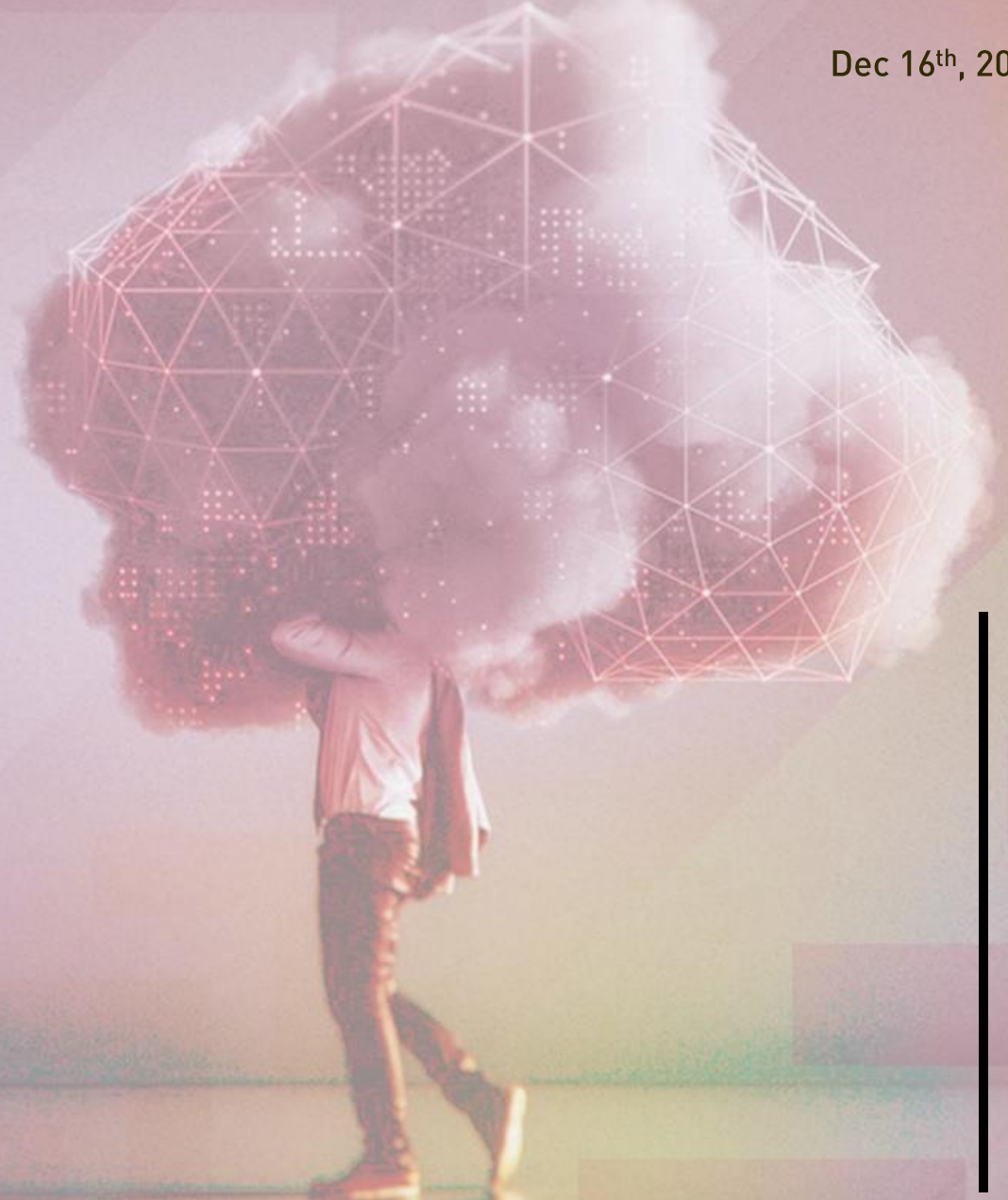
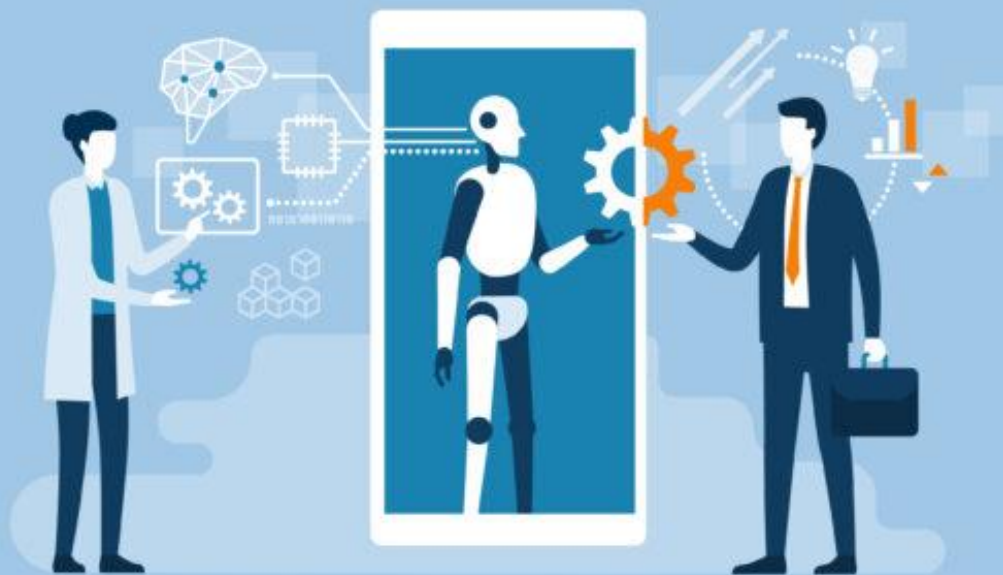


