropriate minor version of the package (mandatory).
6. From the Choose input dataset drop-down list, select the required dataset (mandatory).
7. From the Choose evaluation dataset drop-down list, select the required dataset (mandatory).
8. Click **Create**.

A full pipeline is used to train a new model and evaluate its performance in one go. Additionally, a preprocessing step is run before the training, allowing for custom data manipulation.



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- A full pipeline is used to train a new model and evaluate its performance in one go. Additionally, a preprocessing step is run before the training, allowing for custom data manipulation.
- To create a new full pipeline:
 1. Navigate to the Create new pipeline run page.
 2. From the Pipeline type drop-down list, select **Full Pipeline run** (mandatory).
 3. From the Choose package drop-down list, select the required package (mandatory).
 4. From the Choose package major version drop-down list, select the appropriate major version of the package (mandatory).
 5. From the Choose package minor version drop-down list, select the appropriate minor version of the package (mandatory).
 6. From the Choose input dataset drop-down list, select the required dataset (mandatory).
 7. From the Choose evaluation dataset drop-down list, select the required dataset (mandatory).
 8. Click **Create**.

Full Pipeline: Understanding the Specifics

Full Pipeline: Understanding the Specifics



Here are the various mandatory and optional fields and controls for a full pipeline:

- **Input dataset (required):** Select the dataset/folder from which you want to import data for full training. Note that all files in this dataset/folder will be available locally during the pipeline run at the path stored in the data_directory variable.
- **Evaluation dataset (required):** Select the dataset/folder from which you want to import data for evaluation. All files in this dataset/folder will be available locally during the pipeline run at the path stored in the test_data_directory variable. If no folder is selected, we assume that the pipeline will generate data in test_data_directory in process_data.
- **Parameters or environment variables:** These are as follows:
 - **training_data_directory (default 'dataset/training')**: Defines where training data will be accessible locally for the pipeline.
 - **test_data_directory (default 'dataset/test')**: Defines where test data will be accessible locally for the pipeline.
 - **artifacts_directory (default 'Artifacts')**: Defines where the Artifacts folder is accessible locally for the pipeline.
 - **save_training_data (default 'True')**: Indicates to upload the training_data_directory folder at the end of the pipeline run as an output of the pipeline under the directory, training_data_directory, if set to True.
 - **save_test_data (default 'True')**: Indicates to upload the training_data_directory folder at the end of the pipeline run as an output of the pipeline under the directory, test_data_directory, if set to True.

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Here are the various mandatory and optional fields and controls for a full pipeline:

- **Input dataset (required):** Select the dataset/folder from which you want to import data for full training. Note that all files in this dataset/folder will be available locally during the pipeline run at the path stored in the data_directory variable.
- **Evaluation dataset (required):** Select the dataset/folder from which you want to import data for evaluation. All files in this dataset/folder will be available locally during the pipeline run at the path stored in the test_data_directory variable. If no folder is selected, we assume that the pipeline will generate data in test_data_directory in process_data.
- **Parameters or environment variables:** These are as follows:
 - **training_data_directory (default 'dataset/training')**: Defines where training data will be accessible locally for the pipeline.
 - **test_data_directory (default 'dataset/test')**: Defines where test data will be accessible locally for the pipeline.
 - **artifacts_directory (default 'Artifacts')**: Defines where the Artifacts folder is accessible locally for the pipeline.

- **save_training_data (default ‘True’)**: Indicates to upload the training_data_directory folder at the end of the pipeline run as an output of the pipeline under the directory, training_data_directory, if set to True.
- **save_test_data (default ‘True’)**: Indicates to upload the training_data_directory folder at the end of the pipeline run as an output of the pipeline under the directory, test_data_directory, if set to True.

Full Pipeline: Accessing Details

Full Pipeline: Accessing Details

To access the details of a full pipeline:

1. Navigate to the Pipelines page. A table showing the available pipelines is displayed.
2. Select the required full pipeline. A page showing the details of the selected pipeline is displayed.
3. To view the complete log list as the Logs section displays only a partial log list, click the download icon.

After a successful pipeline run, there will be another version of the ML package.

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- After a successful pipeline run, there will be another version of the ML package.
- To access the details of a full pipeline:
 1. Navigate to the Pipelines page. A table showing the available pipelines is displayed.
 2. Select the required full pipeline. A page showing the details of the selected pipeline is displayed.
 3. To view the complete log list as the Logs section displays only a partial log list, click the download icon.

Full Pipeline: Accessing Details (Cont'd)

Full Pipeline: Accessing Details (Cont'd)

Here are a few key points to note:

- The `train()` function is being trained on `train.csv`, and not on the unaltered contents of the data folder.
- The first full pipeline runs evaluations on a directory with `example1.txt`, `example2.txt`, and `test.csv`; whereas the second full pipeline runs evaluations on a directory only with `test.csv`.
- Each individual component can write arbitrary artifacts as a part of the pipeline, such as histograms, TensorBoard logs, and distribution plots.

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As seen in the video, the `train()` function is being trained on `train.csv`, and not on the unaltered contents of our data folder (`example1.txt` and `example2.txt`). `Process_data` can effectively be used to dynamically split data based on any user-defined parameters.

Additionally, you may notice that the first full pipeline runs evaluations on a directory with `example1.txt`, `example2.txt`, and `test.csv`; whereas the second full pipeline runs evaluations on a directory only with `test.csv`. This is because you did not explicitly select an evaluation set when you created the second one, meaning that you can evaluate on new data from UiPath Robot as well as dynamically split the already existent data.

Lastly, each individual component can write arbitrary artifacts as a part of this pipeline, such as histograms, TensorBoard logs, and distribution plots.

Full Pipeline: Outputs

Full Pipeline: Outputs

Every execution saves the following series of related files and folders:

- The new ML package version automatically generated by the training pipeline.
- The Artifacts folder (visible only if non-empty) is folder regrouping all artifacts (for example, train report and evaluation report) generated by the pipeline and saved under the artifacts_directory folder.
- The Training folder (only if save_training_data was set to True) is a copy of the training_data_directory folder.
- The Test folder (only if save_training_data was set to True) is a copy of the test_data_directory folder.



These files and folders are stored in the Outputs section of the pipeline details page.

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Every execution saves the following series of related files and folders. The new ML package version automatically generated by the training pipeline. The Artifacts folder (visible only if non-empty) is folder regrouping all artifacts (for example, train report and evaluation report) generated by the pipeline and saved under the artifacts_directory folder.

The Training folder (only if save_training_data was set to True) is a copy of the training_data_directory folder. The Test folder (only if save_training_data was set to True) is a copy of the test_data_directory folder.

Note: These files and folders are stored in the Outputs section of the pipeline details page.

Description of Pipeline Status and Pipeline Details Pages

Description of Pipeline Status and Pipeline Details Pages



A pipeline run can be executed in any one of the seven statuses.

Scheduled	Packaging	Waiting for resources
<ul style="list-style-type: none">This is a pipeline that has been scheduled to start in the future.For example, a pipeline is scheduled to start at 1.00 am every Monday. When the date-time for the pipeline to start is reached, the pipeline is queued to run.	<ul style="list-style-type: none">This is a pipeline that has a docker image that will execute the training pipeline being built.It may take up to 20 minutes if you are training this specific version of the ML package for the first time.	<ul style="list-style-type: none">This is a pipeline that waits for resources because there is no license available for the pipeline to execute.The pipeline checks every five minutes if a new license is available (this will happen if you remove running ML skills or if another pipeline is completed) and will start as soon as this is the case.

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A pipeline run can be executed in any one of the seven statuses:

- Scheduled:** This is a pipeline that has been scheduled to start in the future. For example, a pipeline is scheduled to start at 1.00 am every Monday. When the date-time for the pipeline to start is reached, the pipeline is queued to run.
- Packaging:** This is a pipeline that has a docker image that will execute the training pipeline being built. It may take up to 20 minutes if you are training this specific version of the ML package for the first time.
- Waiting for resources:** This is a pipeline that waits for resources because there is no license available for the pipeline to execute. The pipeline checks every five minutes if a new license is available (this will happen if you remove running ML skills or if another pipeline is completed) and will start as soon as this is the case.

Description of Pipeline Status and Pipeline Details Pages (Cont'd)

Description of Pipeline Status and Pipeline Details Pages (Cont'd)



A pipeline run can be executed in any one of the seven statuses.

Running	Failed	Killed
<ul style="list-style-type: none"> This is a pipeline that has started and is executing. For running pipelines, the pipelines details page shows an information tab, real-time logs, and an action to kill the pipeline. Note that clicking Kill will immediately stop the pipeline and will change its status to "Killed." The logs will be a snapshot of the logs at the time the kill action was executed. 	<ul style="list-style-type: none"> This is a pipeline that failed during execution. For failed pipelines, the pipelines details page will always show an information tab, logs, and an action to restart the pipeline. Restarting will add a new pipeline to the queue with the exact same parameters with which it was created. Depending on the stage at which this pipeline failed, partial pipeline outputs will be shown. 	<ul style="list-style-type: none"> This is a pipeline that was executing until the user explicitly called for its termination. For killed pipelines, the pipelines details page shows an information tab, an action to restart the pipeline, and an action to remove the pipeline. In addition, depending on the point at which this pipeline was killed, the pipeline details page may also include logs.

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- Running:** This is a pipeline that has started and is executing. For running pipelines, the pipelines details page shows an information tab, real-time logs, and an action to kill the pipeline. Note that clicking kill will immediately stop the pipeline and will change its status to "Killed." The logs will be a snapshot of the logs at the time the kill action was executed.
- Failed:** This is a pipeline that failed during execution. For failed pipelines, the pipelines details page will always show an information tab, logs, and an action to restart the pipeline. Restarting will add a new pipeline to the queue (if the queue is empty, will immediately start executing) with the exact same parameters with which it was created. Depending on the stage at which this pipeline failed, partial pipeline outputs will be shown.
- Killed:** This is a pipeline that was executing until the user explicitly called for its termination. For killed pipelines, the pipelines details page shows an information tab, an action to restart the pipeline, and an action to remove the pipeline. In addition, depending on the point at which this pipeline was killed, the pipeline details page may also include logs.

Description of Pipeline Status and Pipeline Details Pages (Cont'd)

Description of Pipeline Status and Pipeline Details Pages (Cont'd)

A pipeline run can be executed in any one of the seven statuses.



Successful

- This is a pipeline that has completed execution.
- For successful pipelines, the pipelines details page shows:
 - An information tab
 - An action to delete the pipeline
 - An action to remove the pipeline
 - An action to restart the pipeline, along with logs and pipeline outputs



For more details on pipeline status, visit the About Pipelines page at <https://docs.uipath.com/ai-fabric/docs/about-pipelines>.

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- **Successful:** This is a pipeline that has completed execution. For successful pipelines, the pipelines details page shows an information tab, an action to delete the pipeline, an action to remove the pipeline, and an action to restart the pipeline, along with logs and pipeline outputs.

Note: For more details on pipeline status, kindly visit the About Pipelines page at <https://docs.uipath.com/ai-fabric/docs/about-pipelines>.

Lab Exercise



Lab Exercise

M3 | L5



Please refer to Lab Exercise 4 of Day 1 in the Lab Guide.

Lab Exercise 4 (20 Minutes)



Lab Exercise 4 (20 Minutes)

[Create a full pipeline](#)

Create a full pipeline based on the previously created datasets, Train and Test, and the out-of-the-box MultiLingualTextClassifier ML package.

UiPath Reboot™ Work.

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For this exercise, guide the learners to create a full pipeline based on the previously created datasets, Train and Test, and the out-of-the-box MultiLingualTextClassifier ML package. Consider showing them the steps in the application.

Lesson 6: ML Skills

ML Skills

M3 | L6

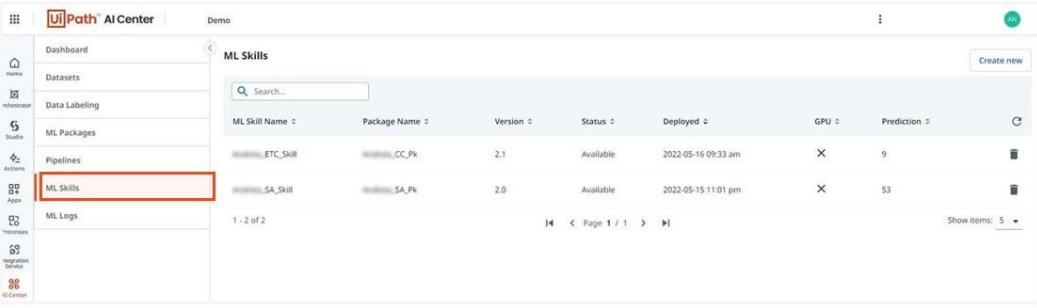


In Lesson 6, you will gain a high-level understanding of ML skills and how to manage them in the AI Center.

ML Skills Overview

ML Skills Overview

- An ML skill is a live deployment of an ML package, which can be used in any RPA workflow by simply dragging and dropping an ML skill activity into Studio.
- Basic monitoring is provided on ML skills in the form of prediction counts (number of requests to a skill).
- To view the ML skills associated with a project, in the left navigation bar, click **ML Skills**. The ML Skills page with a list of ML skills associated with the project is displayed.



ML Skill Name	Package Name	Version	Status	Deployed	GPU	Prediction
ETC_Skill	CC_Pk	2.1	Available	2022-05-16 09:33 am	X	9
SA_Skill	SA_Pk	2.0	Available	2022-05-15 11:01 pm	X	53

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An ML skill is a live deployment of an ML package, which can be used in any RPA workflow by simply dragging and dropping an ML skill activity into Studio. Basic monitoring is provided on ML skills in the form of prediction counts (number of requests to a skill).

To view the ML skills associated with a project, in the left navigation bar, click **ML Skills**. The ML Skills page with a list of ML skills associated with the project is displayed.

Creating an ML Skill

Creating an ML Skill

To create an ML skill for a project:

1. Navigate to the ML Skills page.
2. Click **Create New**. The Create New ML Skill page is displayed.
3. In the Name field, type a suitable ML skill name (mandatory).
4. From the Choose Package drop-down list, select the required package (mandatory).
5. From the Choose package major version drop-down list, select the appropriate major version of the package (mandatory).
6. From the Choose package minor version drop-down list, select the appropriate minor version of the package (mandatory).
7. In the Skill description field, type a suitable skill description (optional).
8. To enable more compute power, enable the **Enable GPU** toggle button (optional).
9. To auto update the ML skill created, enable the **Enable Auto Update** toggle button (optional).
10. To undeploy the ML skill after a period of inactivity, from the Undeploy Skill after period of inactivity drop-down list, select the desired period.
11. Click **Create**.

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Here are the steps to create an ML skill for the project:

1. Navigate to the ML Skills page.
2. Click **Create New**. The Create New ML Skill page is displayed.
3. In the Name field, type a suitable ML skill name (mandatory).
4. From the Choose Package drop-down list, select the required package (mandatory).
5. From the Choose package major version drop-down list, select the appropriate major version of the package (mandatory).
6. From the Choose package minor version drop-down list, select the appropriate minor version of the package (mandatory).
7. In the Skill description field, type a suitable skill description (optional).
8. To enable more compute power, enable the **Enable GPU** toggle button (optional).
9. To auto update the ML skill created, enable the **Enable Auto Update** toggle button (optional).
10. To undeploy the ML skill after a period of inactivity, from the Undeploy Skill after period of inactivity drop-down list, select the desired period.

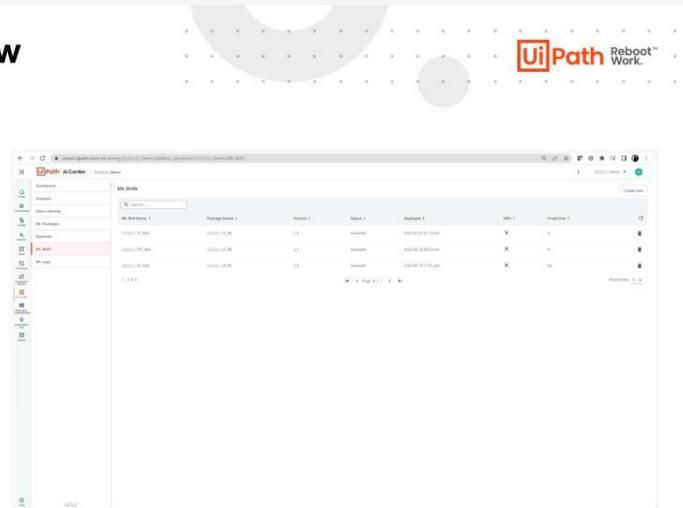
11. Click **Create**.

Updating an ML Skill to a New ML Package Version

Updating an ML Skill to a New ML Package Version

To update an ML skill to a new ML package version:

1. Navigate to the ML Skills page.
2. Double-click the name of the desired ML skill. The ML skill details page is displayed.
3. To update the desired version of the skill, in the extreme right side of the row showing that version, click the update icon. A confirmation dialog box is displayed.
4. Click **Confirm**.



While the skill is updating, you can still call the ML skill activity (on the version that is about to be replaced). The update happens with zero downtime.

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To update an ML skill to a new ML package version:

1. Navigate to the ML Skills page.
2. Double-click the name of the desired ML skill. The ML skill details page is displayed.
3. To update the desired version of the skill, in the extreme right side of the row showing that version, click the update icon. A confirmation dialog box is displayed.
4. Click **Confirm**.

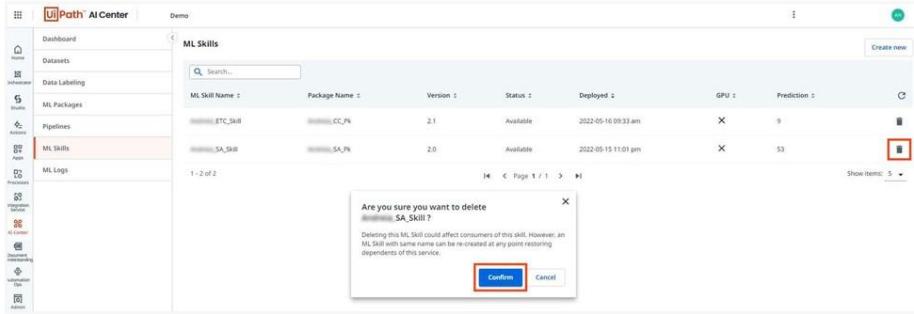
Note: While the skill is updating, you can still call the ML skill activity (on the version that is about to be replaced). The update happens with zero downtime.

Deleting an ML Skill

Deleting an ML Skill

To delete an ML skill:

1. Navigate to the ML Skills page.
2. In the extreme right side of the target skill row, click the delete icon. A confirmation dialog box is displayed.
3. Click **Confirm**.



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To delete an ML skill:

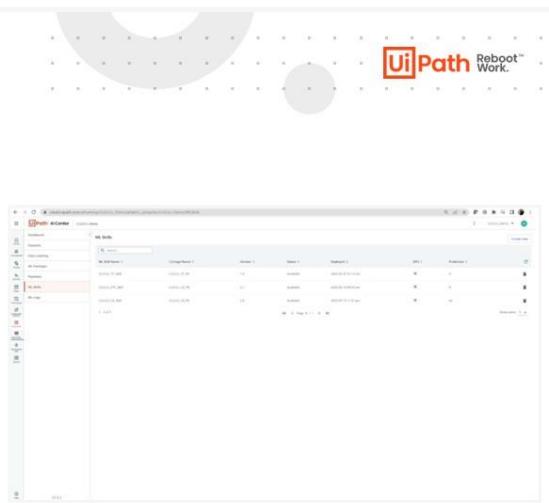
1. Navigate to the ML Skills page.
2. In the extreme right side of the target skill row, click the delete icon. A confirmation dialog box is displayed.
3. Click **Confirm**.

Updating an ML Skill

Updating an ML Skill

To update an ML skill:

1. Navigate to the details page of the desired ML skill.
2. To update the desired version of the skill, in the extreme right side of the row showing that version, click the update icon. A confirmation dialog is displayed.
3. In the confirmation dialog, perform the following steps:
 - i. To enable more compute power, enable the **Enable GPU** toggle button. Using an on-premise AI Center version results in using the available GPU. However, using the cloud version results in using more AI units from the license.
 - ii. To enable the access of the ML skill via an endpoint, enable the **Make ML Skill Public** toggle button.
 - iii. To auto update the ML skill created, enable the **Enable Auto Update** toggle button.
 - iv. To undeploy the ML skill after a period of inactivity, from the **Undeploy Skill after period of inactivity** drop-down list, select the required period.
 - v. Click **Confirm**.



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To update an ML skill:

1. Navigate to the details page of the desired ML skill.
2. To update the desired version of the skill, in the extreme right side of the row showing that version, click the update icon. A confirmation dialog is displayed.
3. In the confirmation dialog, perform the following steps:
 - i. To enable more compute power, enable the **Enable GPU** toggle button. If you are using an on-premise version of AI Center, you are using the available GPU. If you are using the cloud version, you will use more AI units from the license.
 - ii. To enable the access of the ML skill via an endpoint, enable the **Make ML Skill Public** toggle button.
 - iii. To auto update the ML skill created, enable the **Enable Auto Update** toggle button.
 - iv. To undeploy the ML skill after a period of inactivity, from the **Undeploy Skill after period of inactivity** drop-down list, select the required period.
 - v. Click **Confirm**.

Lab Exercise



Lab Exercise

M3 | L6



Please refer to Lab Exercise 5 of Day 1 in the Lab Guide.

Lab Exercise 5 (10 Minutes)



Lab Exercise 5 (10 Minutes)

Create ML skills

1. Create an ML skill for the Sentiment Analysis ML package.
2. Create an ML skill for MultiLingualTextClassification once the full pipeline runs successfully.

UiPath Reboot Work.

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Lesson 7: ML Logs

ML Logs

M3 | L7



In Lesson 7, you will learn what ML logs are and the various types of information available on ML logs.

ML Logs Overview

The ML Logs page shows a consolidated view of all events related to the project.

Severity	Action	User	Description	Time
Info	Pipeline	Machine Learning	Full training of [REDACTED] MLTC_Pk 3.0 started - Run 28afbe8a-52f1-4e...	2022-05-24 12:46 am
Info	Pipeline	Machine Learning	Full training of [REDACTED] MLTC_Pk 3.0 scheduled - Run 28afbe8a-52f1-...	2022-05-24 12:46 am
Info	Pipeline	Machine Learning	Full training of [REDACTED] MLTC_Pk 3.0 launched - Run 28afbe8a-52f1-4...	2022-05-24 12:46 am
Info	ML Package	Machine Learning	MLPackage # [REDACTED] MLTC_Pk v93 validation successful	2022-05-24 12:45 am
Info	ML Skill	Machine Learning	MLSkill # [REDACTED] TC_Skill MLPackage v91 Is Available	2022-05-20 03:04 pm
Info	ML Skill	Machine Learning	MLSkill # [REDACTED] TC_Skill MLPackage v91 Update MLSkill License Succ...	2022-05-20 03:04 pm
Info	ML Skill	Machine Learning	MLSkill # [REDACTED] TC_Skill MLPackage v91 Undeployed Successfully	2022-05-17 01:55 pm
Info	ML Skill	Machine Learning	MLSkill # [REDACTED] TC_Skill MLPackage v91 Is Available	2022-05-17 01:54 pm
Info	ML Skill	Machine Learning	MLSkill # [REDACTED] TC_Skill MLPackage v91 Updated Successfully	2022-05-17 01:54 pm
Info	ML Skill	Machine Learning	MLSkill # [REDACTED] TC_Skill MLPackage v91 Deployment Started	2022-05-17 01:52 pm
Info	ML Package	Machine Learning	MLPackage # [REDACTED] TC_Pk 1.0 validation successful	2022-05-17 01:47 pm
Info	Pipeline	Machine Learning	Train only of [REDACTED] TC_Pk 1.0 success - Run 9fcac881-dc0f-47c6-bd...	2022-05-17 01:46 pm
Info	ML Package	Machine Learning	MLPackage # [REDACTED] TC_Pk v91 validation started	2022-05-17 01:46 pm
Info	Pipeline	Machine Learning	Train only of [REDACTED] TC_Pk 1.0 started - Run 9fcac881-dc0f-47c6-bd...	2022-05-17 01:43 pm
Info	Pipeline	Machine Learning	Train only of [REDACTED] TC_Pk 1.0 launched - Run 9fcac881-dc0f-47c6-b...	2022-05-17 01:43 pm

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The ML Logs page shows a consolidated view of all events related to the project.

Event Categories

Event Categories

Here are the categories to which the ML log events belong.

ML Package Validation

Pipeline Related Events

ML Skill Deployment Related Events

ML Skill Prediction Related Events

ML Logs Inside ML Packages

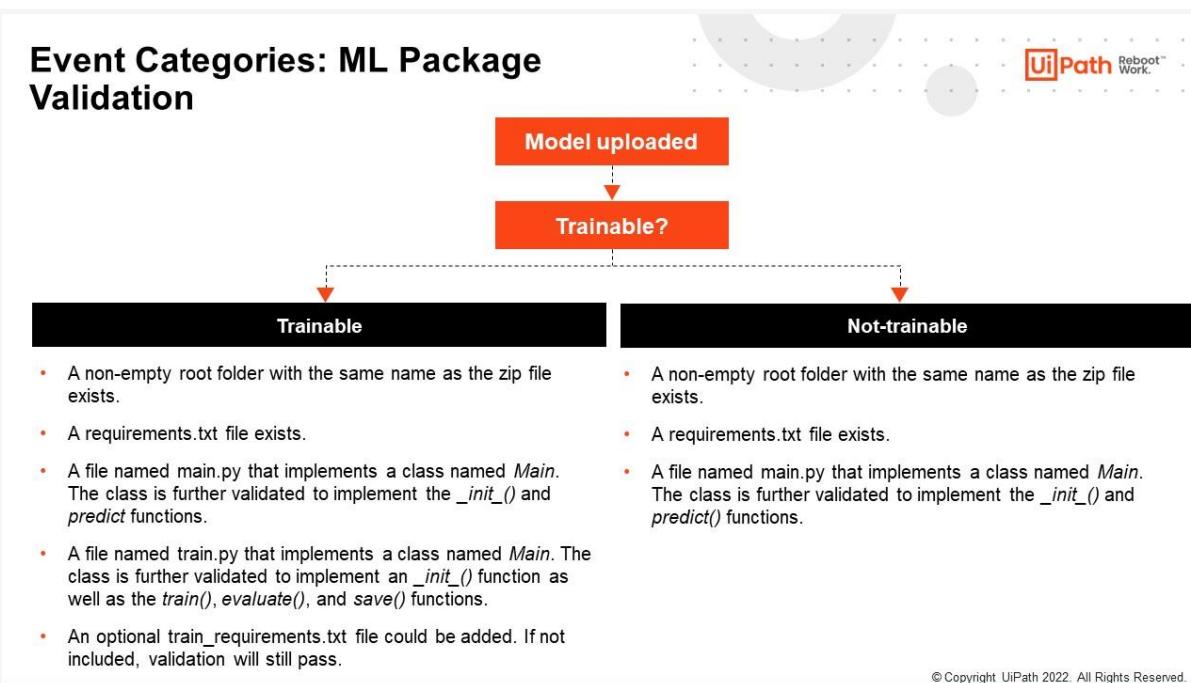
ML Logs Inside Pipelines

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Following are the categories to which the ML log events belong:

- ML package validation
- Pipeline related events
- ML skill deployment related events
- ML skill prediction related events
- ML logs inside ML packages
- ML logs inside pipelines

Event Categories: ML Package Validation



- AI Center first verifies whether a model is labeled as Trainable when it is uploaded. The uploaded.zip file is then evaluated using a set of criteria for that model.
- For trainable models:
 - A non-empty root folder with the same name as the zip file exists.
 - A requirements.txt file exists.
 - A file named main.py that implements a class named Main. The class is further validated to implement the __init__() and predict() functions.
 - A file named train.py that implements a class named Main. The class is further validated to implement an __init__() function as well as the train(), evaluate(), and save() functions.
 - An optional train_requirements.txt file could be added. If not included, validation will still pass.
- For non-trainable models:
 - A non-empty root folder with the same name as the zip file exists.
 - A requirements.txt file exists.

