

IBM Watson Studio Kullanarak

KREDİ RİSK TAHMİNİ

Kürşat GÜZEL

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Storage Oluşturma

<https://cloud.ibm.com/catalog> adresine giriş yapıyoruz.

Catalog

IBM Cloud catalog

Category

- Compute (37)
- Containers (11)
- Networking (30)
- Storage (25)
- Enterprise applications (3)
- AI / Machine Learning (23)
- Analytics (12)
- Databases (21)
- Developer tools (17)
- Logging and monitoring (4)
- Migration (11)

Search resources and products...

Object Storage

Block Storage for VPC

Block Storage Snapshots for VPC

Cloud Native Storage and Data Service

Db2 Warehouse

File Storage for VPC

DevSecOps Application Lifecycle Management

Power Virtual Server for SAP HANA

Deployable architecture

Deployable architecture

Deployable architecture

Arama ekranından “Object Storage” ismini aratıyoruz ve ilgili depolamayı seçiyoruz.

The screenshot shows the IBM Cloud Catalog interface. On the left, there's a sidebar with 'IBM Cloud' and a search bar. The main area displays the 'Cloud Object Storage' service details. It includes sections for 'Summary' (Cloud Object Storage, Free, Region: Global, Plan: Lite, Service name: Cloud Object Storage-1, Resource group: Default), 'Create' (button highlighted with a red box), 'About', and 'Choose an Infrastructure' (IBM Cloud and Satellite options). Below this, there's a 'Select a pricing plan' section with a table showing the 'Lite' plan (Free, up to 25 GB per month) and a note about only one Lite instance allowed per account. A large blue 'Create' button is at the bottom right.

“Create” ile depolama alanımızı oluşturuyoruz.

The screenshot shows the IBM Cloud Instances page. The left sidebar has 'Dashboard' and 'Resource list' (highlighted with a red box). The main area shows 'Cloud Object Storage-ai' with tabs for 'Instances' and 'Actions...'. Below is a 'Buckets' section with a table header: Name, Public access, Location, Storage class, Created. A 'Create bucket' button is at the top right. The table body is currently empty.

Sol üst kısımdan “Resource list” kısmında oluşturduğumuz bulut depolama alanını kontrol edebiliriz.

The screenshot shows the IBM Cloud Resource list interface. On the left, there's a sidebar with various service icons like Compute, Containers, Networking, Storage, Converged infrastructure, Enterprise applications, AI / Machine Learning, Analytics, Blockchain, Databases, Developer tools, and Logging and monitoring. A specific entry under 'Storage' is highlighted with a red box: 'Cloud Object Storage-ai'. The main table lists this resource with details: Name 'Cloud Object Storage-ai', Group 'Default', Location 'Global', Product 'Cloud Object Storage', Status 'Active', and Tags. There are also filter and search bars at the top of the table.

“Storage” altında oluşturduğumuz bulut depolama nesnelerini görebiliriz.

Watson Studio Oluşturma

The screenshot shows the IBM Cloud Dashboard. In the search bar at the top, 'ibm Watson studio' is typed. Below the search bar, it says '0 resource results found'. Under the 'Catalog Results' section, 'Watson Studio' is listed as a service. To the right, there are three cards: 'Use Watson Assistant' (Popular, 2 min), 'Get started with machine learning + Watson Studio' (Getting Started, 10 min), and 'Architecture center' (Recommended). At the bottom of the dashboard, there are five cards: 'News' (View all), 'Recent support cases' (View all), 'Planned maintenance' (View all), and 'IBM Cloud status' (View all).

IBM Cloud ekranında arama kısmından “IBM Watson Studio” aratıyoruz.

Watson Studio

Develop sophisticated machine learning models using Notebooks and code-free tools to infuse AI throughout your business.

Create **About**

Type Service

Provider IBM

Last updated 01/19/2023

Category AI / Machine Learning

Compliance HIPAA Enabled IAM-enabled

Location Frankfurt London Tokyo Dallas

Related links Docs Terms

Select a location

Frankfurt (eu-de) **1**

Select a pricing plan

Displayed prices do not include tax. Monthly prices shown are for country or location: [United States](#)

Plan	Features and capabilities	Pricing
Lite	1 authorized user 10 capacity unit-hours monthly limit Environment = # of capacity units required per hour <ul style="list-style-type: none"> • 1 vCPU + 4 GB RAM = 0.5 • 2 vCPU + 8 GB RAM = 1 • 4 vCPU + 16 GB RAM = 2 • Decision Optimization + Watson NLP = Environment + 5 • Synthetic Data Generator, 2 vCPU + 8 GB RAM = 7 (requires Watson Machine Learning) 	Free

The Lite plan for Watson Studio offers everything you need to become a better data scientist or domain expert in a

Summary

Watson Studio **Free**

Location: Frankfurt
Plan: Lite
Service name: Watson Studio-6k
Resource group: Default

2

I have read and agree to the following license agreements:
[Terms](#)

3

Create

Add to estimate

Watson Studio ekranında ücretsiz bir sunucu oluşturuyoruz.

1 Numaralı alan ile bir bölge seçiyoruz. Türkiye'ye yakın olması sebebi ile Frankfurt'u seçiyoruz.

2 Numaralı alan ile lisans anlaşmasını kabul ediyoruz. İlgili anlaşmanın dikkatlice okunması tavsiye edilir.

3 Numaralı alan ile oluşturma aşamasını tamamlıyoruz.

Watson Studio-6k **Active** [Add tags](#)

Manage

Watson Studio in Cloud Pak for Data and watsonx

Build and deploy machine learning models on either platform. Work with foundation models on watsonx as a Service.

Launch in

IBM Watson Studio in Cloud Pak for Data and watsonx

IBM Cloud Pak for Data, watsonx Unifying platforms

IBM Cloud Base cloud infrastructure

IBM Watson Studio is part of IBM Cloud Pak for Data and watsonx, and serves as the AI capability of the data fabric architecture.

Helpful links

Documentation Learn about tools, features, and how to perform a wide variety of Data and AI tasks. Cloud Pak for Data	Learning path Start a step-by-step tutorial to get up and running quickly. Cloud Pak for Data	Videos Watch videos to learn about Watson Studio. Cloud Pak for Data
----------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------

Oluşturulan kaynakları görüntülemek istiyorsak sol üsté bulunan “Kaynak Listesi” kısmından görüntüleyebiliriz.

IBM Cloud

Search resources and products...

Catalog Manage KÜRSAT GÜZEL's Acco...

Create resource +

Resource list

Name	Group	Location	Product	Status	Tags
Watson Studio-6k	Default	Frankfurt	Watson Studio	Active	-
Compute (0)					
Containers (0)					
Networking (0)					
Storage (1)					
Converged infrastructure (0)					
Enterprise applications (0)					
AI / Machine Learning (1)					
Watson Studio-6k	Default	Frankfurt	Watson Studio	Active	-
Analytics (0)					
Blockchain (0)					
Databases (0)					
Developer tools (0)					
Logging and monitoring (0)					

“AI / Machine Learning” altında oluşturduğumuz servisi görebiliriz.

IBM Cloud

Search resources and products...

Catalog Manage KÜRSAT GÜZEL's Acco...

Watson Studio-6k Active Add tags ↗ Details Actions...

Watson Studio in Cloud Pak for Data and watsonx

Watson Studio in Cloud Pak for Data and watsonx

Build and deploy machine learning models on either platform. Work with foundation models on watsonx as a Service.