Dec 16<sup>th</sup>, 2022

# ORACLE<sup>®</sup> Auto ML

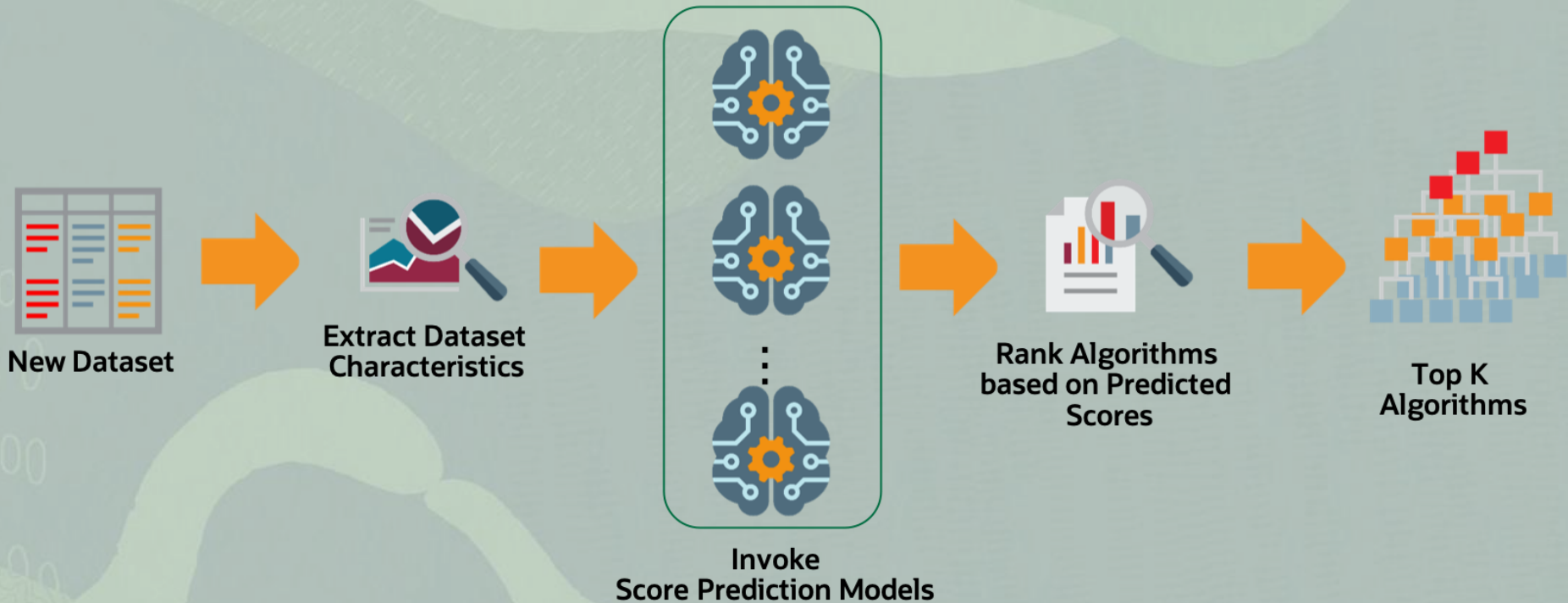


# What is Auto ML?



- Auto ML: the process of applying machine learning (ML) models to real-world problems
- Auto ML automates the selection, composition and parameterization of machine learning models.

# ORACLE<sup>®</sup> Auto ML



# ORACLE<sup>®</sup> Auto ML

01

## Prerequisites

Autonomous Database  
Lunchpad

02

## Data Load

Importing Data

03

## Run Auto ML

Hotel booking dataset  
Notebooks

04

## Q&A



# Creating Autonomous Database

ORACLE Cloud Search resources, services, documentation, and Marketplace US West (San J)

Overview > Autonomous Database > Autonomous Databases

Follow these process

## Autonomous Database

Autonomous Database delivers fast performance and requires no database administration. It performs all while the system is running, without human intervention. Autonomous Databases located in the Oracle cloud infrastructure. [Learn more](#).

[Create Autonomous Database](#)

Click here to make Database

Display Name	State	Dedicated	OCPUs	Storage	Workload type
<a href="#">RRFBCAFA5S4ATEYM</a> <small>Always Free</small>	Available	No	1	20 GB	Data Warehouse

List scope

Displaying 1 /

After setting up account for Oracle cloud

- Make your Autonomous Database with 'Create Autonomous Database'

# Creating Autonomous Database

ORACLE Cloud Search resources, services, documentation, and Marketplace

## Create Autonomous Database

### Configure the database

Always Free ⓘ ☒ Show only Always Free configuration options

ⓘ If your Always Free Autonomous Database has no activity for 7 consecutive days, the database will be automatically stopped. Your data will be preserved, and you can restart the database to continue using it. If the database remains stopped for 3 months, it will be reclaimed. [Learn more.](#)