- A file named main.py that implements a class named Main. The class is further validated to implement the `_init_()` and `predict()` functions.

Note: ML logs for this category illustrate validation start and finish times and the actual validation errors, if any.

Event Categories: Pipeline Related Events

Event Categories: Pipeline Related Events

When a pipeline is created, the logs of the pipeline's status are displayed on the ML Logs page.

The screenshot shows the 'ML Logs' section of the 'Demo' workspace in the 'UiPath AI Center'. The left sidebar includes 'Dashboard', 'Datasets', 'Data Labeling', 'ML Packages', 'Pipelines' (which is selected), 'ML Skills', and 'ML Logs'. The main area is titled 'ML Logs' with a search bar. It displays a table of logs with columns: Severity, Action, User, Description, and Time. The logs are color-coded by severity: Info (green) and Error (red). Several logs are highlighted with red boxes, specifically those related to pipeline training and validation. The logs include entries like 'Full training of [REDACTED]_MLTC_Pn 3.0 started - Run 28afefbe-52f1-4ec...', 'Full training of [REDACTED]_MLTC_Pn 3.0 scheduled - Run 28afefbe-52f1...', and 'Train only of [REDACTED]_TC_Pn 1.0 started - Run 9cae881-dc0f-476d-8d6...'. The time column shows dates from May 2022.

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When a pipeline is created, the logs of the pipeline's status are displayed on the ML Logs page.

Event Categories: ML Skill Deployment Related Events

Event Categories: ML Skill Deployment Related Events

When an ML skill is created, AI Center deploys that skill. This entails installing dependencies, running several security checks and optimizations, setting up the network within the namespace of the tenant, creating a container with a certain number of replicas from the corresponding ML package, and finally checking the health of the ML skill.

The screenshot shows the 'ML Logs' section of the UiPath AI Center interface. The logs table has columns for Severity, Action, User, Description, and Time. Several log entries are highlighted with red boxes, indicating specific deployment steps:

- Action: ML Skill**
Description: MLSkill #000000_TC_Skill MLPackage v11 Undeployed successfully
Time: 2022-05-17 01:51:59 pm
- Action: ML Skill**
Description: MLSkill #000000_TC_Skill MLPackage v11 Is Available
Time: 2022-05-17 01:51:54 pm
- Action: ML Skill**
Description: MLSkill #000000_TC_Skill MLPackage v11 Updated Successfully
Time: 2022-05-17 01:51:54 pm
- Action: ML Skill**
Description: MLSkill #000000_TC_Skill MLPackage v11 Deployment Started
Time: 2022-05-17 01:51:52 pm
- Action: ML Package**
Description: MLPackage #000000_TC_PN v11 validation successful
Time: 2022-05-17 01:51:47 pm
- Action: Pipeline**
Description: Train only of #000000_TC_PN v11 succeeded - Run #00ae881dc0f47c6d6...
Time: 2022-05-17 01:51:46 pm
- Action: ML Package**
Description: MLPackage #000000_TC_PN v11 validation started
Time: 2022-05-17 01:51:46 pm
- Action: Pipeline**
Description: Train only of #000000_TC_PN v11 started - Run #00ae881dc0f47c6d6...
Time: 2022-05-17 01:51:43 pm
- Action: Pipeline**
Description: Train only of #000000_TC_PN v11 launched - Run #00ae881dc0f47c6d6...
Time: 2022-05-17 01:51:43 pm

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When an ML skill is created, AI Center deploys that skill. This entails installing dependencies, running several security checks and optimizations, setting up the network within the namespace of the tenant, creating a container with a certain number of replicas from the corresponding ML package, and finally checking the health of the ML skill.

Note: ML logs for this category illustrate deployment start and finish times and the actual deployment errors, if any.

Event Categories: ML Skill Prediction Related Events

Event Categories: ML Skill Prediction Related Events

When a live skill is serving, if there is a prediction failure (an exception thrown by the Python code), the exception is shown in this component.

Severity	User	Description	Time
Info	Pipeline	Full training of [REDACTED]_MLTC_PN 3.0 started - Run 28afffe8-52f1-4ec...	2022-05-24 12:46 am
Info	Pipeline	Full training of [REDACTED]_MLTC_PN 3.0 scheduled - Run 3fafffe8-52f1...	2022-05-24 12:46 am
Info	Pipeline	Full training of [REDACTED]_MLTC_PN 3.0 launched - Run 28afffe8-52f1-...	2022-05-24 12:46 am
Info	ML.Package	ML.Package #00000000_0000_0000_0000_000000000000 validation successful	2022-05-20 12:45 am
Info	ML.Skill	MLSkill #00000000_0000_0000_0000_000000000000 TC_Skill MLPackage v1 Is Available	2022-05-20 03:04 pm
Info	ML.Skill	MLSkill #00000000_0000_0000_0000_000000000000 TC_Skill MLPackage v1 Update ML.Skill License Success...	2022-05-20 03:04 pm
Info	ML.Skill	MLSkill #00000000_0000_0000_0000_000000000000 TC_Skill MLPackage v1 Deployment successful	2022-05-17 01:54 pm
Info	ML.Skill	MLSkill #00000000_0000_0000_0000_000000000000 TC_Skill MLPackage v1 Is Available	2022-05-17 01:54 pm
Info	ML.Skill	MLSkill #00000000_0000_0000_0000_000000000000 TC_Skill MLPackage v1 Updated Successfully	2022-05-17 01:54 pm
Info	ML.Skill	MLSkill #00000000_0000_0000_0000_000000000000 TC_Skill MLPackage v1 Deployment Started	2022-05-17 01:52 pm
Info	ML.Package	ML.Package #00000000_0000_0000_0000_000000000000 TC_PN v1 validation successful	2022-05-17 01:47 pm
Info	ML.Package	ML.Package #00000000_0000_0000_0000_000000000000 Train only of [REDACTED]_TC_PN 3.0 succeeded - Run 95ae881-dc0f-476b-...	2022-05-17 01:46 pm
Info	ML.Package	ML.Package #00000000_0000_0000_0000_000000000000 Train only of [REDACTED]_TC_PN v1 validation started	2022-05-17 01:46 pm
Info	ML.Package	ML.Package #00000000_0000_0000_0000_000000000000 Train only of [REDACTED]_TC_PN 3.0 started - Run 95ae881-dc0f-476b-...	2022-05-17 01:43 pm
Info	ML.Package	ML.Package #00000000_0000_0000_0000_000000000000 Train only of [REDACTED]_TC_PN 3.0 launched - Run 95ae881-dc0f-476b-...	2022-05-17 01:43 pm

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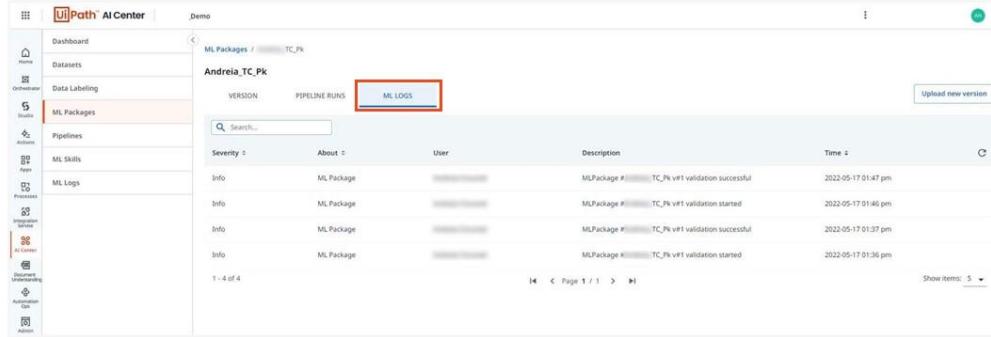
When a live skill is serving, if there is a prediction failure (an exception thrown by the Python code), the exception is shown in this component.

Event Categories: ML Logs inside ML Packages

Event Categories: ML Logs inside ML Packages

To view the ML logs inside an ML package:

1. Navigate to the ML Packages page and select the required package. The selected package's details page is displayed.
2. Click **ML Logs**. A table showing ML logs is displayed.



The screenshot shows the 'ML Packages' details page for 'Andrea_TC_Pk'. The 'ML LOGS' tab is selected, highlighted with a red box. A table below lists four log entries. The columns are: Severity, About, User, Description, and Time. The data is as follows:

Severity	About	User	Description	Time
Info	ML Package	[redacted]	MLPackage # TC_Pk vrl validation successful	2022-05-17 01:47 pm
Info	ML Package	[redacted]	MLPackage # TC_Pk vrl validation started	2022-05-17 01:46 pm
Info	ML Package	[redacted]	MLPackage # TC_Pk vrl validation successful	2022-05-17 01:37 pm
Info	ML Package	[redacted]	MLPackage # TC_Pk vrl validation started	2022-05-17 01:36 pm

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To view the ML logs inside an ML package:

1. Navigate to the ML Packages page and select the required package. The selected package's details page is displayed.
2. Click **ML Logs**. A table showing ML logs is displayed

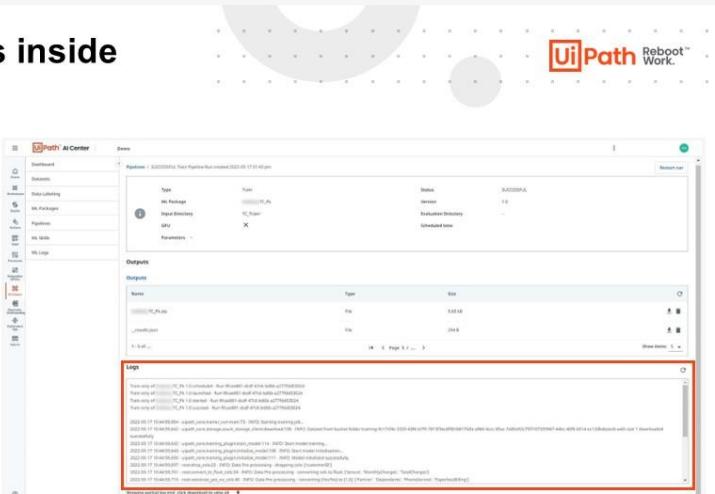
Event Categories: ML Logs inside Pipelines

Event Categories: ML Logs inside Pipelines

To view the ML logs inside a pipeline:

1. Navigate to the Pipelines page.
2. Select the required pipeline. The selected pipeline's details page is displayed. The Logs section on the bottom of the page provides the required information.

The Logs section of the page usually provides information about how the pipeline is running, the different steps that are being performed, and the different metrics for each epoch to be able to monitor the training.




When you look inside a pipeline, you can also see additional logs regarding what is happening during the pipeline. You can also download these logs.

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To view the ML logs inside a pipeline:

1. Navigate to the Pipelines page.
2. Select the required pipeline. The selected pipeline's details page is displayed. The Logs section on the bottom of the page provides the required information

The Logs section of the page usually provides information about how the pipeline is running, the different steps that are being performed, and the different metrics for each epoch to be able to monitor the training.

Note: When you look inside a pipeline, you can also see additional logs regarding what is happening during the pipeline. You can also download these logs.

Lesson 8: Consuming ML Skills

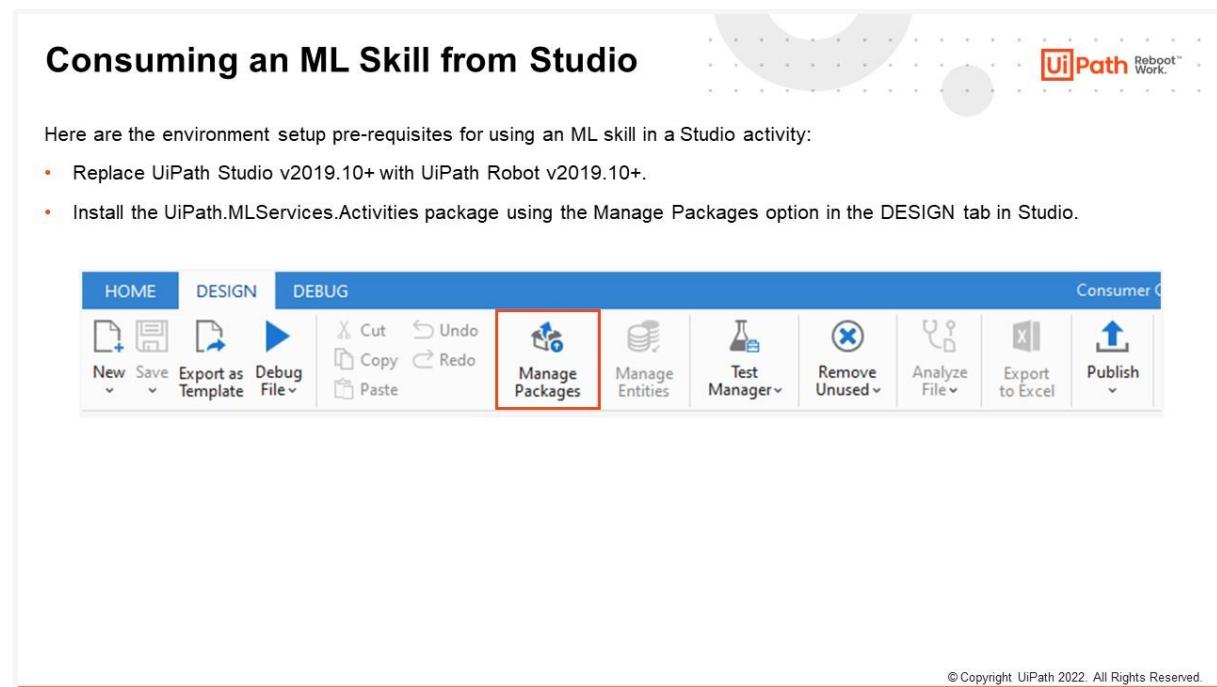
Consuming ML Skills

M3 | L8



In Lesson 8, you will know how to use ML skills in Studio.

Consuming an ML Skill from Studio



Here are the environment setup pre-requisites for using an ML skill in a Studio activity:

- Replace UiPath Studio v2019.10+ with UiPath Robot v2019.10+.
- Install the `UiPath.MLServices.Activities` package using the `Manage Packages` option in the DESIGN tab in Studio.

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Here are the environment setup pre-requisites for using an ML skill in a Studio activity:

- Replace UiPath Studio v2019.10+ with UiPath Robot v2019.10+.
- Install the `UiPath.MLServices.Activities` package using the `Manage Packages` option in the DESIGN tab in Studio.

Consuming an ML Skill from Studio (Cont'd)

Consuming an ML Skill from Studio (Cont'd)



To consume an ML skill from Studio:

1. From the Activities panel in the left, search and drag the ML Skill activity and drop it into the RPA workflow.
2. Next to the Search drop-down menu, click the refresh icon. The drop-down list is populated with all the successfully deployed ML skills from Orchestrator connected to this robot.
3. From the Search drop-down list, select the desired ML skill.
4. Click **Test Skill**. The Test Skill dialog is displayed.
5. In the Select Input field, type the required data.
6. Click **Test Skill**. The output is displayed in the Output section of the Test Skill dialog.
7. Click **Close**.

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To consume an ML skill from Studio:

1. From the Activities panel in the left, search and drag the ML Skill activity and drop it into the RPA workflow.
2. Next to the Search drop-down menu, click the refresh icon. The drop-down list is populated with all the successfully deployed ML skills from Orchestrator connected to this robot.
3. From the Search drop-down list, select the desired ML skill.
4. Click **Test Skill**. The Test Skill dialog is displayed.
5. In the Select Input field, type the required data.
6. Click **Test Skill**. The output is displayed in the Output section of the Test Skill dialog.
7. Click **Close**.

Note: Make sure to pass the data to the input of the ML skills exactly as you would with any other activity. To know more about the ML Skill activity, kindly visit <https://docs.uipath.com/activities/docs/ml-skills>.

Lab Exercise



Lab Exercise

M3 | L8



Please refer to Lab Exercise 6 of Day 1 in the Lab Guide.

Lab Exercise 6 (30 Minutes)



Lab Exercise 6 (30 Minutes)

Consume the sentiment analysis ML skill



Given a transcript of a conversation between a customer and an agent, for each reply, use the Sentiment Analysis ML skill to display the overall sentiment and its confidence.

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Lesson 9: Analysis of the Output of Pipeline

Analysis of the Output of Pipeline

M3 | L9



In Lesson 9, you will go through the analysis of the output of pipeline.

Pipeline Outputs

Pipeline Outputs

- For the out-of-the-box models, the pipeline output cannot be customized, and you can check the documentation for it.
- For the custom machine learning models, the pipeline outputs must be specifically developed by the data scientist.
- For the Multilingual Text Classification model, the out-of-the-box one from UiPath, you can check the outputs in the documentation here: <https://docs.uipath.com/ai-fabric/v0/docs/multi-lingual-text-classification>



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For the out-of-the-box models, the pipeline output cannot be customized, and you can check the documentation for it. For the custom machine learning models, the pipeline outputs must be specifically developed by the data scientist.

For the Multilingual Text Classification model, the out-of-the-box one from UiPath, you can check the outputs in the documentation here: <https://docs.uipath.com/ai-fabric/v0/docs/multi-lingual-text-classification>

Pipeline Outputs: View Output of Pipelines

The screenshot shows the Pipeline Details page for a successful run of the Demo_MLTC_Pk pipeline. The page includes sections for Pipeline Overview, Pipeline Details, Outputs, and Logs.

Pipeline Overview:

- Type: Full
- ML Package: Demo_MLTC_Pk
- Generated version: 4.1
- Evaluation Directory: GC_Tests
- Scheduled time: [redacted]
- Status: SUCCESSFUL
- Base version: 4.0
- Input Directory: GC_Tests
- GPU: X
- Parameters: [redacted]

Outputs:

Name	Type	Size
_results.json	File	530 B
artifacts	Directory	—
data	Directory	—
test	Directory	—

Logs:

```

Full training of Demo_MLTC_Pk 4.0 launched - Run e4e7fe0d97274244-a412-477a-721346
Full training of Demo_MLTC_Pk 4.0 started - Run e4e7fe0d97274244-a412-477a-721346
Full training of Demo_MLTC_Pk 4.0 succeeded - Run e4e7fe0d97274244-a412-477a-721346
Full training of Demo_MLTC_Pk 4.0 launched - Run e4e7fe0d97274244-a412-477a-721346
Full training of Demo_MLTC_Pk 4.0 started - Run e4e7fe0d97274244-a412-477a-721346
Full training of Demo_MLTC_Pk 4.0 succeeded - Run e4e7fe0d97274244-a412-477a-721346

0003 loss_test 0.5272 ± 0.0000 score_train 1.0000 score_test 0.7833
2022-11-14 15:09:02,402 - root/train-403 INFO epoch 10 loss_train 0.0038 loss_test 0.6135 ± 0.0000 score_train 1.0000 score_test 0.8187

```

Here are the steps to view the output of pipelines:

1. Navigate to the Pipelines page.
2. Click Demo_MLTC_Pk. The Pipeline Details page is displayed.

The Pipeline Details page displays the outputs for the full pipelines (the type of pipeline we have run on the Demo_MLTC_Pk package) and the logs.

Output of Pipelines

Output of Pipelines

- The _results.json file contains the following information about the pipeline run:
 - Inputs:** Provides information related to the package, version, whether a GPU is used or not, and what are the datasets for input and for evaluation (if we have a full pipeline).
 - Env:** Provides information related to the environment variables used and their values.
 - Run_summary:** Provides information related to the summary of the run. From here, the most important section is the outputs, which contain the score of the current full pipeline run.



```
{
  "parameters": {
    "pipeline": "Pipeline_1668432748468",
    "inputs": {
      "package": "Demo_MLTC_Pk",
      "version": "4.0",
      "gpu": false,
      "input_data": "CC_Train/",
      "evaluation_data": "CC_Test/"
    },
    "env": {
      "dataset.input_format": "auto",
      "dataset.target_column_name": "target",
      "dataset.input_column_name": "input",
      "model.epochs": "10"
    }
  },
  "run_summary": {
    "execution_time": "5738.05300116539",
    "start_at": "13:36:08 14/11/2022 UTC",
    "end_at": "15:11:46 14/11/2022 UTC",
    "outputs": {
      "score": 0.9235588972431079,
      "evaluation_data": "test",
      "artifacts_data": "artifacts"
    },
    "status": 0
  }
}
```

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The _results.json file contains the following information about the pipeline run:

- Inputs:** Provides information related to the package, version, whether a GPU is used or not, and what are the datasets for input and for evaluation (if we have a full pipeline).
- Env:** Provides information related to the environment variables used and their values.
- Run_summary:** Provides information related to the summary of the run. From here, the most important section is the outputs, which contain the score of the current full pipeline run.

Output of Pipelines (Cont'd)

Output of Pipelines (Cont'd)

- The data folder contains the CSV file with predictions that will be used for evaluation.
- The test folder contains the CSV file that was used to test the model.
- The outputted artefacts of this OOB model are stored in the artefacts folder.

Name	Type	Size	Actions
Evaluation_Report.pdf	File	225 kB	
classification_report.json	File	710 B	
confusion_matrix.json	File	400 B	
confusion_matrix.png	File	29.9 kB	
precision_recall_Bank account or service.png	File	67 kB	
precision_recall_Credit reporting.png	File	65.5 kB	
precision_recall_Debt collection.png	File	64.9 kB	
precision_recall_Mortgage.png	File	64.5 kB	
thresholds_Bank account or service.json	File	114 B	
thresholds_Credit reporting.json	File	100 B	
thresholds_Debt collection.json	File	100 B	
thresholds_Mortgage.json	File	148 B	

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The data folder contains the CSV file with predictions that will be used for evaluation. The test folder contains the CSV file that was used to test the model. The outputted artefacts of this out-of-the-box model are stored in the artefacts folder.

Knowledge Checks

Knowledge Checks



Knowledge Check 1

Knowledge Check 1

01/06

1. Which of these pipelines require a dataset to produce a set of metrics and logs (Choose two)?

- Evaluation pipeline
- Training pipeline
- Full pipeline
- Only full pipeline
- Only evaluation pipeline



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Knowledge Check 2

Knowledge Check 2

02/06

2. Which of these actions can be performed while clicking Edit project?

- You can edit an existing project's description and name from the project's Dashboard page by clicking Edit project.
- You can only edit an existing project's description from the project's Dashboard page by clicking Edit project.
- You can edit an existing project's description or name from the project's Dashboard page by clicking Edit project.
- You can delete an existing project from the project's Dashboard page by clicking Edit project.

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Knowledge Check 3

Knowledge Check 3

03/06

3. As an RPA developer, you have the option to make a dataset public. To do so, which of these options will you choose?

- Select download dataset and toggle the option for the Make dataset Public field.
- Select upload dataset and toggle the option for the Make dataset Public field.
- Select Edit dataset or Create new dataset and toggle the option for the Make dataset Public field.
- Toggle the Make dataset Private field.

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Knowledge Check 4

Knowledge Check 4

04/06

4. When an ML package is uploaded, it will be shown as version 1.0 (We say this is major version 1 and minor version 0). What does this differentiate?

- This is to differentiate between ML packages that have been uploaded by the user and ML packages that have been retrained via human validation.
- This is to differentiate between ML packages that have been uploaded by the user and ML packages that have been retrained via pipelines.
- This is to differentiate between ML packages that have been retrained via pipelines and ML packages that have been uploaded by the user.
- This is to differentiate between ML packages that have been trained by the user and ML packages that have been retrained via human validation.

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Knowledge Check 5

Knowledge Check 5

05/06

5. When creating a new pipeline run, which of these fields are mandatory (Choose three)?

- Pipeline type
- Choose package major version
- Choose package minor version
- Choose package
- Choose input dataset



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Knowledge Check 6

Knowledge Check 6

06/06



6. As a data scientist, you want to go for a live deployment of the ML package. During this process, you can choose to enable auto-update. Which of the following sets of actions is correct in terms of the auto-update?
- The model is automatically updated with a different ML package version and a new minor version.
 - The model is automatically updated, but with the same ML package version and the same minor version.
 - The model is automatically updated with the latest retrained version of the model, which has the same ML package version but a new minor version.
 - The model is automatically updated with the latest retrained version of the model, which has a new ML package version but the same minor version.

