



Azure ML Webservice Deployment

Citizen Analytics – An Initiative by Data Science Team

START ►

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Learning Objectives

By the end of this module, you will be able to:



01

Describe the steps to deploy Azure web-service

02

Describe the steps to deploy machine learning model as a web-service

03

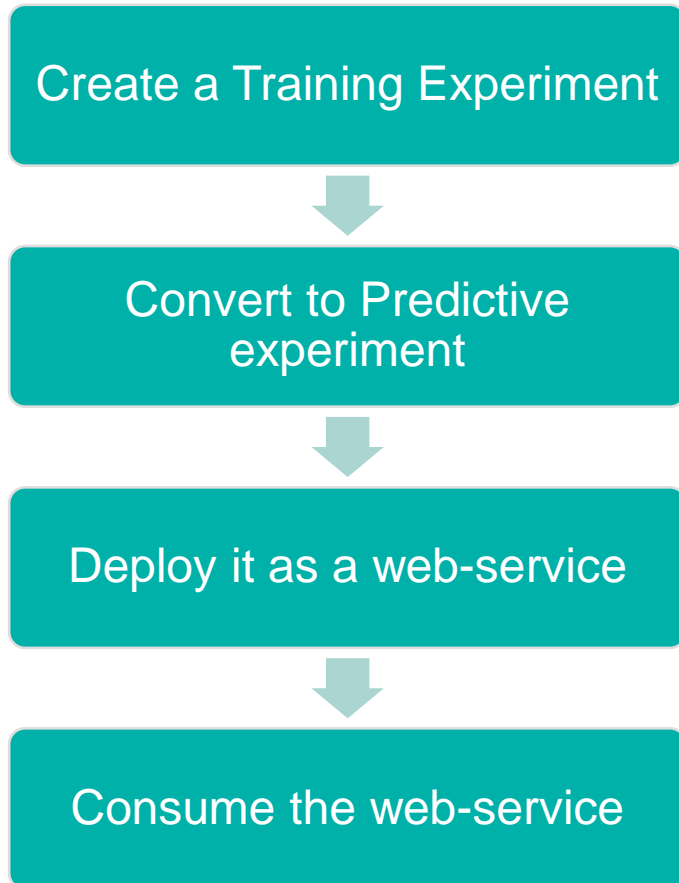
Describe ways to consume Azure web-services

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Azure ML Webservice Deployment Steps

Azure ML Webservice Deployment Steps



Here are the stages that a typical solution follows as you develop and deploy it using Machine Learning Studio (classic):

