



Use no-code ML to solve real-world challenges

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Solutions Architect

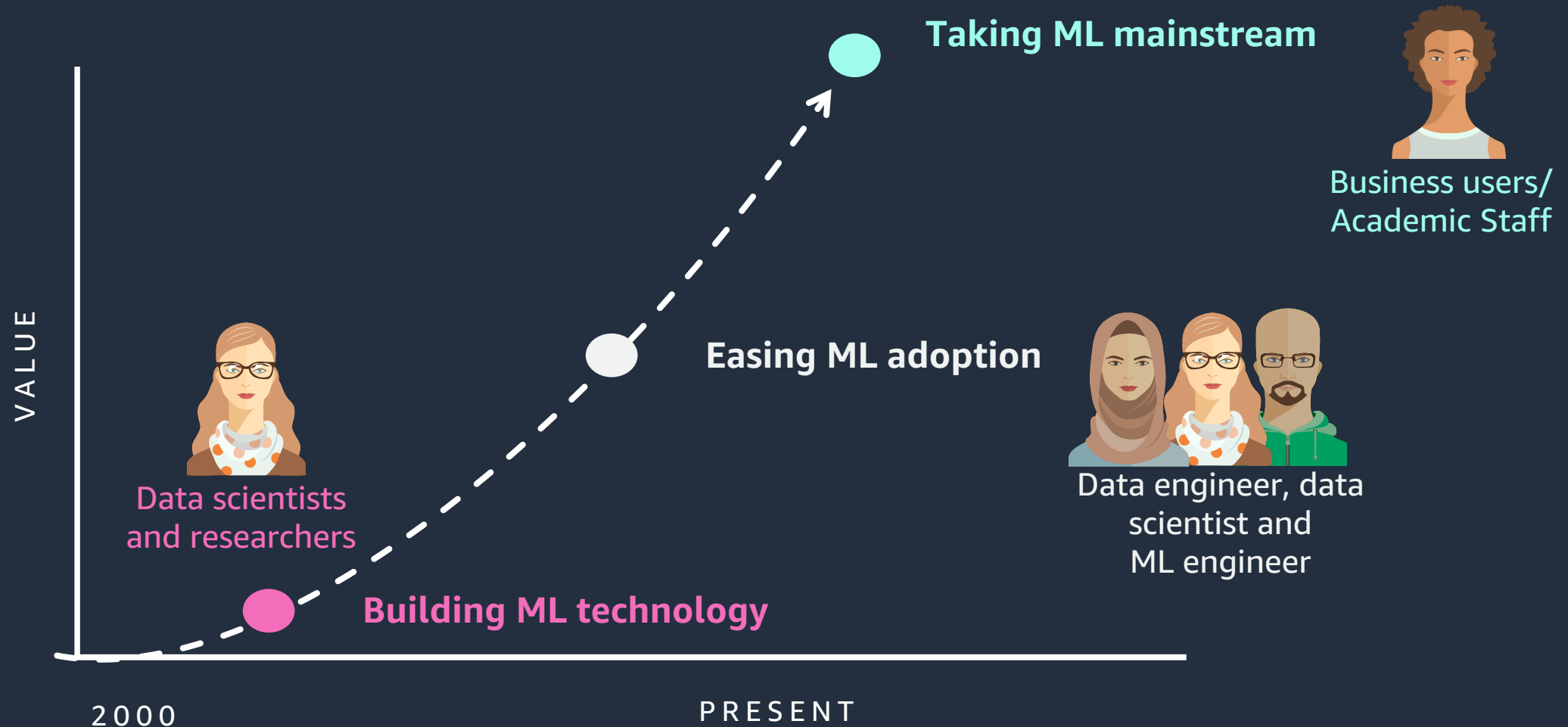
Amazon Web Services

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Agenda

- Why no-code ML?
- Using ready-to-use models
- Preparing and analyzing data
- Creating custom models
- Using generative AI
- Demo

Why no-code machine learning?