Launch in 1 IBM Cloud Pak for Data 2 IBM Watsonx

IBM Watson Studio in Cloud Pak for Data and watsonx
IBM Cloud Pak for Data, watsonx Unifying platforms
IBM Cloud Base cloud infrastructure

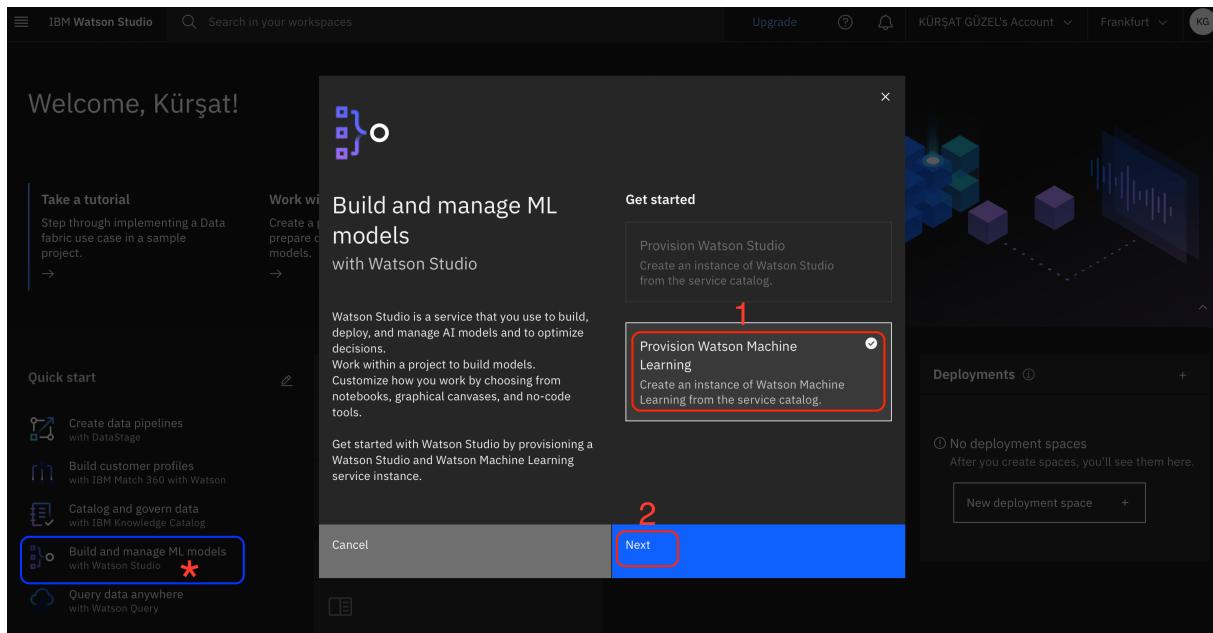
IBM Watson Studio is part of IBM Cloud Pak for Data and watsonx, and serves as the AI capability of the data fabric architecture.

Helpful links:

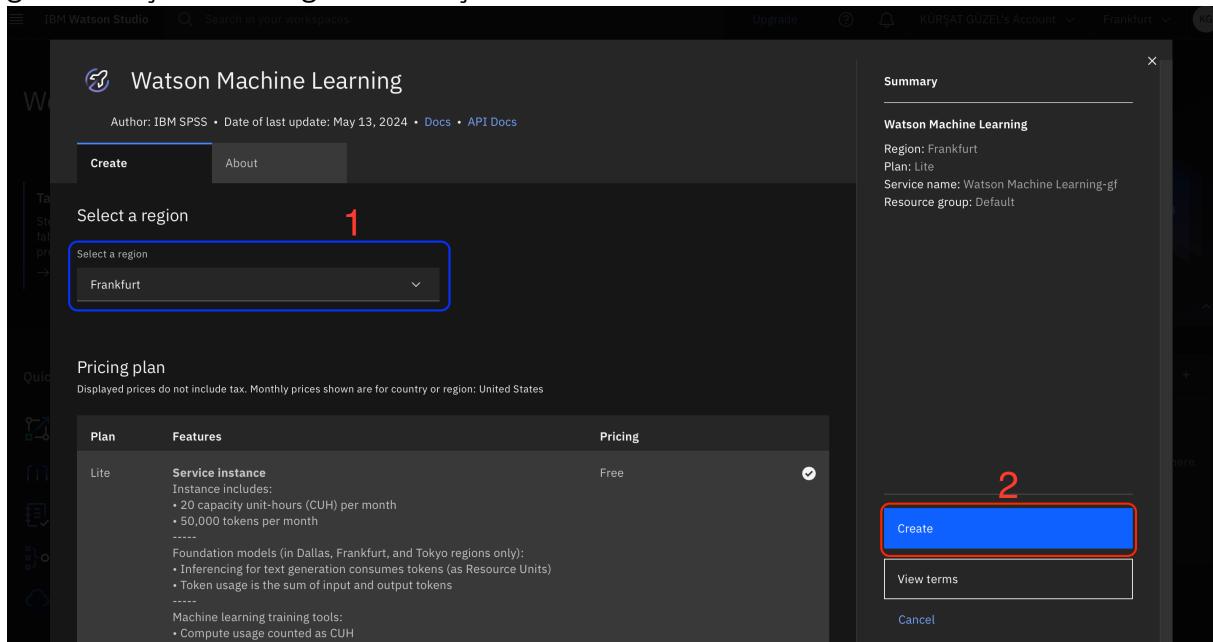
- Documentation**: Learn about tools, features, and how to perform a wide variety of Data and AI tasks. [Cloud Pak for Data →](#) [watsonx →](#)
- Learning path**: Start a step-by-step tutorial to get up and running quickly. [Cloud Pak for Data →](#) [watsonx →](#)
- Videos**: Watch videos to learn about Watson Studio. [Cloud Pak for Data →](#) [watsonx →](#)

“Launch in” kısmından (1) “IBM Cloud Park for Data” yi açıyoruz.

Watson Studio altında ML Model Oluşturma

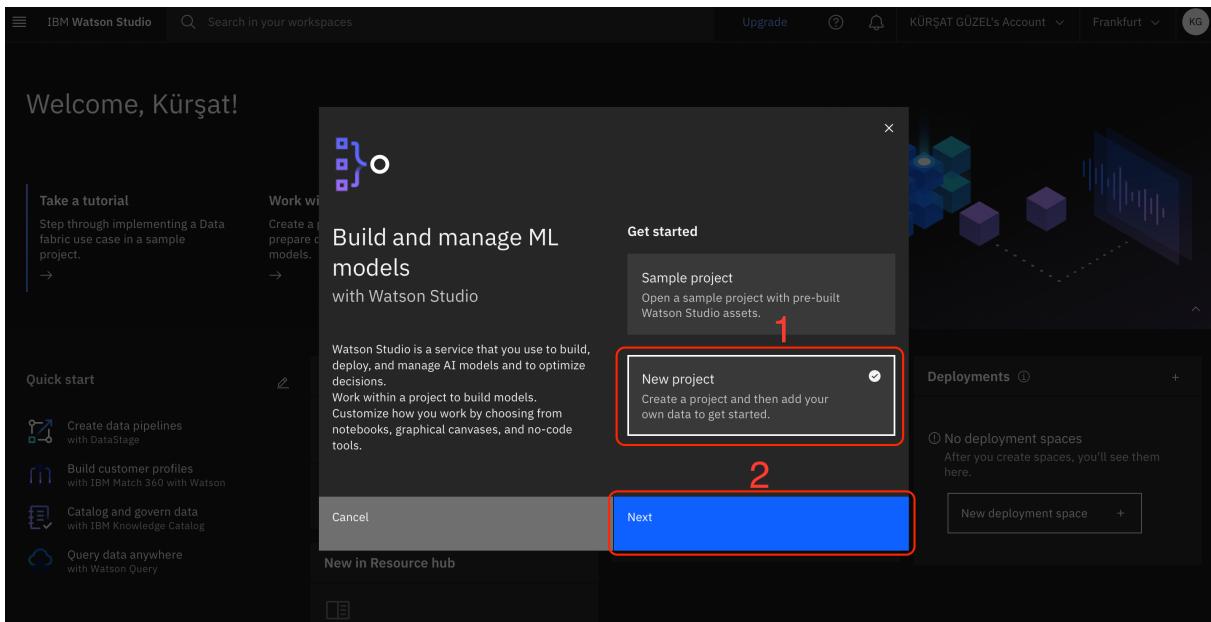


Açılan sayfada “Provision Watson Machine Learning”(1) seçip ardından “Next”(2) diyoruz. Not: Eğer sayfa açıldığında ekrandaki pop-up açılmazsa sol alta “*” sebolü ile gösterilmiş alandan ilgili ekranı açabilirsiniz.