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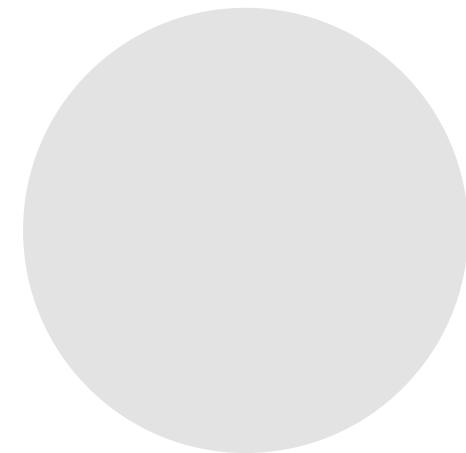
Key Takeaways

Key Takeaways

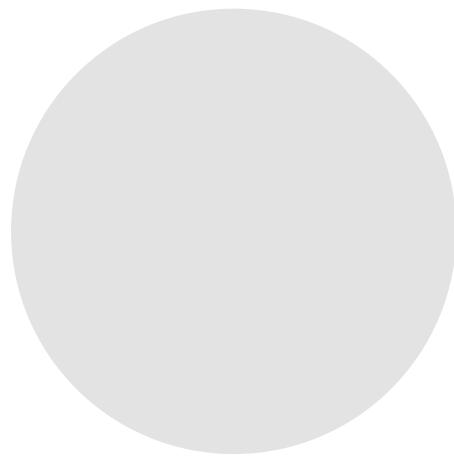
- AI Center is based on five core concepts, namely project, dataset, pipelines, ML skills, and ML logs.
- Creating, editing, and deleting are the different options available for managing projects in AI Center.
- Datasets enable ML models to access new data points, such as new files or folders uploaded from the application or any data from UiPath Robot at runtime.
- A public dataset will be accessible via an endpoint (protected with an API key) from outside of the UiPath environment.
- Pipelines are of three types, namely, training, evaluation, and full.
- An ML skill is a live deployment of an ML package used in any RPA workflow.
- ML logs display a consolidated view of all events related to the project.
- ML package validation, pipeline related events, ML skill deployment related events, ML skill prediction related events, ML logs inside ML packages, and ML logs inside pipelines are the categories in which the ML log events are classified.

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Day 2



M4 - Integrating AI Center with RPA



Welcome

UiPath AI Center Training

M4 | Integrating AI Center with RPA



Welcome to Module 4! In this module, you will learn about UiPath Action Center and the different phases of UiPath AI Center. You will also learn to build an orchestration process.

Lessons Covered in This Module

About This Module | M4 | Integrating AI Center with RPA



Lessons covered in this module

- Lesson 1: Closing the Loop

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This module consists of just one foundation lesson namely, Closing the Loop.

Learning Objectives

About This Module | M4 | Integrating AI Center with RPA



Learning objectives

- Describe the working of UiPath Action Center.
- Describe the phases in UiPath AI Center.
- Explain user intervention in long-run workflows.
- Explain how to orchestrate human tasks with Robot tasks.
- Describe how to build an orchestration process in UiPath Studio.

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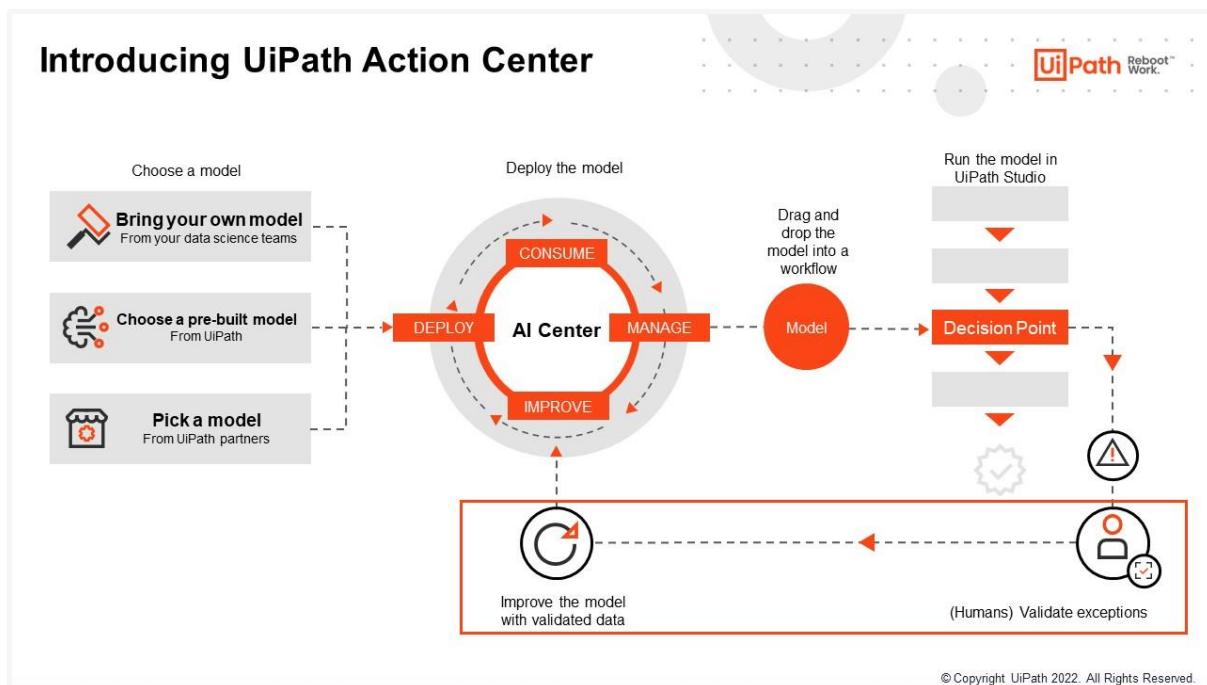
Lesson 1: Closing the Loop

Closing the Loop

M4 | L1



Introducing UiPath Action Center



AI Center enables users to add a Machine Learning (ML) model, transform it into an ML package, train and evaluate it using pipelines, deploy it as a ML skill, and finally consume it from UiPath Studio to make cognitive decision in an automation process.

UiPath Action Center is used for sending feedback from the process to the ML model. This allows you to close the loop of the ML project and make the model available for continuous learning from new data.

Working of AI Center

Working of AI Center

AI Center enables you to deploy, consume, manage, and improve ML models. It enables consuming these models by adding them to the Robotic Process Automation (RPA) workflows in Studio.

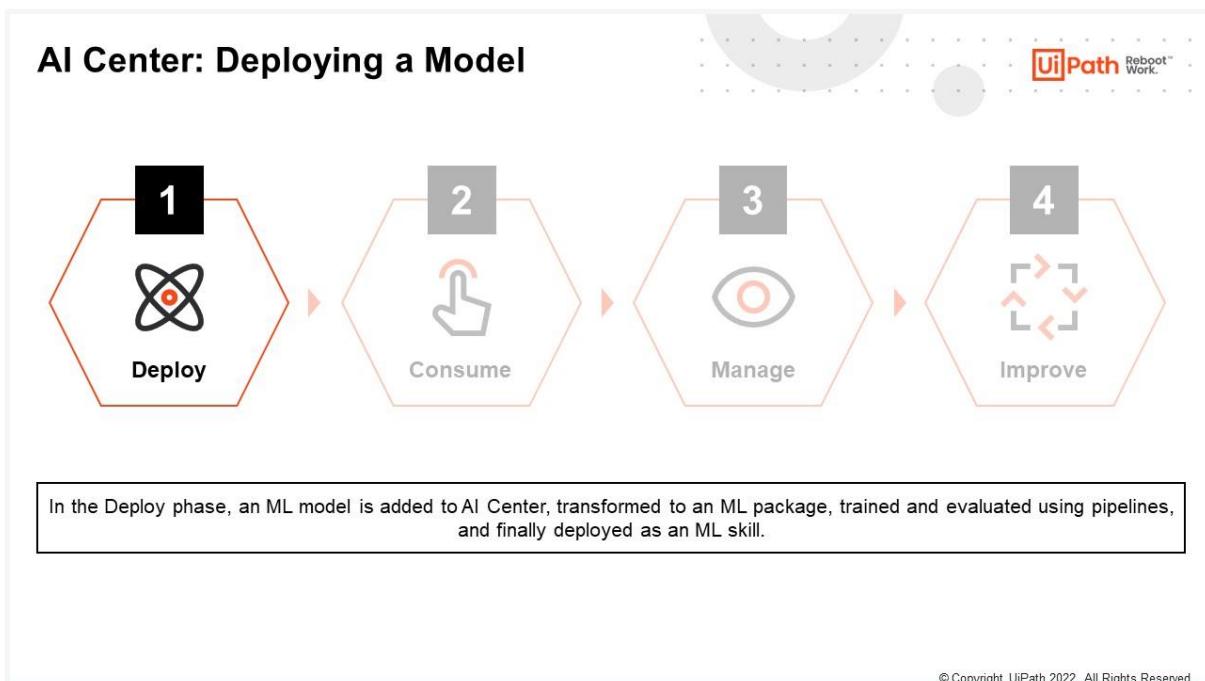
```
graph LR; A[1 Deploy] --> B[2 Consume]; B --> C[3 Manage]; C --> D[4 Improve]
```

The diagram consists of four orange hexagonal boxes arranged horizontally, connected by red arrows pointing from left to right. Each box contains a black square with a white number and a corresponding icon below it. Box 1 (Deploy) has a gear icon. Box 2 (Consume) has a hand cursor icon. Box 3 (Manage) has an eye icon. Box 4 (Improve) has a circular arrow icon.

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AI Center enables you to deploy, consume, manage, and improve ML models. It enables consuming these models by adding them to the Robotic Process Automation (RPA) workflows in Studio.

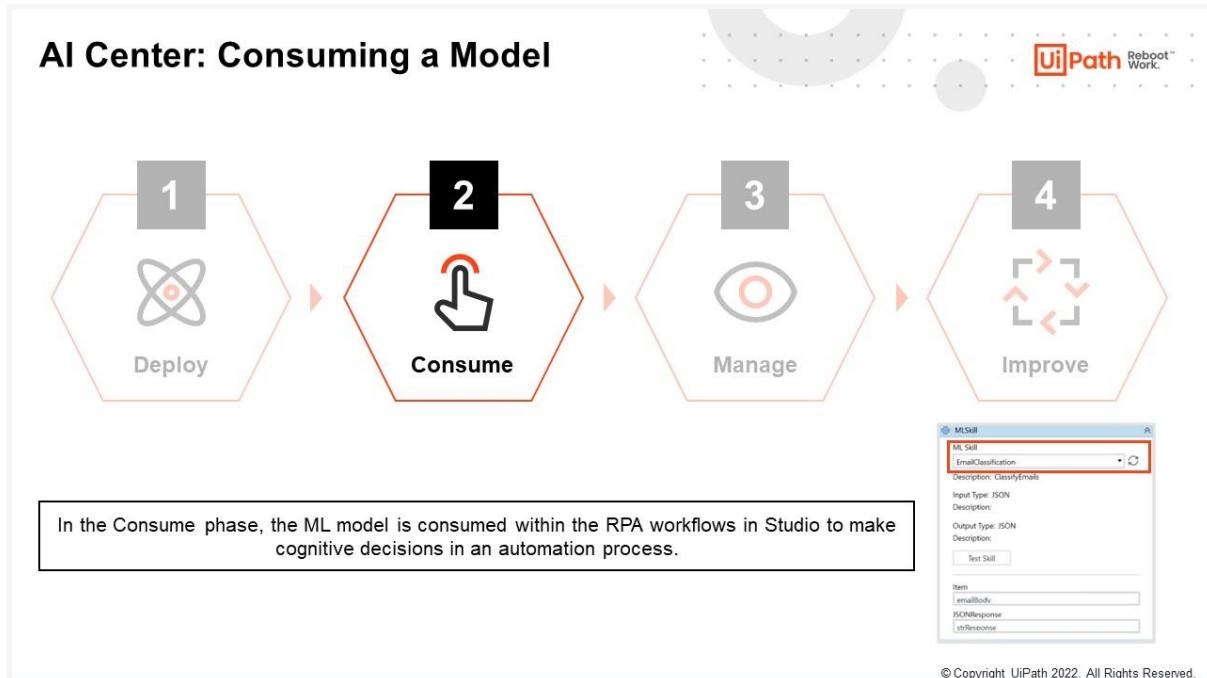
AI Center: Deploying a Model



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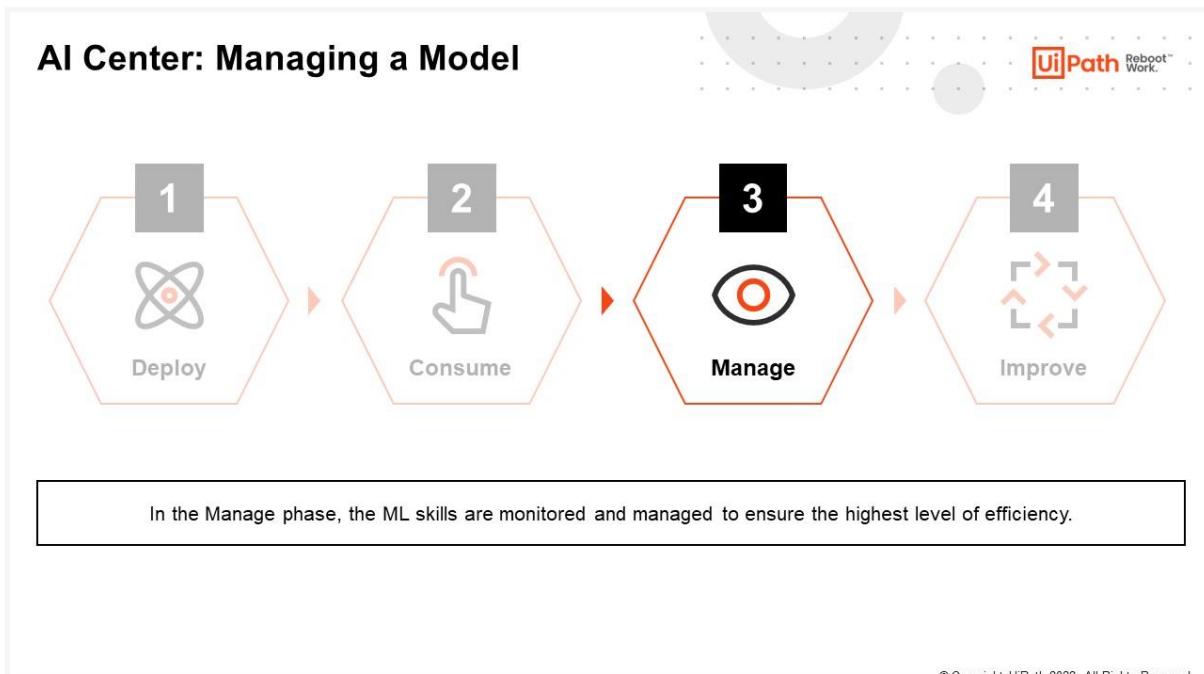
In the Deploy phase, an ML model is added to AI Center, transformed to an ML package, trained and evaluated using pipelines, and finally deployed as an ML skill.

AI Center: Consuming a Model



In the Consume phase, the ML model is consumed within the RPA workflows in Studio to make cognitive decisions in an automation process.

AI Center: Managing a Model



In the Manage phase, the ML skills are monitored and managed to ensure the highest level of efficiency.

AI Center: Improving a Model

The diagram illustrates the AI Center cycle, consisting of four sequential phases:

- 1 Deploy**: Represented by a hexagon containing a gear icon.
- 2 Consume**: Represented by a hexagon containing a hand icon.
- 3 Manage**: Represented by a hexagon containing an eye icon.
- 4 Improve**: Represented by a hexagon containing a circular arrow icon.

A callout box highlights the **Improve** phase: "In the Improve phase, the ML models are constantly trained and improved using the human validated data."

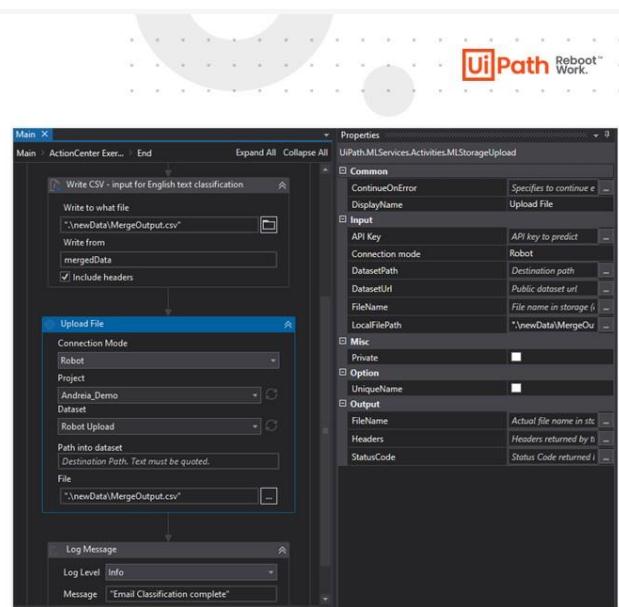
Below the diagram is a screenshot of a software interface titled "Action 28347: Manual classifier". The interface shows an email body with text about a harassing agency, suggested categories like "Debt collector", and a "Submit" button.

In the Improve phase, the ML models are constantly trained and improved using the human validated data.

The Upload File Activity

The Upload File Activity

- The UiPath.MLServices.Activities package contains an activity for sending data from a process to a given dataset.
- This is the Upload File activity. It connects the Studio workflows to the AI Center tenant exactly in the same way as the ML Skill activity.
- In this activity, you can select the project and dataset to which you want to send the data back.
- This activity along with Action Center capabilities enables you to complete the feedback loop, gather new data to monitor the performance of a model, and retrain it when required.



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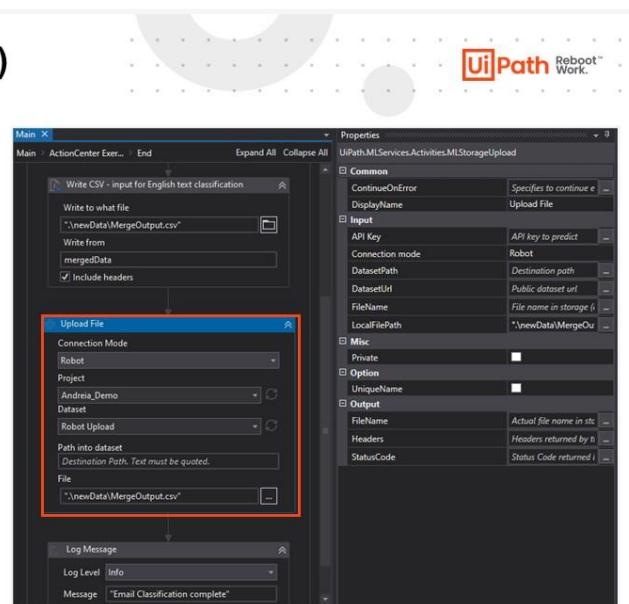
The UiPath.MLServices.Activities package contains an activity for sending data from a process to a given dataset. This is the Upload File activity. It connects the Studio workflows to the AI Center tenant exactly in the same way as the ML Skill activity. In this activity, you can select the project and dataset to which you want to send the data back.

This activity along with Action Center capabilities enables you to complete the feedback loop, gather new data to monitor the performance of a model, and retrain it when required.

The Upload File Activity (Cont'd)

To send the data back from a process to a project's dataset:

1. Open the desired Main workflow in Studio.
2. From the Activities panel in the left, search and drag the **Upload File** activity, and drop it into the Main workflow.
3. To upload by selecting a project and a dataset, from the Connection Mode drop-down list, select **Robot**.
4. From the Project drop-down list, select the required project.
5. From the Dataset drop-down list, select the required dataset available for the project.
6. In the Path into dataset field, type inside double quotes the internal path within the dataset where you want to upload the file.
7. To select the local path of the file you want to upload, in the File field, click the horizontal ellipsis button.



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Here are the steps to send data back from a process to a project's dataset:

1. Open the desired Main workflow in Studio.
2. From the Activities panel in the left, search and drag the **Upload File** activity, and drop it into the Main workflow.
3. To upload by selecting a project and a dataset, from the Connection Mode drop-down list, select **Robot**.
4. From the Project drop-down list, select the required project.
5. From the Dataset drop-down list, select the required dataset available for the project.
6. In the Path into dataset field, type inside double quotes the internal path within the dataset where you want to upload the file.
7. To select the local path of the file you want to upload, in the File field, click the horizontal ellipsis button.

The Upload File Activity (Cont'd)

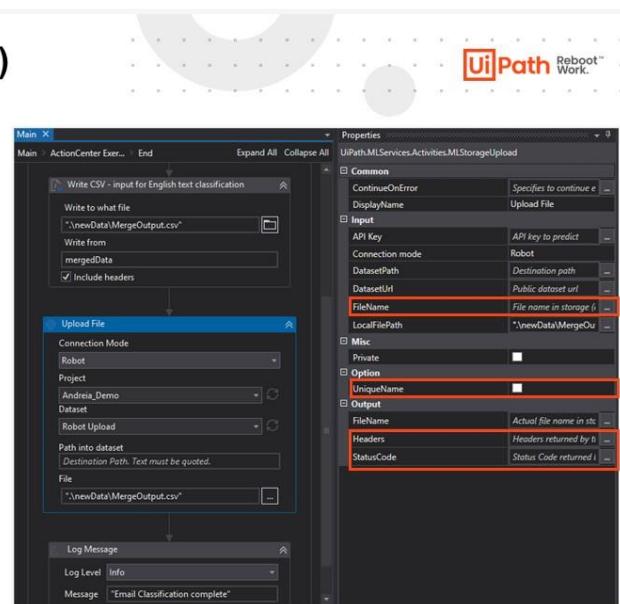
The Upload File Activity (Cont'd)

To send the data back from a process to a project's dataset:

6. In the Properties panel:

- i. To customize the filename upon storage, in the **FileName** field, type a suitable name with the extension, **FileName**.**Option**. By default, the filename will be the same as the local one.
- ii. To modify the filename automatically for making it unique, select the **UniqueName** check box. Following is the syntax of how the filename will be modified:
`<FileNameWithoutExtension>-<RobotType>-<RobotID>-<epoch>. <extension>.Output`

The Output section provides information such as the headers and status code returned by the ML skill request.



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6. In the Properties panel:

- i. To customize the filename upon storage, in the **FileName** field, type a suitable name with the extension, **FileName**.**Option**. By default, the filename will be the same as the local one.
- ii. To modify the filename automatically for making it unique, select the **UniqueName** check box. Following is the syntax of how the filename will be modified: `<FileNameWithoutExtension>-<RobotType>-<RobotID>-<epoch>. <extension>.Output`

The Output section provides information such as the headers and status code returned by the ML skill request.

Note: If a file with the same name already exists at the same location where you are uploading a new file, the existing file will be overwritten. You can customize the filename using the Properties panel of the activity.

Retrieve Human Input with Actions

Retrieve Human Input with Actions

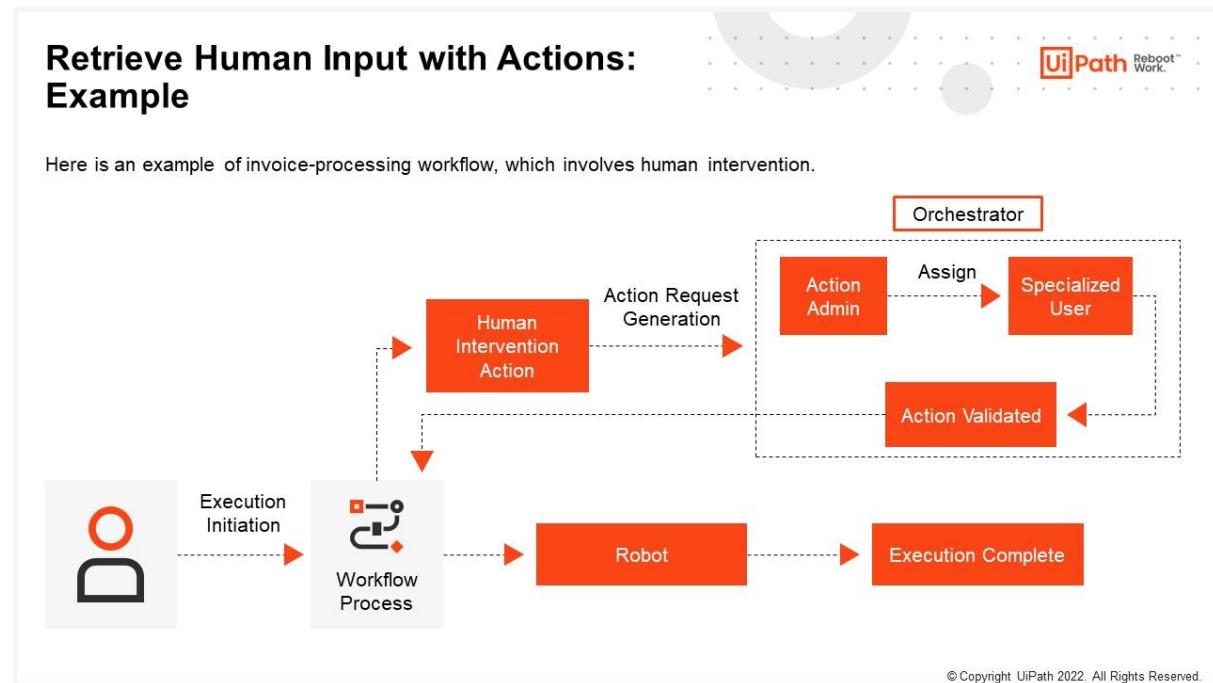
- Actions are tasks to be performed or undertaken by users when dealing with long-running workflows, and user intervention is required before proceeding to the next step in the workflow.
- Once an action is generated in Orchestrator, it is displayed on the Actions page with the status as Unassigned.

The screenshot shows the 'UiPath Actions' interface. On the left, there's a sidebar with various icons for Home, Orchestrator, Activities, Processes, Implementations, AI Center, Deployment Monitoring, Automations, and Admin. The main area has tabs for Pending, Unassigned, and Completed, with Unassigned selected. Below the tabs, there's a search bar and a list of four 'Manual classification' items, each with a small circular icon, a red box, and the text 'No Label Added' and '10 days ago'. To the right of the list is a large text input field labeled 'Email body' with placeholder text 'Email body', a 'Suggested' section, a 'Classes list' section, and a 'Submit' button at the bottom.

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Actions are tasks to be performed or undertaken by users when dealing with long-running workflows, and user intervention is required before proceeding to the next step in the workflow. Once an action is generated in Orchestrator, it is displayed on the Actions page with the status as Unassigned.

Retrieve Human Input with Actions: Example



The diagram illustrates a scenario of invoice-processing workflow wherein human intervention is required. A user with execution permissions starts a job for the corresponding process. The job is executed as usual, up until it encounters the activity that suspends it. That's when human intervention is required.

In Orchestrator, an activity is generated and awaits validation. An action admin who handles the actions inbox further assigns the item to a specialized user.

The user gets notified that an action is pending. After the action has been validated, the job is resumed, and the execution is finished by any robot that is available.

Lab Exercise



Lab Exercise

M4 | L1



Please refer to Lab Exercise 1 of Day 2 in the Lab Guide.