Choose database version

19c

OCPU count *Read-only*

1

Always Free Autonomous databases can utilize up to 1 core. The CPU core count cannot be adjusted.

☐ OCPU auto scaling

Allows systems to expand up to three times the provisioned OCPU as workload increases. [Learn more](#) about auto scaling.

Create Autonomous Database [Cancel](#)

- Choose Always Free Database option
- Prevent the unexpected charges from your database.  
You can update your account with your extra permission

# Access to Launchpad

The screenshot shows the Oracle Cloud console interface. At the top, there's a navigation bar with 'ORACLE Cloud' and a search bar. Below it, the breadcrumb trail reads 'Overview > Autonomous Database > Autonomous Database details'. The main content area features a large green 'ADW' logo on the left, labeled 'AVAILABLE'. To the right of the logo, the database name 'RRFBCAFA5S4ATEYM' is displayed with an 'Always Free' tag. Below the name, there are several tabs: 'Database actions' (highlighted with a red box and an arrow pointing to a callout box), 'Database connection', 'Performance', and 'Tools'. The 'Database actions' tab is active, showing 'Autonomous Database information' and 'General information'. The 'General information' section lists details: 'Database name: RRFBCAFA5S4ATEYM', 'Workload type: Data Warehouse', 'Compartment: letswandive (root)', 'OCID: ...d7lwsq' (with 'Show' and 'Copy' links), and 'Created: Tue, Dec 13, 2022, 00:06:32 UTC'. On the right side of the console, there's a 'Development' section with four cards: 'SQL' (with a document icon), 'DATA MOI' (with a database icon), 'REST' (with a wrench icon), and 'LIQUIBASE' (with a database icon). Each card has a brief description of its functionality.