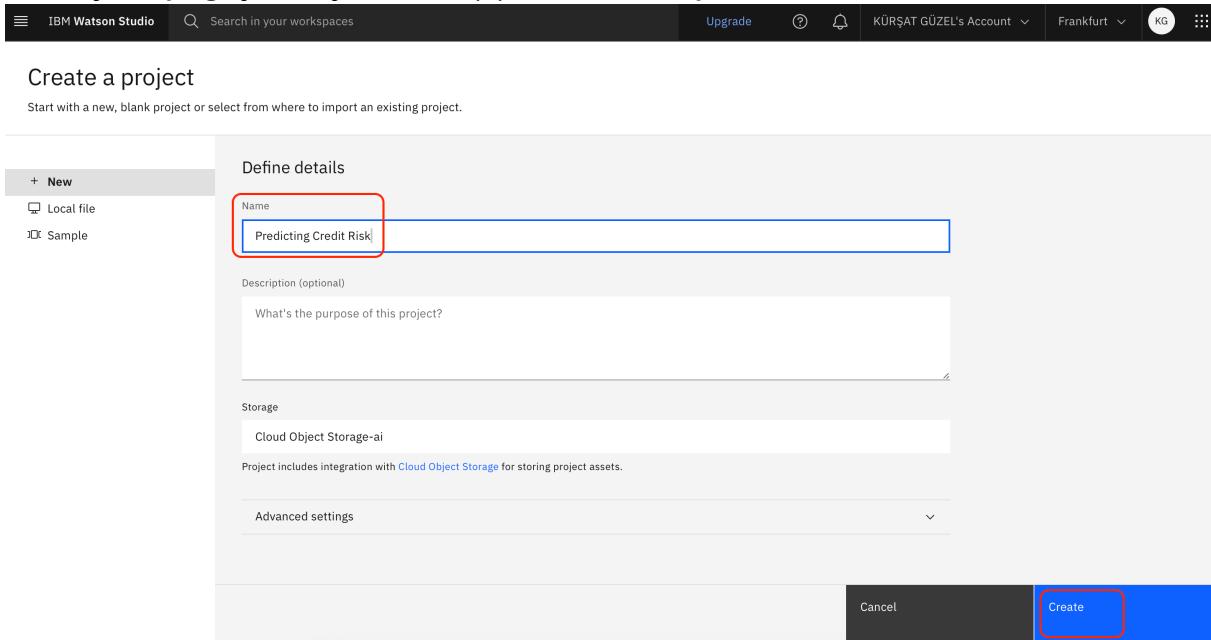


Önce bölgeyi seçiyoruz (1). Türkiye'ye yakın olduğu için “Frankfurt” seçtik. Ardından “Create” (2) ile oluşturuyoruz.

ML Projesi Oluşturma



Yeni bir proje oluşturacağımız için “New Project” (1) seçeneğini seçiyoruz. Proje detayları olan aşamaya geçmek için “Next” (2) ile devam ediyoruz.



Proje ismini “Name” alanına yazıyoruz ardından “Create” ile projeyi oluşturuyoruz. Not: Daha önce oluşturduğumuz depolama alanı “Storage” kısmında geldiğini görmüş oluyoruz.

The screenshot shows the 'Predicting Credit Risk' project overview. It includes sections for 'Assets' (with a note about creating assets with tools), 'Resource usage' (0 CUH for the month), and 'Project history' (a message from the user 'KURŞAT GUZEL' created at 2:06 AM). There are tabs for 'Overview', 'Assets', 'Jobs', and 'Manage'.

Projeye Veri Seti Ekleme

Oluşturma işlemi sonrasında üsteki sayfa bizleri karşıılıyor.

The screenshot shows the 'Data in this project' section with the 'Assets' tab selected (marked with a red box and number 1). A large red box and number 2 highlights the 'Drop data files here or browse for files to upload' area. The interface shows 0 assets and a placeholder for adding assets.

Varlıklar(“Assets”) bölümünü(1) seçiyoruz ardından “Data in this Project”(2) alanından veri setini yükliyoruz.

The screenshot shows the 'Data in this project' section with the 'Assets' tab selected. A red box and number 1 highlights the 'Predicting Credit Risk.csv' file in the list. A red box and number 2 highlights the 'Karşıya Yükle' (Upload) button. The file details show 'Predicting Credit Risk.csv' is a CSV file (55 KB).

Veri setini yukarıdaki adımları dikkate alarak yükliyoruz.

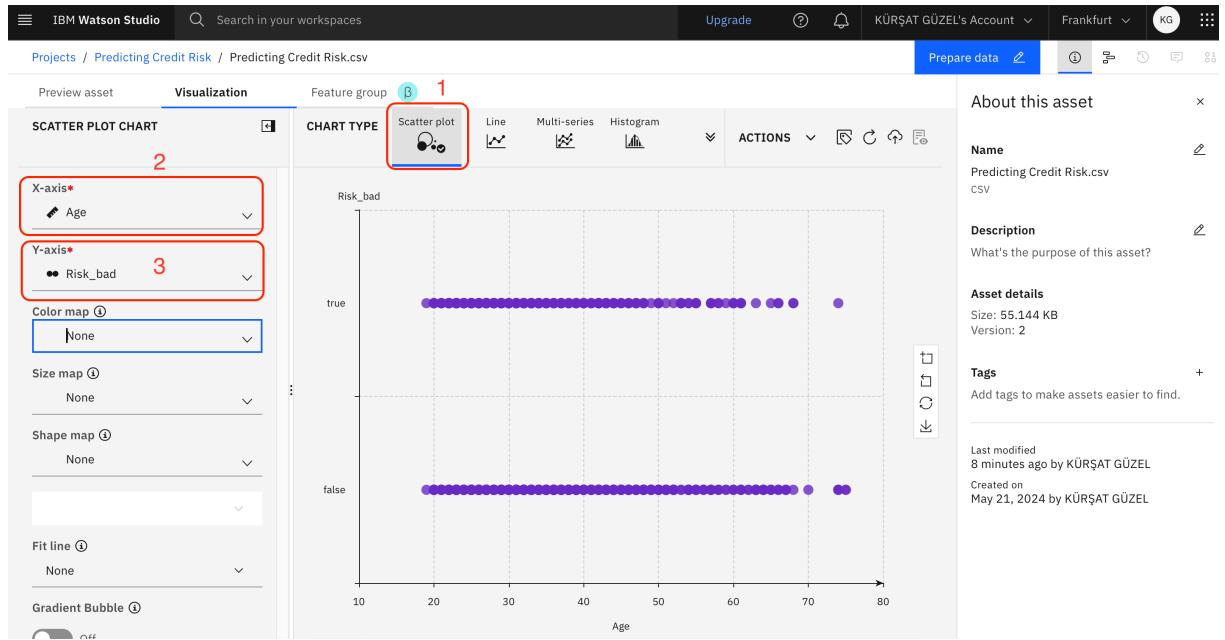
Watson Studio İle EDA İşlemleri

The screenshot shows the 'Assets' tab in the IBM Watson Studio interface. A red box highlights the 'Predicting Credit Risk.csv' file in the 'All assets' list, which is a CSV file. To the right, there's a 'Data in this project' sidebar with a 'Drop data files here or browse for files to upload' area.