Introduction to Risks



Lab Exercise 1 (120 Minutes)

Complete the customer complaints feedback loop

Scenario: Here is an RPA workflow that classifies customer complaints using an ML skill already deployed in the ComplaintsClassifier project. However, when the confidence is not high enough, the email is simply marked as 'Unclassified.'

Goal: The task here is to ask a human to manually label these emails using the capabilities of Action Center and send the labeled data back to the project.

Action 28347: Manual classifier Assigned to You UNASSIGNED < PREVIOUS NEXT > X

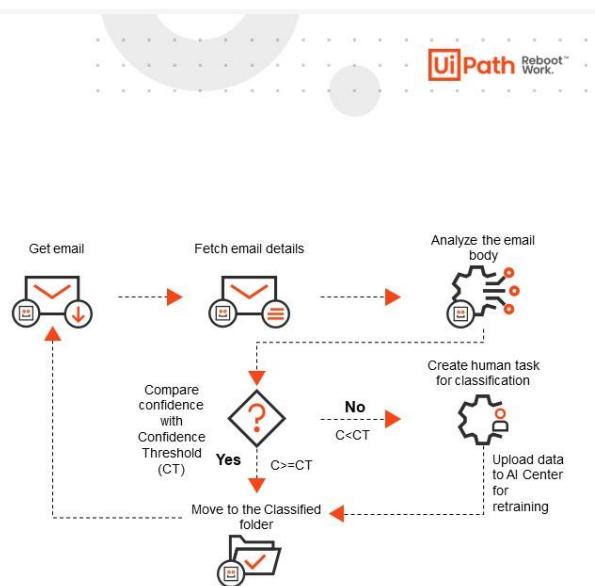
Email Body

The agency that keeps calling hangs up every time I answer our COMPANY TELEPHONE. I have called back due to our caller ID and it turns out to be a credit card company who keeps calling for XXXX of our FORMER employees which I have stated to them. They tell me they will remove our number and do not do it. This is becoming a problem because they will not stop HARRASING us.

Suggested

- Debt collection
- Classes list

Submit

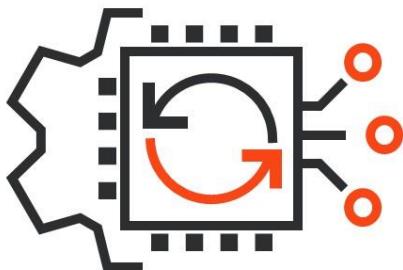


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Orchestration Process Overview

Orchestration Process Overview

- Automating company-wide processes often needs a combination of long-running workflows for ensuring context persistence, invoking different services, and adding humans to the loop.
- These elements are coordinated using business rules and conditions and execution monitoring also becomes indispensable. An orchestration process fulfills both the purposes.
- Long-running workflows are master projects that support service orchestration, human intervention, and long-running transactions in unattended environments.
- Human intervention plays a major role when certain processes require human input to handle exceptions, approvals, or validation before proceeding to the next step in the activity.
- Here, the process execution is suspended to free up robots until the human task is completed.



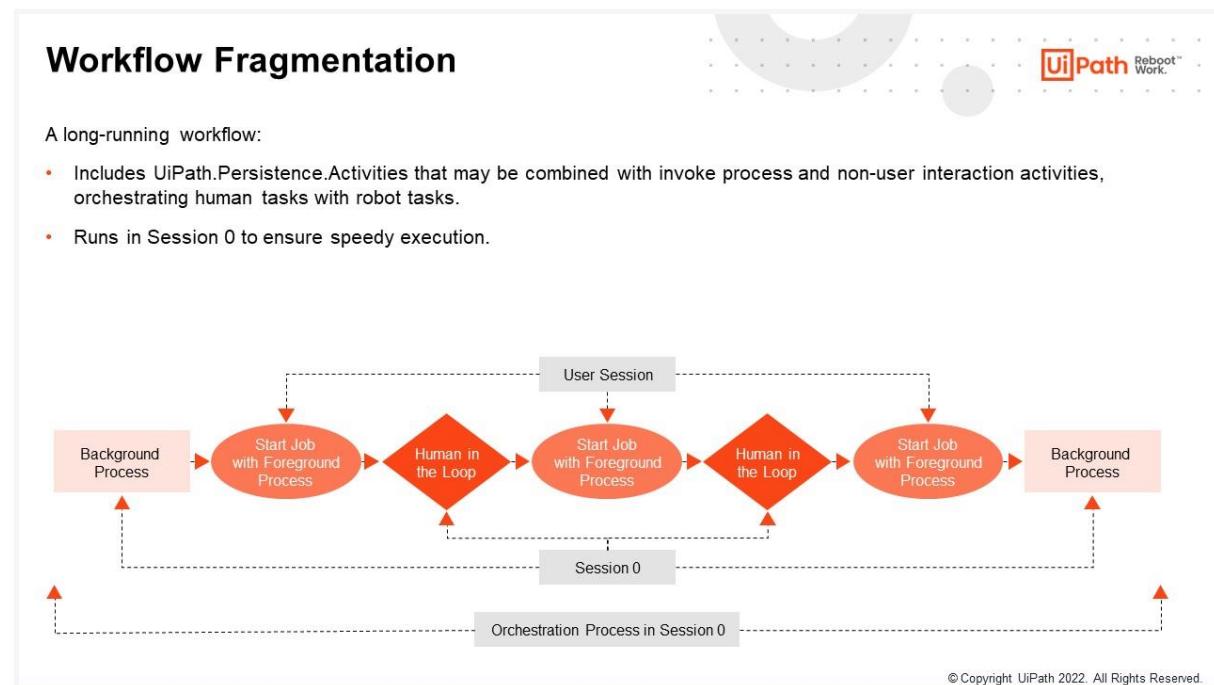
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Automating company-wide processes often needs a combination of long-running workflows for ensuring context persistence, invoking different services, and adding humans to the loop. These elements are coordinated using business rules and conditions and execution monitoring also becomes indispensable.

An orchestration process fulfills both the purposes. Long-running workflows are master projects that support service orchestration, human intervention, and long-running transactions in unattended environments.

Human intervention plays a major role when certain processes require human input to handle exceptions, approvals, or validation before proceeding to the next step in the activity. Here, the process execution is suspended to free up robots until the human task is completed.

Workflow Fragmentation



A long-running workflow:

- Includes UiPath.Persistence.Activities that may be combined with invoke process and non-user interaction activities, orchestrating human tasks with robot tasks.
- Runs in Session 0 to ensure speedy execution.

Note: Debugging of an orchestration process is done in a user session.

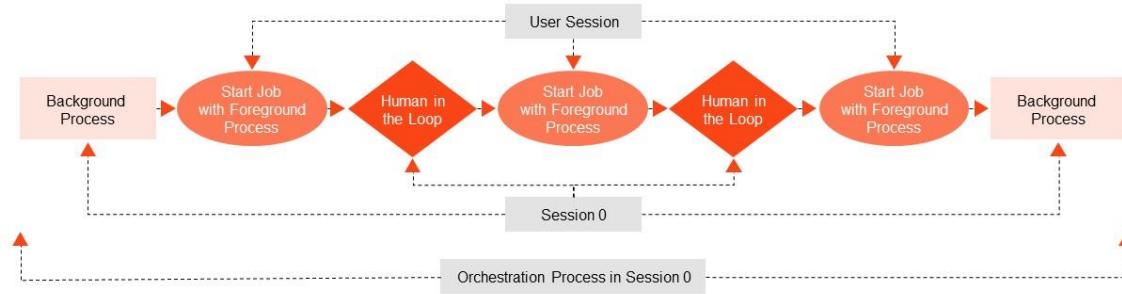
Workflow Fragmentation (Cont'd)

Workflow Fragmentation (Cont'd)



Long-running workflows may orchestrate:

- **Background processes:** It contains activities to perform Application Programming Interface (API) calls and runs in Session 0. They can be invoked using the Invoke Process activity.
- **UI:** It is a process with user interaction activities called by the Start Job from Orchestrator activity and running in a user session.
- **Human in the loop:** The user interacts through tasks that require forms to be completed in Orchestrator. It implies the usage of the Create Form Task activity paired with the Wait for Form Task and Resume activity.



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Orchestration Process Template

Orchestration Process Template

It is essential to create long-running workflows using the new Orchestration Process template. Following are the steps to create an orchestration process project using the orchestration process template:

1. Open Studio.
2. In its Home Backstage view, click **Orchestration Process**. The New Orchestration Process dialog is displayed.
3. In the New Orchestration Process dialog:
 - i. In the Name field, type a suitable project name.
 - ii. In the Description field, type a project description.
4. Click **Create**. The new orchestration process project is created with the default `UiPath.Persistence.Activities` and `UiPath.System.Activities` dependencies in a flowchart workflow type.

The screenshot shows the UiPath Studio interface. At the top, there's a navigation bar with icons for Home, Studio, Projects, and Help. Below it is a search bar labeled 'Search project (Ctrl+Alt+P)'. The main area has a title bar 'New Orchestration Process' with a close button. The content area is titled 'New Orchestration Process' with the sub-instruction 'Implement a process through service orchestration and human intervention as well as through long-running transactions.' Below this are three input fields: 'Name' (containing 'OrchestrationProcess'), 'Location' (containing 'C:\Users\username\Documents\UiPath'), and 'Description' (containing 'Orchestration Process'). At the bottom right of the dialog is a 'Create' button. To the right of the dialog is the 'Project' sidebar, which shows a tree structure for the project 'QuotationsApproval_OrchestrationProcess'. The tree includes 'Dependencies' (with entries for 'UiPath.Persistence.Activities = 1.0.1' and 'UiPath.System.Activities = 19.10.1'), '.settings', 'Main.xaml', and 'project.json'. At the bottom right of the interface is a copyright notice: '© Copyright UiPath 2022. All Rights Reserved.'

It is essential to create long-running workflows using the new Orchestration Process template. Following are the steps to create an orchestration process project using the orchestration process template:

1. Open Studio.
2. In its Home Backstage view, click **Orchestration Process**. The New Orchestration Process dialog is displayed.
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 - i. In the Name field, type a suitable project name.
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4. Click **Create**. The new orchestration process project is created with the default `UiPath.Persistence.Activities` and `UiPath.System.Activities` dependencies in a flowchart workflow type.

Orchestration Process Template: Parameters

Orchestration Process Template: Parameters

Following are a couple of parameters in the template's project.json file that need to be considered for smooth execution of the process:

- The `requiresUserInteraction: false` parameter indicates that the workflow does not contain user interaction activities, like a background process.
- The `supportsPersistence: true` parameter indicates that the process execution resumes upon task completion.

It is a best practice to NOT modify parameters manually in the project.json file.

```
"webServices": [],
"schemaVersion": "4.0",
"studioVersion": "19.10.1.0",
"projectVersion": "1.0.0",
"runtimeOptions": {
  "autoDispose": false,
  "isPausable": true,
  "requiresUserInteraction": false,
  "supportsPersistence": true,
  "excludedLoggedData": [
    "Private:*",
    "*password"
  ],
  "executionType": "Workflow"
}
```



To turn a process into an orchestration process, in the Project Settings dialog, enable the **Supports Persistence** toggle button.

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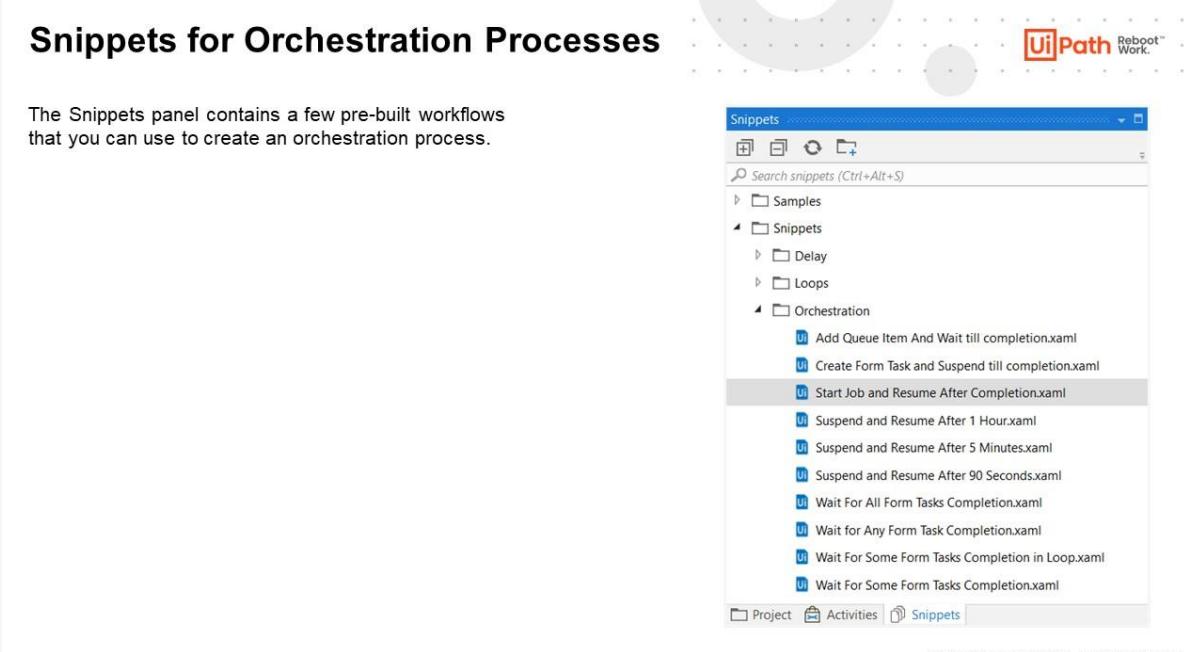
Following are a couple of parameters in the template's project.json file that need to be considered for smooth execution of the process:

- The `requiresUserInteraction: false` parameter indicates that the workflow does not contain user interaction activities, like a background process.
- The `supportsPersistence: true` parameter indicates that the process execution resumes upon task completion.:

It is a best practice to NOT modify parameters manually in the project.json file.

Note: To turn a process into an orchestration process, in the Project Settings dialog, enable the **Supports Persistence** toggle button.

Snippets for Orchestration Processes



The Snippets panel contains a few pre-built workflows that you can use to create an orchestration process.

The screenshot shows the UiPath Studio interface with the Snippets panel open. The panel title is "Snippets". It includes a search bar with the placeholder "Search snippets (Ctrl+Alt+S)". Below the search bar is a tree view of snippet categories: "Samples" (expanded), "Snippets" (expanded), and "Orchestration" (expanded). Under "Orchestration", there are ten workflow snippets listed:

- Add Queue Item And Wait till completion.xaml
- Create Form Task and Suspend till completion.xaml
- Start Job and Resume After Completion.xaml** (highlighted)
- Suspend and Resume After 1 Hour.xaml
- Suspend and Resume After 5 Minutes.xaml
- Suspend and Resume After 90 Seconds.xaml
- Wait For All Form Tasks Completion.xaml
- Wait for Any Form Task Completion.xaml
- Wait For Some Form Tasks Completion in Loop.xaml
- Wait For Some Form Tasks Completion.xaml

At the bottom of the Snippets panel, there are three tabs: "Project", "Activities", and "Snippets", with "Snippets" being the active tab. The footer of the interface includes the "UiPath Reboot Work." logo and the copyright notice "© Copyright UiPath 2022. All Rights Reserved."

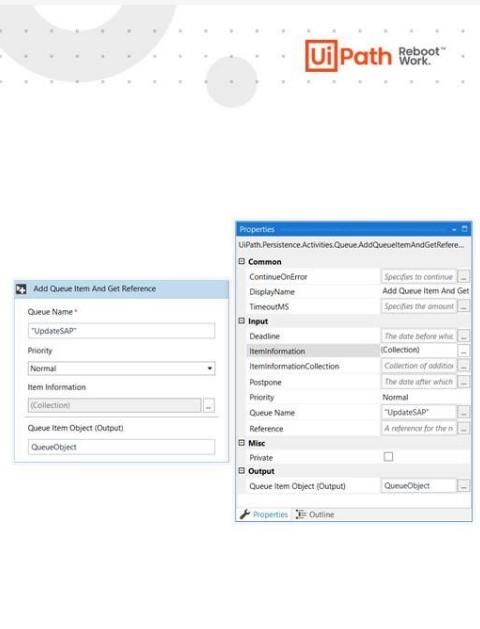
The Snippets panel contains a few pre-built workflows that you can use to create an orchestration process.

Building an Orchestration Process

Building an Orchestration Process

Following are the steps to pair queues, jobs, and tasks long-running activities as a part of the `UiPath.Persistence.Activities` package and build your own orchestration process:

1. To add an Orchestrator queue item to wait for a transaction to complete during the workflow execution, from the Activities panel, search and drag the **Add Queue Item And Get Reference** activity and drop it into the workflow.
2. Configure the activity with the help of the following steps:
 - i. In the Queue Name field, type a suitable queue variable name in quotes. This is where the QueueItem object is to be added (mandatory).
 - ii. From the Priority drop-down list, select a suitable priority level of the queue item that is added.
 - iii. To specify a collection of additional information about the specific QueueItem to be added, next to the Item Information field, click the horizontal ellipsis menu and provide the desired information.
 - iv. In the Queue Item Object (Output) field, type the name of a variable, which is of type, QueueItemData. This variable will be returned from Orchestrator as a QueueItemData object after the queue is created and will be then passed to the Wait for Queue Item and Resume activity.



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Following are the steps to pair queues, jobs, and tasks long-running activities as a part of the `UiPath.Persistence.Activities` package and build your own orchestration process:

1. To add an Orchestrator queue item to wait for a transaction to complete during the workflow execution, from the Activities panel, search and drag the **Add Queue Item And Get Reference** activity and drop it into the workflow.
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 - iv. In the Queue Item Object (Output) field, type the name of a variable, which is of type, QueueItemData. This variable will be returned from Orchestrator as a QueueItemData object after the queue is created and will be then passed to the Wait for Queue Item and Resume activity.

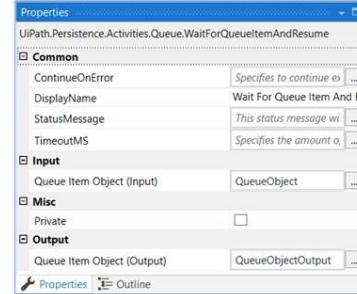
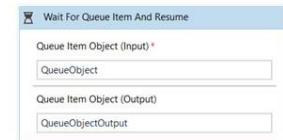
Note: When the queue item is processed, arguments provided in the Item Information field are assigned back to the mapped workflow variables if this activity is paired with Wait for Queue Item and Resume activity.

Building an Orchestration Process (Cont'd)

Building an Orchestration Process (Cont'd)

Following are the steps to pair queues, jobs, and tasks long-running activities as a part of the `UiPath.Persistence.Activities` package and build your own orchestration process:

3. To suspend the execution of the current workflow until the specified transaction is completed before proceeding to the next step in the process, below the Add Queue Item And Get Reference activity in the workflow, add the Wait For Queue Item And Resume activity.
4. Configure the activity with the help of the following steps:
 - i. In the Queue Item Object (Input) field, type the name of the variable, which was set as the value of the Queue Item Object (Output) field in the Add Queue Item and Get Reference activity (mandatory).
 - ii. In the Queue Item Object (Output) field, type the name of the variable, which is of type, `QueueItemData`. This variable will store the updated queue object received from Orchestrator once the queue item is processed.



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It is essential to pair the Add Queue Item And Get Reference activity with the Wait For Queue Item And Resume activity. Following are the steps for pairing the same:

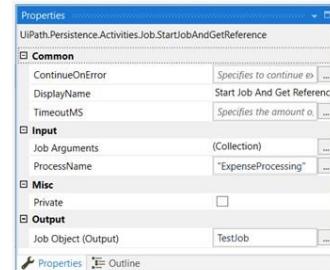
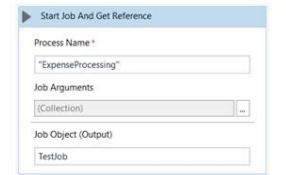
3. To suspend the execution of the current workflow until the specified transaction is completed before proceeding to the next step in the process, below the Add Queue Item And Get Reference activity in the workflow, add the Wait For Queue Item And Resume activity.
4. Configure the activity with the help of the following steps:
 - i. In the Queue Item Object (Input) field, type the name of the variable, which was set as the value of the Queue Item Object (Output) field in the Add Queue Item and Get Reference activity (mandatory).
 - ii. In the Queue Item Object (Output) field, type the name of the variable, which is of type, `QueueItemData`. This variable will store the updated queue object received from Orchestrator once the queue item is processed.

Building an Orchestration Process (Cont'd)

Building an Orchestration Process (Cont'd)

Following are the steps to pair queues, jobs, and tasks long-running activities as a part of the `UiPath.Persistence.Activities` package and build your own orchestration process:

5. To start a job in Orchestrator and fetch the corresponding job object to wait for job completion during the workflow execution, add the Start Job And Get Reference activity to the workflow.
6. Configure the activity with the help of the following steps:
 - i. In the Process Name field, type a suitable name of the job that you want to start (mandatory), in quotes.
 - ii. To specify a collection of additional information about the job, next to the Job Arguments field, click the horizontal ellipsis menu and provide the desired information.
 - iii. In the Job Object (Output) field, type the name of a job object that will be returned from Orchestrator as a `JobData` object after the task is created. This object will be then passed to the Wait for Job and Resume activity.



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5. To start a job in Orchestrator and fetch the corresponding job object to wait for job completion during the workflow execution, add the Start Job And Get Reference activity to the workflow.
6. Configure the activity with the help of the following steps:
 - i. In the Process Name field, type a suitable name of the job that you want to start (mandatory), in quotes.
 - ii. To specify a collection of additional information about the job, next to the Job Arguments field, click the horizontal ellipsis menu and provide the desired information.
 - iii. In the Job Object (Output) field, type the name of a job object that will be returned from Orchestrator as a `JobData` object after the task is created. This object will be then passed to the Wait for Job and Resume activity.

Note:

- If your workflow uses this activity to invoke another workflow, it is mandatory for the robot to be connected to Orchestrator, and that the robot needs to have View permissions on Processes and Environments, and View, Edit, and Create permissions on jobs.

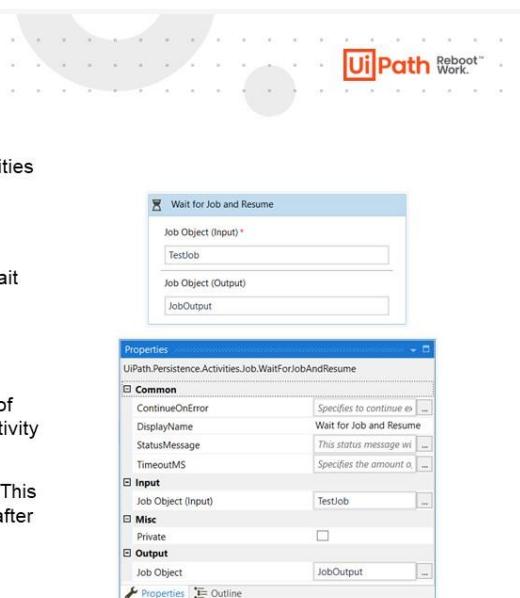
- After execution, the modified arguments are then mapped back to the workflow variables if this activity is paired with Wait for Job and Resume activity.

Building an Orchestration Process (Cont'd)

Building an Orchestration Process (Cont'd)

Following are the steps to pair queues, jobs, and tasks long-running activities as a part of the `UiPath.Persistence.Activities` package and build your own orchestration process:

7. To temporarily suspend the current process until the reference job is completed, below the Start Job And Get Reference activity, add the Wait for Job and Resume activity.
8. Configure the activity with the help of the following steps:
 - i. To identify the job this activity is waiting to be completed, in the Job Object (Input) field, type the job object, which was set as the value of the Job Object (Output) field in the Start Job And Get Reference activity (mandatory).
 - ii. In the Job Object (Output) field, type the name of a job data object. This object will store the updated job object received from Orchestrator after this activity is executed.



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It is essential to pair the Start Job And Get Reference activity with the Wait for Job and Resume activity. Following are the steps for pairing the same:

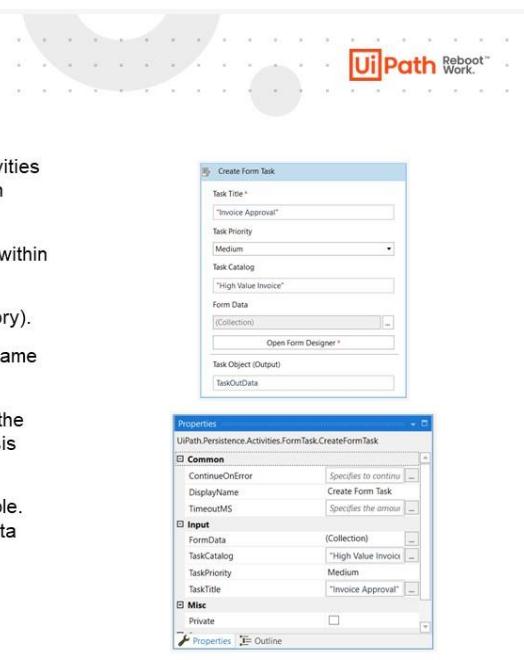
6. To temporarily suspend the current process until the reference job is completed, below the Start Job And Get Reference activity, add the Wait for Job and Resume activity.
7. Configure the activity with the help of the following steps:
 - i. To identify the job this activity is waiting to be completed, in the Job Object (Input) field, type the job object, which was set as the value of the Job Object (Output) field in the Start Job And Get Reference activity (mandatory).
 - ii. In the Job Object (Output) field, type the name of a job data object. This object will store the updated job object received from Orchestrator after this activity is executed.

Building an Orchestration Process (Cont'd)

Building an Orchestration Process (Cont'd)

Following are the steps to pair queues, jobs, and tasks long-running activities as a part of the `UiPath.Persistence.Activities` package and build your own orchestration process:

9. To create a task with form-based visualization for human interactions within a workflow, add the Create Form Task activity to the workflow.
 - i. In the Task Title field, type a suitable task name in quotes (mandatory).
 - ii. In the Task Catalog field, type the optional business classification name of task items, in quotes.
 - iii. To specify a collection of business data that you want to display in the form as fields, next to the Form Data field, click the horizontal ellipsis menu and provide the desired data.
 - iv. In the Task Object (Output) field, type the name of a suitable variable. This variable will be returned from Orchestrator as a Form Task Data object once the task is created.
 - v. To edit the form, click **Open Form Designer**.