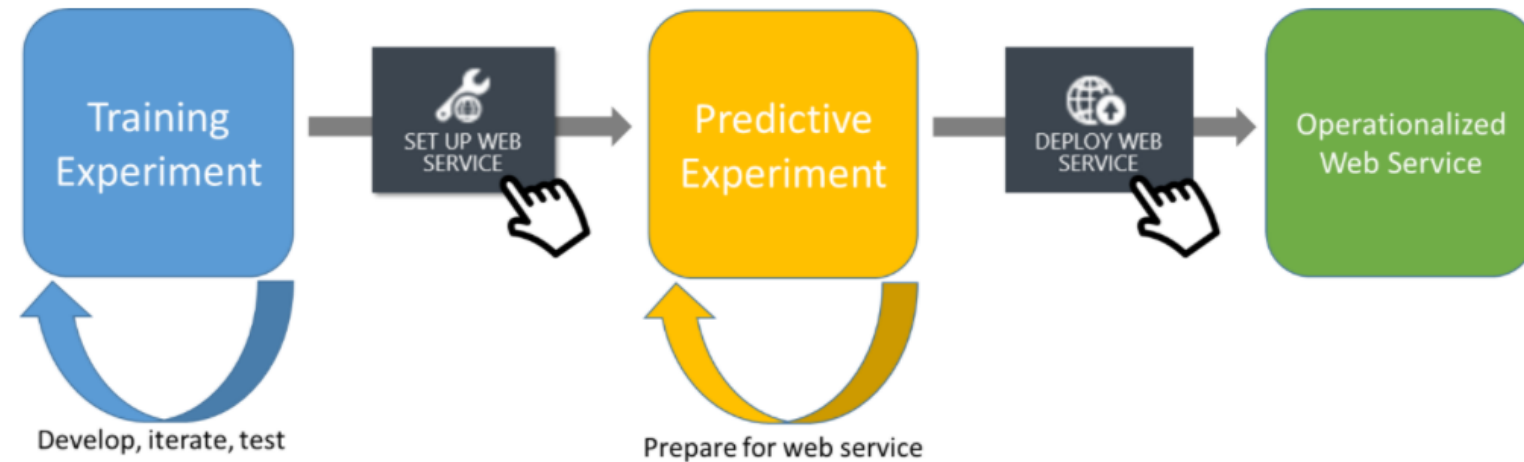


Figure 1 - Stages of a typical predictive analysis model

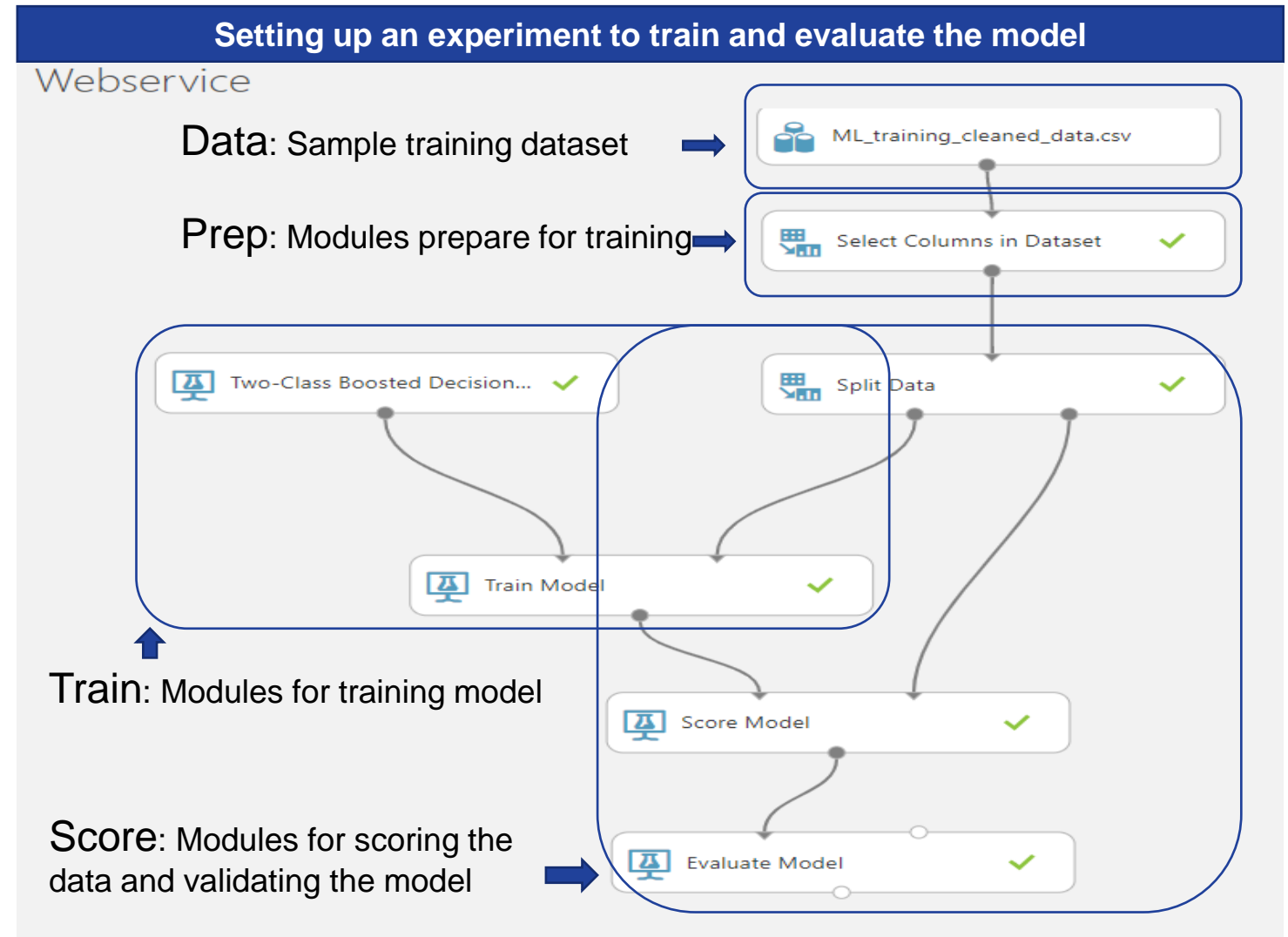
Source: <https://docs.microsoft.com/en-us/azure/machine-learning/classic/model-progression-experiment-to-web-service>