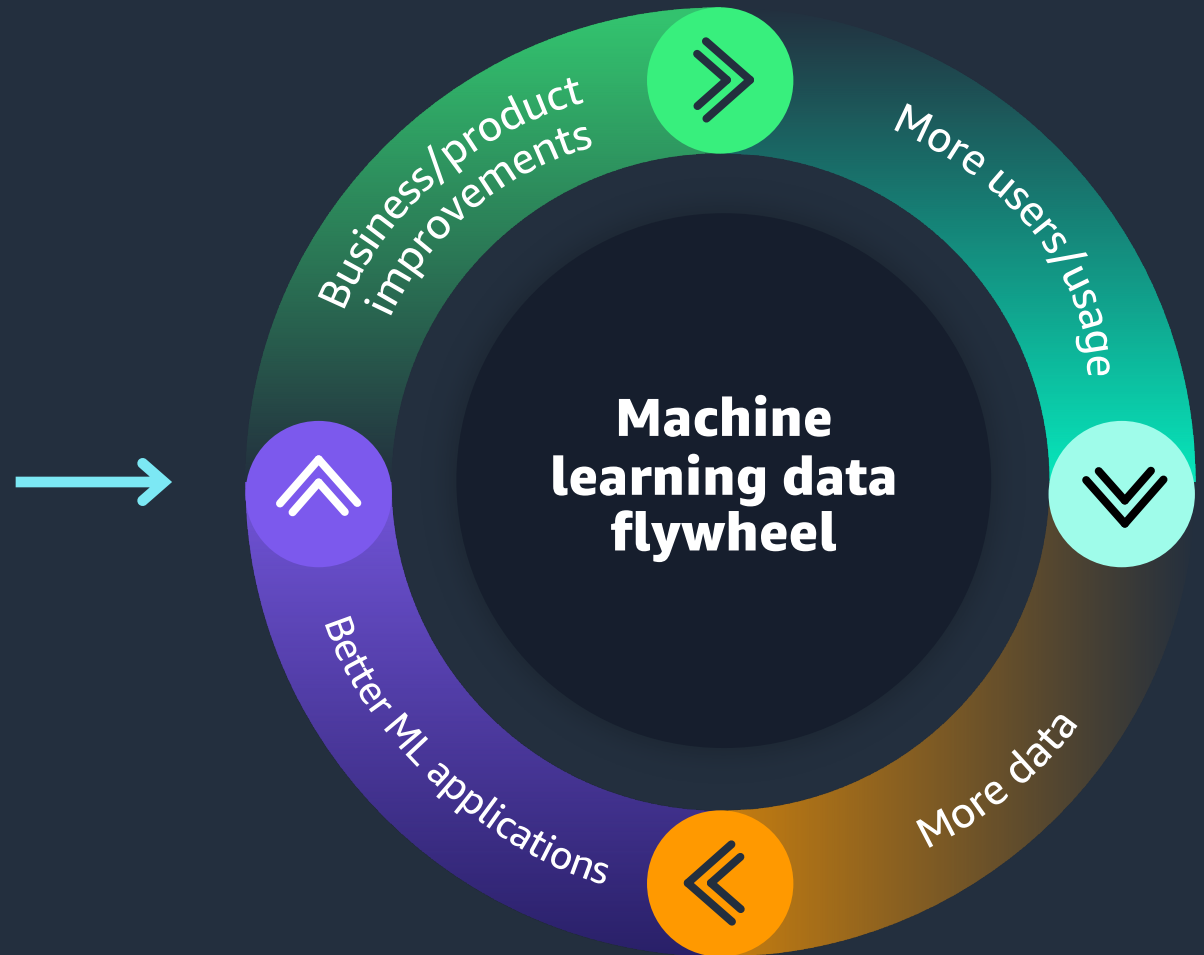


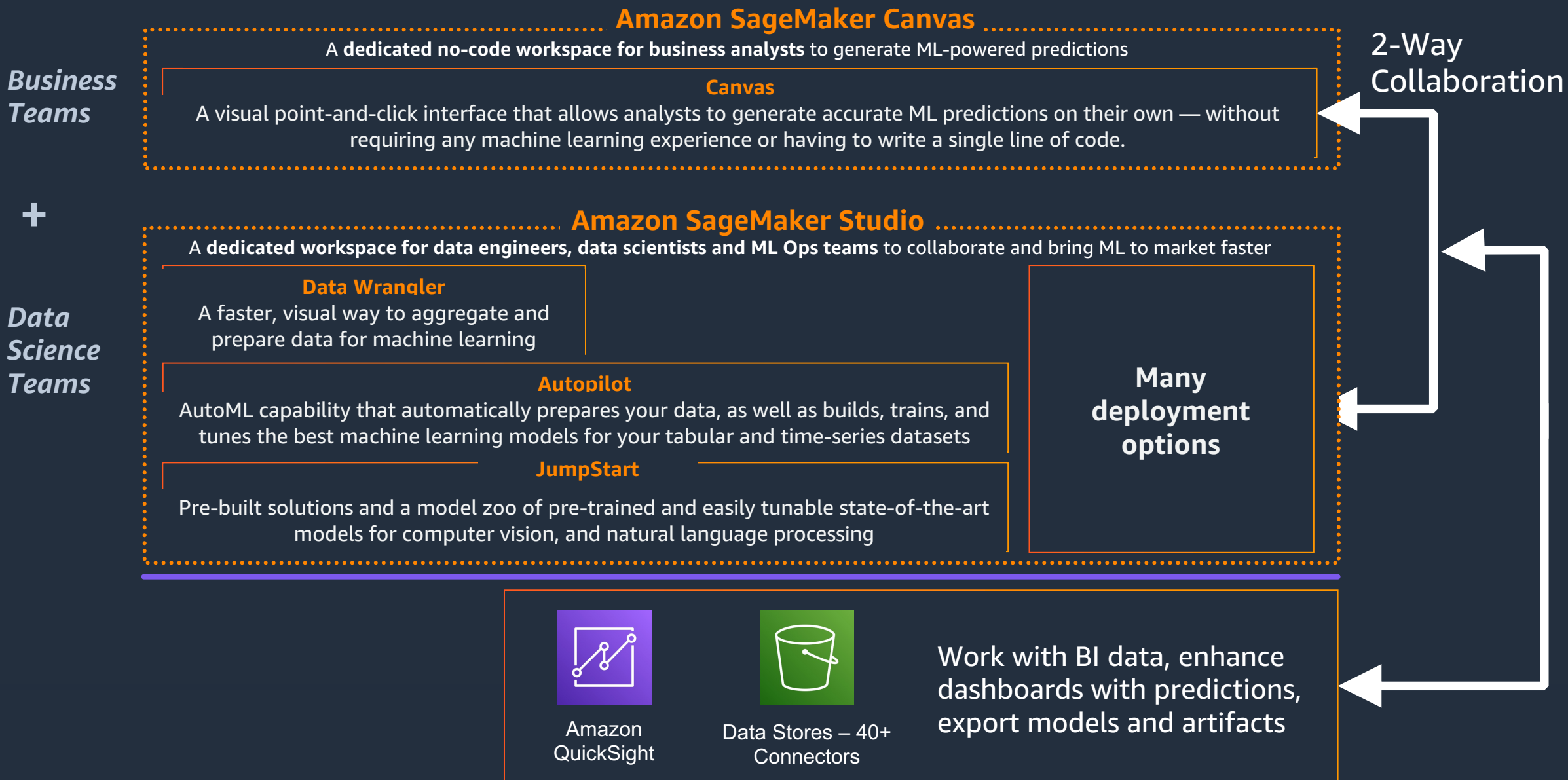
Building practical ML applications is hard

The bottleneck

BUILDING BETTER ML APPLICATIONS CAN BE THE BOTTLENECK BECAUSE:

- Line of business teams depend on data science teams to make machine learning (ML) powered decisions
- Data science teams are oversubscribed, while ML needs are only increasing
- High learning curve for technical users to learn how to code
- Friction points in the machine learning journey and prioritizing use cases





Amazon SageMaker Canvas

Build ML models and generate accurate predictions — no code required



Quickly access and prepare data for Machine Learning



Built-in AutoML to build models and generate accurate predictions



Share ML models and collaborate with data science teams



Usage-based pricing to avoid licensing fees and reduce TCO



Import ML models from any tool within or outside Amazon SageMaker and generate predictions directly in SageMaker Canvas