9. To create a task with form-based visualization for human interactions within a workflow, add the Create Form Task activity to the workflow.
 - i. In the Task Title field, type a suitable task name in quotes (mandatory).
 - ii. In the Task Catalog field, type the optional business classification name of task items, in quotes.
 - iii. To specify a collection of business data that you want to display in the form as fields, next to the Form Data field, click the horizontal ellipsis menu and provide the desired data.
 - iv. In the Task Object (Output) field, type the name of a suitable variable. This variable will be returned from Orchestrator as a Form Task Data object once the task is created.
 - v. To edit the form, click **Open Form Designer**.

Note:

- A form with the relevant workflow context is presented to users for decision-making and other scenarios.
- To enable the Form Designer in this activity, you must install the `UiPath.FormActivityLibrary` package.

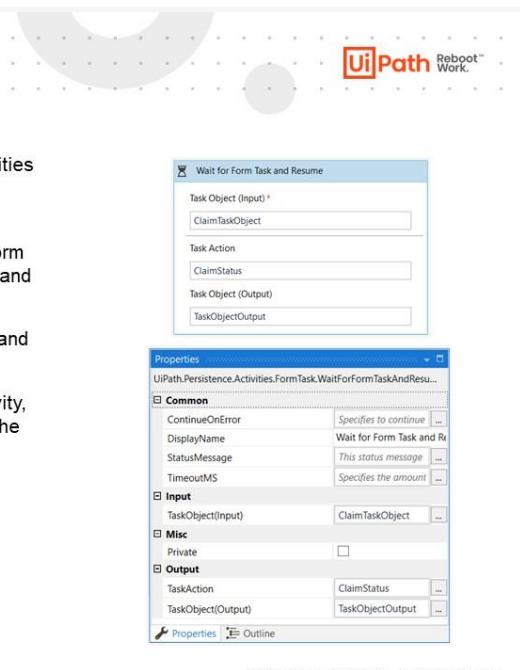
- When using a Studio version starting with 2021.4 with UiPath.Persistence.Activities and UiPath.FormActivityLibrary versions prior to 1.2.1, the Form Designer window does not hold focus and you can interact with Studio when the Form Designer window is open. To avoid this issue, make sure to update the packages to the latest version

Building an Orchestration Process (Cont'd)

Building an Orchestration Process (Cont'd)

Following are the steps to pair queues, jobs, and tasks long-running activities as a part of the `UiPath.Persistence.Activities` package and build your own orchestration process:

10. To suspend the execution of the current workflow until the specified form action is completed in Orchestrator, configure the Wait for Form Task and Resume activity.
11. To suspend the workflow execution and resume it at a specified date and time, configure the Resume After Delay activity.
12. Execute the workflow. Whenever Robot executes a long-running activity, Studio enters the read-only state with the Resume option enabled in the ribbon.
13. Complete the underlying task, queue item, or job.
14. Click **Resume**.



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10. To suspend the execution of the current workflow until the specified form action is completed in Orchestrator, configure the Wait for Form Task and Resume activity.
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12. Execute the workflow. Whenever Robot executes a long-running activity, Studio enters the read-only state with the Resume option enabled in the ribbon.
13. Complete the underlying task, queue item, or job.
14. Click **Resume**.

Best Practices

Best Practices



Here are some best practices to follow when executing an orchestration process:

- Long-running activities (Wait and Resume activities) part of the `UiPath.Persistence.Activities` package can only be used in an orchestration process entry point, the file marked as `Main.xaml`.
- Reusable components built out of an orchestration process can only be referred within another orchestration process.
- If a long-running workflow is attached to queue processing and if the workflow is in a suspended state, the queue item will remain in an in-progress state even beyond 24 hours until the workflow sets the transaction status upon resumption. The queue item identifiers will be part of the persisted workflow context if they are included in the same scope as Wait and Resume activities.
- Persistence points (Wait and Resume activities) must not be used within the body of a For Each activity as they suspend the workflow after executing the first iteration and this might not be the desired behavior. Alternatively, use loops with persistence activities, example, the Parallel For Each activity. Note that, by default, the maximum number of resume triggers per job is limited to 1,000.
- The Delay and Retry Scope activities are not supported and do not work properly when used in the main workflow of an orchestration process. They should be placed inside a No Persist Scope activity in such cases.

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- The Delay and Retry Scope activities are not supported and do not work properly when used in the main workflow of an orchestration

process. They should be placed inside a No Persist Scope activity in such cases.

Best Practices

Best Practices



Here are some best practices to follow when executing an orchestration process:

- Long-running workflows can be resumed in any available robot of the same type as the one that suspended the job (for example, unattended or non-production) in the same environment or folder. Thus, the local resources required for execution must also be made available after persistence points.
- All variables used in the scope of a long-running activity must be serializable. Text, True or False, Number, Array, Date, and Time, Data Table, and GenericValue types of variables are all serializable.
- Variables used in scopes that do not contain long-running activities are not subjected to the serialization requirement, as the workflow does not get suspended in their scope. Non-serializable data types can be used in separate scopes in the same workflow or by invoking other files if they are between Wait and Resume activities, such as Wait for Job and Resume, Wait for Queue Item and Resume, and Wait for Form Task and Resume.
- Consider that some properties of objects generated by long-running activities cannot be evaluated in the Locals panel.
- Implement appropriate batching in workflows that expect a high number of actions per job. There is a default limit of 1,000 actions (or other job triggers) that a job can wait for at a time.

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- Long-running workflows can be resumed in any available robot of the same type as the one that suspended the job (for example, unattended or non-production) in the same environment or folder. Thus, the local resources required for execution must also be made available after persistence points.
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- Consider that some properties of objects generated by long-running activities cannot be evaluated in the Locals panel.
- Implement appropriate batching in workflows that expect a high number of actions per job. There is a default limit of 1,000 actions (or other job triggers) that a job can wait for at a time.

Knowledge Checks

Knowledge Checks



Knowledge Check 1

Knowledge Check 1

01/05

1. Match the following AI Center descriptions with the correct phases.

Phase	Description
<input type="checkbox"/> Deploy	To make cognitive decision in an automation process.
<input type="checkbox"/> Consume	To monitor the ML skills.
<input type="checkbox"/> Manage	To train using human validated data.
<input type="checkbox"/> Create	To add a model and transform it as a ML package.

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Knowledge Check 2

Knowledge Check 2

02/05



2. It is important to send data from the process to a given dataset. Which of the following activity packages includes an activity for this purpose?

- UiPath.Persistence.Activities
- UiPath.MLServices.Activities
- UiPath.System.Activities
- UiPath.UIAutomation.Activities

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Knowledge Check 3

Knowledge Check 3

03/05

3. Which of the following packages contains a long-running workflow that can be combined with invoke process and non-user interaction activities?

- UiPath.Persistence.Activities
- UiPath.MLServices.Activities
- UiPath.System.Activities
- UiPath.UIAutomation.Activities



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Knowledge Check 4

Knowledge Check 4

04/05

4. Based on UiPath best practices, which of these activities must never be present in the main workflow of an Orchestrator process (Choose two)?

- Wait
- Resume
- Delay
- Retry Scope
- Wait for Job and Resume



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Knowledge Check 5

Knowledge Check 5

05/05

5. Which of the following activities should the Wait for Job and Resume activity be paired with?

- Wait for Queue Item and Resume
- Start Job and Get Reference
- Add Queue Item and Get Reference
- Create Form Task



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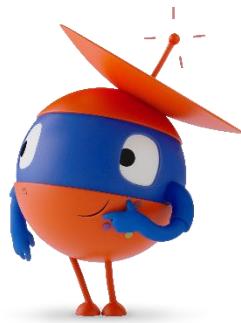
Key Takeaways

Key Takeaways

- UiPath Action Center is used for sending feedback from the process to the ML model.
- Deploy, consume, manage, and improve are the four phases in AI Center.
- Long-running workflows require actions to be performed by users before proceeding to the next step.
- The `UiPath.Persistence.Activities` are combined with invoked processes and non-user interaction activities to orchestrate human tasks with robot tasks in long-run workflows.

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M5 - AI Center Main Concepts – Focus on Custom Machine Learning Models



Welcome

UiPath AI Center Training

M5 | AI Center Main Concepts –
Focus on Custom Machine
Learning Models



Welcome to Module 5! In this module, you will learn about custom Machine Learning (ML) packages and their types, building custom ML models, and ensuring their version control.

Lessons Covered in This Module

About This Module | M5 | AI Center Main Concepts – Focus on Custom Machine Learning Models



Lessons covered in this module

- Lesson 1: Custom ML Packages
- Lesson 2: Building Your Own Custom ML Models
- Lesson 3: ML Models Version Control

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This module is divided into three foundation lessons namely, Custom ML Packages, Building Your Own Custom ML Models, and ML Models Version Control.

Learning Objectives

About This Module | M5 | AI Center Main Concepts – Focus on Custom Machine Learning Models



Learning objectives

- Define a custom-built ML package.
- Identify the two types of ML packages.
- Describe the structure of an ML package.
- Identify the input types of ML packages.
- Describe how to upload a custom-built ML package in UiPath AI Center.
- Describe how to deploy a model as ML skill in UiPath AI Center.
- Comprehend how the version of an ML package changes in UiPath AI Center.

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Lesson 1: Custom ML Packages

Custom ML Packages

M5 | L1



Lesson 1 focuses on the custom ML packages, their types, and their components.

What Is a Custom ML Package?

A custom-built ML package contains all the code and metadata needed to train and serve an ML model. You can upload a custom-built ML package as a zip.

Name	Description	Status	Modified Date	Modified By
ML_TC_Pk	This is the preview version of a generic, retrai...	Undeployed	2022-05-24 12:45 am	[Redacted]
ML_TC_Pk	Package description	Deployed	2022-05-31 01:14 am	[Redacted]
ML_CC_Pk	This is the preview version of a generic, retrai...	Deployed	2022-05-16 09:36 am	[Redacted]
ML_SA_Pk	This model was open sourced by Facebook Resear...	Deployed	2022-05-15 11:04 pm	[Redacted]

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- As a data scientist, you can build and deploy your own ML models on AI Center.
- A custom-built ML package contains all the code and metadata needed to train and serve an ML model.
- You can upload a custom-built ML package as a zip. To do so:
 - In AI Center, navigate to the Dashboard page of a suitable project.
 - In the left navigation bar, click **ML Packages**. The Create a new package page is displayed on the right side.
 - On the Create a new package page, select the **Upload zip file** card.

Types of ML Packages

Types of ML Packages

An ML package must adhere to a small set of requirements. Requirements are separated into components needed for serving a model (serving components) and training a model (training components). This results in two types of ML packages that you can upload.



Not Retrainable ML Package

- For serving only
- Deployable as an ML skill

Retrainable ML Package

- For both serving and training purposes
- Possible to run pipelines on top of this package and deploy it as an ML skill

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- An ML package must adhere to a small set of requirements.
- Requirements are separated into components needed for serving a model (serving components) and components needed for training a model (training components). This results in two types of ML packages that you can upload, which are as follows:
 - **Not Retrainable:** Is used for serving only, meaning you can only deploy the model as an ML skill.
 - **Retrainable:** Is used both for serving as well as training purposes, meaning you can run pipelines on top of such an ML package, as well as deploy it as an ML skill.

Structure of an ML Package

Structure of an ML Package

An ML package, at minimum, must have three components.



MLPackage1

main.py

Folder and main.py at its root

```
class Main:
    def __init__(self):
        pass

    def predict(self, json_df):
        pass
```

File main.py with the *Main* class implementing *__init__()* to load the model and *predict()* to help during serving



requirements.txt

File requirements.txt with dependencies to run the model

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- An ML package, at minimum, must provide the following components:
 - A folder containing a main.py file at root of the folder
 - A class called *Main* in main.py that implements at least two functions:
 - ***__init__(self)***: Takes no argument and loads your model and/or data for the model (for example, word embeddings).
 - ***predict(self, input)***: Is run at the model serving time.
 - A file named requirements.txt with dependencies needed to run the model
- If the ML package is not retrainable, then it must also have the model's state on which the predictions will be made (for example, joblib or pickle file). If it is retrainable and only contains the training component, then that file can be missing. If it also contains the serving component, the initial state must also be present.

ML Package: Serving Component

ML Package: Serving Component

The serving component of an ML package can be thought of as the model at inference time. That is, at serving time, a container image is created using the provided requirements.txt file and the *predict()* function is used as the endpoint to the model.



File requirements.txt with dependencies to run the model

```
class Main:  
    def __init__(self):  
  
    def predict(self, json_df):
```

File main.py with the *Main* class implementing *_init_()* to load the model and *predict()* to help during serving

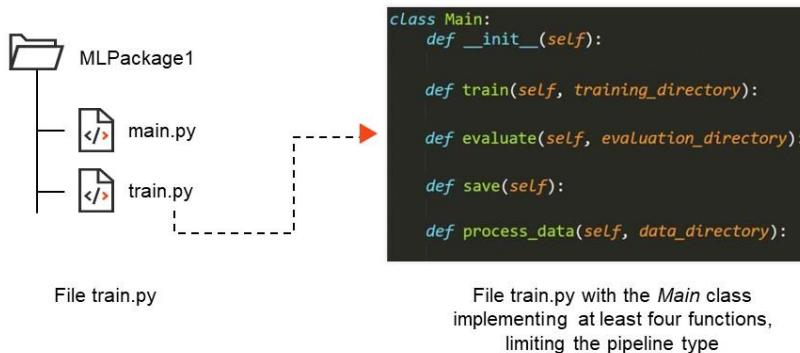
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The serving component of an ML package can be thought of as the model at inference time. That is, at serving time, a container image will be created using the provided requirements.txt file and the *predict()* function will be used as the endpoint to the model.

ML Package: Training and Evaluation Component

ML Package: Training and Evaluation Component

In addition to inference, an ML package can optionally be used to train an ML model. This is done by adding the train.py file in the same root folder.



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In addition to inference, an ML package can optionally be used to train an ML model. This is done by adding the train.py file in the same root folder. In this file, you need to define the *Main* class that implements at least four functions apart from the *__init__()* function. Except for *__init__()*, all these functions are optional but will limit the type of pipeline that can be run with the corresponding ML package.

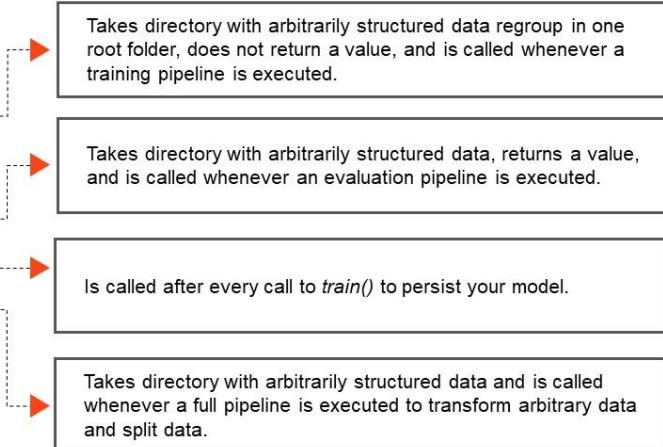
ML Package: Training and Evaluation Component (Cont'd)

ML Package: Training and Evaluation Component (Cont'd)



In addition to inference, an ML package can optionally be used to train an ML model. This is done by adding the `train.py` file in the same root folder.

```
class Main:
    def __init__(self):
        ...
    def train(self, training_directory):
        ...
    def evaluate(self, evaluation_directory):
        ...
    def save(self):
        ...
    def process_data(self, data_directory):
```



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- The `train()` function takes directory with arbitrarily structured data regroup in one root folder, does not return a value, and is called whenever a training pipeline is executed. Specifically, any data saved to the path pointed to by the environment variable, `training_data_directory`, will be the input to the `train()` function.
- The `evaluate()` function takes directory with arbitrarily structured data, returns a value, and is called whenever an evaluation pipeline is executed. Specifically, any data saved to the path pointed to by the environment variable, `evaluation_data_directory`, will be the input to the `evaluate()` function.
- The `save()` function takes no argument and is called after every call to `train()` to persist your model.
- The `process_data()` function takes a directory with arbitrarily structured and is called only when a full pipeline is executed. In the execution of this pipeline, the function can perform arbitrary data transforms and can split data.

Example: Churn Prediction

Example: Churn Prediction

- Customer retention is a top priority for many businesses, as acquiring new customers can be more expensive than retaining the existing ones.
- In this context, gaining an understanding of the causes of churning and estimating the risk associated with the individual ones are powerful reasons for designing a data-driven retention strategy.
- A churn model can be the tool to bring these elements together, providing insights and outputs that drive decision making across an organization.



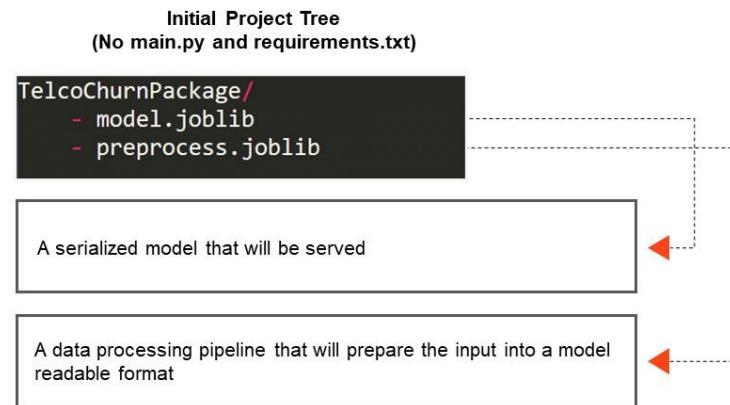
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Let's comprehend the application of a ML model for serving and training purposes for predicting the churn rate of customers. Customer retention is a top priority for many businesses, as acquiring new customers can be more expensive than retaining the existing ones. In this context, gaining an understanding of the causes of churning and estimating the risk associated with the individual ones are powerful reasons for designing a data-driven retention strategy. A churn model can be the tool to bring these elements together, providing insights and outputs that drive decision making across an organization.

Example: ML Model for Serving (Not Retrainable)

Example: ML Model for Serving (Not Retrainable)

In the example of customer churn prediction, the business problem does not call for model retraining. Thus, the ML package must contain a serialized model and a data processing pipeline prior to having main.py and requirements.txt.



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- In the example of customer churn prediction, the business problem does not call for model retraining.
- Thus, before adding main.py and requirements.txt files, the ready-to-serve ML package must contain the:
 - Serialized model, model.joblib, that will be served.
 - Data processing pipeline, preprocess.joblib, that will prepare the input into a model readable format.

Example: ML Model for Serving (Not Retrainable) (Cont'd)

Example: ML Model for Serving (Not Retrainable) (Cont'd)

To make the ML model ready to serve, you need to add main.py and requirements.txt file to the project's root folder.

```
import pandas as pd
from joblib import load
import json

class Main:
    def __init__(self):
        self.preprocess = load('model/preprocess.joblib')
        self.model = load('model/model.joblib')

    def predict(self, json_df):
        df = pd.read_json(json_df, orient='records')

        preprocessed_df = self.preprocess.transform(df.copy())
        prediction_tuples = self.model.predict_proba(preprocessed_df)

        return json.dumps(prediction_tuples.tolist())
```

Sample main.py

+
joblib==0.14.1
pandas==1.0.3
json5==0.9.4
jsonschema==3.2.0

Sample requirements.txt

=
TelcoChurnPackage/
- model.joblib
- preprocess.joblib
- main.py
- requirements.txt

Final Folder

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To make the ML model ready to serve, you need to add main.py and requirements.txt file to the project's root folder.

Example: ML Model with Training Enabled

Example: ML Model with Training Enabled

```

train.py
from sklearn.linear_model import LogisticRegression
from sklearn.model_selection import train_test_split
from joblib import load
import pandas as pd
import joblib

class Main:
    def __init__(self):
        self.cur_dir = os.path.dirname(os.path.abspath(__file__))
        self.target_col = 'churn'
        self.model_name = 'model/preprocess.joblib'
        self.model = load(self.model.joblib)

    def train(self, training_directory):
        X_train, y_train = self.read_data(training_directory)
        X_train = self.preprocess.transform(X_train)
        y_train = self.train_encode(['yes', 'no'])

        self.model = self.model.fit(X_train, y_train)
        self.model_file_path = "model/train.joblib"
        return self.model

    def evaluate(self, evolution_directory):
        X_train, y_train = self.read_data(evolution_directory)
        X_test = self.preprocess.transform(X_test)
        y_test = y_test.map({'yes': 1, 'no': 0})

        y_pred = self.model.predict(X_test)
        print(f'Accuracy: {y_pred.equals(y_test)}')

    def save(self):
        joblib.dump(self.model, self.model.joblib)

    def process_data(self, data_directory):
        X, y = self.load_data(data_directory)
        X_train, y_train = self.train_encode(X, y)
        X_train = self.preprocess.fit_transform(X_train, columns=self.feature_columns)
        train_df = pd.DataFrame(X_train, columns=self.feature_columns)
        train_df.to_csv(os.path.join(self.cur_dir, data_directory, 'training', 'train.csv'), index=False)

        test_df = pd.DataFrame(X, columns=self.feature_columns)
        test_df.to_csv(os.path.join(self.cur_dir, data_directory, 'test', 'evaluate.csv'), index=False)
        test_df.to_csv(os.path.join(self.cur_dir, data_directory, 'test', 'evaluate.csv'), index=False)

    def load_data(self, data_directory):
        df_list = []
        for filename in os.listdir(os.path.join(self.cur_dir, data_directory)):
            if filename.endswith('.csv'):
                df_list.append(pd.read_csv(os.path.join(self.cur_dir, data_directory, filename), header=0, encoding='utf-8'))

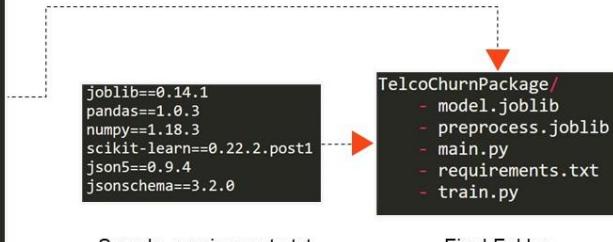
        df = pd.concat(df_list, axis=0)
        self.feature_columns = data.drop([self.target_col, axis=1]).columns
        X = data[self.feature_columns]
        y = data[self.target_col]

        return X, y

```

Sample train.py

In the example of customer churn prediction, the business problem may call for model retraining. It then becomes essential to build upon the serving-only ML package. In other words, you now need to add train.py and edit requirements.txt if needed.



Sample requirements.txt

Final Folder

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In the example of customer churn prediction, the business problem may call for model retraining. It then becomes essential to build upon the serving-only ML package. In other words, you now need to add train.py and edit requirements.txt if needed.

Note: This model can be first served. As new data points come into the system via a robot or a human in the loop, training and evaluation pipelines can be created leveraging train.py.

Data/Input Types of ML Packages

Data/Input Types of ML Packages



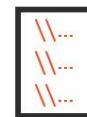
To make AI Center easier to use in an RPA workflow, an ML package can only have one of three data/input types. These high-level concepts are captured at ML package upload time.



JSON as a sequence of characters



File, informing the ML skill activity to expect a file path for sending the file to the *predict()* function



Files, informing the ML skill activity to expect a list of file paths



Details on handling these different types and code snippets are [here](#).

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- To make AI Center easier to use in an RPA workflow, an ML package can only have one of three data/input types. These high-level concepts are captured at ML package upload time. These data types are as follows:
 - **JSON:** Refers to a sequence of characters.
 - **File:** Informs the AI Center RPA workflow activity (ML skill activity) making calls to this model to expect a path to a file. Specifically, the ML skill activity will read the file from the file system and send the file to the *predict()* function as a serialized byte string. In effect, this is a convenient feature that the model uploader is giving to an RPA Developer. That is, the RPA Developer can now just pass a path to a file instead of having to read and serialize the file in the RPA workflow itself.
 - **Files:** Informs the AI Center that the ML skill activity making calls to this model to expect a list of file paths. Just as in the former case, the ML skill activity will read each file, serialize each file, and send a list of byte strings to the *predict()* function.

Note:

- For more details on handling these different types and code snippets, kindly visit <https://docs.uipath.com/ai-fabric/v0/docs/building-ml-packages>.

- Don't worry if you did not quite get this just yet; in the next lesson, you will get a sample to try.

Lesson 2: Building Your Own Custom ML Models

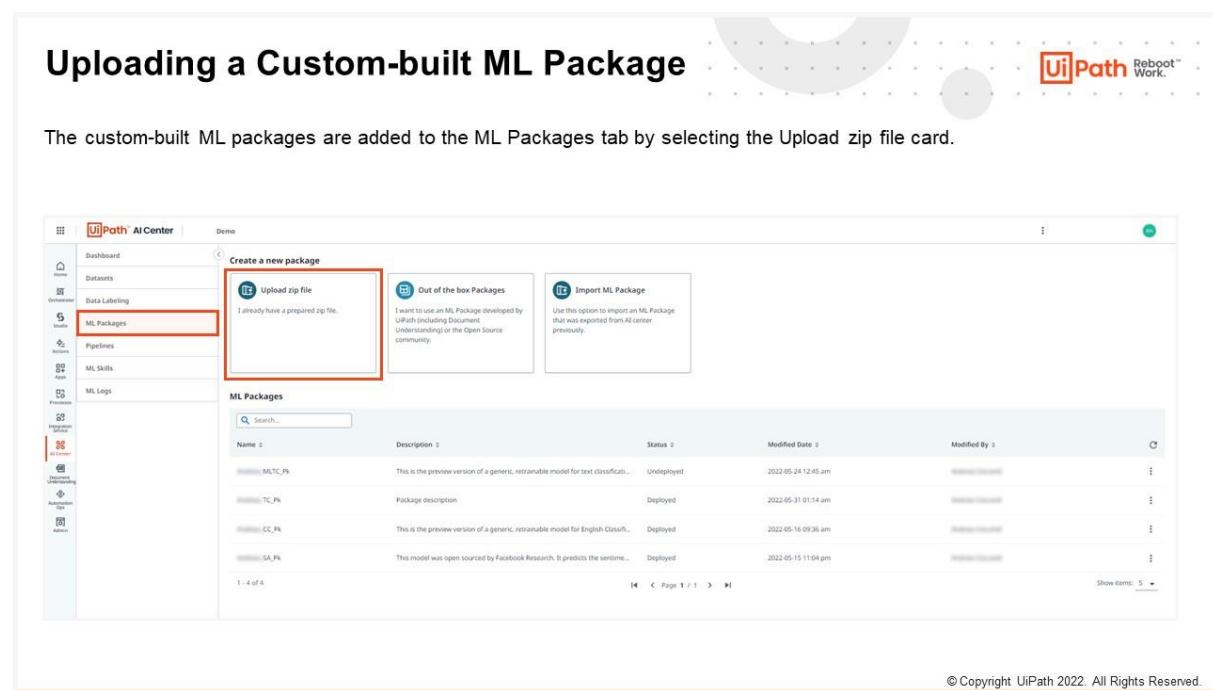
Building Your Own Custom ML Models

M5 | L2



Lesson 2 focuses on how to build custom ML models.