Deploy Machine Model as Webservice

Setting up the experiment to train and evaluate a model

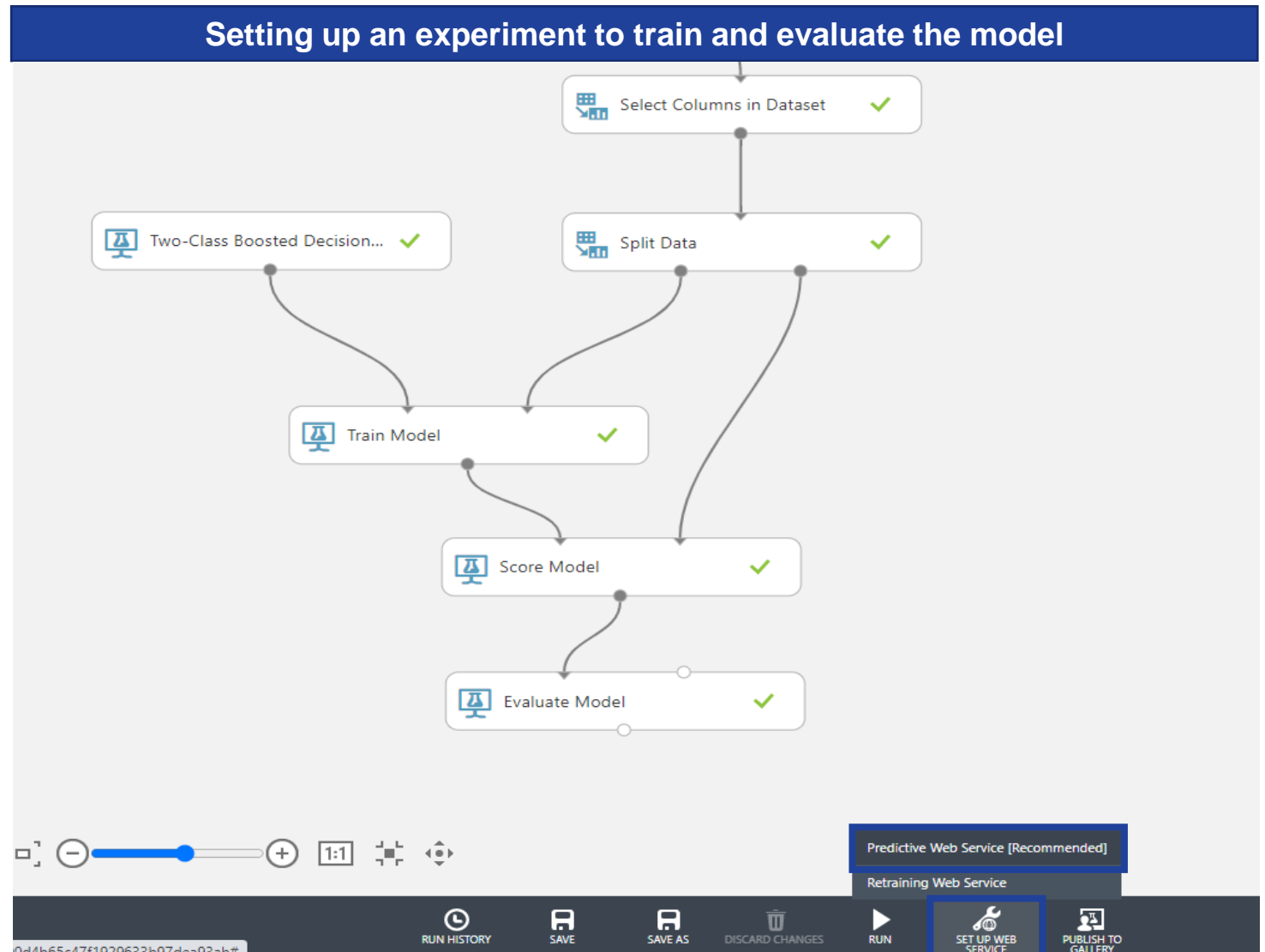
When converting training experiment to a predictive experiment, some of these modules are no longer needed

- **Data** - The data in this sample dataset is not used during scoring. However, the metadata from this dataset is used by the trained model.
- **Prep** - these modules may or may not be necessary to process the incoming data.
- **Train** - These modules are used to train the model.
- **Score** - In the predictive experiment, [Split Data](#) module can be removed. [Score Model](#) module is needed to return a score result through the web service.



Setting up the web service

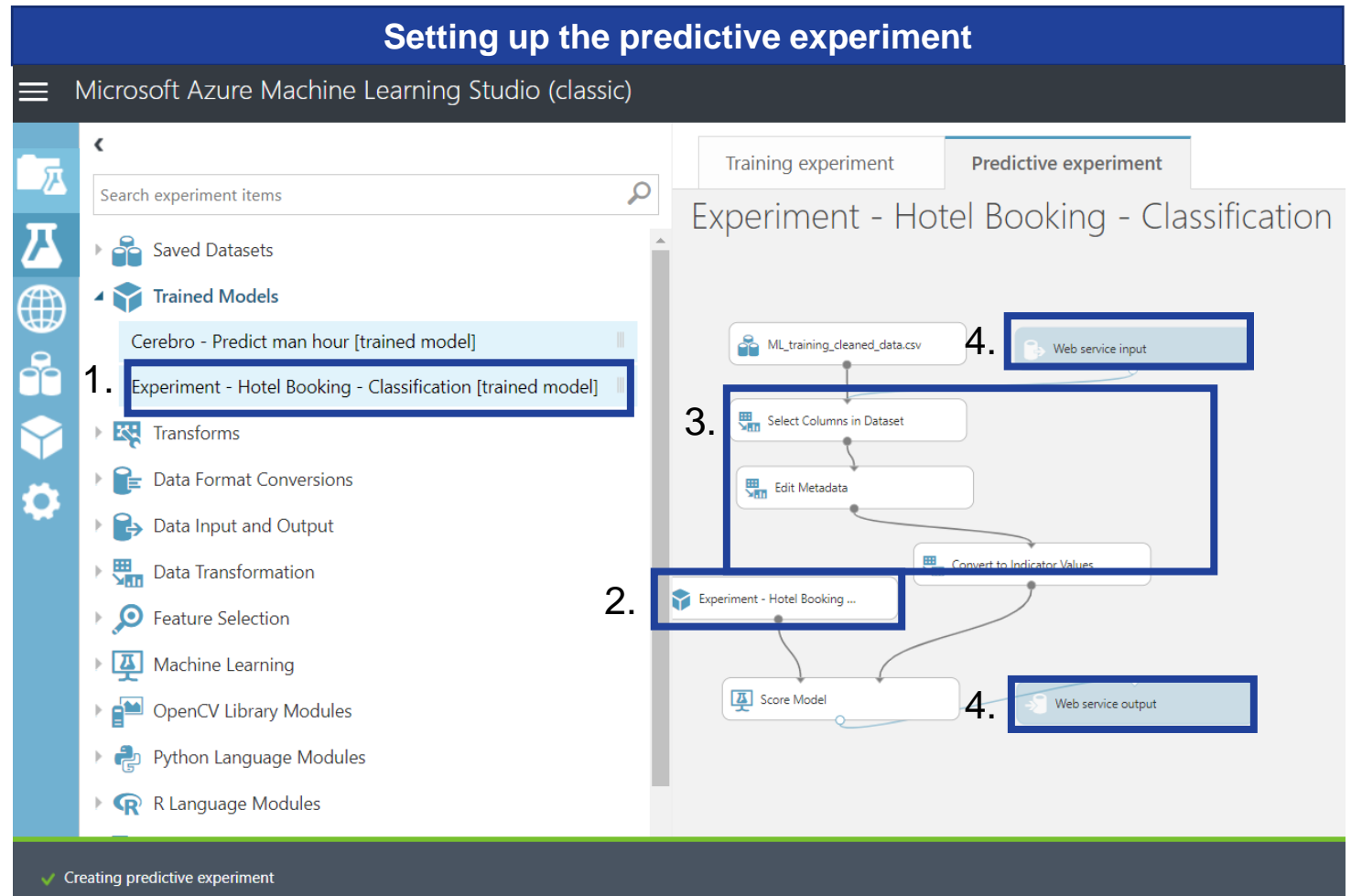
- Hover over 'SETUP WEB SERVICE' tab at the bottom pane
- Select 'Predictive Web Service (Recommended)' option