ORACLE Cloud Search resources, services, documentation, and Marketplace

ORACLE Database Actions | Launchpad

Overview > Autonomous Database > Autonomous Database details

ADW AVAILABLE

RRFBCAFA5S4ATEYM Always Free

Database actions Database connection Performance Tools

Autonomous Database information

General information

Database name: RRFBCAFA5S4ATEYM

Workload type: Data Warehouse

Compartment: letswandive (root)

OCID: ...d7lwsq Show Copy

Created: Tue, Dec 13, 2022, 00:06:32 UTC

Development

SQL Execute queries and scripts, browse and manage your database object...

DATA MOI Reverse-engineer relational diagrams

REST An IDE for your REST APIs that enables you to manage templates,...

LIQUIBASE View Changel schema.

Click here to access to Launchpad

- Launchpad has almost everything you want

# What's in Launchpad

ORACLE Database Actions | Launchpad

Administration		Monitoring	
JSON Create collections, upload documents, query and filter your...	CHARTS Use SQL queries to build rich charts and dashboards containing multip...	DATA TRANSFORMS Transform data for analysis and other applications.	DATA ANALYSIS Analyze your data.
SCHEDULING An interface for DBMS_SCHEDULER that enables you to monitor jobs,...	ORACLE MACHINE LEARNING Oracle Machine Learning provides several components accessible...		
APEX Login to APEX, develop and run rich, low-code web applications.	GRAPH STUDIO Oracle Graph Studio is a tool for visualizing and analyzing graph property d...		
DATABASE USERS REST enable schemas, change passwords, assign storage quota,...	APEX WORKSPACES Create and delete APEX workspaces, view the list of...	PERFORMANCE HUB Access SQL Monitoring reports and Active Session History (ASH)...	DATABASE DASHBOARD Monitor database activity charts such as CPU usage, number of...

Click here to access to make User



# Make DATABASE User with Oracle Machine Learning Enable

The screenshot shows the Oracle Database Actions console. On the left, the 'Current User' section displays the 'ADMIN' user with 'REST Enabled', 'Graph Enabled', and 'OML Enabled' status. Below this, a list of users includes 'ADBSNMP'. The main area is the 'Create User' form, which has two tabs: 'User' and '3 Granted Roles'. The 'User' tab is active, showing fields for 'User Name', 'Password', and 'Confirm Password'. To the right of these fields are options for 'Quota on tablespace DATA' (set to 'Use default quota'), 'Password Expired (user must change)' (disabled), and 'Account is Locked' (disabled). At the bottom of the form, there are three toggle switches: 'Graph' (disabled), 'Web Access' (disabled), and 'OML' (enabled). The 'OML' toggle is highlighted with a red box and a red arrow pointing to it. A callout box with the text 'Enable Machine Learning' is positioned next to the 'OML' toggle.

ORACLE Database Actions | Database Users

Search

ADMIN

Current User

ADMIN REST Enabled Graph Enabled OML Enabled

ORDS Alias: admin

Last Login: 12/14/2022, 2:24:31 AM Password Expires in 358 days

https://gd38ad1217fdef4-rrfbcafa5s4ateym.adb.us-sanjose-1.oraclecloudapps.com

All Users

Search by User Name

Filter by Sort by

ADBSNMP

Create User

User

3 Granted Roles

User Name \*

Password \*

Confirm Password \*

Quota on tablespace DATA

Use default quota

Password Expired (user must change)

Account is Locked

Graph ?

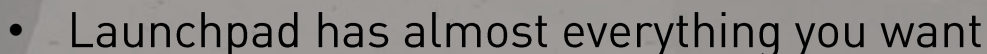
Web Access ?

OML ?