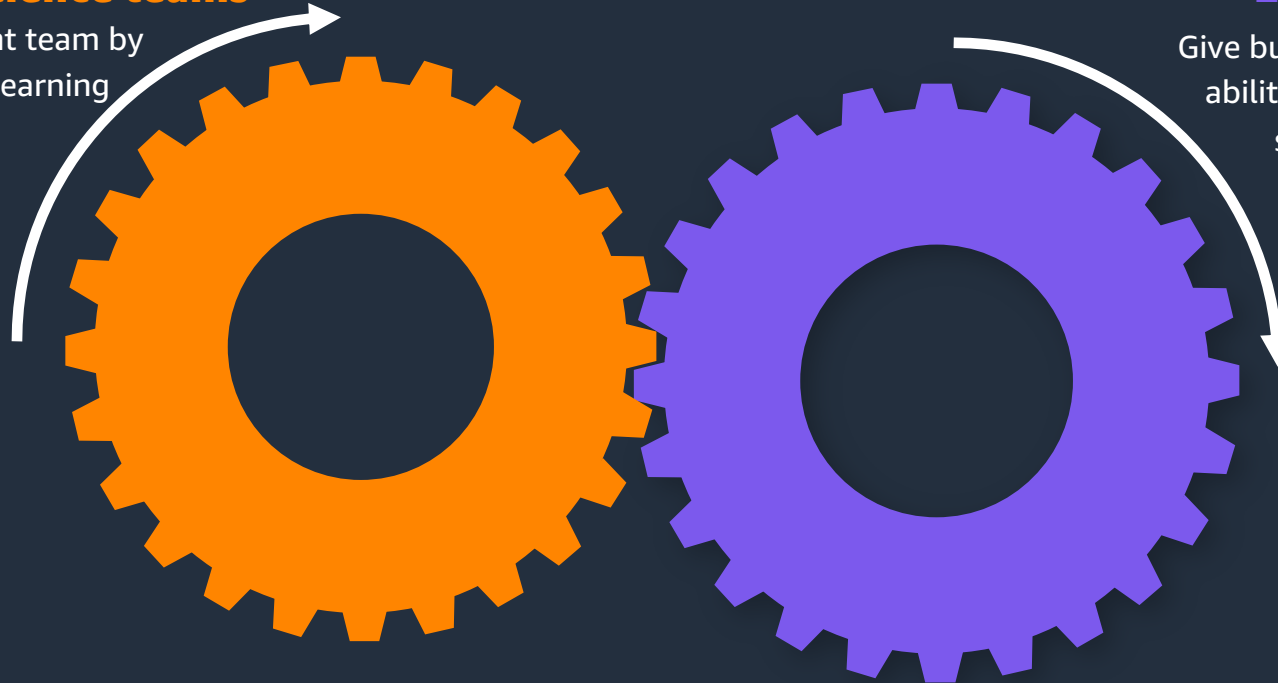
Ways SageMaker low-code/no-code helps

Accelerate data science teams

Do more with your current team by using low-code machine learning tools in order to get to the desired outcomes faster.

Enable business users

Give business users and analysts the ability to do ML without any code, scaling the number of people who can create ML powered insights, forecasts, and predictions

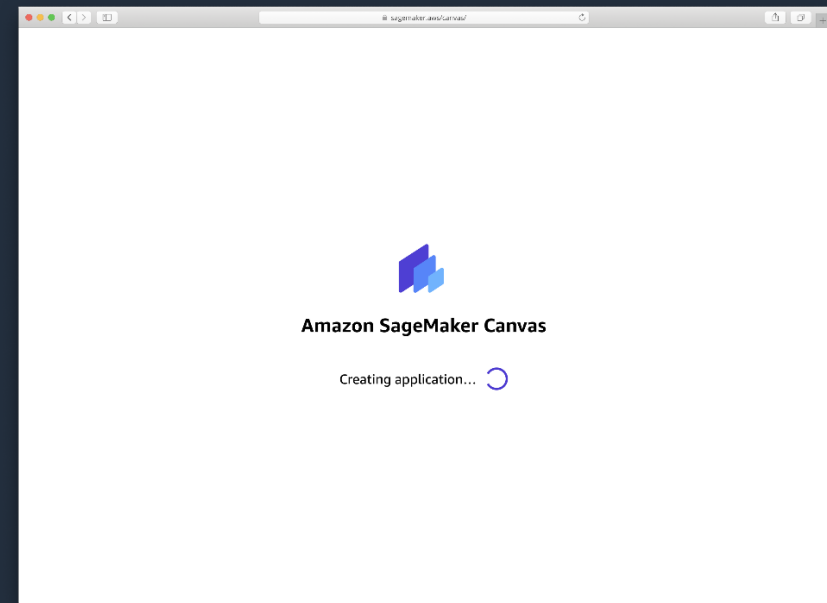


Collaborate together

SageMaker LCNC ML has several points of collaboration making it efficient for Business users to use data scientist models or for data scientists to make changes on the models analysts build and creating one place for all the analytics and machine learning in a team or organization

Amazon SageMaker Canvas

Self-service access to a business-friendly tool for machine learning



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Get started

Get started with quick actions to build and use ML and generative AI models – no code required.

Prepare and analyze data

Build a custom model

Compare GenAI models & query docs

Explore ready-to-use-models

Learn to build machine learning models for different real world use cases. [Explore Workshops](#)

Recent work

Data flows [+ Create a data flow](#)

Name	Last updated ↓
------	----------------

Canvas news

[Featured blog](#)

Detect anomalies in manufacturing data using Amazon SageMaker Canvas

Feb 15

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Ready-to-use models

**Document queries**

Extract information from structured documents such as paystubs, bank statements, W-2s, and mortgage application forms by asking questions using natural language.

Powered by Amazon Textract

**Sentiment analysis**

Detect sentiment in lines of text, which can be positive, negative, neutral, or mixed.

Powered by Amazon Comprehend

**Entities extraction**

Extract entities, which are real-world objects such as people, places, and commercial items, or units such as dates and quantities, from text.

Powered by Amazon Comprehend

**Language detection**

Determine the dominant language in text such as English, French or German.

Powered by Amazon Comprehend

**Personal information detection**

Detect personal information that could be used to identify an individual, such as addresses, bank account numbers, and phone numbers, from text.

Powered by Amazon Comprehend

**Object detection in images**

Detect objects, concepts, scenes, and actions in your images.

Powered by Amazon Rekognition

**Text detection in images**

Detect text in your images.

Powered by Amazon Rekognition

**Expense analysis**

Extract information from invoices and receipts, such as date, number, item prices, total amount, and payment terms.

Powered by Amazon Textract

**Identity document analysis**

Extract information from passports, driver licenses, and other identity documentation issued by the US Government.

Powered by Amazon Textract

**Document analysis**

Analyze documents and forms for relationships among detected text.

Powered by Amazon Textract

Object detection of images

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Ready-to-use models > Object detection in images Ready-to-use model

Single prediction

Batch prediction

Use single prediction to get real-time results on the image you upload. The results are the different objects detected from the image. To generate prediction results from multiple image datasets, use batch prediction instead.

Upload an image to generate predictions.