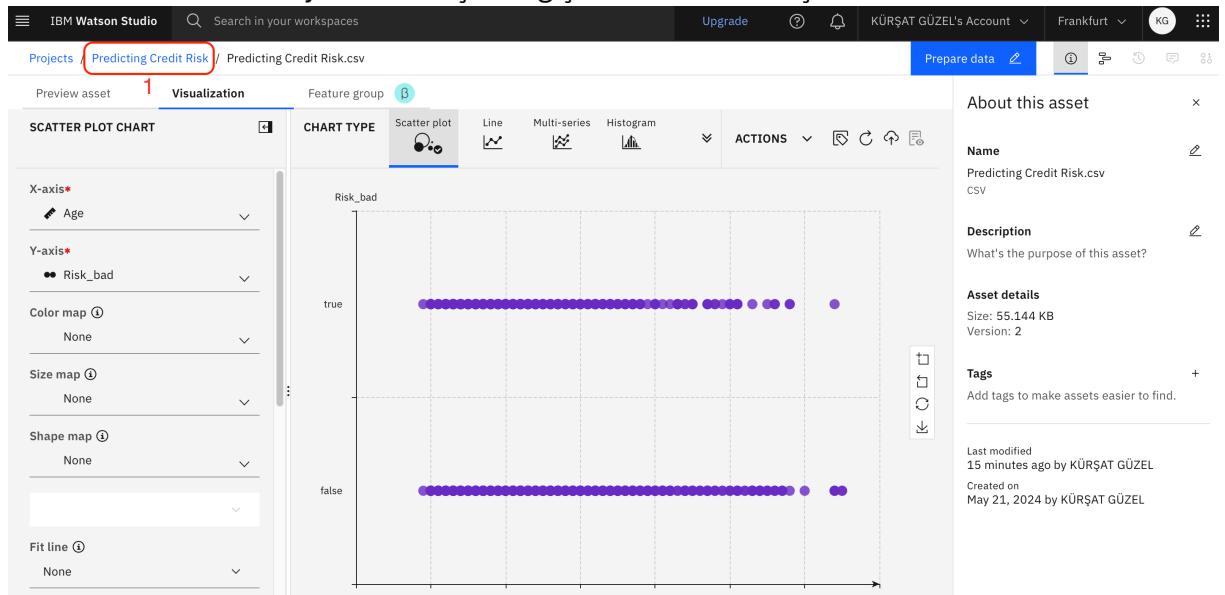
Kırmızı renkteki alandan yüklemiş olduğumuz dosyayı açıp ayırtlarını görebiliriz.

The screenshot shows the 'Visualization' tab in the Watson Studio interface, previewing the 'Predicting Credit Risk.csv' file. A red box highlights the 'Visualization' tab. The preview shows a table with columns: Age, Job, Credit amount, Duration, Purpose_car, Purpose Domestic appliances, and Purpose. The table has 25 columns and 1000 sample rows. The interface also shows 'About this asset' details like Name (Predicting Credit Risk.csv), Description (What's the purpose of this asset?), Asset details (Size: 55.144 KB, Version: 2), and Tags (Add tags to make assets easier to find).

Ayrıntılı EDA işlemleri için "Visualization" (1) alandan yapabiliriz.



1 numaralı alan ile grafik tipimizi “Scatter plot” olarak seçtik. 2 numaralı alan ile x eksenini ve 3 numaralı alan ile y eksenini için değişken isimlerini seçtik.



1 numaralı alan ile varlıklar sayfasına geri dönüyoruz.

AutoAI Oluşturma

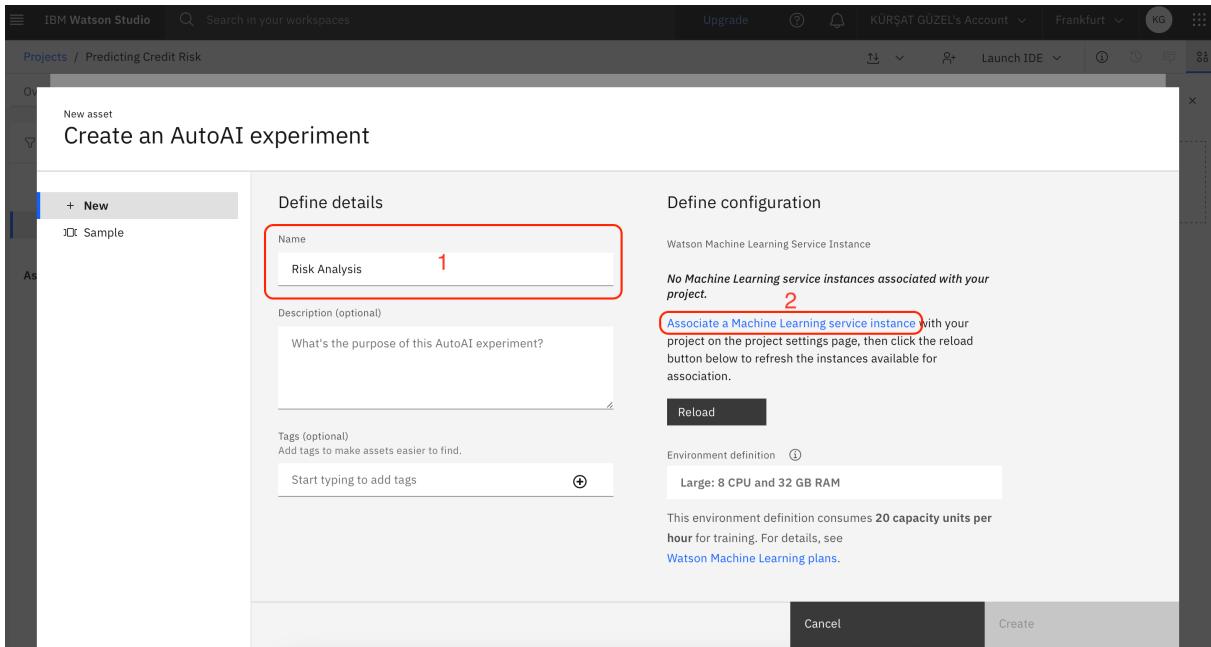
The screenshot shows the IBM Watson Studio interface with the 'Projects / Predicting Credit Risk' workspace selected. The top navigation bar includes 'Upgrade', 'KÜRSAT GÜZEL's Account', 'Frankfurt', and a user icon. The main area has tabs for 'Overview', 'Assets' (which is selected), 'Jobs', and 'Manage'. A search bar at the top says 'Search in your workspaces'. On the left, there's a sidebar with '1 assets' and 'All assets' selected. The main content area shows a table titled 'All assets' with one item: 'Predicting Credit Risk.csv' (1 CSV file). To the right, a section titled 'Data in this project' with a red box around the 'New asset' button. The 'New asset' button is highlighted with a red box and has the number '1' above it.

1 numaralı alanda yer alan “New asset” ile yeni bir varlık oluşturuyoruz.

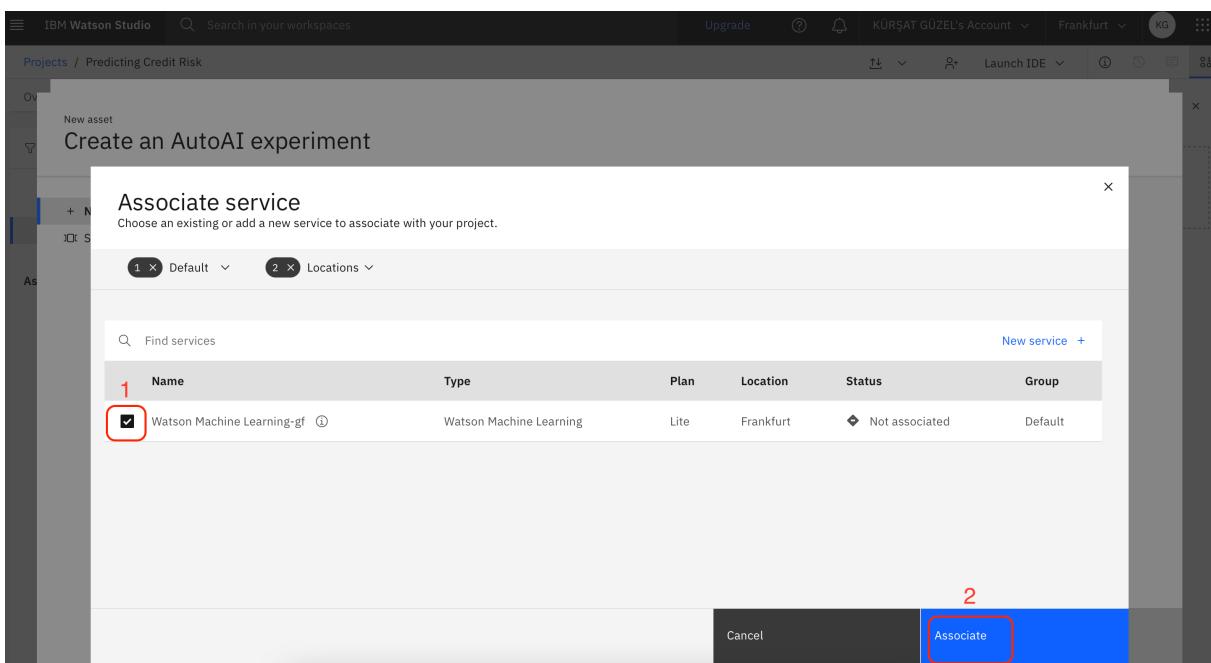
The screenshot shows the 'New asset' dialog box. The title is 'New asset' and it says 'Select a tool based on what type of asset you want and how you want to work.' On the left, there's a sidebar with '1 asset' and 'Tool type' dropdown set to 'All types'. The main area has a search bar with 'AutoAI' typed in, and a red box surrounds this search bar with the number '1'. Below the search bar, under 'Automated builders', there's a card for 'AutoAI' with a red box around it and the number '2'. The card description says: 'Automatically analyze your tabular data and generate candidate model pipelines customized for your predictive modeling problem.' At the bottom left of the dialog box is a 'Show descriptions' toggle switch.