Enable Machine Learning

Web access advanced features

- OML: Oracle Machine Learning



# Load File in LOAD DATA

The screenshot shows the Oracle Database Actions Launchpad interface. The left sidebar contains navigation links: Overview, Data Load, Analysis, Insights, and Catalog. The main content area is titled 'What do you want to do with your data?' and features three options: 'LOAD DATA' (highlighted with a red box and a blue checkmark), 'LINK DATA', and 'FEED DATA'. Below this, the section 'Where is your data?' offers three choices: 'LOCAL FILE' (highlighted with a red box and a blue checkmark), 'DATABASE', and 'CLOUD STORE'. A callout box with the text 'Click Next to upload your file' has a red arrow pointing to a 'Next' button in the bottom right corner.

ORACLE Database Actions | Launchpad Search

Overview  
Data Load  
Analysis  
Insights  
Catalog

What do you want to do with your data?

- LOAD DATA**  
Import data into your autonomous database. ✓
- LINK DATA  
Leave your data in place and let your autonomous database access it.
- FEED DATA  
Set up an ongoing feed of new data into your autonomous database.

Where is your data?

- LOCAL FILE**  
Select text or Excel files from your local device. ✓
- DATABASE  
Select tables from your remote databases.
- CLOUD STORE  
Select objects from URLs.

Click Next to upload your file

Next

# Load File in LOAD DATA

1



Drag and drop here to upload  
or

Select Files

Data Load > Local Files

3

2



Source:

hotel\_bookings.csv (16M)

Target:

HOTEL\_BOOKINGS\_5

# Choose Auto ML in Oracle machine Learning Dashboard

≡ ORACLE Machine Learning



## How Do I?



### Get Started

Get started with Oracle Machine Learning



### Use AutoML

How to create AutoML Experiments



### Deploy Models

How to Deploy Machine Learning Models



### Create Notebooks

How to create a notebook



### Create Jobs

How to create a job



### Manage Permissions

How to manage collaborative permissions in workspaces



### Try It

Follow along with a hands on workshop

## Quick Actions



### AutoML

Create and run AutoML Experiments



### Models

Manage and Deploy Machine Learning Models



### Scratchpad

Run Scratchpad



### Notebooks

The place for data discovery and analytics



### Jobs

Schedule notebooks to run at certain times



### Examples

Check out some examples

Click here to make AutoML



# Create Auto ML

≡ ORACLE Machine Learning

## AutoML Experiments

Click here to create AutoML

+ Create

 Edit

 Delete

 Duplicate

 Start ▼

 Stop

☐ Name ^

Comment ⚡

Created On ⚡

☐ HOTEL

12/13/22, 6:42 PM

# Create Experiment

ORACLE Machine Learning

HEEJAE Project  
HEEJAE Workspace

HEEJAE

## Create Experiment

Start

Cancel

Save

**1**

Name

Hotel ADR prediction

Comments

**2**

Data Source

HEEJAE.HOTEL\_BOOKINGS\_3

**3**

Predict

ADR

Prediction Type

Regression

Case ID

Select Case ID

**4**

Additional Settings

- 1** Name it
- 2** Choose data source we imported
- 3** Select Target variable
- 4** Prediction type as Regression

# Change Model metric to R2

ORACLE Machine Learning

▼ Additional Settings

Reset

Maximum Top Models

5

Maximum Run Duration (Hours)