Upload image

LabelDetection.jpg



Pricing Information

Prediction results

Search labels

Confidence ⓘ

Clock Tower

100%

Tower

100%

Bus

100%

Vehicle

100%

Housing

95%

Tour Bus

93%

Double Decker Bus

92%

When you use Object detection in images, you are using Amazon Rekognition in the background to generate prediction results. Object detection in images' Service Terms and pricing apply. [Learn more](#)

Expense analysis

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Use single prediction to get real-time results on the document you upload. The results are the different summary and line item fields detected from the document.
To generate prediction results from multiple document datasets, use batch prediction instead.

Upload a document to generate predictions.

Upload invoice or receipt

Select sample document

Invoice

Receipt

Receipt.jpeg



WHOLE FOODS MARKET
BRYANT PARK BKA
813-728-5700

BROO BROWN ALE	\$10.99
BOTTLE DEPOSIT	\$0.30
DRSCL STRAWBERRIES	\$3.49
OVF OG LG EGGS	\$2.89
365 WHL MLK	\$4.09
NOOSA HONEY YOGHURT	\$2.29
365 OG ROMAINE BAG	\$2.69
365 SALTED CORN CHIPS	\$2.79
POVG WHITE BAGIT	\$3.50
365 PBSTR BALLS OG	\$3.99
365 JMBD PAPER TOWELS	\$1.69
365 CHUNKY SALSA	\$2.69
LACRX GRAPEFRUIT	\$5.99
BOTTLE DEPOSIT	\$0.60
PHIND GRND BEEF	\$5.99
Subtotal	\$59.96
Tax	\$5.64
Total	\$65.60
Sold Items	13
PAID	
VISA	\$65.64
04/02/2019	09:16:42

Prediction results

Summary fields Line item fields

Search labels

Confidence ⓘ

VENDOR_PHONE

917-728-5700

100%

ZIP_CODE

10036

100%

Total:

\$55.64

100%

Sold Items:

13

100%

INVOICE_RECEIPT_DATE

04/02/2019

100%

When you use Expense analysis, you are using Amazon Textract in the background to generate prediction results. Expense analysis: Conditon Terms and pricing apply. Learn more

Prediction results	
Summary fields	Line item fields
ITEM	PRICE
BROO BROWN ALE	\$10.99
BOTTLE DEPOSIT	\$0.30
DRSCL STRAWBERRIES	\$3.49
OVF OG LG EGGS	\$2.89
365 WHL MLK	\$4.09
NOOSA HONEY YOGHURT	\$2.29
365 OG ROMAINE BAG	\$2.69
365 SALTED CORN CHIPS	\$2.79

Identity document analysis

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Single prediction

Batch prediction

Use single prediction to get real-time results on the identification document you upload. The results are the different fields and values detected from the identification document. To generate prediction results from multiple document datasets, use batch prediction instead.

Upload a document to generate predictions.

Upload document

DriversLicense.png

Pricing Information

Prediction results

Search labels

Confidence ⓘ

DATE_OF_ISSUE

03/18/2018

98%

CLASS

D

98%

ZIP_CODE_IN_ADDRESS

02801

98%

MRZ_CODE

98%

EXPIRATION_DATE

01/20/2028

98%

aws

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Personal information detection

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Single prediction

Batch prediction

Use single prediction to get real-time results on the text you enter. The results are the entities extracted from the text. To generate prediction results from multiple tabular datasets, use batch prediction instead.

Text field

Generate prediction results

Canvas currently only supports English language. If non-English text is entered, you will get incorrect prediction results.

Hi John, this is Carlos from Acme Financials. Your credit card with account number 1234-5678-9012-3456 has been activated. Starting on the next billing cycle, we will automatically withdraw your payment from your bank account number 1234-5678 with routing number 123456789.

Pricing Information

Prediction results

Search labels

Confidence ⓘ

John

NAME

100%

Carlos

NAME

100%

1234-5678-9012-3456

CREDIT_DEBIT_NUMBER

100%

1234-5678

BANK_ACCOUNT_NUMBER

100%

123456789

BANK_ROUTING

100%

aws

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Sentiment analysis

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Single prediction

Batch prediction

Use single prediction to get real-time results on the text you enter. The results can be positive, neutral, negative, or mixed. To generate prediction results from multiple rows of text, use batch prediction instead.

Text field

Generate prediction results

Canvas currently only supports English language. If non-English text is entered, you will get incorrect prediction results.

I enjoyed visiting Mexico. It was very comfortable but also expensive. The amenities were ok but the service was better than I expected. Chichen Itza and Museo Nacional de Antropología are my top favorites.

Create a custom model

Pricing Information

Prediction results

Search labels

Confidence ⓘ

Positive

98%

Mixed

2%

Negative

0%

Neutral

0%

Text detection in images

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Ready-to-use models > **Text detection in images** Ready-to-use model

Use single prediction to get real-time results on the image you upload. The results are the different text labels detected from the image.
To generate prediction results from multiple image datasets, use batch prediction instead.

Upload an image to generate predictions.

Upload image

TextDetection.jpg



Prediction results

Search labels

Confidence ⓘ

IT'S

100%

but keep

100%

MONDAY

99%

Smiling

86%



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Document analysis

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Single prediction

Batch prediction

Use single prediction to get real-time results on the document you upload. The results are the values detected from the document.

Upload a document to generate predictions.

Upload document

SampleDocuments.pdf

Page 1

Page 2

Page 3

001 783 8071 050X 160000

ABC 12543 12345 12345 00000000 1

ANY COMPANY CORP.

475 ANY AVENUE

ANYTOWN, USA 12345

Social Security Number: 997-45-4321

Taxable Marital Status: Married

Employment Authorization: Full-time/Seasonal

Federal: 3.8% Additional Tax

State: 2

Local: 2

Earnings Statement

Period ending: 7/18/2008

Pay date: 7/25/2008

JOHN STILES

151 MAIN STREET

ANYTOWN, USA 12345

Earnings	rate	hours	this period	year to date
Regular	10.00	32.00	320.00	13,600.00
Overtime	15.00	1.00	15.00	780.00
Holiday	10.00	8.00	80.00	4,160.00
Tuition			17.43*	1,948.00
Gross Pay			\$ 432.43	20,508.00

Deductions	rate	hours	this period	year to date
Federal Income Tax	- 40.80		- 13.12	- 2,111.20
Social Security Tax	- 28.95		- 9.32	- 1,458.40
Medicare Tax	- 6.58		- 2.11	- 341.12
NY State Income Tax	- 8.43		- 2.73	- 438.36
NYC Income Tax	- 5.94		- 1.90	- 308.88
NY SUNSD Tax	- 0.80		- 0.26	- 41.28
Other	- 5.00		- 1.59	- 253.50
401(k)	- 38.40		- 12.31	- 1,970.40
Savings Plan	- 15.00		- 4.81	- 769.50
Life Insurance	- 5.00		- 1.59	- 253.50
Loan	- 30.00		- 9.54	- 1,526.40
Adjustment			+ 13.50	
Net Pay			\$ 281.90	

* Excluded from federal taxable wages

Your federal wages this period are \$380.15

Other Benefits and Information

this period

total to date

Group Term Life

5.51

27.00

Loan Amt Paid

840.00

Vac Hrs

40.00

Sick Hrs

16.00

Title

Operator

Important Notes

EFFECTIVE THIS PAY PERIOD YOUR REGULAR HOURLY RATE HAS BEEN CHANGED FROM \$8.00 TO \$10.00 PER HOUR.