Setting up the web service continued...

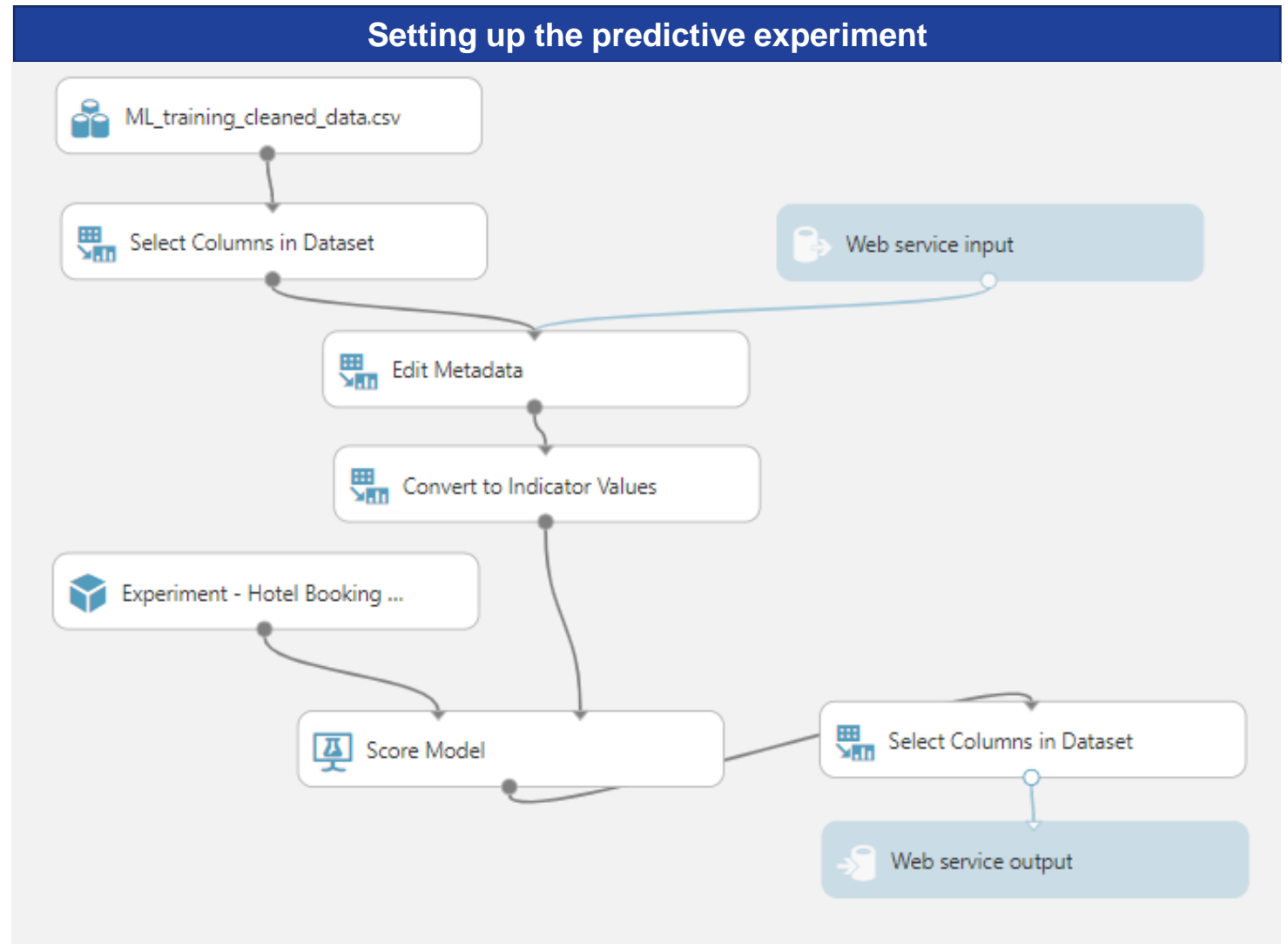
Set Up Web Service performs below steps of converting training experiment to a predictive experiment:

1. It saves trained model in the **Trained Models** section of the module palette.
2. It then replaces the machine learning algorithm and [Train Model](#) modules with the saved trained model.
3. It analyzes experiment and removes modules that were clearly used only for training and are no longer needed.
4. It inserts *Web service input* and *output* modules into default locations in your experiment.