8

Database Service Level

Low

Model Metric

R2



Algorithms

☐ Name

☒ Generalized Linear Model

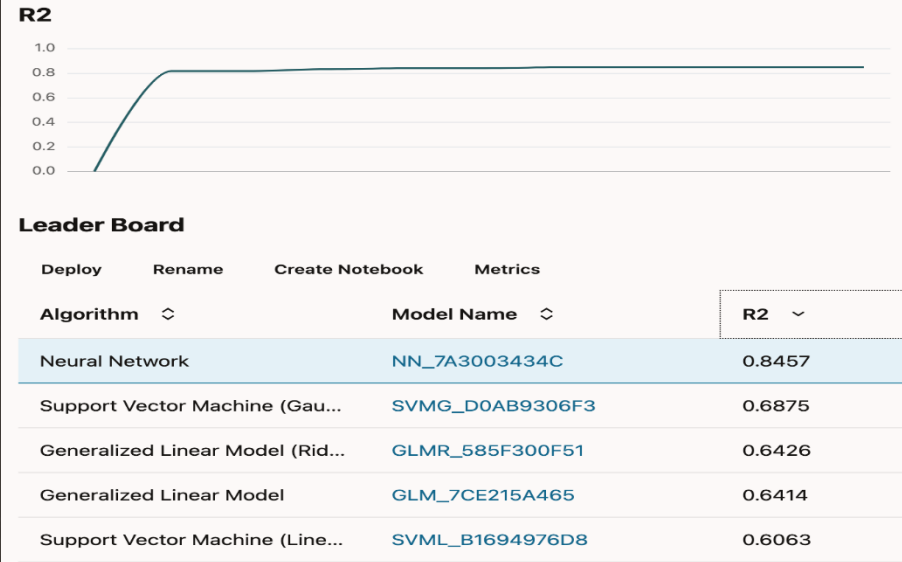
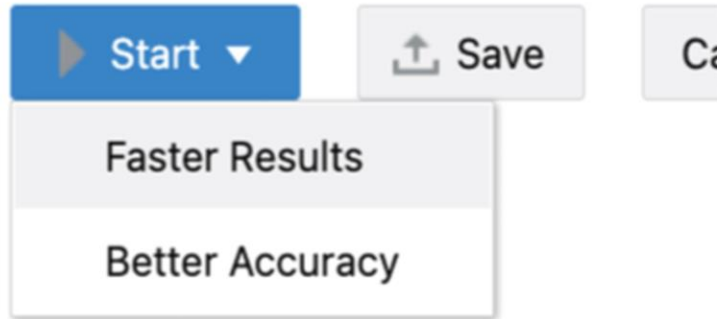
Choose R2 as model matrix

# Selecting the features for the model

Features							
 Refresh							<input type="text" value="Filter"/>
<input type="checkbox"/>	Name	Type	Distinct Values	Min	Max	Mean	Std Dev
	ADR	NUMBER	9358	-6.38	5400	96.89	103.02
<input checked="" type="checkbox"/>	ADULTS	NUMBER	14	0	55	1.86	0.6
<input checked="" type="checkbox"/>	AGENT	VARCHAR2	333				
<input checked="" type="checkbox"/>	ARRIVAL_DATE_DAY_OF_MONTH	NUMBER	31	1	31	15.8	8.93
<input checked="" type="checkbox"/>	ARRIVAL_DATE_MONTH	VARCHAR2	12				
<input checked="" type="checkbox"/>	ARRIVAL_DATE_WEEK_NUMBER	NUMBER	53	1	53	27.17	13.74

- The above panel shows the features available for selection as predictor variables for the models.
- The summary information for each feature is displayed.
- The checkboxes present against each feature can be used to add or remove the predictor variables.