WE WILL BE STARTING OUR UNITED WAY FUND DRIVE SOON AND LOOK FORWARD TO YOUR PARTICIPATION.

ANY COMPANY CORP.

475 ANY AVENUE

ANYTOWN, USA 12345

Payroll check number: 60000000

Pay date: 7/25/2008

Social Security No: 997-45-4321

Pay to the order of: JOHN STILES

This amount: TWO HUNDRED NINETY-ONE AND 90/100 DOLLARS

\$291.90

Enter a query to search in the document

+

Add up to 15 queries at once. You will be charged for the single submission.

Queries (0)

Prediction Results (3)

Is the document signed?

3 results

yes

Page: 1

Confidence 97%

No

Page: 2

Confidence 77%

No

Page: 3

Confidence 70%

Data preparation

Creating data flow

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Data Wrangler: Data flow > 📄 New data flow 2024-3-31 12:56 PM.flow



Import data

→



Prepare data

→



Scale data operations

→



Build models

To get started...

Import data ▾

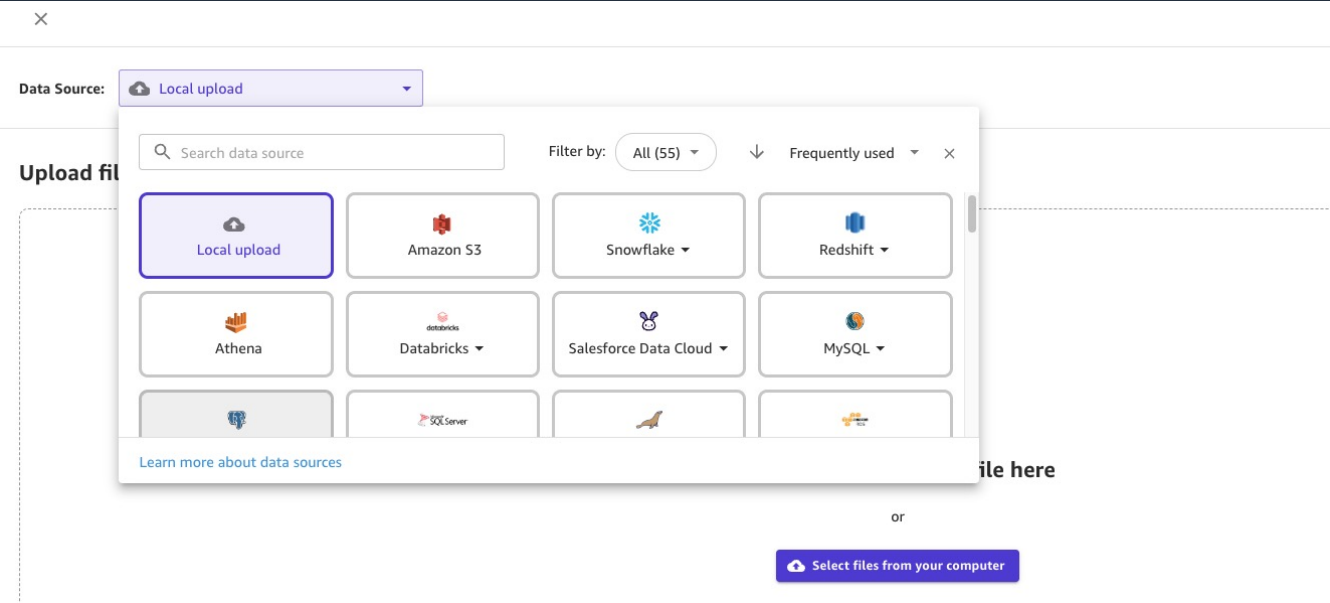
Select existing dataset ▲

Dataset type

Tabular
CSV or Parquet files

Image
PNG and JPG files

Selecting data sets



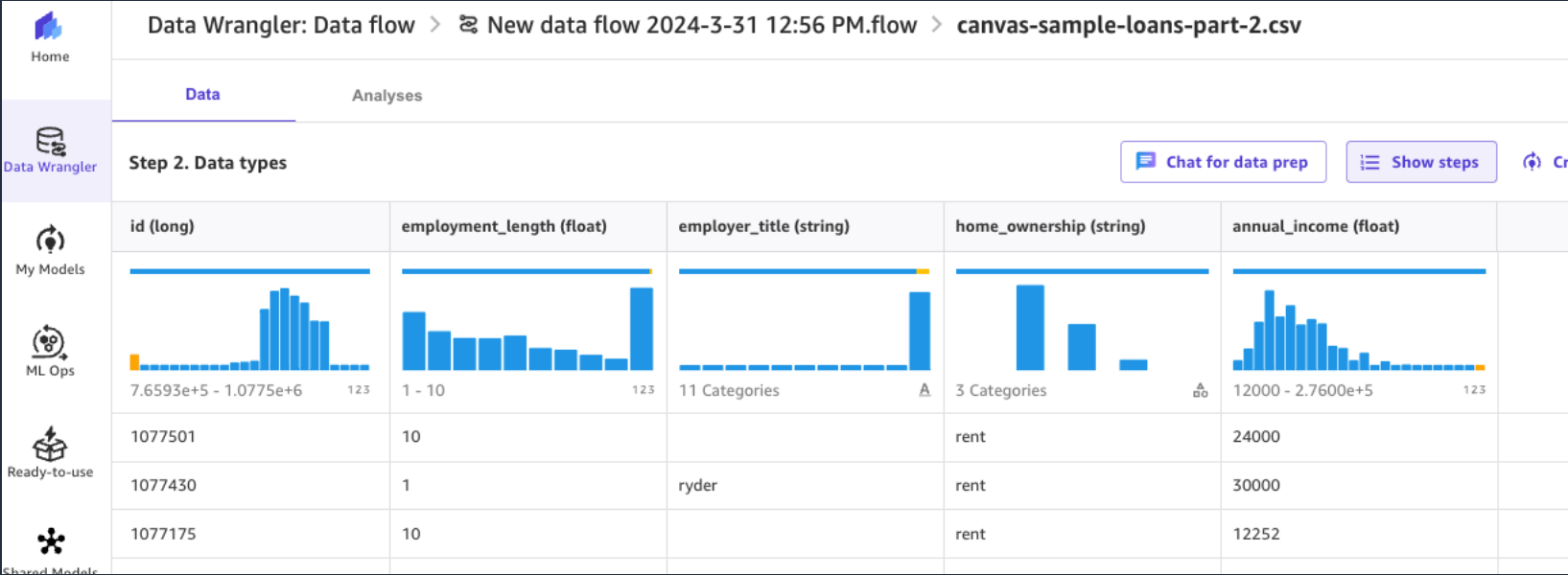
Data Wrangler: Data flow > New data flow 2024-3-31 12:56 PM.flow > Select existing dataset