Uploading a Custom-built ML Package



The custom-built ML packages are added to the ML Packages tab by selecting the Upload zip file card.

The screenshot shows the 'ML Packages' tab selected in the sidebar. A red box highlights the 'Upload zip file' card under 'Create a new package'. The card contains the text: 'I already have a prepared zip file.' Below the card is a table listing four ML packages:

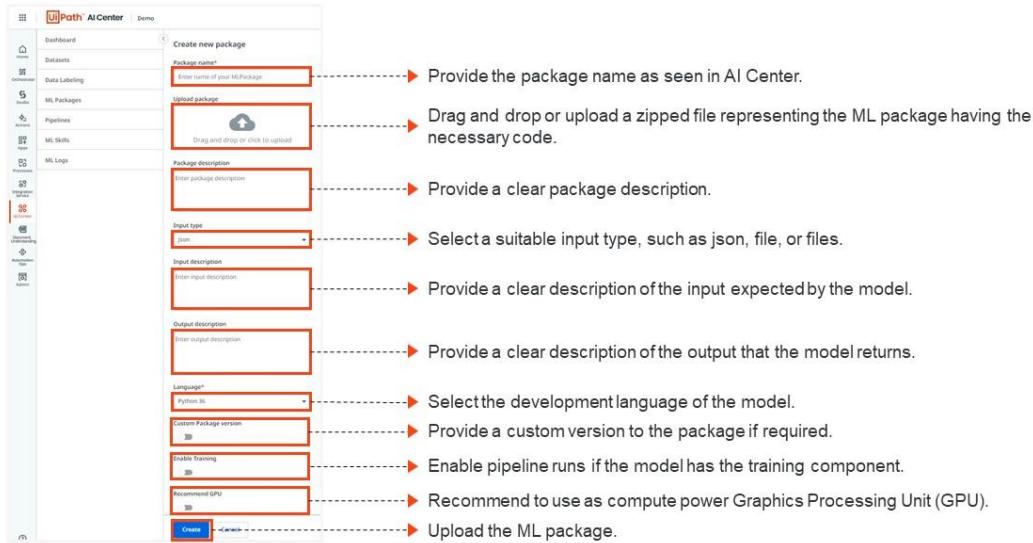
Name	Description	Status	Modified Date	Modified By
MLTC_PK	This is the preview version of a generic, retrainable model for text classificati...	Undeployed	2022-05-24 12:45 am	[Redacted]
TC_PK	Package description	Deployed	2022-05-31 01:14 am	[Redacted]
CC_PK	This is the preview version of a generic, retrainable model for English Classifi...	Deployed	2022-05-16 09:36 am	[Redacted]
SA_PK	This model was open sourced by Facebook Research. It predicts the sentime...	Deployed	2022-05-15 11:04 pm	[Redacted]

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The custom-built ML packages are added to the ML Packages tab by selecting the Upload zip file card. The ML Packages tab contains all the ML packages of the project.

Uploading a Custom-built ML Package (Cont'd)

Uploading a Custom-built ML Package (Cont'd)



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- Selecting the Upload zip file card opens the Create new package page, which has the following fields:
 - **Package name**: It is a required field asking for the package name as seen in AI Center.
 - **Upload package**: It is a required field asking to drag and drop or upload a zipped file representing the ML package having the necessary code (described in Lesson 1).
 - **Package description**: It is an optional field asking for a clear description of the package, including what it about and different options, so anyone who will see it will have a clear understanding of the model inside.
 - **Input type**: It is a required field asking for the input type, such as json, file, or files, with which the package is going to work with.
 - **Input description**: It is an optional field asking for a clear description of the input expected by the model. This description will be visible to the RPA Developers using the ML skill activity in UiPath Studio. As a good practice, it is recommended to show an example of the input format to facilitate communication between the data scientists and RPA Developers.
 - **Output description**: It is an optional field asking for a clear description of the output returned by the model. This description will be visible to the RPA Developers using the ML skill activity in

Studio. As a good practice, it is recommended to show an example of the output format to facilitate communication between the data scientists and RPA Developers.

- **Language:** It is a required field asking for the development language of the model. For now, the supported languages are Python 2.7, 3.6, and 3.7.
- **Custom Package version:** This field enables you to provide a custom version for your package, if selected.
- **Enable Training:** This field, if enabled, enables pipeline runs. This also means that you will have to structure the ML package with the training component.
- **Recommend GPU:** This field, if enabled, enables you to recommend to use as compute power Graphics Processing Unit (GPU) for this ML package.
- **Create:** This button, when clicked, uploads the ML package.

Serving: Package Validation

Serving: Package Validation

When a model is uploaded, AI Center validates the uploaded .zip file against the stated requirements. For all packages, three checks are performed.



MLPackage1



Non-empty root folder

```
joblib==0.14.1  
pandas==1.0.3  
json5==0.9.4  
jsonschema==3.2.0
```

Sample requirements.txt

```
class Main:  
    def __init__(self):  
  
        def predict(self, json_df):
```

File main.py with the *Main* class implementing *_init_()* and *predict()* functions

Success or failure, along with any errors that caused validation failure, is shown in ML logs.

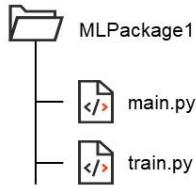
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- When a model is uploaded, AI Center validates the uploaded .zip file against the stated requirements.
- For all packages, the following three checks are performed:
 - A non-empty root folder exists.
 - A requirements.txt file exists.
 - A file named main.py exists in the root folder which implements the *Main* class. The class is further validated to implement the *_init_()* and *predict()* functions.
- Success or failure, along with any errors that caused validation failure, is shown in ML logs.

Training: Package Validation

Training: Package Validation

When a model is uploaded and it is indicated as retrainable, AI Center validates the uploaded .zip file against the stated requirements. For these packages, two checks are performed.



Non-empty root folder

```

class Main:
    def __init__(self):
        pass

    def train(self, training_directory):
        pass

    def evaluate(self, evaluation_directory):
        pass

    def save(self):
        pass

    def process_data(self, data_directory):
        pass
    
```

File train.py with the *Main* class implementing *__init__()* and other functions

Success or failure, along with any errors that caused validation failure, is shown in ML logs.

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- When a model is uploaded and it is indicated as retrainable, AI Center validates the uploaded .zip file against the stated requirements.
- For these packages, the following two checks are performed:
 - A non-empty root folder exists.
 - A file named train.py exists in the root folder, which implements the *Main* class. The class is further validated to implement the *__init__()* function and the subsequent functions (*train()*, *evaluate()*, *save()*).
- Success or failure, along with any errors that caused validation failure, is shown in ML logs.

Lab Exercise 2



Lab Exercise

M5 | L2



Refer to Lab Exercise 2 of Day 2 in the Lab Guide.

Lab Exercise 2 (20 Minutes)



Lab Exercise 2 (20 Minutes)

Use a custom ML model in AI Center

TelcoChurn.zip is a sample custom ML package for the churn model, which is ready to be used in AI Center. It is retrainable and offers an example on how to split data into training and testing in the `process_data()` function. In addition, it offers an example on saving artifacts to pipeline output. In this exercise:

1. Upload the re-trainable TelcoChurn.zip package to AI Center.
2. Deploy it as an ML skill in AI Center.

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Lab Exercise 3



Lab Exercise

M5 | L2



Refer to Lab Exercise 3 of Day 2 in the Lab Guide.

Lab Exercise 3 (40 Minutes)



Lab Exercise 3 (40 Minutes)

Retrain a model using a pipeline

Data.zip contains the following two datasets:

- Train.csv for training the model
- Test.csv for evaluating the model

In this exercise:

1. Create two folders in the Datasets tab and upload the respective files.
2. Create either a training pipeline or a full pipeline on top of these datasets.

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Lesson 3: ML Packages Version Control

ML Packages Version Control

M5 | L3

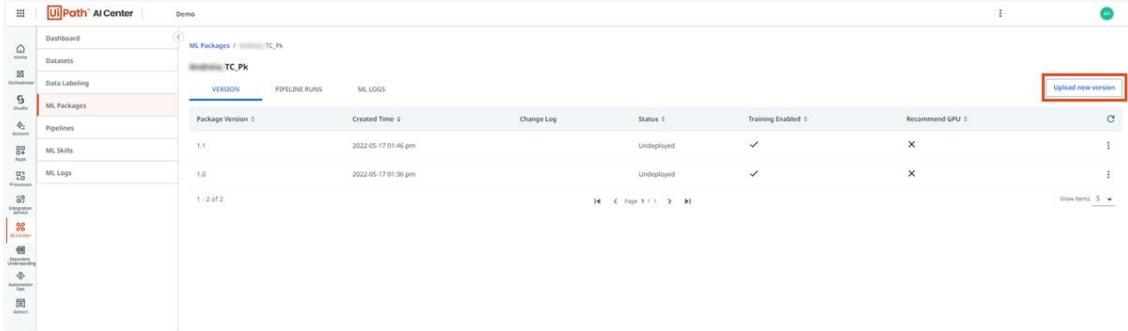


Lesson 3 focuses on the version management of ML packages.

Uploading a New ML Package Version

Uploading a New ML Package Version

AI Center supports versioning and version management of ML packages. To upload a new version of an ML package, navigate to the ML package details page and click **Upload new version**. Uploading a new ML package version on an existing ML package creates a new major version.



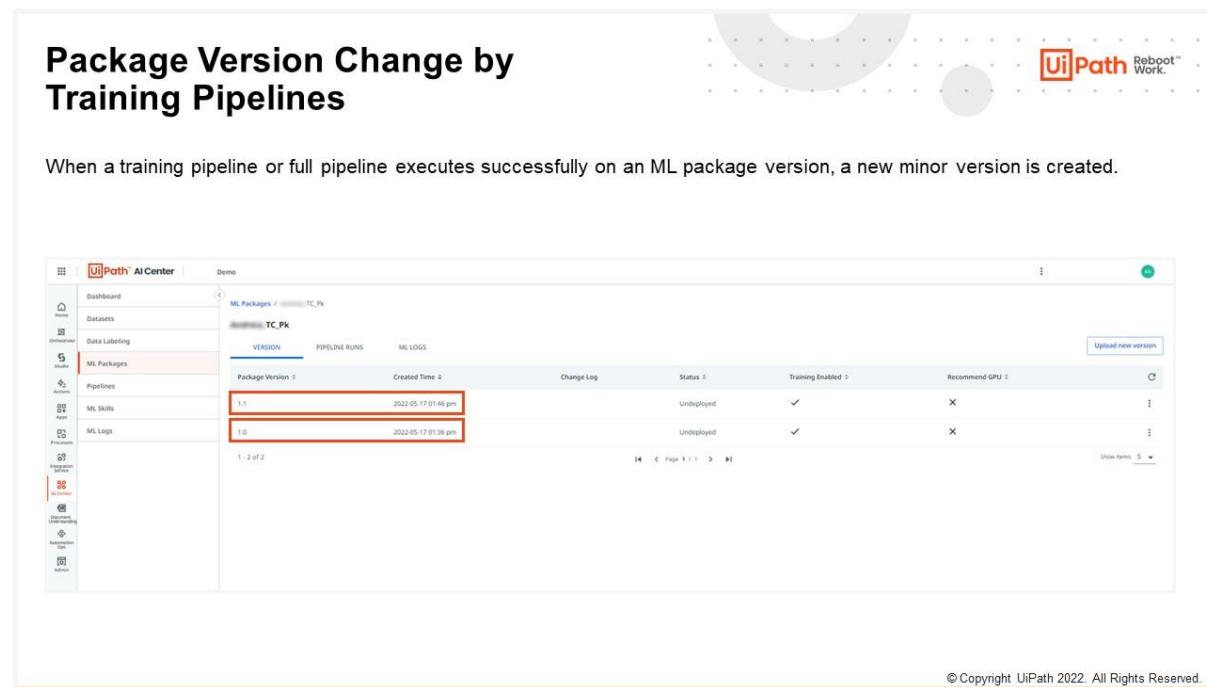
Package Version	Created Time	Change Log	Status	Training Enabled	Recommend GPU
1.1	2022/05/17 01:46 pm		Undeployed	✓	✗
1.0	2022/05/17 01:36 pm		Undeployed	✓	✗

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AI Center supports versioning and version management of ML packages. To upload a new version of an ML package, navigate to the ML package details page and click **Upload new version**. Uploading a new ML package version on an existing ML package creates a new major version.

For example, an ML package uploaded for the first time will have version 1.0. When you upload a new version of the same package, the version will then be 2.0.

Package Version Change by Training Pipelines



The screenshot shows the 'ML Packages' section of the UiPath AI Center. On the left, there's a sidebar with various AI Center modules like Dashboard, Datasets, Data Labeling, ML Packages, Pipelines, ML Skills, and ML Logs. The main area displays 'ML Packages / TC_pk'. Below this, there are tabs for 'VERSION', 'PIPELINE RUNS', and 'ML LOGS'. Under the 'VERSION' tab, a table lists two versions:

Package Version	Created Time	Status	Training Enabled	Recommend GPU
1.1	2022/05/17 01:46 pm	Undeployed	✓	✗
1.0	2022/05/17 01:36 pm	Undeployed	✓	✗

At the bottom right of the table, there's a link 'Upload new version'.

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When a training pipeline or full pipeline executes successfully on an ML package version, a new minor version is created. For example, if an uploaded ML package has version 1.0 and you start a training pipeline, upon its completion, the version will be 1.1 as shown in the ML package details page.

Package Version Change by Updating Its ML Skill

The screenshot shows the 'ML Skills' page for a skill named 'Demo_TC_Skill'. The skill is listed as 'Available' with version '1.0'. The 'ML Package' dropdown is set to 'Demo_TC_Pk'. The 'Deployment' section shows a deployment period from '2022/11/14 04:29 pm' to '2022/11/14 04:29 pm'. The 'MLU' dropdown is set to '1.0'. A 'Change Log' button is visible. Below the main details, there's a table for 'Package Versions' with two entries: '1.1' (Created: 2022/11/14 04:29 pm) and '1.0' (Created: 2022/11/14 04:29 pm). A 'Show items' dropdown is at the bottom right of the table.

A modal dialog box titled 'Are you sure you want to update Demo_TC_Skill ?' is displayed. It contains two sections: 'Current' (set to 'Demo_TC_Pk 1.0') and 'New' (set to 'Demo_TC_Pk 1.1'). Below these are several checkboxes: 'Enable GPU', 'Make ML Skill Public', 'Enable Auto Update', and 'Advanced Infra Settings'. At the bottom of the dialog are 'Confirm' and 'Cancel' buttons.

At the bottom right of the main interface, there's a copyright notice: '© Copyright UiPath 2022. All Rights Reserved.'

Updating an ML skill in the ML skills details page also changes its ML package version.

Lab Exercise 4



Lab Exercise

M5 | L3



Refer to Lab Exercise 4 of Day 2 in the Lab Guide.

Lab Exercise 4 (10 Minutes)



Lab Exercise 4 (10 Minutes)

Change the version of an ML Skill to a new version and consuming it via Studio

Change the version of the Telco Churn ML skill to the newer version (1.1) and consume it via Studio using the workflow in the `UiPath_Workflow_CustomerChurn.zip` file.

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Knowledge Checks

Knowledge Checks



Knowledge Check 1

Knowledge Check 1

01/05

- When a model is uploaded, AI Center validates the uploaded .zip file. For all packages validated for serving, which of these checks are performed (Choose three)?

- A non-empty root folder exists.
- A file named train.py exists in the root folder which implements a class Main.
- A file named main.py exists in the root folder which implements a class Main.
- A requirement.txt file exists.
- A file named serve.py exists in the root folder which implements a class Main.

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Knowledge Check 2

Knowledge Check 2

02/05

2. When it comes to selecting the development language of the model, which of these languages are supported (Choose three)?

Python 3.7

Python 3.6

Python 2.7

Python 2.6

Python 2.5



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Knowledge Check 3

Knowledge Check 3

03/05

3. Which of these purposes does a retrainable ML package serve?

- These are used for serving only.
- These are used both for serving as well as training purposes.
- These are used for training only.
- These are used for evaluating only.

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Knowledge Check 4

Knowledge Check 4

04/05

4. To make AI Center easier to use within an RPA workflow, which input types can the ML package have (Choose three)?

- Json
- File
- Sequence of integers
- Folders
- Files



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Knowledge Check 5

Knowledge Check 5

05/05

5. When is the new minor version of an ML package updated?
- When both training pipeline and full pipeline executes successfully.
 - When a training pipeline or full pipeline executes successfully.
 - When an evaluation pipeline and full pipeline executes successfully.
 - When the training, evaluation, and full pipelines executes successfully.



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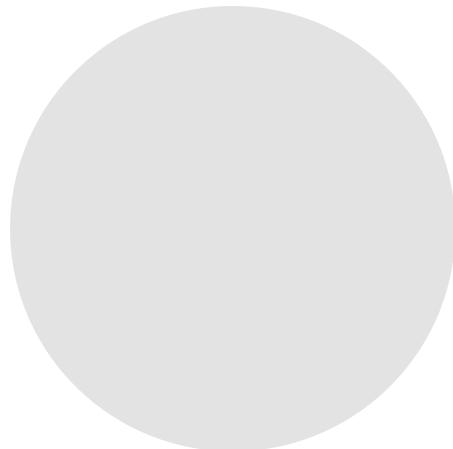
Key Takeaways

Key Takeaways

- A custom-built ML package contains all the code and metadata needed to train and serve a machine learning model.
- The Upload zip file card enables you to upload a custom-built ML package.
- There are two types of ML packages that you can upload namely, not retrainable used for serving only and retrainable used for serving as well as training purposes.
- An ML package must at minimum have the main.py file at the root of the folder and the requirements.txt file.
- An ML package meant for both training and evaluation should also have the train.py file along with the main.py file and the requirements.txt file.
- JSON, file, and files are the three supported input types for an ML package.
- When a new ML package version is uploaded, it creates a new major version.
- When a training pipeline or full pipeline executes successfully on an ML package version, it results in a new minor version, such as from 1.0 to 1.1.

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M6 - AI Center Best Practices, Governance, and Other Relationships



Welcome

AI Center Training

**M6 | AI Center Best Practices,
Governance, and Other
Relationships**



Welcome to Module 6! In this module, you will learn about advanced topics in AI Center, interaction of AI Center with the UiPath ecosystem, AI Center deployment options, and AI Center licensing.

Lessons Covered in This Module

About This Module | M6 | AI Center Best Practices, Governance, and Other Relationships

Lessons covered in this module

- Lesson 1: Advanced Topics
- Lesson 2: AI Center in Relation with Other Products
- Lesson 3: AI Center Deployment Options
- Lesson 4: Licensing

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This module is divided into four foundation lessons namely, Advanced Topics, AI Center in Relation with Other Products, AI Center Deployment Options, and Licensing.

Learning Objectives

About This Module | M6 | AI Center Best Practices, Governance, and Other Relationships



Learning objectives

- Identify the concerns related to Machine Learning (ML) models.
- Identify the techniques used to mitigate the concerns related to ML models.
- Describe how AI Center implements the mitigation techniques.
- Describe how AI Center interacts with the UiPath ecosystem.
- Identify the different options to deploy AI Center.
- Identify the licensing requirements for AI Center.

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Lesson 1: Advanced Topics

Advanced Topics

M6 | L1



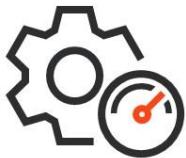
Lesson 1 focuses on the concerns regarding ML models, the mitigation techniques that address these concerns, and the MOJO model format.

ML Model: A Function of Three Factors

ML Model: A Function of Three Factors



One way to think of an instance (serialized bytes) of an ML model is as a function of three factors.



Runtime of training
(model algorithm or
architecture, hyperparameters
explored, etc.)



Data the model is being
trained on



Initialization of the algorithm or
architecture

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- One way to think of an instance (serialized bytes) of an ML model is as a function of three factors, which are as follows:
 - Runtime of training (model algorithm or architecture, hyperparameters explored, etc.)
 - Data the model is being trained on
 - Initialization of the algorithm or architecture

ML Model: Concerns

ML Model: Concerns

An ML model will only be as good as the data used to train it. This translates into two concerns.



Depending on the use case, a data scientist may need to get thousands of labeled data points, which can be prohibitively expensive.

Even if the data scientist acquires a giant data set, training on the entire dataset every time may take too long (cost too much compute).

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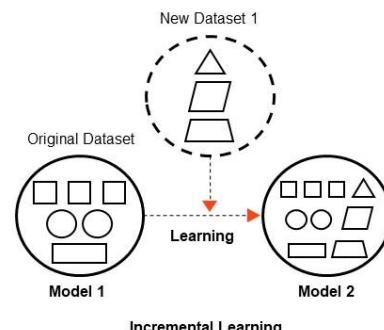
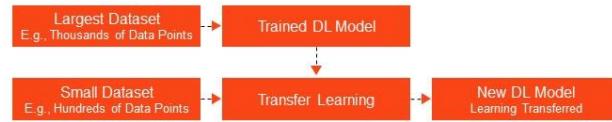
- An ML model will only be as good as the data used to train it. This translates into the following two concerns:
 - Depending on the use case, a data scientist may need to get thousands of labeled data points, which can be prohibitively expensive.
 - Even if the data scientist acquires a giant data set, training on the entire dataset every time may take too long (cost too much compute).

ML Models Concerns: Mitigation Techniques

ML Models Concerns: Mitigation Techniques

For the two related ML model concerns, there are two major techniques used to mitigate them.

- **Transfer Learning:** Researchers train models on massive amounts of data for a very long time. These are pretrained models or weights. When a new use case comes in, they can initialize the pretrained model with the pretrained weights (initialization of the algorithm or architecture), thus, not requiring much data to train the new model.
- **Incremental Learning/Online Learning:** Instead of training on all the data, a researcher may seek to start with an already serialized model and enable that model to be updated with just a small batch (even size 1) of data.



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- For the two related ML model concerns, there are two major techniques used to mitigate them, which are as follows:
 - **Transfer Learning:** Researchers train models on massive amounts of data for a very long time and checkpoint these models. These are often referred to as pretrained models or weights. When a new use case comes in, they can initialize the pretrained model with the pretrained weights (initialization of the algorithm or architecture), thus, not requiring much data to train the new model.
 - **Incremental Learning/Online Learning:** Instead of training on all the data, a researcher may seek to start with an already serialized model and enable that model to be update with just a small batch (even size 1) of data. This is sometimes referred to interchangeably as online learning, which is also sometimes used to exclusively refer to the same setup, except that it happens with streaming data.

Mitigation Techniques in AI Center

Mitigation Techniques in AI Center



- Easily enables transfer learning and incremental learning.
- Facilitates easy transfer learning via a user-defined parameter.
- Provides the flexibility of model implementation and scheduled pipelines to ensure that the updates of a model are efficient, high-performing, and automatic.

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AI Center easily enables transfer learning and incremental learning. In addition, a user-defined parameter can easily drive transfer learning. The flexibility of model implementation of AI Center and scheduled pipelines ensure that the updates of a model are efficient, high-performing, and automatic.

Transfer Learning in AI Center

Transfer Learning in AI Center



You may have noticed that the tutorial ML package you uploaded to the Pipelines section prints information about itself when called via the ML skill activity. The pipeline logs also print this information in the evaluate function. The purpose is to underscore how transfer learning was enabled.

The ML package has a file called base/metadata.json; this is the pretrained model.

The train function of an ML package version 1.0 will read this file and save a new model in finetuned/metadata.json.

The new model's identification (hash) will be taken as the hash of the base model and the data it was trained on (mimicking the three factors).

When you create ML package version 1.2 through the full pipeline in Exercise 6, the code simulates transfer learning again, but this time derived on ML package version 1.1.

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- You may have noticed that the tutorial ML package you uploaded to the Pipelines section prints information about itself when called via the ML skill activity. The pipeline logs also print this information in the *evaluate* function. The purpose is to underscore how transfer learning was enabled, which is as follows:
 - The ML Package has a file called base/metadata.json. This represents the pretrained model that was trained on massive amounts of data (perhaps even for a completely different task as ours).
 - The train function of an ML package version 1.0 will read this base/metadata.json (pretending this is the model) and save a new model in finetuned/metadata.json.
 - The new model's identification (hash) will be taken as the hash of the base model and the data it was trained on (mimicking the three factors covered in the beginning of this module). Thus, a new model trained on some base with the same data will produce the same hash. This ML package version 1.1 can be thought of as derived or transferred from the base model (base/metadata.json).
 - When you create ML package version 1.2 through the full pipeline in Exercise 6, the code simulates transfer learning again (and potentially incremental learning if you had added, say, just one

more text file example3.txt and saved the optimizer state), but this time derived on ML package version 1.1.

Transfer Learning in AI Center (Cont'd)

Transfer Learning in AI Center (Cont'd)



You can see the process of transfer learning clearly in the pipeline logs of the full pipeline.

```
Evaluation on {'serialized model': 'f615ed0d26de5cf3e8003caa1e76dcc5a6fc4a7e99a39d9236858b77d902b4e3', 'trained from': 'base', 'output classes': ['positive', 'negative']} -> Score 0.85
```

Evaluation done on ML package version 1.1 (id f615ed0d...) derived from the base pretrained model

```
Evaluation on {'serialized model': 'c453b72746367b4abcff1a8b9d8337f3ebc35664d8797a1df17ab906bd98ff66', 'trained from': 'f615ed0d26de5cf3e8003caa1e76dcc5a6fc4a7e99a39d9236858b77d902b4e3', 'output classes': ['positive', 'negative']} -> Score 0.72
```

Evaluation done on the newly trained ML package version 1.2 (id c453b727...) trained from ML package version 1.1 (id f615ed0d...)



You can force the training function to use base/metadata.json always by setting one of the parameters in the code of the ML package as `from_base`.

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You can see the process of transfer learning clearly in the pipeline logs of the full pipeline, which show the evaluation done on ML package version 1.1 derived from the base pretrained model and evaluation done on the newly trained ML package version 1.2 trained from ML package version 1.1.