1 numaralı arama alanında “AutoAI” aratıyoruz. Sorgu sonucu çıkan “AutoAI” (2) açıyoruz.

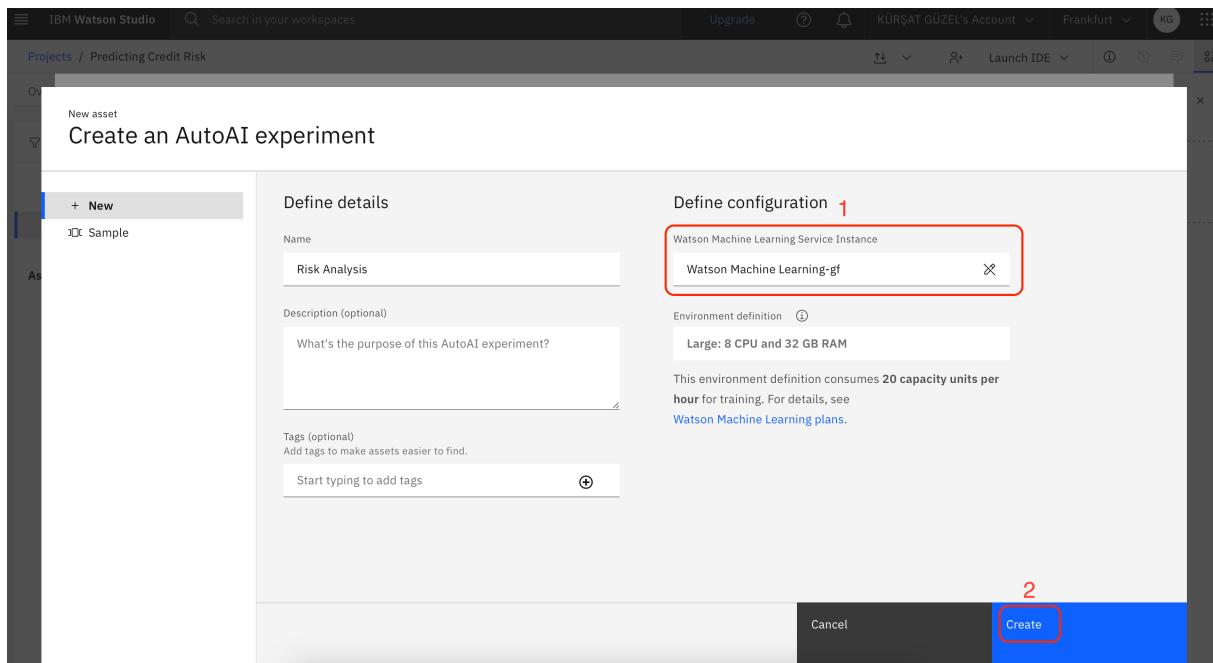
ML Servisi Kurma



1 numaralı “Name” alanına proje ismini yazıyoruz. Ardından “Watson Machine Learning” servisini kurmak için 2 numaralı alana giriyoruz.

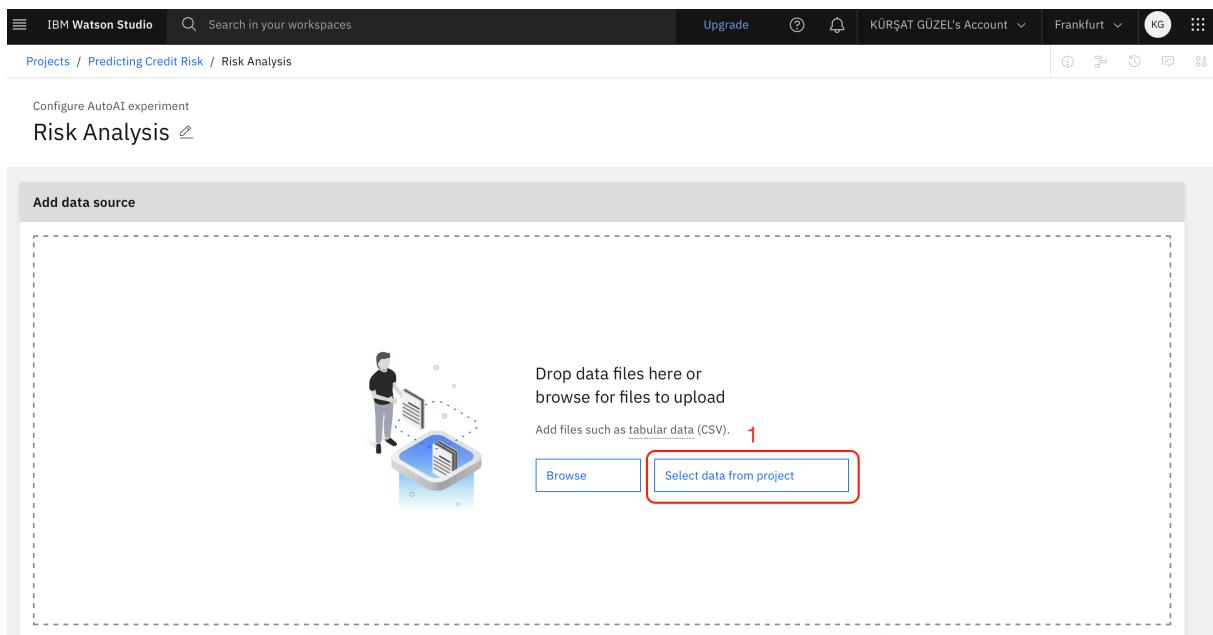


1 numaralı alandaki yeri aktif ediyoruz. 2 numaralı alandaki “associate” alanı seçip işlemi tamamlıyoruz.