You can select a dataset that has already been imported or you can create a new dataset.

Search datasets in Canvas

Name	Columns	Rows	Cells	Created	Status
canvas-sample-loans-part-2.csv	5	1,000	5,000	03/05/2024 4:23 PM	Ready
canvas-sample-housing.csv	10	1,000	10,000	03/05/2024 4:23 PM	Ready
canvas-sample-retail-electronics-forecasting.csv	6	40,500	243,000	03/05/2024 4:23 PM	Ready

Amazon Sagemaker Data Wrangler



Data quality and insights report

Summary

Dataset statistics

Key	Value
Number of features	5
Number of rows	1000
Missing	1.36%
Valid	98.6%
Duplicate rows	0%

← Create analysis

Analysis type Required

Histogram

Custom Visualization

Data Quality And Insights Report

Data Quality And Insights Report for Amazon Personalize

Duplicate rows

Feature Correlation

Histogram

Multicollinearity

Quick Model

Anomalous samples

Canvas detects anomalous samples using the Isolation forest algorithm after basic preprocessing. The isolation forest associates an anomaly score to each sample (row) of the dataset.

- Low anomaly scores indicate anomalous samples.
- High scores are associated with non-anomalous samples.
- Samples with negative anomaly score are usually considered anomalous and samples with positive anomaly score are considered non-anomalous.

When you look at a sample that might be anomalous, we recommend that you pay attention to unusual values. For example, you might have anomalous values that result from errors in the most anomalous samples according to the Canvas's implementation of the isolation forest algorithm. We recommend using domain knowledge and business logic when you examine

Anomaly scores	id	employment_length	employer_title	home_ownership	annual_income
0.134	1064924	6.0	united states air force	rent	48000.0
0.134	1068180	7.0	united states air force	rent	49500.0
0.134	972383	10.0	new buck corporation	mortgage	50700.0
0.14	1067026	10.0	us air force	rent	66000.0
0.14	977277	2.0	the woodlands ficial group	mortgage	175000.0
0.143	1058946	10.0	newark public schools	mortgage	103000.0

Chat for data prep

Welcome to chat for data prep!

From here, you can explore, visualize, and transform your data using natural language. To get started, we have some guided prompts for you.

Plot histogram of the column id

What is the maximum value of the column annual_income

What is the mean value of the column annual_income

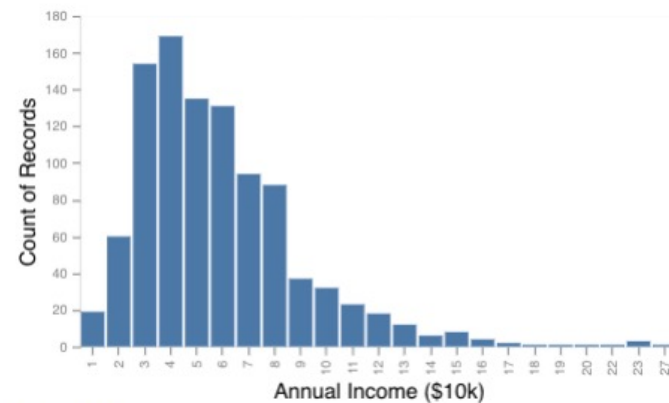
Plot a chart for annual income in \$10000 buckets



Plot a chart for annual income in \$10000 buckets



The code first converts the annual_income column to \$10,000 buckets by floor dividing the values by 10,000. It then creates a bar chart using altair, with the bucketed annual_income column on the x-axis and the count of records in each bucket on the y-axis. This generates a histogram showing the distribution of annual_income in \$10k buckets.



Let's build a ML model to predict college student dropout

Creating a new model

Create new model

Model name

Model name

My new model 024-3-31 1:21 PM

Use only letters, numbers, and underscores up to 32 characters.

Problem type

Select the problem type you want the model to solve.



☒ Predictive analysis
Build models using tabular datasets to predict single or multiple categories as well as regression and time-series forecast problems.



☐ Image analysis
Build models using image datasets to predict single or multiple categories for image classification problems.



☐ Text analysis
Build models using tabular datasets to predict single or multiple categories for text classification problems.



☐ Fine-tune foundation model
Customize a foundation model on your data to improve its performance for a specific task or domain.

Cancel

Create

Training data set

HomeInsertDrawPage LayoutFormulasDataReviewViewTell me

Paste

Calibri (Body)

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My models > New model 2024-4-1 9:20 AM > Version 1

Select

Build

Analyze

Predict

Deploy

Select dataset

You can import a tabular dataset or choose one that has already been imported. Your dataset must contain at least one input column and a target column.

Search datasets in Canvas

All

Joined

Name	Columns	Rows	Cells	Created	Status
☒ student_dropout V1	37	4,424	163,688	04/01/2024 9:20 AM	Ready

Model configurations

Configure model

Basic

Model type

Advanced - Optional

Objective metric

Training method and algorithms

Data split

Max candidates and runtime

Training method

Configuring the Ensemble or Hyperparameter optimization training method will default to Standard build.

☒ Auto Recommended

Canvas selects the algorithms that are most relevant to your dataset and the best range of hyperparameters to tune model candidates. The best-performing model candidate is chosen.

☐ Ensemble

Canvas chooses an AutoML algorithm based on your data and trains a multi-layer stack ensemble model to make predictions for regression and classification problems.