Note: You can force the *training* function to use base/metadata.json always by setting one of the parameters in the code of the ML package as `from_base`. For example, if you create a training pipeline (choosing any arbitrary ML Package version, say, 1.3), set this parameter, and keep the dataset constant, you will generate a new model with the same hash `f615ed0d26de...` This is because you are forcing transfer learning on the base model, and not on the fine-tuned model.

Lesson 2: AI Center in Relation with Other Products

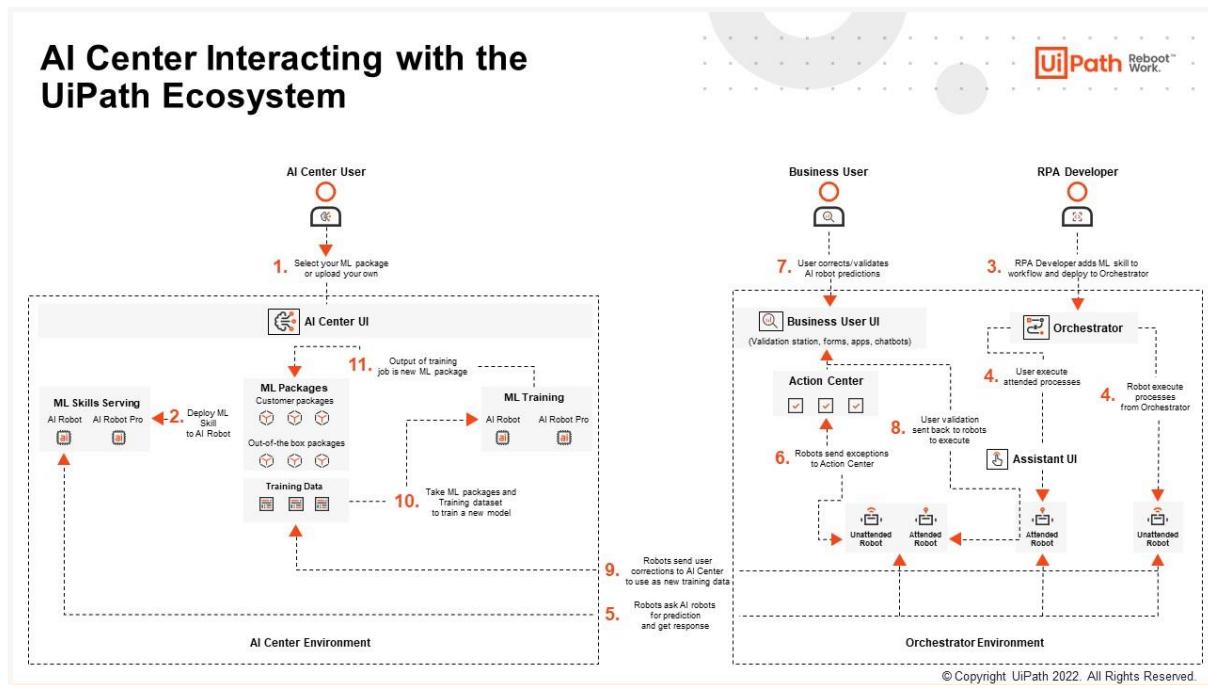
AI Center in Relation with Other Products

M6 | L2



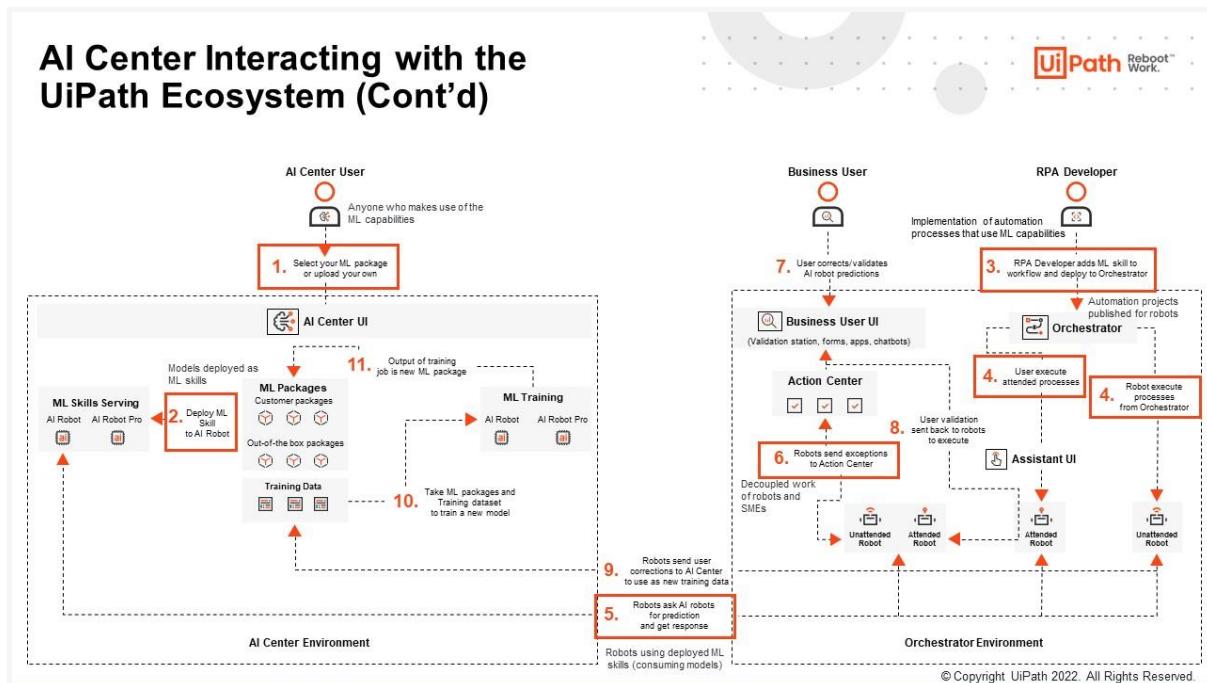
Lesson 2 focuses on how AI Center interacts with the UiPath ecosystem.

AI Center Interacting with the UiPath Ecosystem



Through this diagram, you will be able to discover how AI Center interacts with the UiPath ecosystem.

AI Center Interacting with the UiPath Ecosystem (Cont'd)



The interaction of AI Center with the UiPath ecosystem starts with an AI Center user. There is no typical persona for this user. Anyone can utilize AI Center to make use of the ML capabilities.

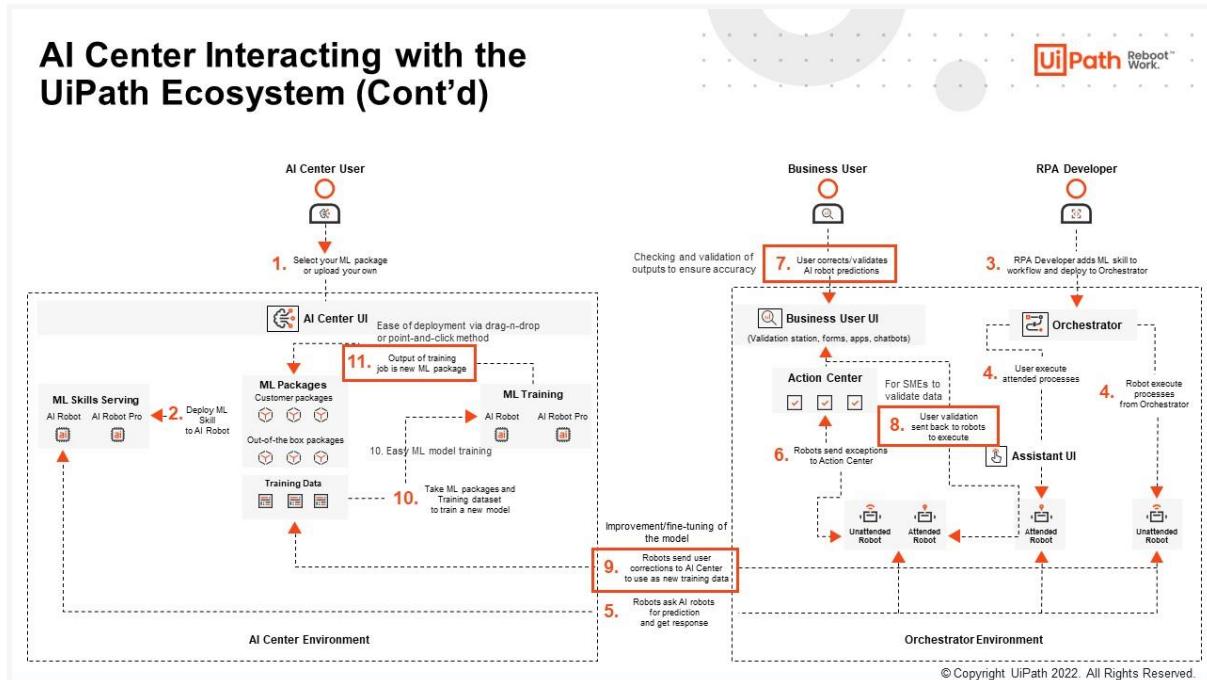
Next, models are deployed as ML skills to be consumed when executing automated processes. Now, an RPA Developer implements automation processes that use ML capabilities.

Then, UiPath Orchestrator, a component of the UiPath Platform, enables the orchestration and management of robots running automation processes. The automation projects by RPA Developers, including those that use ML skills, are published to Orchestrator, from where they become available to robots.

Next, it is the time for consuming model. While executing automation processes, robots use the deployed ML skills. In this way, automation can go beyond the regular rule-based approach.

Then, comes unattended validation. As no technology is infallible, sometimes user intervention is needed to ensure correct results. The actions of Action Center decouple the work of robots and Subject Matter Experts (SMEs).

AI Center Interacting with the UiPath Ecosystem (Cont'd)



Now, a business user, an SME who understands the business requirements, can check, and validate outputs in order to ensure accurate results. Then, comes attended validation. Here, the SMEs are immediately prompted when data validation is required. Now, it is the time to implement feedback loop. Here, the user-validated data can be used to further improve and fine-tune the model.

Once the model is fine-tuned, it is time to take ML packages and training dataset to train or retrain an ML package into a new version with improved capabilities. Now, the trained ML models are deployed via point-and-click and drag-and-drop method and the output is a new ML package.

Lesson 3: AI Center Deployment Options

AI Center Deployment Options

M6 | L3



Lesson 3 focuses on the different options to deploy AI Center and ML models.

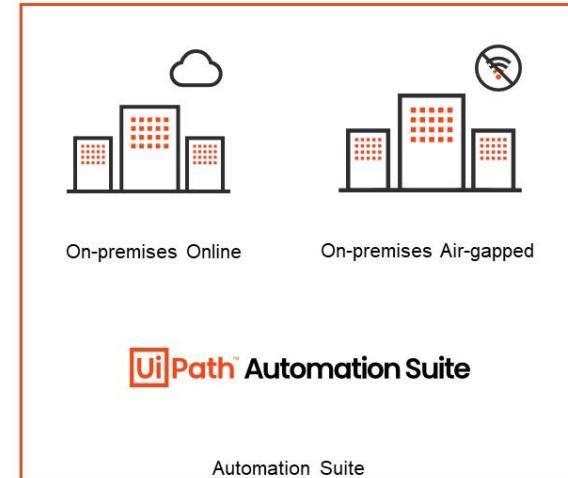
Deploying AI Center

Deploying AI Center

There are five AI Center deployment options.



In-cloud Availability



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There are five AI Center deployment options namely, in-cloud availability, on-premises online, on-premised air-gapped, hybrid mode, and Automation Suite.

Deploying AI Center: In-cloud Availability

Deploying AI Center: In-cloud Availability

In this setup, AI Center is available as a service hosted in UiPath cloud. UiPath manages the necessary product infrastructure and is fully responsible for ensuring that everything functions correctly.

Capabilities

- UiPath Automation Cloud to deploy, manage, and improve ML models
- Assurance of no infrastructure and no maintenance
- Uptime guarantee for enterprise version
- Frequent patches released with new features and bug fixes, in accordance with the Automation Cloud release cadence



UiPath Automation Cloud

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- In this setup, AI Center is available as a service hosted in UiPath cloud. UiPath manages the necessary product infrastructure and is fully responsible for ensuring that everything functions correctly.
- Following are the capabilities of the in-cloud availability deployment option:
 - UiPath Automation Cloud to deploy, manage, and improve ML models
 - Assurance of no infrastructure and no maintenance
 - Uptime guarantee for enterprise version
 - Frequent patches released with new features and bug fixes, in accordance with the Automation Cloud release cadence

Deploying AI Center: Automation Suite

Deploying AI Center: Automation Suite



The Automation Suite installer enables you to install all your server-side products in a single deployment.

Capabilities

- Deployment of the complete UiPath Automation Platform in the environment of your choice, including bare metal machines, on-premises virtual machine infrastructure, or cloud subscriptions
- Everything in one package to deploy in multi-node mode with automatic scaling and built-in High Availability (HA), monitoring, configuration, and upgrade
- Different deployment profiles to be chosen accurately



Details about deployment architecture, requirements, and installation are [here](#).

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- The Automation Suite installer enables you to install all your server-side products in a single deployment.
- Following are the capabilities of the Automation Suite deployment option:
 - Deployment of the complete UiPath Automation Platform in the environment of your choice, including bare metal machines, on-premises virtual machine infrastructure, or cloud subscriptions
 - Everything in one package to deploy in multi-node mode with automatic scaling and built-in High Availability (HA), monitoring, configuration, and upgrade
 - Different deployment profiles that you must choose accurately

Note: To know more about deployment architecture, requirements, and installation, navigate to <https://docs.uipath.com/automation-suite/docs/deployment-architecture>.

Deploying AI Center: On-premises Online (as part of Automation Suite)

Deploying AI Center: On-premises Online (as part of Automation Suite)

In this setup, AI Center is deployed in the customer's infrastructure, either on a local server or on the private cloud. Customers take control over hosting their ML models.

Capabilities

- Local deployment, management, and improvement of ML models
- Customer-managed infrastructure
- Full integration with on-premises Orchestrator
- Patches released with much slower cadence
- Easy installation and management
- Document Understanding (DU) metering in UiPath Automation Cloud



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- In this setup, AI Center is deployed in the customer's infrastructure, either on a local server or on the private cloud.
- Customers take control over hosting their ML models.
- Following are the capabilities of the on-premises online deployment option:
 - Local deployment, management, and improvement of ML models
 - Customer-managed infrastructure
 - Full integration with on-premises Orchestrator
 - Patches released with much slower cadence
 - Easy installation due to the automatic retrieval of installer and associated artifacts from the internet
 - Easy management, as updates to AI Center and/or models can be automatically downloaded
 - Document Understanding (DU) metering in UiPath Automation Cloud

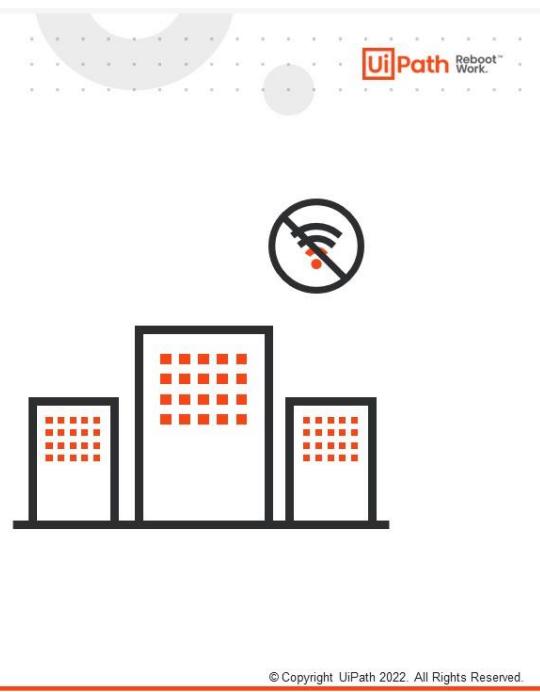
Deploying AI Center: On-premises Air-gapped (as part of Automation Suite)

Deploying AI Center: On-premises Air-gapped (as part of Automation Suite)

Air-gapped installation enables customers to use AI Center in a disconnected environment, when there is no internet connection to reach UiPath licensing server. It is popular among UiPath customers in public and financial services sectors, having highly secure environments.

Capabilities

- Local deployment, management, and improvement of ML models
- Customer-managed infrastructure
- Full integration with on-premises Orchestrator
- Manual download of all resources, which are then loaded in the node
- DU metering in UiPath Automation Cloud
- No internet access required



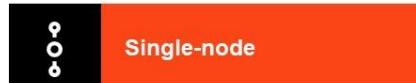
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- Air-gapped installation enables customers to use AI Center in a disconnected environment when there is no internet connection to reach UiPath licensing server. This means that at both install time and runtime, no outbound connections are needed to use a fully featured version of AI Center.
- Air-gapped is popular among UiPath customers in public and financial services sectors, having highly secure environments.
- Following are the capabilities of the on-premises air-gapped deployment option:
 - Local deployment, management, and improvement of ML models
 - Customer-managed infrastructure
 - Full integration with on-premises Orchestrator
 - Manual download of all resources, which are then loaded in the node
 - DU metering in UiPath Automation Cloud
 - No internet access required

Types of AI Center On-premise Installations

Types of AI Center On-premise Installations

There are two types of AI Center on-premise installations.



Single-node



Multi-node (New in 22.10)

- You can deploy AI Center on any physical or virtual machine.
- The AI Center installer also includes the installation of Kubernetes on the machine.
- It is recommended to install it on a fresh cloud virtual machine in Azure, Amazon Web Services (AWS), or Google Cloud Platform (GCP).

- This new feature enables customers to run many ML skills and training pipelines in an environment with high-availability and scalable processing power.
- AI Center is deployed on a Kubernetes cluster. The supported providers are Azure Kubernetes Service, Docker Enterprise Edition, and Red Hat OpenShift (in preview).

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- There are two types of AI Center on-premises installations, which are as follows:
 - **Single-Node:** You can deploy AI Center on any physical or virtual machine. The AI Center installer also includes the installation of Kubernetes on the machine. It is recommended to install it on a fresh cloud virtual machine in Azure, Amazon Web Services (AWS), or Google Cloud Platform (GCP).
 - **Multi-Node (New in 22.10):** This new feature enables customers to run many ML skills and training pipelines in an environment with high-availability and scalable processing power. AI Center is deployed on a Kubernetes cluster. The supported providers are Azure Kubernetes Service, Docker Enterprise Edition, and Red Hat OpenShift (in preview).

Deploying AI Center: Hybrid Mode (Cloud AI Center + Orchestrator On-premise)

Deploying AI Center: Hybrid Mode (Cloud AI Center + Orchestrator On-premise)

In this setup, AI Center is available as a service hosted in UiPath cloud. However, the users don't need to move their existing on-premises installation of Orchestrator.

Capabilities

- Robots connected to the on-premises Orchestrator
- Robots calling ML skills to upload data to a dataset
- Calling of ML Skills via the new ML services activities, public ML skills, and public datasets
- Benefit of all advantages of AI Center in the cloud
- Frequent patches with new features and bug fixes, under the cloud platform release cadence
- No requirement for installation and management on AI Center
- DU metering in UiPath cloud



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- In this setup, AI Center is available as a service hosted in UiPath cloud. However, the users don't need to move their existing on-premises installation of Orchestrator.
- Following are the capabilities of the hybrid mode deployment option:
 - Robots connected to the on-premises Orchestrator
 - Robots calling ML skills to upload data to a dataset
 - Calling of ML Skills via the new ML services activities, public ML skills, and public datasets
 - Benefit of all advantages of AI Center in the cloud, without having to migrate the existing on-premises Orchestrator
 - Frequent patches with new features and bug fixes, under the cloud platform release cadence
 - No requirement for installation and management on AI Center
 - DU metering in UiPath cloud

Lesson 4: Licensing

Licensing

M6 | L4



Lesson 4 focuses on AI Center licensing.

Purchases for AI Center Cloud

The screenshot shows the 'Purchases for AI Center Cloud' section. At the top, there's a header with the 'UiPath AI Center' logo and a sub-header 'Reboot Work.' Below this, a message states: 'For AI Center cloud, you can purchase AI robots (not the same as UiPath Robots) to run your ML skills or training pipelines. You can also purchase AI robot pro, an AI robot plus a Graphics Processing Unit (GPU) to accelerate ML.' Below the message, there are two tabs: 'Cloud' (selected) and 'On-premise'. Under each tab, there are two items: 'AI Robot' and 'AI Robot Pro'. Each item has a small icon, a name, a description, and a note about resource requirements.

	Cloud	On-premise
AI Robot (Provides runtimes to serve and train ML skills.)	Runs two ML skills or a training job at a time regardless of the resource requirements.	Runs two ML skills or a training job at a time regardless of the resource requirements.
AI Robot Pro (Is a commercial bundle of AI robot and a GPU that accelerates ML serving or training.)	Runs two ML skills or a training job at a time with GPU available.	Is not there, as AI robots can utilize the available GPUs.

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For AI Center cloud, you can purchase AI robots (not the same as UiPath Robots) to run your ML skills or training pipelines. You can also purchase AI robot pro, an AI robot plus a Graphics Processing Unit (GPU) to accelerate ML.

An AI robot provides the runtime to serve and train ML skills. It enables you to run up to two ML skills or a training job at a time regardless of the resource requirements, whether on cloud or on-premise.

AI robot pro is a commercial bundle having an AI robot and a GPU. GPUs enable you to accelerate ML serving or training, though they are more often important for training. While it is available on cloud, it is not required in the on-premise setup. This is because an AI robot can easily utilize the available GPUs in this setup.

Purchases for AI Center Cloud: AI Units

Purchases for AI Center Cloud: AI Units



AI Units are the unit of measurement used to license AI products. AI Units are charged based on consumption when the models are bringing value to you.

UiPath AI Center™

	Prediction Cost	Hardware Cost
Formula	$\text{Prediction Cost} = \text{Input Size} * \text{Unit Cost Of The Model}$	$\text{Hardware Cost} = \text{Input Size} * \text{Model Used}$ Note: It depends onto either using CPU or GPU.
Example	Using UiPath Custom Named Entity Recognition model with input size of 5000 characters: $5000 \text{ Characters} = 3 \text{ units} \text{ (1 unit}=2000 \text{ characters)}$ $\text{Consumption: } 3 \text{ units} * 0.5 \text{ (unit cost)} = 1.5 \text{ AI Units}$	ML Skills: <ul style="list-style-type: none"> CPU (HA Skill): 2 AI Units/hour GPU (HA Skill): 40 AI Units/hour Pipelines: <ul style="list-style-type: none"> CPU: 6 AI Units/hour GPU: 20 AI Units/hour

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AI Units are the unit of measurement used to license AI products. AI Units are charged based on consumption when the models are bringing value to you.

- Prediction cost
 - Formula
 - $\text{Prediction Cost} = \text{Input Size} * \text{Unit Cost Of The Model}$
- Example
 - Using UiPath Custom Named Entity Recognition model with input size of 5000 characters:
 - $5000 \text{ Characters} = 3 \text{ units} \text{ (1 unit}=2000 \text{ characters)}$
 - Consumption: $3 \text{ units} * 0.5 \text{ (unit cost)} = 1.5 \text{ AI Units}$
- Hardware Cost
 - Formula
 - $\text{Hardware Cost} = \text{Input Size} * \text{Model Used}$
 - Note: It depends onto either using CPU or GPU.
- Example
 - ML Skills

- CPU (HA Skill): 2 AI Units/hour
 - GPU (HA Skill): 40 AI Units/hour
- Pipelines
 - CPU: 6 AI Units/hour
 - GPU: 20 AI Units/hour

Prediction Cost – Input Size

Prediction Cost – Input Size



The formula to calculate the prediction cost is Input Size * Unit Cost Of The Model.

Model	Input Type	Input Unit	Computed Input Unit
DU Models	Document	1 Page	Number of pages in the input document
Computer Vision	Image	1 Image	Always 1
Task Mining	Dataset	1 Dataset	Always 1
Other Models	Json	2000 Characters = 1 Unit	$\text{Cell}(\text{length}(\text{input})/2000)$
	File	5 MB = 1 Unit	$\text{Cell}(\text{size}/5\text{MB})$
	Files	5 MB = 1 Unit	$\text{Cell}(\text{sum}(\text{size}(\text{input}))/5\text{MB})$

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The formula to calculate the prediction cost is Input Size * Unit Cost Of The Model.

Prediction Cost – Model Used

Model	Input Type	Unit cost
DU Models	Per Prediction	For a list of all Document Understanding models, check the Metering & Charging Logic page from the Document Understanding guide.
Computer Vision	Per Prediction	0
Task Mining	Per Successful Pipeline	5000
UiPath Light Text Classifier	Per Prediction	0.2
UiPath Multilingual Classifier	Per Prediction	0.5
UiPath Custom Named Entity Recognition	Per Prediction	0.5
Open-Source Packages	Per Prediction	0.1
Custom Packages (Uploading Your Zip File)	Per Prediction	0.1

 Except for Task Mining, running a pipeline or deploying an ML Skill only consumes AI Units related to hardware consumption.

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Except for Task Mining, running a pipeline or deploying an ML Skill only consumes AI Units related to hardware consumption.

Hardware Cost

Hardware Cost

The cost of the hardware used is added to the prediction cost (Input Size * Model Used) to get the final cost.

	Prediction Cost	Hardware Cost	Unit Cost
ML Skill	High Availability (HA) Skill	CPU	2 AI Units/hour
	HA Skill	GPU	40 AI Units/hour
Pipelines		CPU	6 AI Units/hour
		GPU	20 AI Units/hour



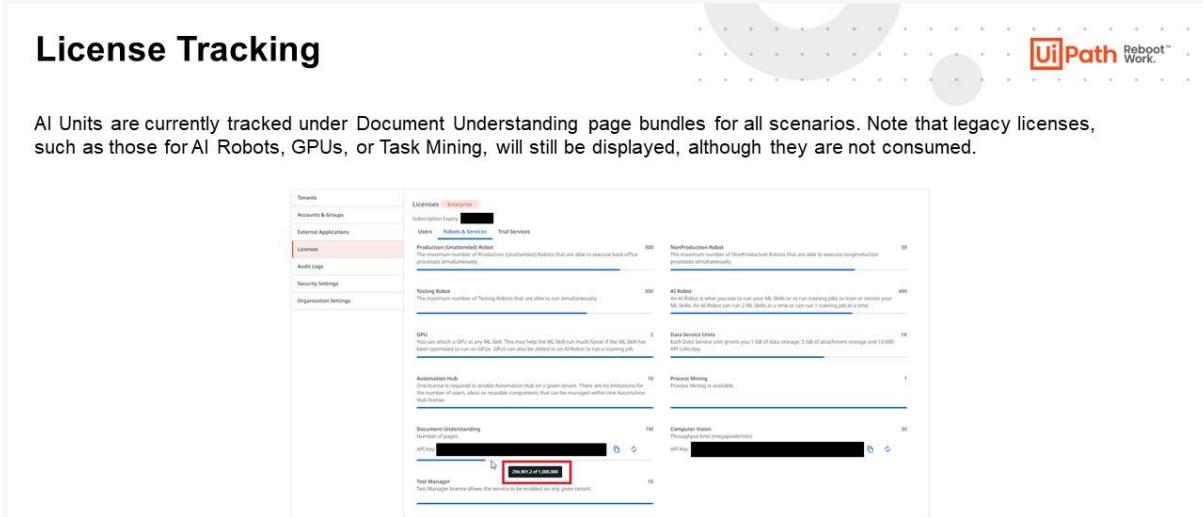
Any hour started is charged.