Adjust input and output modules

- Connect the output of the **Web service input** module to a different module in the experiment.
- to return only the scoring results, add a Select Columns in Dataset module to exclude all columns except the scoring results. Then move the **Web service output** module to the output of the Select Columns in Dataset module.
- If there are more modules in experiment that will not be needed during scoring, these can be removed



Selection of required columns for web service output

- Right Click on the 'Score Model' module and select 'Visualize'
- Let's say we want only the columns 'Scored Labels' and 'Scored Probabilities' as the web service output

Selection of required columns									
Webservice [Predictive Exp.] > Score Model > Scored dataset									
rows		columns							
130820		27							
days_in_waiting_list	customer_type	required_car_parking_spaces	total_of_special_requests	reservation_status	Add(children_adults)	Total_guest	Scored Labels	Scored Probabilities	
0	Transient	0	0	Check-Out	2	2	false	0.000018	
0	Transient	0	0	Check-Out	2	2	false	0.000018	
0	Transient	0	0	Check-Out	1	1	false	0.000024	
0	Transient	0	0	Check-Out	1	1	false	0.000024	
0	Transient	0	1	Check-Out	2	2	false	0.000022	
0	Transient	0	1	Check-Out	2	2	false	0.000022	
0	Transient	0	0	Check-Out	2	2	false	0.00003	
0	Transient	0	1	Check-Out	2	2	false	0.00003	
0	Transient	0	1	Canceled	2	2	true	0.999988	
0	Transient	0	0	Canceled	2	2	true	0.999988	
0	Transient	0	0	Canceled	2	2	true	0.999988	

Selection of required columns for web service output

- Add 'Select Columns in Dataset' module and connect to 'Score Model'
- Connect the 'Score Model' to the 'Web service output' module
- Select 'Launch column selector' in the properties tab of 'Select Columns in Dataset' module
- Select the columns 'Scored Labels' and 'Scored Probabilities' as shown in the figure

Selection of required columns

Select columns

BY NAME

WITH RULES

AVAILABLE COLUMNS

All Types search columns

country
is_repeated_guest
previous_cancellations
previous_bookings_not_canceled
reserved_room_type
assigned_room_type
booking_changes
deposit_type
days_in_waiting_list
customer_type
required_car_parking_spaces
total_of_special_requests
reservation_status
Add(children_adults)
Total_guest