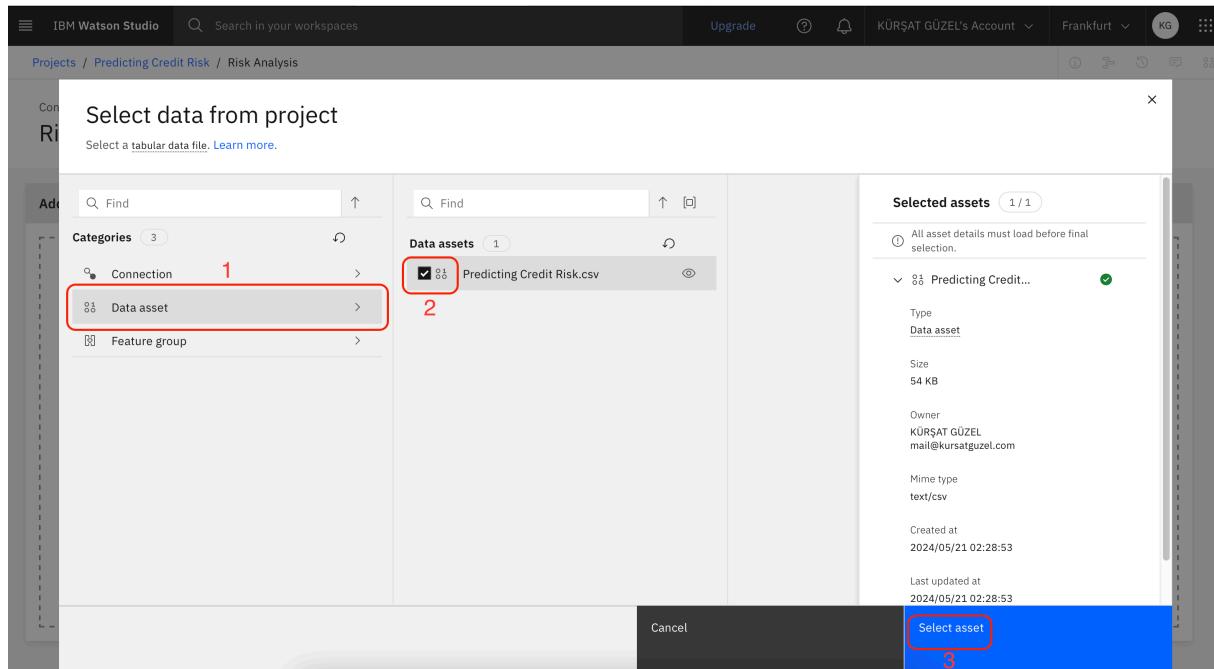


1 numaralı alana servisin geldiğini gördük hemen ardından 2 numaralı alanda bulunan “Create” ile yeni varlığımızı oluşturuyoruz.

AutoAI'ye Veri Seti Ekleme



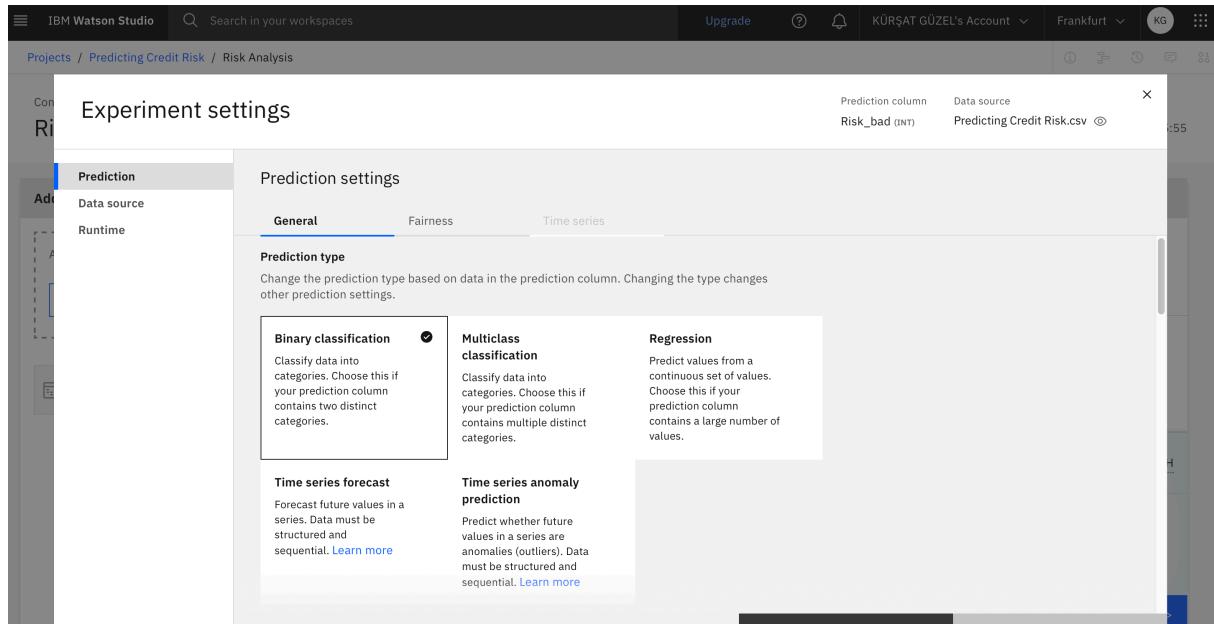
1 numaralı alan ile daha önce yüklediğimiz veri setini seçiyoruz.



1 numaralı alanı seçiyoruz ardından veri setimizi 2 numaralı tık ile seçiyoruz ve ardından 3 numaralı alanda bulunan “Select asset” ile varlığımızın seçimini tamamlıyoruz.

AutoAI ile Tahmin Modelleri Oluşturma

1 numaralı alan ile zaman serisi analizi oluşturmayacağımızı belirtiyoruz ardından açılan 2 numaralı alan ile tahmin edeceğimiz sütunu seçiyoruz. Tüm bu işlemlerin ardından 3 numaralı alan ile özelleştirilmiş ayarları yapıyoruz.



The screenshot shows the 'Experiment settings' dialog in IBM Watson Studio. The 'Prediction' tab is selected. Under 'Prediction type', 'Binary classification' is chosen. Other options like 'Multiclass classification' and 'Regression' are also listed. The 'General' tab is selected under the 'Prediction settings' tab.

Prediction

Prediction settings

General Fairness Time series

Prediction type
Change the prediction type based on data in the prediction column. Changing the type changes other prediction settings.

Binary classification (selected) Classify data into categories. Choose this if your prediction column contains two distinct categories.

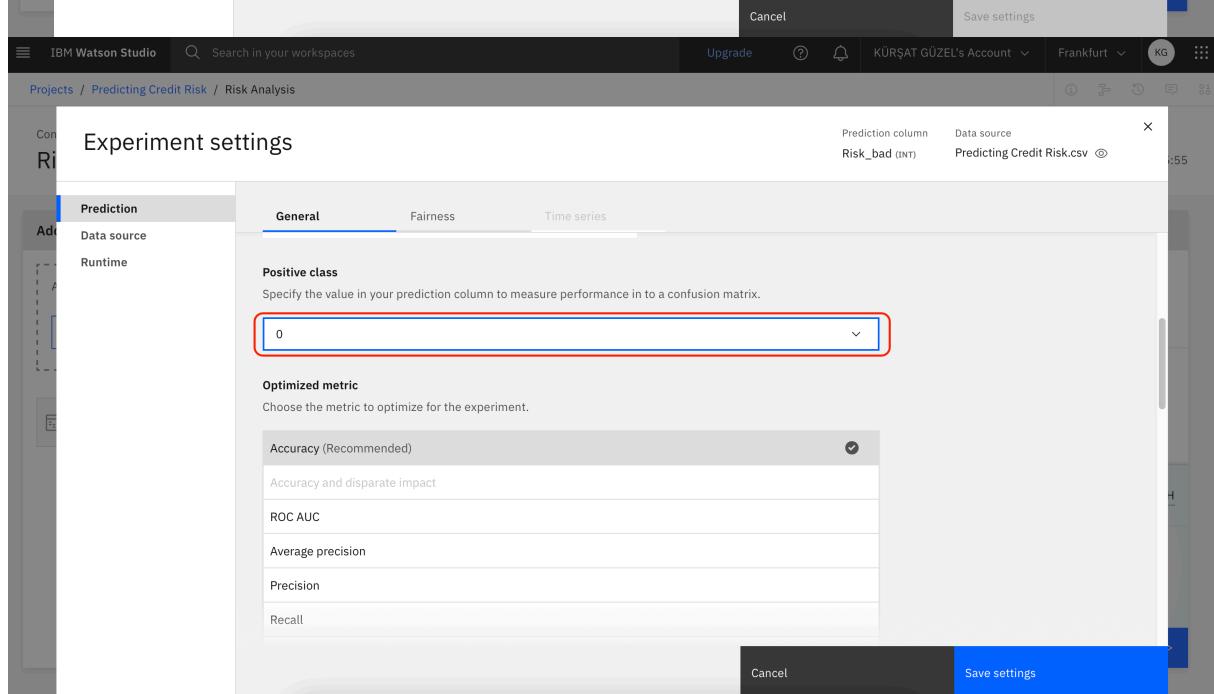
Multiclass classification Classify data into categories. Choose this if your prediction column contains multiple distinct categories.

Regression Predict values from a continuous set of values. Choose this if your prediction column contains a large number of values.