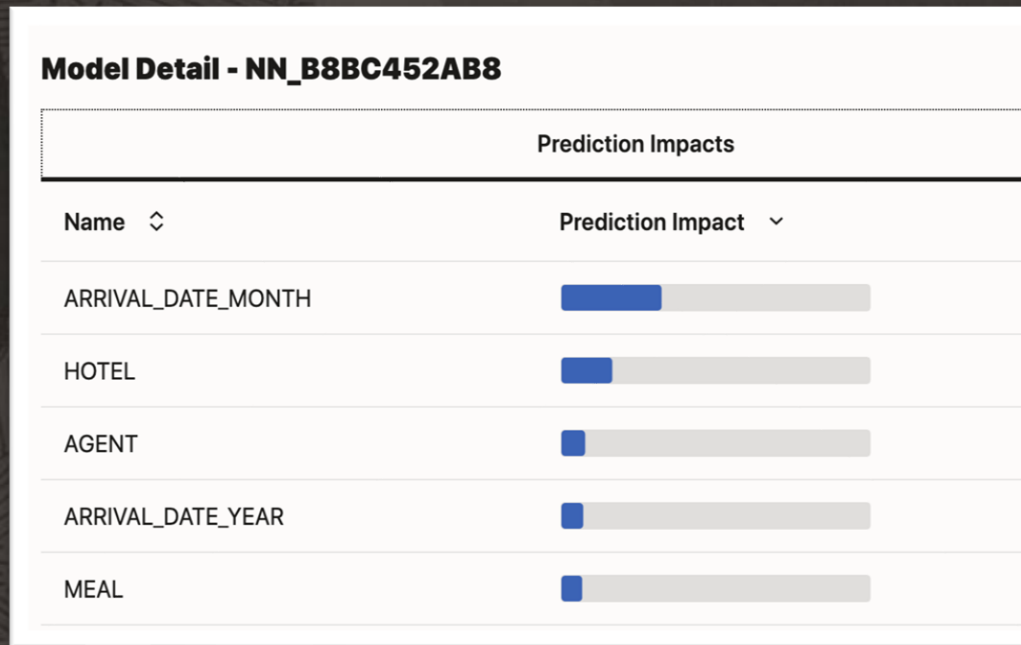
# Starting the models



- After defining the model, in the top-right hand corner of the experiment, we can choose to start the models either with “Faster results” or “better accuracy”.
- Selecting “Faster Results” option builds the models in lesser time when compared with “Better Accuracy” option.
- As the model runs, a checklist appears in the upper right hand section with updates on its progress.
- A leaderboard is displayed which ranks the models based on the model metric selected for the experiment.



# Knowing the prediction impact Of the features after the model



- The prediction impact of the most important features can be found by selecting a model.
- In the above image, model running with Neural Network algorithm and name NN\_B8BC452AB8 is selected.

# Working with Auto Model Notebooks

**HOTEL 3 NN (2)** 🔍 📄 📁 📌 📤 🔍

1 🔍 ⚙️ default

Oracle Machine Learning AutoML UI - Experiment - Generated Notebook ▶️ 🔍 📄 ⚙️ 🔍 **READY**

**Get proxy object for selected data** ▶️ 🔍 📄 ⚙️ 🔍 **READY**

```
%python
import oml

columns = '"MEAL"', '"COUNTRY"', '"IS_CANCELED"', '"ARRIVAL_DATE_DAY_OF_MONTH"', '"HOTEL"', '"ARRIVAL_DATE_MONTH"', '"PREVIOUS_CANCELLATIONS"', '"AGENT"',
'"PREVIOUS_BOOKINGS_NOT_CANCELED"', '"LEAD_TIME"', '"CUSTOMER_TYPE"', '"MARKET_SEGMENT"', '"IS_REPEATED_GUEST"', '"RESERVATION_STATUS"', '"RESERVED_ROOM_TYPE"',
'"ARRIVAL_DATE_YEAR"', '"DISTRIBUTION_CHANNEL"', '"TOTAL_OF_SPECIAL_REQUESTS"', '"ASSIGNED_ROOM_TYPE"', '"ARRIVAL_DATE_WEEK_NUMBER"', '"ADULTS"', '"COMPANY"', '"ADR"'
schema="HEEJAE"
table="HOTEL_BOOKINGS_3"

column = ','.join(columns)
query = 'SELECT ' + column + ' FROM ' + schema + '.' + table + ' where ' + '"ADR"' + ' is not null'

build_data = oml.sync(query=query)
z.show(build_data)
```

**Prepare training data** ▶️ 🔍 📄 ⚙️ 🔍 **READY**

```
%python
X_train = build_data.drop('ADR')
y_train = build_data[:, 'ADR']
```

- Oracle notebooks can be created for a model by clicking on “Create Notebook” option in the Leaderboard section.
- They are similar to Jupyter notebooks and provides interface to run SQL queries, create visualizations, and experiment with machine learning,
- The cells can be run to clean the data, create and fit the model and rate its accuracy.

# Working with Auto Model Notebooks

**HOTEL 3 NN (2)**



Export

Export (Clear Output)

Oracle Machine Learning AutoML UI - Export Notebook

- The notebooks can be run directly in this page or it can be downloaded and exported by using “Export” option.

# Q&A ORACLE®