25 columns available

>

<

SELECTED COLUMNS

All Types search columns

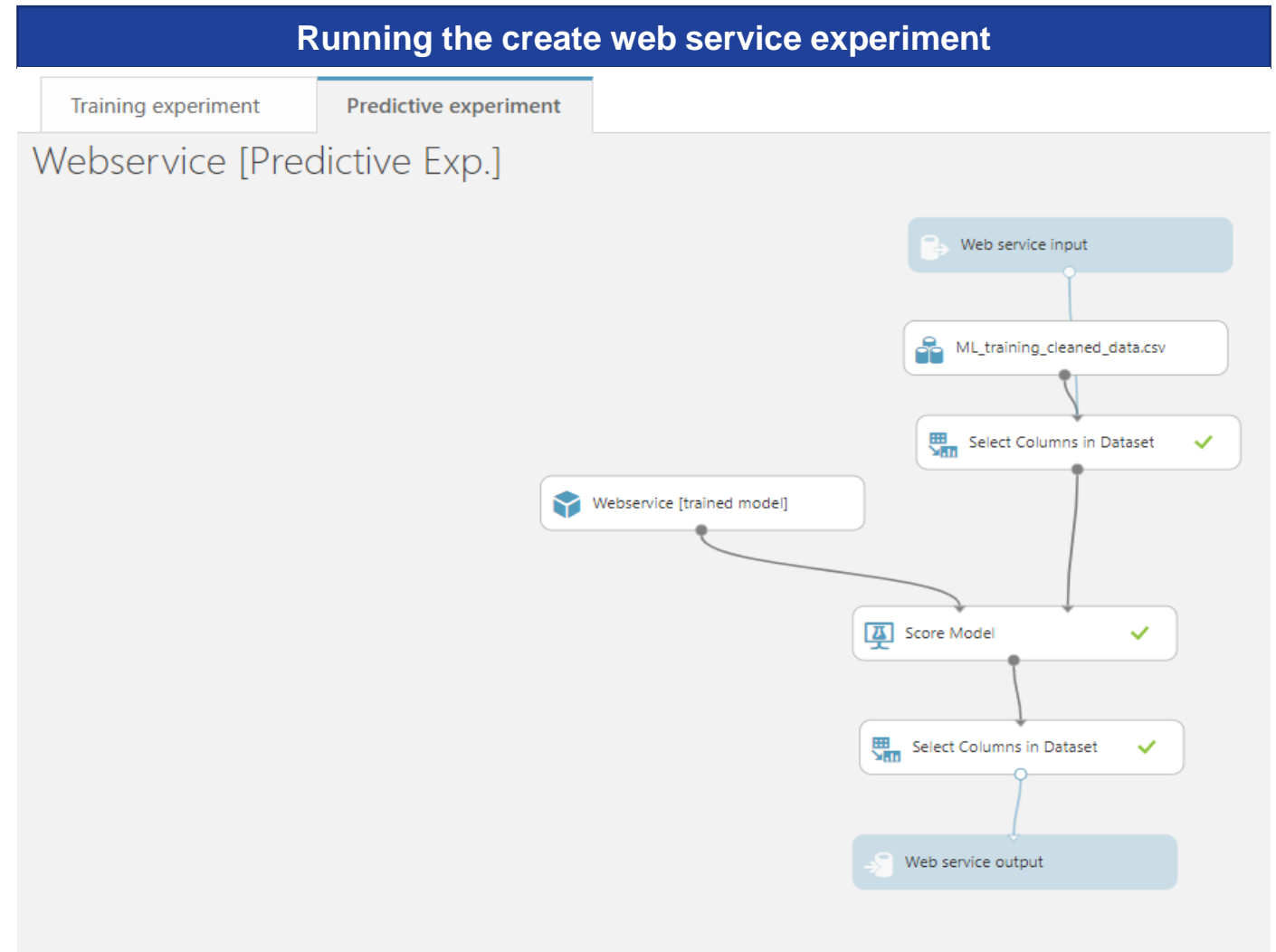
Scored Labels
Scored Probabilities

2 columns selected

✓

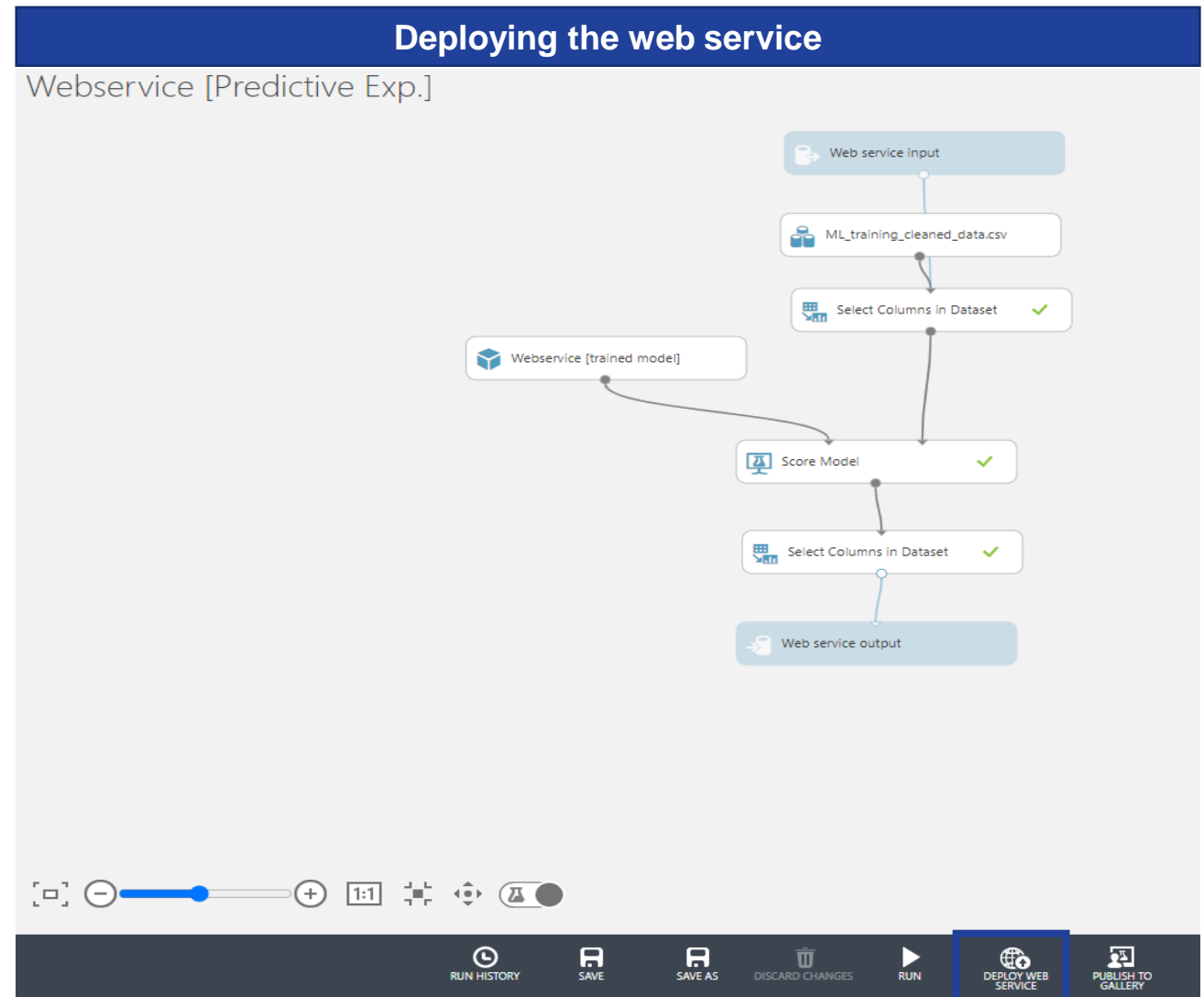
Selection of required columns for web service output

- The experiment should be as shown in the figure
- RUN the experiment



Deploy the web service

- Deploy the web service by clicking the 'DEPLOY WEB SERVICE' option at the bottom pane as highlighted in the figure



Deploy the web service

- A web service is created as shown in the figure
- We can call it using an application or excel sheet

Creation of the web service

webservice [predictive exp.]

DASHBOARD CONFIGURATION

General New Web Services Experience preview

Published experiment

View snapshot View latest

Description

No description provided for this web service.