Time series forecast Forecast future values in a series. Data must be structured and sequential. [Learn more](#)

Time series anomaly prediction Predict whether future values in a series are anomalies (outliers). Data must be structured and sequential. [Learn more](#)

Cancel **Save settings**



The screenshot shows the 'Experiment settings' dialog in IBM Watson Studio. The 'Prediction' tab is selected. Under 'Positive class', the value '0' is selected. Under 'Optimized metric', 'Accuracy (Recommended)' is selected. The 'General' tab is selected under the 'Prediction settings' tab.

Prediction

Prediction settings

General Fairness Time series

Positive class
Specify the value in your prediction column to measure performance in to a confusion matrix.
0

Optimized metric
Choose the metric to optimize for the experiment.

Accuracy (Recommended)
Accuracy and disparate impact
ROC AUC
Average precision
Precision
Recall

Cancel **Save settings**

Pozitif sınıf “1” olarak ayarlanmıştır.

The screenshot shows the 'Experiment settings' dialog in the 'Prediction' tab. The 'General' tab is selected. A red box highlights the 'Algorithms to include' section, which lists several machine learning classifiers: Decision Tree Classifier, Extra Trees Classifier, Gradient Boosting Classifier, LGBM Classifier, and Logistic Regression. All checkboxes are checked. Below this is a search bar and a 'Save settings' button.

Kullanılmak istenilen algoritmalar eklenmiştir.

The screenshot shows the 'Experiment settings' dialog in the 'Runtime' tab. The 'Runtime settings' section contains three input fields: 'Initial model tuning iterations: 10', 'Feature engineering iterations: 30', and 'Final model tuning iterations: 25'. Below this is a 'Watson Machine Learning service' section with a dropdown menu showing 'Watson Machine Learning-gf'. The 'Environment definition' section includes a note about resource allocation and a link to learn more. The 'Model creation' section shows the runtime configuration: 'Large: 8 CPU and 32 GB RAM'. The 'Save settings' button is highlighted with a red box.

Özelleştirme işlemleri tamamlandıktan sonra “Save settings” ile ayarları kaydettik.

IBM Watson Studio Search in your workspaces Upgrade KÜRSAT GÜZEL's Account Frankfurt KG

Projects / Predicting Credit Risk / Risk Analysis

Configure AutoAI experiment Risk Analysis Autosaved: 04:38:04

Add data source

Add files such as tabular data (CSV).
Browse Select data from project

Predicting Credit Risk.csv Size: 53.85 KB Columns: 25

Configure details

Create a time series analysis? Enable this option to predict future activity over a specified date/time range. Data must be structured and sequential. Learn more Yes No

What do you want to predict? Prediction column Risk_bad

Prediction column: Risk_bad CUH remaining: 20 CUH

PREDICTION TYPE: Binary Classification POSITIVE CLASS: 0 OPTIMIZED FOR: Accuracy & run time

Experiment settings Run experiment

“Run experiment” ile model oluşturmaya başlıyoruz. İşlem sırasındaki örnek görseller aşağıdadır.

IBM Watson Studio Search in your workspaces Upgrade KÜRSAT GÜZEL's Account Frankfurt KG

Projects / Predicting Credit Risk / Risk Analysis

Experiment summary Pipeline comparison ★ Rank by: Accuracy (Optimized) | Cross validation score

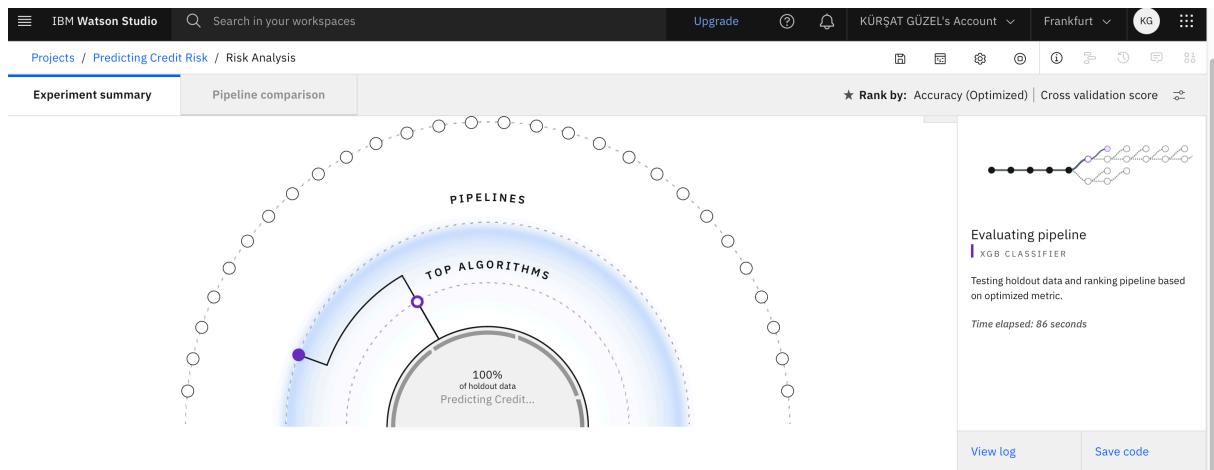
Relationship map Prediction column: Risk_bad Progress map Swap view

Predicting Cred... Pending PREDICTING CREDIT ... Starting the AutoAI experiment Time elapsed: 2 seconds

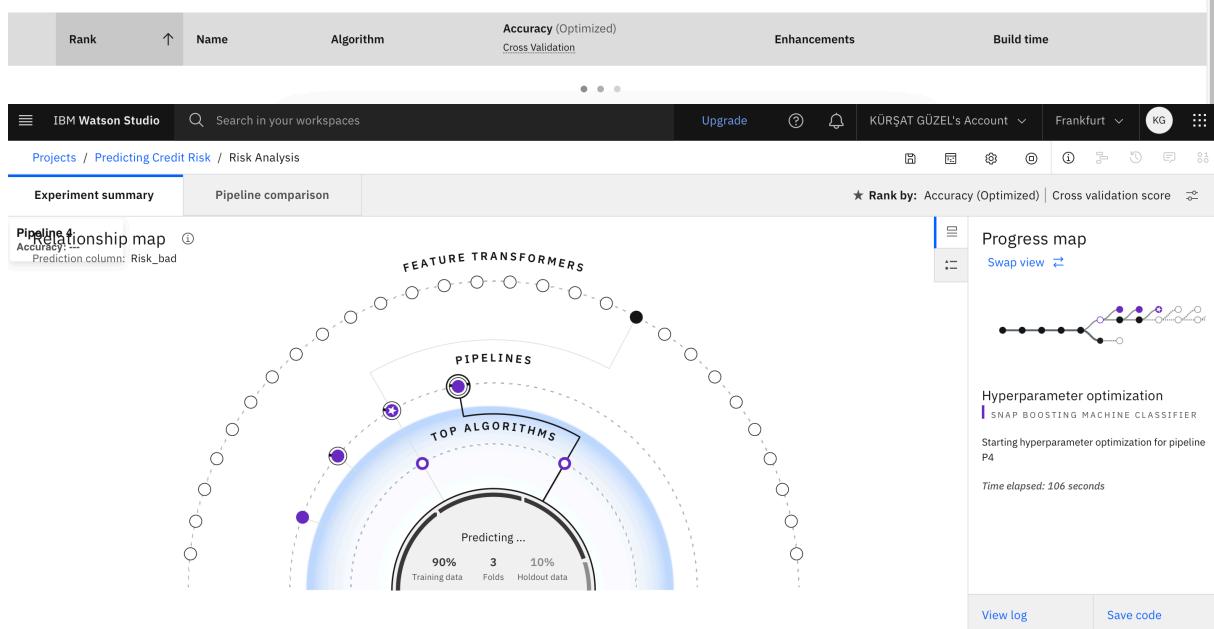
View log Save code

Pipeline leaderboard ▾

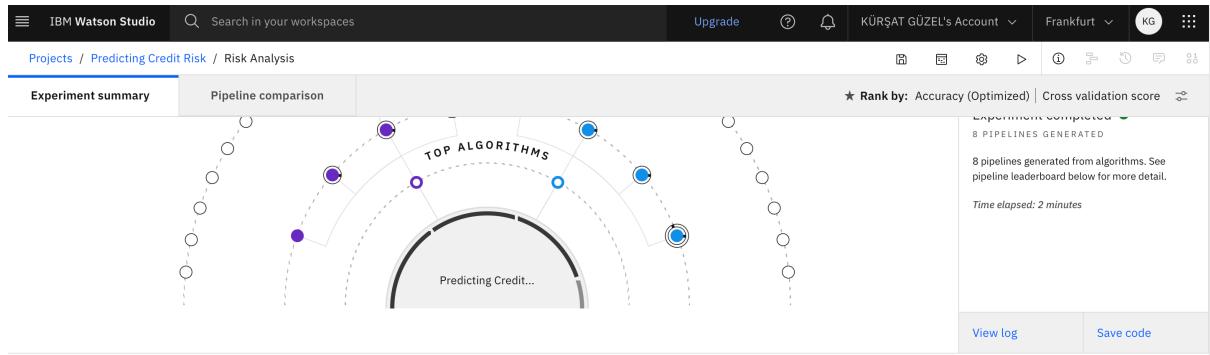
Rank	↑	Name	Algorithm	Accuracy (Optimized) Cross Validation	Enhancements	Build time
------	---	------	-----------	------------------------------------------	--------------	------------