☐ Hyperparameter optimization

AnalyzePredictDeploy

Configure model Reset to default settings

Basic

Model type

Advanced - Optional

Objective metric

Training method and algorithms

Data split

Max candidates and runtime

Training method

Configuring the Ensemble or Hyperparameter optimization training method will default to Standard build.

☐ Auto Recommended

Canvas selects the algorithms that are most relevant to your dataset and the best range of hyperparameters to tune model candidates. The best-performing model candidate is chosen.

☒ Ensemble

Canvas chooses an AutoML algorithm based on your data and trains a multi-layer stack ensemble model to make predictions for regression and classification problems.

☐ Hyperparameter optimization

Algorithms

Select the algorithms that you'd like to test for improving the model's prediction accuracy. 8/8 selected

☒ XGBoost

A supervised learning algorithm that attempts to accurately predict a target variable by combining an ensemble of estimates from a set of simpler and weaker models.

☒ Linear Models

A framework that uses a linear equation to model the relationship between target label and feature vector in observed data.

☒ LightGBM

A framework that uses tree-based algorithms, gradient boosting, and histogram-based algorithms to optimize speed and accuracy. Optimized for handling categorical variables.

☒ CatBoost

A framework that uses tree-based algorithms with gradient boosting. Optimized for handling categorical variables.

Cancel

Save

Preview model

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Select

Build

Analyze

Predict

Deploy

Select a column to predict

Choose the target column. The model that you build predicts values for the column that you select.

Target column

Target

Value distribution

Graduate

Dropout

Enrolled

Model type

SageMaker Canvas automatically recommends the appropriate model type for your analysis.

3+ category prediction

Your model classifies Target into 3 or more categories.

Configure model

Quick build

Preview model

student_dropout

Full dataset: 4.4k rows

Manage columns

Manage rows

Time series

View all

Data visualizer

Column name	Data type	Feature type	Missing	Mismatched	Unique	Mode	Correlation to target
Unemployment_rate	123 Numeric	-	0.00% (0)	0.00% (0)	10	7.6	0.009
Tuition_fees_up_to_date	123 Numeric	Binary	0.00% (0)	0.00% (0)	2	1	0.41
Target	Text	Categorical	0.00% (0)	0.00% (0)	3	Graduate	--

Column impact

Search columns...

1

Curricular_units_2nd_sem_approv

19.123%

2

Curricular_units_1st_sem_approv

7.185%

3

Curricular_units_2nd_sem_grade_

6.805%

4

Tuition_fees_up_to_date

5.418%

5

Curricular_units_2nd_sem_evalua

3.848%

6

Course

3.818%

7

Curricular_units_2nd_sem_enroll

3.581%

8

Age_at_enrollment

3.278%

Impact of Curricular_units_2nd_sem_approv on prediction of Target

Dropout

3.36

-0.24

-2.24

Impact on prediction

Curricular_units_2nd_sem_approv

Preview model

Estimated accuracy

78.983%

The model predicts the correct target (Target) 78.983% of the time.

Column impact

Search columns...

Curricular_units_2nd_sem_approv

2.097

Age_at_enrollment

1.238

Curricular_units_1st_sem_approv

1.028

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Prediction using the model

	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL
1	tional	Curricular_ur	Curricular_ur	Curricular_ur	Curricular_ur	Curricular_ur	Curricular_ur	Curricular_ur	Curricular_ur	Curricular_ur	Curricular_ur	Curricular_ur	Unemploy	Inflation_rat	GDP	Target	
2	0	0	0	0	0	0	0	0	0	0	0	0	10.8	1.4	1.74		
3	0	0	6	6	6	14	0	0	6	6	6	13.6666667	0	13.9	-0.3	0.79	
4	0	0	6	0	0	0	0	0	6	0	0	0	10.8	1.4	1.74		
5	0	0	6	8	6	13.4285714	0	0	6	10	5	12.4	0	9.4	-0.8	-3.12	
6	0	0	6	9	5	12.3333333	0	0	6	6	6	13	0	13.9	-0.3	0.79	
7	0	0	5	10	5	11.8571429	0	0	5	17	5	11.5	5	16.2	0.3	-0.92	
8	0	0	7	9	7	13.3	0	0	8	8	8	14.345	0	15.5	2.8	-4.06	
9	0	0	5	5	0	0	0	0	5	5	0	0	0	15.5	2.8	-4.06	
10	1	0	6	8	6	13.4285714	0	0	6	10	5	12.4	0	9.4	-0.8	-3.12	
11	0	0	6	9	5	12.3333333	0	0	6	6	6	13	0	13.9	-0.3	0.79	
12	0	0	6	6	6	14	0	0	6	6	6	13.6666667	0	13.9	-0.3	0.79	
13	0	0	8	8	8	13.3	0	0	8	8	8	14.345	0	15.5	2.8	-4.06	
14	0	0	6	6	6	13.4285714	0	0	6	10	5	12.4	0	9.4	-0.8	-3.12	
15																	

To make predictions on a dataset, select it or import it. The dataset that you select must have the same number of feature columns as the training dataset. ?

Search datasets in Canvas

Name	Columns	Rows	Cells	Created	Status	
☒ student_dropout_prediction	V1	37	13	481	04/01/2024 10:00 AM	Ready
☐ student_dropout						