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The cost of the hardware used is added to the prediction cost (Input Size * Model Used) to get the final cost.

Note: Any hour started is charged.

License Tracking



The screenshot shows the 'Licenses' section of the UiPath License Management interface. It displays various license categories and their current usage:

- Production Unmanaged Robot:** 300 units available, 0 used.
- NonProduction Robot:** 30 units available, 0 used.
- Testing Robot:** 300 units available, 0 used.
- AI Robot:** 400 units available, 0 used.
- GPU:** 2 units available, 0 used.
- Data Service Units:** 18 units available, 0 used.
- Automation Hub:** 10 units available, 0 used.
- Process Mining:** 1 unit available, 0 used.
- Document Understanding:** 150 units available, 100,002 used.
- Computer Vision:** 30 units available, 0 used.
- Test Manager:** 10 units available, 0 used.

If you hover your mouse over the bar in the Document Understanding section, a pop-up is displayed. You can check this pop-up to see your exact consumption.

AI Units are currently tracked under Document Understanding page bundles for all scenarios. Note that legacy licenses, such as those for AI Robots, GPUs, or Task Mining, will still be displayed, although they are not consumed.

Note: If you hover your mouse over the bar in the Document Understanding section, a pop-up is displayed. You can check this pop-up to see your exact consumption.

License Tracking: Example

License Tracking: Example



To automate a given process, you need to use the [Multilingual Text Classification](#) model from UiPath. The first step is to train the Multilingual Text Classification model on your dataset. The training takes 3 hours 20 minutes using GPU.

After deploying the model as HA skill, it is running on CPU for three months. During this time, the Multilingual Text Classification model processed 20.000 texts, all around 3000 characters.

Calculating total consumption:

- AI Units consumed for training Multilingual Text Classification
 - $4 \text{ (hours)} * 20 \text{ (AI Units per hour for GPU)} = 80 \text{ AI Units}$
- AI Units consumed for hosting Multilingual Text Classification for three months
 - $24 \text{ (hours in a day)} * 90 \text{ (number of days)} * 2 \text{ (AI units per hour)} = 4320 \text{ AI Units}$
- AI Units consumed per prediction made using Multilingual Text Classification:
 - $20000 \text{ (number of predictions)} * 2 \text{ (input size)} * 0.5 \text{ (unit cost)} = 20\,000 \text{ AI Units}$
- AI Units used in total:
 - $\text{Hardware cost} + \text{predictions cost} = 80 + 4320 + 20000 = 24400 \text{ AI Units}$

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To automate a given process, you need to use the Multilingual Text Classification (<https://docs.uipath.com/ai-fabric/v0/docs/multi-lingual-text-classification>) model from UiPath.

The first step is to train the Multilingual Text Classification model on your dataset. The training takes 3 hours 20 minutes using GPU.

After deploying the model as HA skill, it is running on CPU for three months. During this time, the Multilingual Text Classification model processed 20.000 texts, all around 3000 characters.

Calculating total consumption:

- AI Units consumed for training Multilingual Text Classification
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- AI Units consumed per prediction made using Multilingual Text Classification:
 - $20000 \text{ (number of predictions)} * 2 \text{ (input size)} * 0.5 \text{ (unit cost)} = 20\,000 \text{ AI Units}$

- AI Units used in total:
 - Hardware cost + predictions cost = $80 + 4320 + 20000 = 24400$ AI Units

AI Center Environments

AI Center Environments

UiPath Reboot™ Work.



There is no difference among the AI Center environments (dev/test/production) and are all licensed in the same way.



Exporting and migrating models between AI Center instances is currently supported only for on-premise setup. This functionality is under development and will be soon part of the product in all deployments.

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There is no difference among the AI Center environments (dev/test/production) and are all licensed in the same way.

Note: Exporting and migrating models between AI Center instances is currently supported only for on-premise setup. This functionality is under development and will be soon part of the product in all deployments.

DU and AI Center Licensing Dependencies

DU and AI Center Licensing Dependencies

UiPath Reboot™ Work.



- AI robots are required to use DU ML models hosted in AI Center.
- AI robots are required to train/ retrain DU ML models or run DU ML skills.
- The use of non-DU ML models requires purchasing of additional AI robots.

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AI robots are required to use DU ML models hosted in AI Center. AI robots are required to train/ retrain DU ML models or run DU ML skills. The use of non-DU ML models requires purchasing of additional AI robots.

Knowledge Checks

Knowledge Checks



Knowledge Check 1

Knowledge Check 1

01/05

- Match the following deployment options with their capabilities.

Deployment Option	Capability
<input type="checkbox"/> In cloud availability	No internet access required
<input type="checkbox"/> On premises air gapped	Deploy, manage, and improve ML models locally
<input type="checkbox"/> On premises online	Enables you to deploy the full UiPath Automation Platform in the environment of your choice
<input type="checkbox"/> UiPath Automation Suite	Deploy, manage, and improve ML models on UiPath Automation Cloud

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Knowledge Check 2

Knowledge Check 2

02/05

2. Which one of these personas can implement automation processes that make use of ML capabilities?

- Business User
- Process Admin
- RPA Developer
- AI Center User

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Knowledge Check 3

Knowledge Check 3

03/05

3. Which of these statements define pretrained weights?
- A researcher seeking to start with an already serialized model.
 - A researcher training models on massive amounts of data for a very long time.
 - A researcher enabling models to be updated with a small batch of data.
 - A researcher referring to a setup that happens with streaming data.

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Knowledge Check 4

Knowledge Check 4

04/05

4. Which one of these is a deployment option where the users don't need to move their existing on-premises installation of Orchestrator?

- On premises air gapped
- Hybrid mode
- Automation Suite
- On premises online



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Knowledge Check 5

Knowledge Check 5

05/05



5. As a Data Scientist, you have uploaded the tutorial ML package in the Pipelines section. You want the pipeline logs to print this information in the evaluate function. Which one of these activities should be called upon to perform this action?
- ML services
 - Upload file activity
 - ML skill activity
 - Run the evaluation pipeline after it executes successfully

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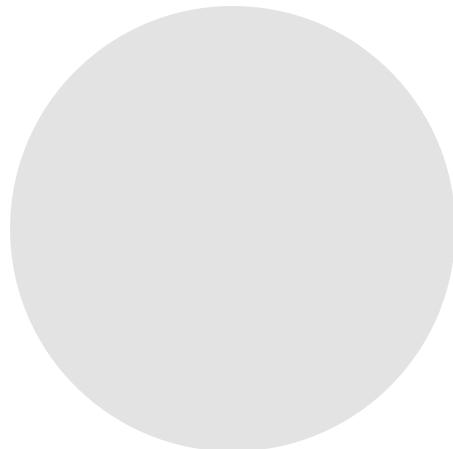
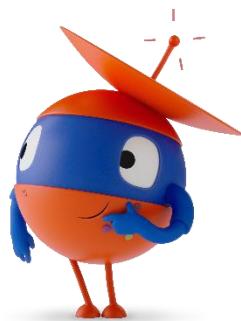
Key Takeaways

Key Takeaways

- An instance of an ML model is as a function of three factors namely, runtime of training, data based on which the model is trained, and initialization of algorithm or architecture.
- Need of giant dataset and time-consuming training on such a dataset are the two main concerns of ML models.
- Transfer learning and incremental learning address the ML models concerns. Both involve working on an existing model to address a new use case.
- AI Center interacts with the UiPath ecosystem through the Orchestrator environment.
- There are five AI Center deployment options namely, in-cloud availability, on-premises online, on-premised air-gapped, hybrid mode, and Automation Suite.
- For AI Center cloud, you can purchase AI robots or AI robot pro to run your ML skills or training pipelines.
- One AI robot can run up to two ML skills concurrently or one training pipeline at a time.

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M7 - Resources and Use Cases



Welcome

AI Center Training

M7 | Resources and Use Cases

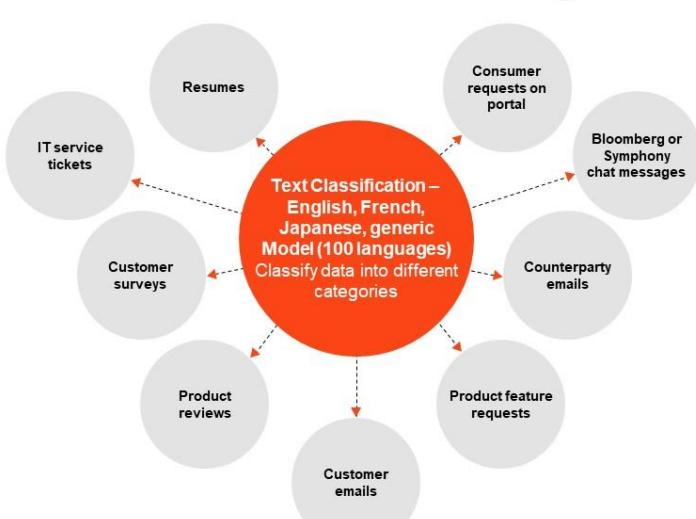


Welcome to Module 7! In this module, you will explore additional learning resources and AI Center use cases.

Use Cases

Use Cases

Based on the out-of-the-box models available, the illustration represents use cases that UiPath has encountered with its customers.

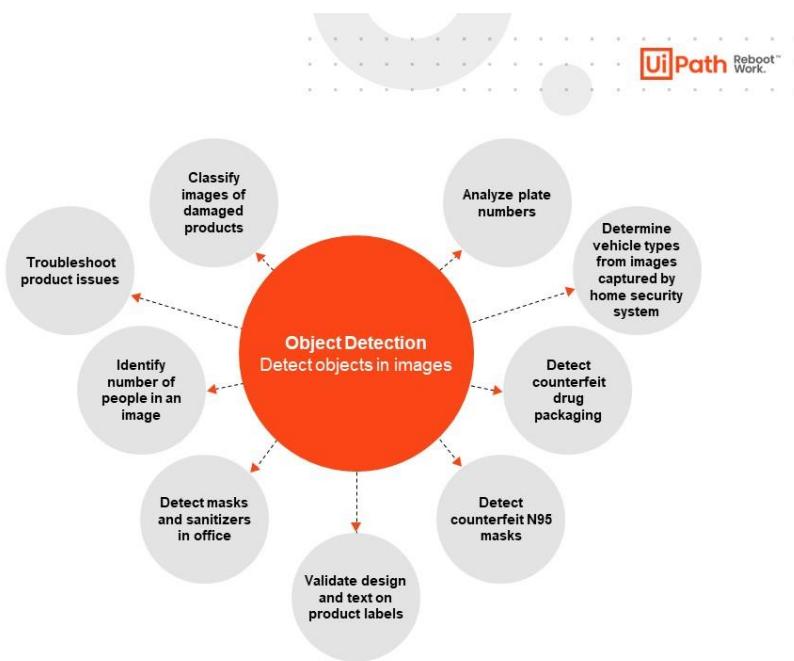


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Use Cases (Cont'd)

Use Cases (Cont'd)

Based on the out-of-the-box models available, the illustration represents use cases that UiPath has encountered with its customers.

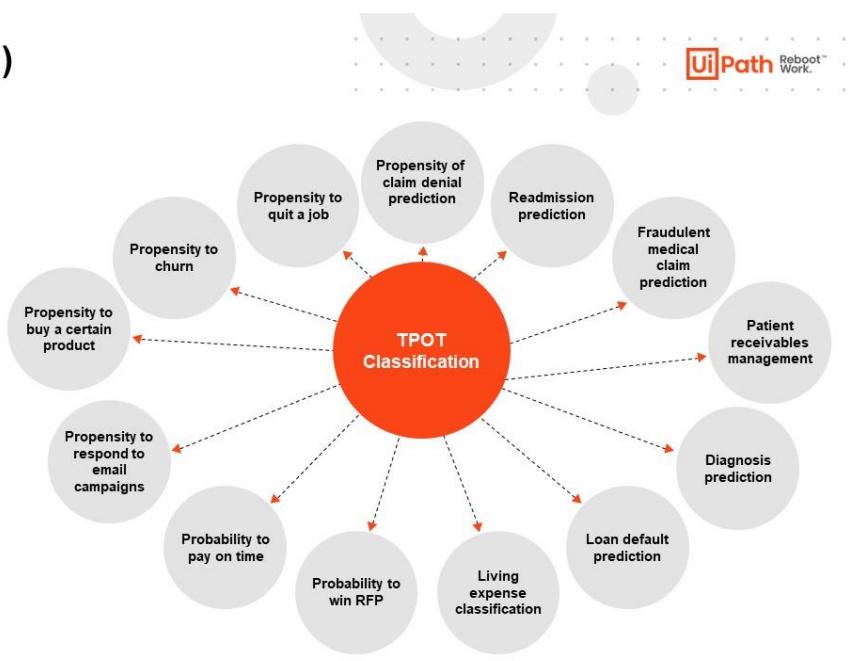


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Use Cases (Cont'd)

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Based on the out-of-the-box models available, the illustration represents use cases that UiPath has encountered with its customers.

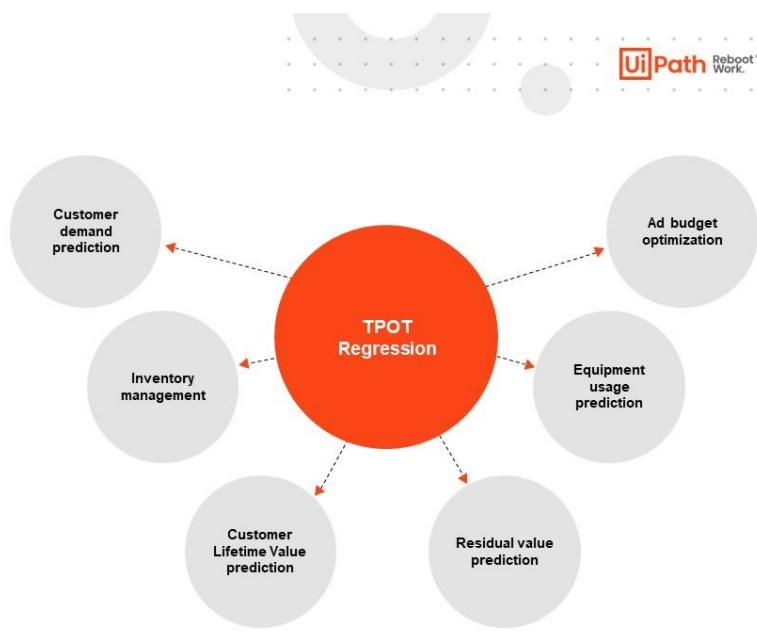


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Use Cases (Cont'd)

Use Cases (Cont'd)

Based on the out-of-the-box models available, the illustration represents use cases that UiPath has encountered with its customers.



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Use Cases (Cont'd)

Use Cases (Cont'd)

Based on the out-of-the-box models available, the illustration represents use cases that UiPath has encountered with its customers.



Language Comprehension

- Text Summarization:** Summarize text as a string.
- Legal clauses/documents
 - Negative news
 - Resumes
 - Prospectus
 - Financial filings
 - Clinical comprehension for coding and audits

Language Comprehension

- Question Answering:** Predict the answer to a question written in English based on some context.

- Semantic Similarity:** Show which sentence or words correlate with each other.

Language Analysis

- Name Entity Recognition:** Recognize 18 types of name entities, including:
- Product
 - Account
 - SSN
 - Transaction ID
 - Currency
 - Company

Language Analysis

- Sentiment Analysis:** Predict the sentiment of a text - very negative, negative, neutral.
- Product review
 - Customer survey
 - Social media posts
 - Employee feedback
 - Brand intelligence
 - Client retention management

Language Analysis

- Language Detection:** Predict the language of a text input.

Language Translation

- English to French, English to German, English to Russian:** Translate text from one language to another.

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Use Cases (Cont'd)

Use Cases (Cont'd)

	HEALTHCARE	FINANCIAL SERVICES	PUBLIC SECTOR	INSURANCE	OTHERS
DATA PROCESSING	<ul style="list-style-type: none"> Classify resumes Classify IT service tickets Classify emails Pregnancy risk evaluation 	<ul style="list-style-type: none"> Classify customer emails Classify counterparty emails Classify Bloomberg or Symphony chat messages Classify requests on portal Classify customer surveys 	<ul style="list-style-type: none"> Classify resumes Classify IT service tickets Classify emails 	<ul style="list-style-type: none"> Classify resumes Classify IT service tickets Classify emails Classify customer surveys Classify customer reviews, and requests 	<ul style="list-style-type: none"> Classify product feature requests
DATA ANALYSIS		<ul style="list-style-type: none"> Customer survey Client retention management 		<ul style="list-style-type: none"> Customer survey Client retention management 	<ul style="list-style-type: none"> Social media posts Brand intelligence Employee feedback
TEST VALIDATION	<ul style="list-style-type: none"> Clinical comprehension for coding and adults 	<ul style="list-style-type: none"> Negative news 		<ul style="list-style-type: none"> Summarize IT issue Extract information from resumes 	<ul style="list-style-type: none"> Summarize IT issue Extract information from resumes
IMAGE ANALYSIS	<ul style="list-style-type: none"> Detect counterfeit N95 masks Detect counterfeit drug packaging 		<ul style="list-style-type: none"> Supply chain management Maintenance systems Inventory control 		<ul style="list-style-type: none"> Detect masks and hand sanitizers in offices Validate design and text on product tablet Analyze plate numbers Identify number of people in an image Detect vehicle types
BLACK DATA COLLECTION	<ul style="list-style-type: none"> Diagnosis prediction Patient receivables management Fraudulent medical claim prediction Readmission prediction Propensity of claim denial prediction 	<ul style="list-style-type: none"> Propensity to respond to email campaigns Propensity to buy a certain product Propensity to pay on time Loan default prediction Living expense classification 		<ul style="list-style-type: none"> Propensity to churn Propensity to buy a certain product Propensity to respond to email campaigns 	<ul style="list-style-type: none"> Propensity to quit a job Propensity to win RFP
BLACK DATA PREDICTION		<ul style="list-style-type: none"> Customer demand prediction Customer lifetime value prediction Residual value prediction 		<ul style="list-style-type: none"> Customer demand prediction Customer lifetime value prediction Residual value prediction 	<ul style="list-style-type: none"> Inventory management Ad budget optimization

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Use Cases (Cont'd)



Use Cases (Cont'd)					
	HR, IT & SECURITY	MARKETING/BRANDING/SALES	PRODUCT/MANUFACTURING/MANUFACTURERS	LEGAL/FINANCE/PURCHASING	OTHERS
TEXT CLASSIFICATION	<ul style="list-style-type: none"> Classify resumes Classify IT service tickets Classify emails <ul style="list-style-type: none"> Employee feedback 	<ul style="list-style-type: none"> Classify customer emails Classify customer reviews, and requests Classify customer emails <ul style="list-style-type: none"> Customer survey Social media posts Brand intelligence Client retention management 	<ul style="list-style-type: none"> Classify product feature requests Classify emails <ul style="list-style-type: none"> Product review 	<ul style="list-style-type: none"> Classify emails 	<ul style="list-style-type: none"> Pregnancy risk evaluation Classify emails
STRUCTURED DOCUMENT ANALYSIS	<ul style="list-style-type: none"> Resume Summarize IT issue 	<ul style="list-style-type: none"> Negative news 	<ul style="list-style-type: none"> Validate design and text on product labels 	<ul style="list-style-type: none"> Troubleshoot product issues Classify images of damaged products 	<ul style="list-style-type: none"> Legal clause/documents Financial filing
IMAGE CLASSIFICATION	<ul style="list-style-type: none"> Detect masks and hand sanitizers in offices Validate design and text on product tablet Analyze plate numbers Detect vehicle types <ul style="list-style-type: none"> Propensity to quit a job 	<ul style="list-style-type: none"> Validate design and text on product labels 	<ul style="list-style-type: none"> Troubleshoot product issues Classify images of damaged products 	<ul style="list-style-type: none"> Detect counterfeit N95 masks Detect counterfeit drug packaging 	<ul style="list-style-type: none"> Clinical comprehension for coding and adults
TIME SERIES FORECASTING		<ul style="list-style-type: none"> Customer demand prediction Customer lifetime value prediction Residual value prediction Ad budget optimization 	<ul style="list-style-type: none"> Equipment usage prediction 	<ul style="list-style-type: none"> Inventory management 	<ul style="list-style-type: none"> Diagnosis prediction Medical variables management Fraudulent medical claim prediction Readmission prediction Propensity of claim denial prediction

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AI Center Use Case Videos

AI Center Use Case Videos

Here are a few use case for AI Center.

Topic	URL
UiPath AI Center Product Overview	https://youtu.be/LXeUeexl1dQ
Bridging the Gap between RPA and AI	https://youtu.be/yYSVGnnAsuw
Predicting Loan Defaults	https://youtu.be/vETSxydDwh0
Inventory Management	https://youtu.be/SyyeEr_x8Fs
Job Matching	https://youtu.be/_9AebekkbAI

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Here are a few use case for AI Center.

- **UiPath AI Center Product Overview:** <https://youtu.be/LXeUeexl1dQ>
- **Bridging the Gap between RPA and AI:** <https://youtu.be/yYSVGnnAsuw>
- **Predicting Loan Defaulters:** <https://youtu.be/vETSxydDwh0>
- **Inventory Management:** https://youtu.be/SyyeEr_x8Fs
- **Job Matching:** https://youtu.be/_9AebekkbAI

Case Studies

Case Studies		
Client	Industry	URL
Heritage Bank	Banking & finance	https://www.uipath.com/resources/automation-case-studies/heritage-bank-banking-rpa
Large Health Insurance Company	Insurance	https://www.uipath.com/resources/automation-case-studies/health-insurance-company-uses-ai-fabric
Cognizant	Healthcare	https://www.uipath.com/resources/automation-case-studies/cognizant-healthcare-rpa
Evros	Banking & finance	https://www.uipath.com/resources/automation-case-studies/evros-technology-group-it-services-rpa
Accelirate	Retail	https://www.uipath.com/resources/automation-case-studies/major-retailer-rpa

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Following are the links for different case studies for you to go through:

- <https://www.uipath.com/resources/automation-case-studies/heritage-bank-banking-rpa>
- <https://www.uipath.com/resources/automation-case-studies/health-insurance-company-uses-ai-fabric>
- <https://www.uipath.com/resources/automation-case-studies/cognizant-healthcare-rpa>
- <https://www.uipath.com/resources/automation-case-studies/evros-technology-group-it-services-rpa>
- <https://www.uipath.com/resources/automation-case-studies/major-retailer-rpa>

Useful Links

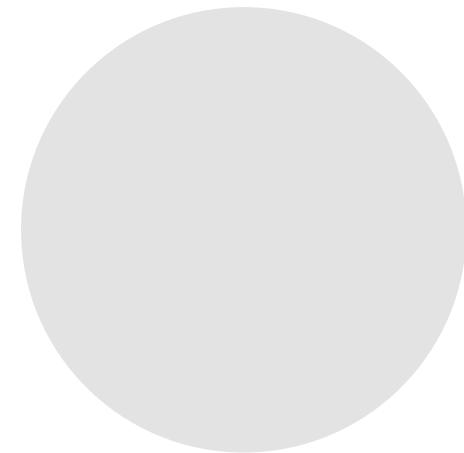
Useful Links	
Topic	URL
AI Center cloud	https://docs.uipath.com/ai-fabric/v0/
AI Center on-premise	https://docs.uipath.com/ai-fabric/docs
ML extractor endpoints	https://docs.uipath.com/document-understanding/docs/machine-learning-extractor
Document manager	https://docs.uipath.com/document-understanding/docs/document-manager
Using AI Center	https://docs.uipath.com/ai-fabric/docs/using-ai-fabric
UiPath Forum	https://forum.uipath.com/

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Expand your knowledgebase by going through the following links on different topics related to AI Center:

- <https://docs.uipath.com/ai-fabric/v0/>
- <https://docs.uipath.com/ai-fabric/docs>
- <https://docs.uipath.com/document-understanding/docs/machine-learning-extractor>
- <https://docs.uipath.com/document-understanding/docs/document-manager>
- <https://docs.uipath.com/ai-fabric/docs/using-ai-fabric>
- <https://forum.uipath.com/>

M8 - Survey and Completion



Welcome

AI Center Training

M8 | Survey and Completion



Welcome to Module 8! In this module, you will provide your feedback regarding this course and complete the exercises required to obtain the Diploma of Completion.

Feedback Survey

Feedback Survey



You reached the end of the course!

Feedback is very important to us!



So, please spend 2–5 minutes to provide your feedback
(https://forms.office.com/pages/responsepage.aspx?id=Kj012FOxF02IJ5AsUfcjV-K8oKaYCQlloo_aRlwG9BUNKLOVEIZMINPMThTWTdDNERLUIY2OUdXUi4u) on
this course and the instructor.

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To provide your valuable feedback on this course and the instructor,
kindly navigate to

https://forms.office.com/pages/responsepage.aspx?id=Kj012FOxF02IJ5AsUfcjV-K8oKaYCQlloo_aRlwG9BUNKLOVEIZMINPMThTWTdDNERLUIY2OUdXUi4u

Receiving Credit

Receiving Credit



- You must have completed all modules in order to receive your Diploma of Completion.
- If you're eligible for the Diploma of Completion, you must take the following Brillium quiz using this link: <https://academy.uipath.com/courses/ai-center-ilt-assessment>
- Note: Please log in to academy.uipath.com with the same email address as you provided for the class registration.
- The passing grade is 80% (from 20 questions, you can miss 4 questions). Good luck!

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Thank You



Thank You!
Happy Automation!

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