Pipeline leaderboard ▾



Pipeline leaderboard ▾



Pipeline leaderboard ▾

	Rank ↑	Name	Algorithm	Accuracy (Optimized) Cross Validation	Enhancements	Build time
★	1	Pipeline 4	● XGB Classifier	0.739	HPO-1 FE HPO-2	00:00:45
	2	Pipeline 3	● XGB Classifier	0.739	HPO-1 FE	00:00:32
	3	Pipeline 2	● XGB Classifier	0.722	HPO-1	00:00:07

İşlemler tamamlandıktan sonra 1 numaralı alandan algoritmaya giriyoruz ve detayları inceleyebiliriz.

IBM Watson Studio | Search in your workspaces | Upgrade | KÜRSAT GÜZEL's Account | Frankfurt | KG | ⋮

Projects / Predicting Credit Risk / Risk Analysis

Pipeline details | Pipeline 4 | Pipeline 4 | Rank 1 | Accuracy (Optimized) 0.720 (Holdout) | Algorithm XGB Classifier | Enhancements HPO-1 +2 | Save as

Model viewer | Model information | Feature summary | Evaluation | Model evaluation | Confusion matrix | Precision recall

Model evaluation

ROC curve ⓘ

The image consists of two vertically stacked screenshots of the IBM Watson Studio interface, both titled "Pipeline 4".

Top Screenshot (Confusion matrix):

- Left sidebar:** Shows "Pipeline details" for Pipeline 4, with "Confusion matrix" selected.
- Right panel:** Displays a "Confusion matrix" table with the following data:

Observed	Predicted		Percent correct
	1	0	
1	59	11	84.3%
0	17	13	43.3%
Percent correct	77.6%	54.2%	72.0%

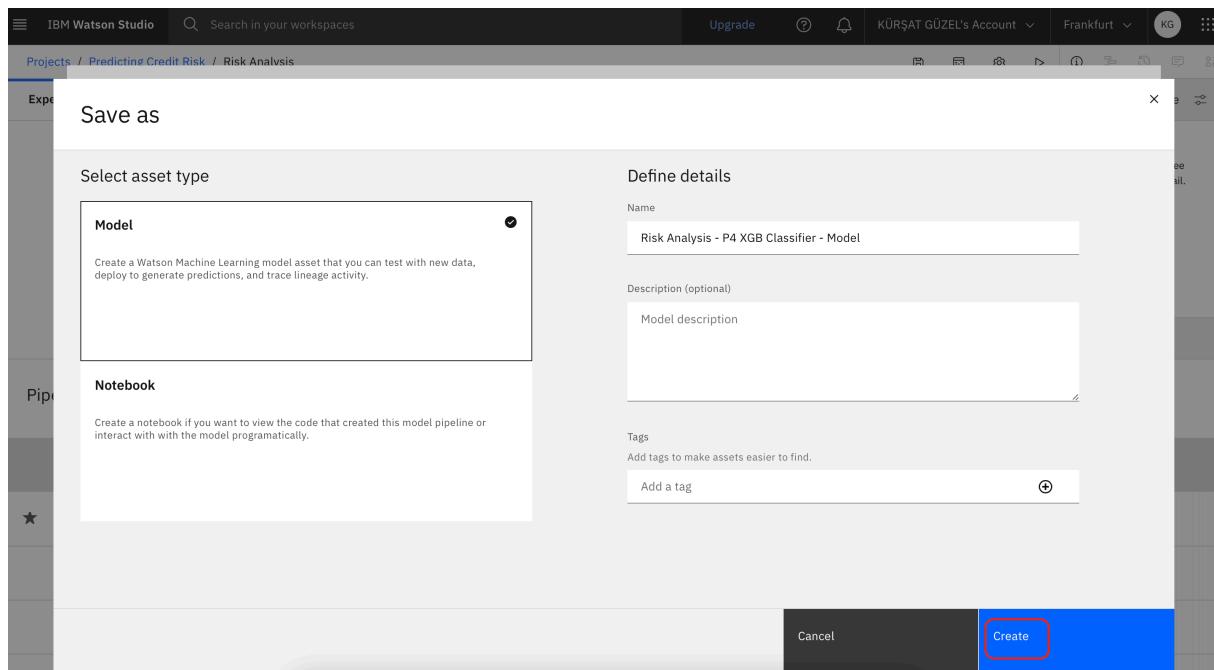
A horizontal bar chart at the bottom indicates the percentage of correct predictions, ranging from "Less correct" (blue) to "More correct" (green).

Bottom Screenshot (Feature summary):

- Left sidebar:** Shows "Pipeline details" for Pipeline 4, with "Feature summary" selected.
- Right panel:** Displays a "Feature summary" table with the following data:

All features	Transformation	Feature importance
Check_no_inf	None	19.52%
Savings_no_inf	None	5.70%
Duration	None	5.67%
Check_rich	None	5.12%
Savings_moderate	None	5.07%
Age	None	4.30%
Job	None	4.17%
Savings_rich	None	4.03%

“Save as” alanı ile modeli kaydedebiliriz.



“Create” modeli oluşturabiliriz.

The screenshot shows the 'Feature summary' section for 'Pipeline 4'. The sidebar on the left includes 'Pipeline details', 'Pipeline 4', 'Model viewer', 'Model information', 'Feature summary' (which is selected), 'Evaluation', 'Model evaluation', 'Confusion matrix', and 'Precision recall'. The main area displays a table titled 'Feature summary' with columns 'Feature name', 'Transformation', and 'Feature importance'. The data is as follows:

Feature name	Transformation	Feature importance
Check_no_inf	None	19.52%
Savings_no_inf	None	5.70%
Duration	None	5.67%
Check_rich	None	5.12%
Savings_moderate	None	5.07%
Age	None	4.30%
Job	None	4.17%
Savings_rich	None	4.03%

A green toast notification at the top right says 'Saved model successfully. Risk Analysis - P4 XGB Classifier - Model was successfully saved to Predicting Credit Risk.' with a 'View in project' button highlighted by a red box.

“View in Project” ile proje detaylarına erişebiliriz.

Yaygınlaştırma İşlemi

The screenshot shows the IBM Watson Studio interface. At the top, there's a navigation bar with 'IBM Watson Studio', a search bar, and various account and location settings. Below the navigation bar, a breadcrumb trail shows 'Projects / Predicting Credit Risk / Risk Analysis - P4 XGB Classifier ...'. A prominent blue button labeled 'Promote to deployment space' is highlighted with a red box. To the right of this button is a card titled 'About this asset' containing details like Name, Description, Asset Details, and Tags. On the left, there's a section titled 'Input Schema' with a table showing 'Input' columns and their types.

Column	Type
Age	"double"
Age_cat_Adult	"double"
Age_cat_Senior	"double"
Age_cat_Young	"double"
Check_moderate	"double"
Check_no_inf	"double"
Check_rich	"double"
Credit amount	"double"
Duration	"double"

“promote to deployment space” ile modelimizi yaygınlaştırma adımlarını yapabiliyoruz.