batchInfer-New model 2024-4-1 9:20 AM-student_dropout_prediction-1711980102

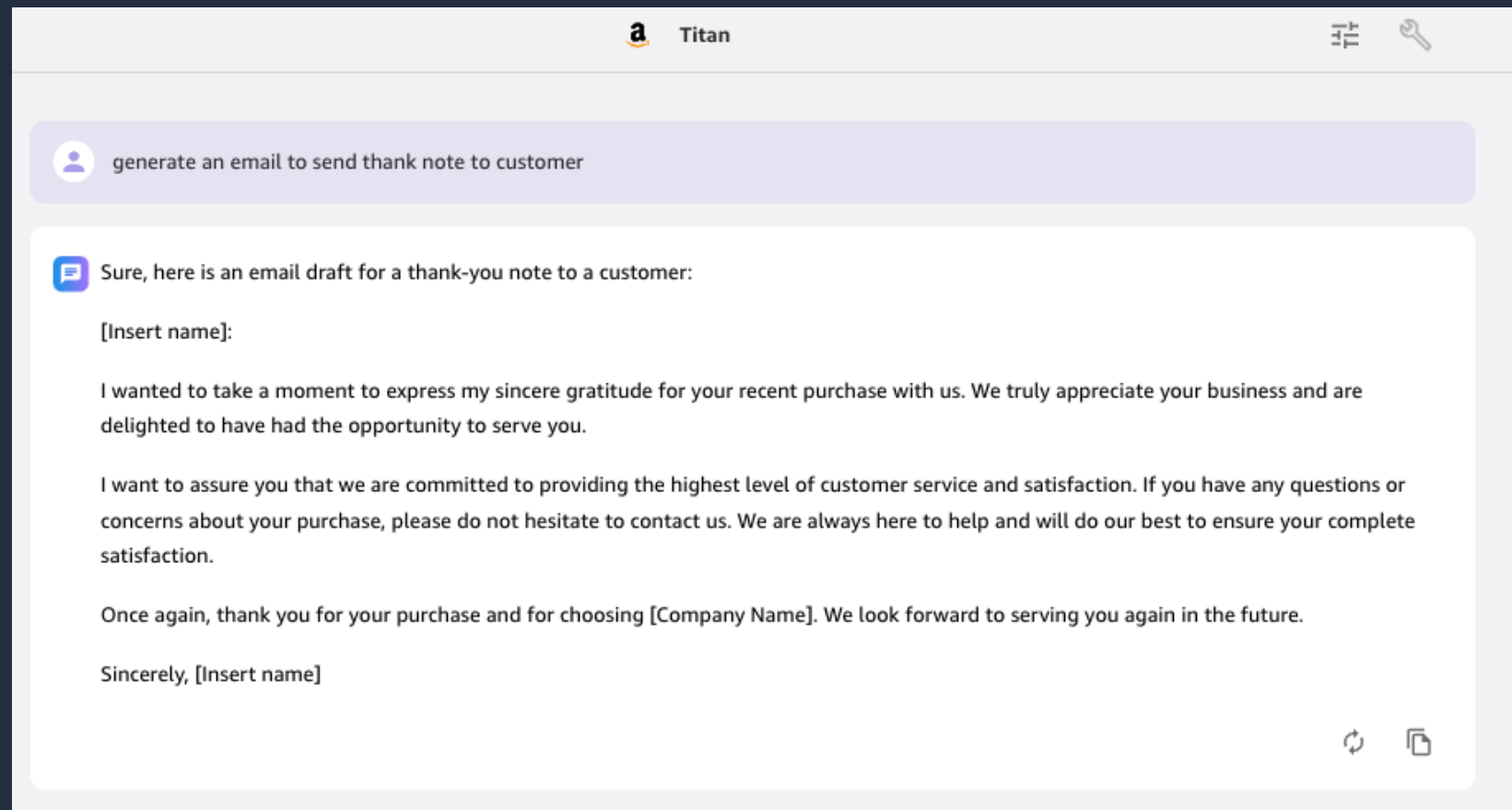
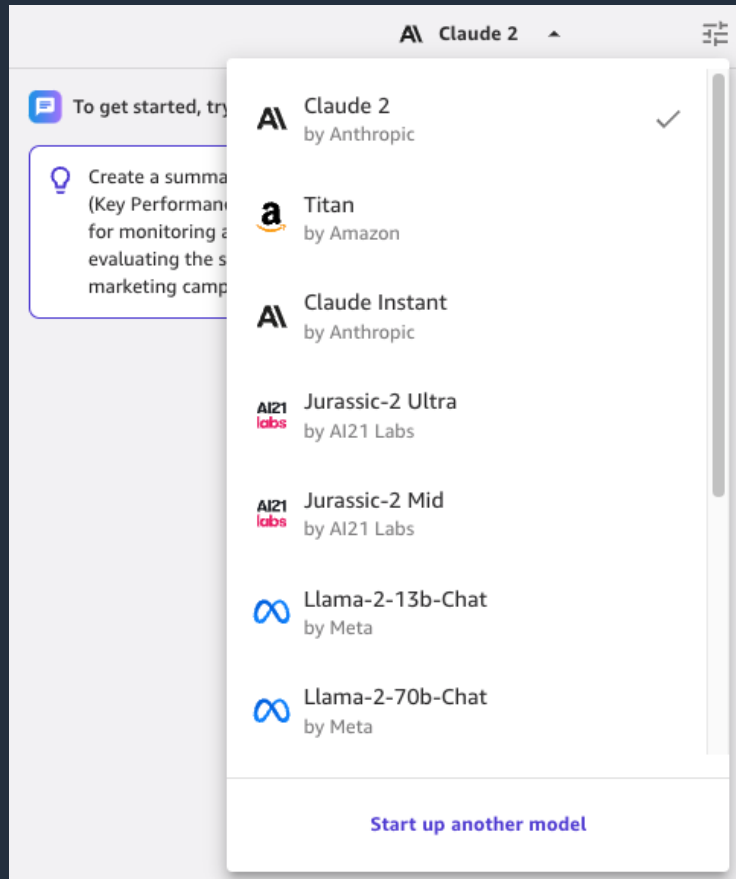
Prediction (Target)	Probability	Marital_status	Application_...	Application_...	Course	Daytime_eve...	Previous_...
Dropout	77.5%	1	17	5	171	1	1
Graduate	95.9%	1	15	1	9254	1	1
Dropout	99.5%	1	1	5	9070	1	1
Graduate	76.4%	1	17	2	9773	1	1
Graduate	96.7%	2	39	1	8014	0	1
Dropout	74.1%	2	39	1	9991	0	19



What is generative AI?

- Generative artificial intelligence is artificial intelligence capable of generating text, images, videos, or other data using generative models, often in response to prompts. Generative AI models learn the patterns and structure of their input training data and then generate new data that has similar characteristics.
- Large language models (LLM) are very large deep learning models that are pre-trained on vast amounts of data

No code generative AI



Customer stories



What universities are saying

“One of the hardest parts about programming with machine learning is configuring the environment to build. Students usually have to choose the compute instances, security policies, and provide a credit card. My students needed Amazon SageMaker to abstract away all of the complexity of setup and provide a free powerful sandbox to experiment. This lets them **write code immediately without needing to spend time configuring the ML environment.**”

Dan Roth

Distinguished Professor of Computer and Information Science at the University of Pennsylvania



What universities are saying

“Amazon SageMaker will help my students learn the building blocks of machine learning by **removing the cloud configuration steps required to get started**. Now, in my natural language processing classes, students have more time to enhance their skills.”

Sanjiv Das

Professor of Finance and Data Science at Santa Clara University



How to get started with Amazon SageMaker Canvas

1

[Immersion Day](#)

2

[MOOC via Coursera](#)

3

[Getting started tutorial](#)



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Thank you!



Please complete the session survey
by scanning the QR code