API key

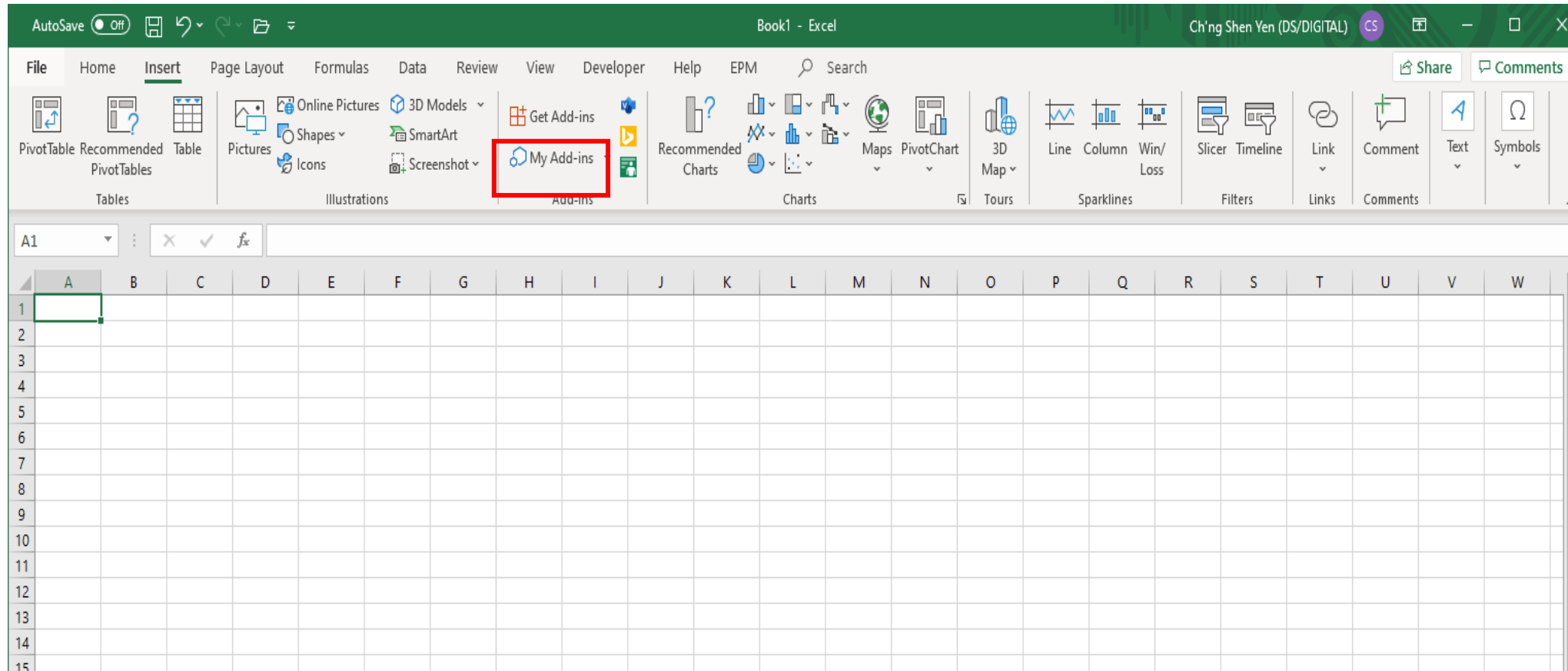
992+U5R0zNsQ9YHly/5L24eyGm/I9od4xfBFKHZDU1IWMG0R9IN8Hvu9B6LW1aWhE3pw5YJ9QkjGXsD8WkUPrQ==

Default Endpoint

API HELP PAGE	TEST	APPS	LAST UPDATED
REQUEST/RESPONSE	<div>Test</div> Test <small>preview</small>	Excel 2013 or later Excel 2010 or earlier workbook	6/1/2020 6:47:49 AM
BATCH EXECUTION	Test <small>preview</small>	Excel 2013 or later workbook	6/1/2020 6:47:49 AM

Access Webservice in Excel

Set up Excel Add-in to consume Azure ML Webservice



1. Click on Insert
2. Click on My Add-ins

Select ML Studio and click on Add

The screenshot displays the Microsoft Excel interface with the Office Add-ins pane open on the right. The 'Azure Machine Learning AML Team' add-in is listed under 'ADMIN MANAGED'. At the bottom of the pane, the 'Add' button is highlighted with a red rectangular box. The Excel ribbon shows the 'Insert' tab, and the worksheet 'Sheet1' is visible at the bottom.

Add Web Service

The image shows a screenshot of the Microsoft Excel application interface. The top ribbon includes tabs for File, Home, Insert, Page Layout, Formulas, Data, Review, View, Developer, Help, and EPM. The 'Insert' tab is currently selected. Below the ribbon, the Excel grid is visible, with cell A1 selected. On the right side of the screen, the 'Azure Machine Learning' sidebar is open. It displays a list of 'Web Services' including 'Titanic Survivor Predictor (Excel Add-i...' and 'Text Sentiment Analysis (Excel Add-in ...'. At the bottom of this list, the '+ Add Web Service' button is highlighted with a red rectangular box. Below this button, there is an 'Auto-predict' checkbox and a 'Predict All' button.

Requirement : URL and API Key

The screenshot displays the Microsoft Excel interface with the 'Azure Machine Learning' pane open on the right side. The pane is titled 'Azure Machine Learning' and has a 'Web Services' section. Under this section, two services are listed: 'Titanic Survivor Predictor (Excel Add-i...)' and 'Text Sentiment Analysis (Excel Add-in ...)'. Below the list, there are two input fields: 'URL' and 'API key', each with a question mark icon for help. At the bottom of the pane, there are 'Cancel' and 'Add' buttons.

Copy API Key from here and click on Request/Response

webservice [predictive exp.]

DASHBOARD CONFIGURATION

General [New Web Services Experience](#) preview

Published experiment

[View snapshot](#) [View latest](#)

Description

No description provided for this web service.

API key

992+U5R0zNs9YHly/5L24eyGm/l9od4xfBFKHZDU1IWMG0R9N8Hvu9B6LW1aWhE3pw5YJ9QkjGXsD8WkUPrQ==

Default Endpoint

API HELP PAGE	TEST	APPS	LAST UPDATED
REQUEST/RESPONSE	Test <small>Test preview</small>	 Excel 2013 or later  Excel 2010 or earlier workbook	6/1/2020 6:47:49 AM
BATCH EXECUTION	Test <small>Test preview</small>	 Excel 2013 or later workbook	6/1/2020 6:47:49 AM

On Request/Response, copy the URI.

Updated: 07/02/2020 09:06

No description provided for this web service.

- [Previous version of this API](#)
- [Submit a request](#)
- [Input Parameters](#)
- [Output Parameters](#)
- [Web App Template for RRS](#)
- [Sample Code](#)
- [API Swagger Document](#) ?
- [Endpoint Managment Swagger Document](#) ?

Request

Method	Request URI	HTTP Version
POST	https://asiasoutheast.services.azureml.net/workspaces/d33ddb3406e5499d9c67cd276acae9cd/services/d37ac6e8b328496fb96f54ab0c568dc7/execute?api-version=2.0&details=true	HTTP/1.1

Fill API Key with Primary Key and URL with Request-Response

The screenshot shows the Microsoft Excel interface with the 'Azure Machine Learning' pane open on the right. The pane displays 'Web Services' and lists two services: 'Titanic Survivor Predictor (Excel Add-in...)' and 'Text Sentiment Analysis (Excel Add-in ...)'. Below the list, the 'URL' field is populated with the following text:

```
https://asiasoutheast.services.azureml.net/workspaces/d33ddb3406e5499d9c67cd276acae9cd/services/d37ac6e8b328496fb96f54ab0c568dc7/execute?api-version=2.0&details=true
```

The 'API key' field is populated with the following text:

```
tgPgHixgBJ/sbqwO9m3AEVNi5c4hGnGa4qbf+VjNHq4IA/hanhOPUw9NTtXW61530Zi1EzjQKg8X6s01k5LW1A==
```

The 'Add' button at the bottom right of the pane is highlighted in blue.

API Connection Successful

The screenshot displays the Microsoft Excel application window. The title bar indicates the file is 'Book1 - Excel' and the user is 'Ch'ng Shen Yen (DS/DIGITAL)'. The ribbon is set to the 'Insert' tab, showing options for PivotTable, Recommended PivotTables, Table, Pictures, Illustrations, Add-ins, Charts, Tours, Sparklines, Filters, Links, Comments, Text, and Symbols. The main workspace is a blank Excel grid with columns A through X and rows 1 through 27. On the right side, the 'Azure Machine Learning' pane is open, showing a 'Tour of ML Studio Demo [Predictive Exp.]' with steps: 1. VIEW SCHEMA, 2. PREDICT, and 3. ERRORS. The 'PREDICT' step is active, showing input and output configuration options.

Azure Machine Learning

← Tour of ML Studio Demo [Predictive Exp.]

- VIEW SCHEMA
- PREDICT
 - Input:** input1
 - Type range or click button to select
 - ☒ My data has headers
 - [Use sample data](#)
 - Output:** output1
 - Enter output cell (e.g. A20)
 - ☒ Include headers
- ERRORS

Predicting will override existing values.
This can't be undone. [Got it!](#)

[Predict](#) ☐ Auto-predict

Summary

Summary

1

Steps involved in the deployment of Azure ML web-service

- Create a training experiment, convert to a predictive experiment, deploy and consume as web-service

2

Deploy machine learning model as web-service

- The Machine Learning model created can be used to predict on the new data without retraining using the Web-service

3

Azure web-service consumption

- Azure web-service can be accessed by using excel or an application

References

References

Deploy a machine learning

<https://docs.microsoft.com/en-us/azure/machine-learning/classic/deploy-a-machine-learning-web-service>

Web Service Parameters

<https://docs.microsoft.com/en-us/azure/machine-learning/classic/web-service-parameters>

Model progression to web service

<https://docs.microsoft.com/en-us/azure/machine-learning/classic/model-progression-experiment-to-web-service>

Web services with import/export

<https://docs.microsoft.com/en-us/azure/machine-learning/classic/web-services-that-use-import-export-modules>

Web service enable logging

<https://docs.microsoft.com/en-us/azure/machine-learning/classic/web-services-logging>

Manage web service

<https://docs.microsoft.com/en-us/azure/machine-learning/classic/manage-new-web-service>

Model Deployment

<https://docs.microsoft.com/en-us/azure/machine-learning/classic/tutorial-part3-credit-risk-deploy#access-the-web-service>

Thank you for your passion!

