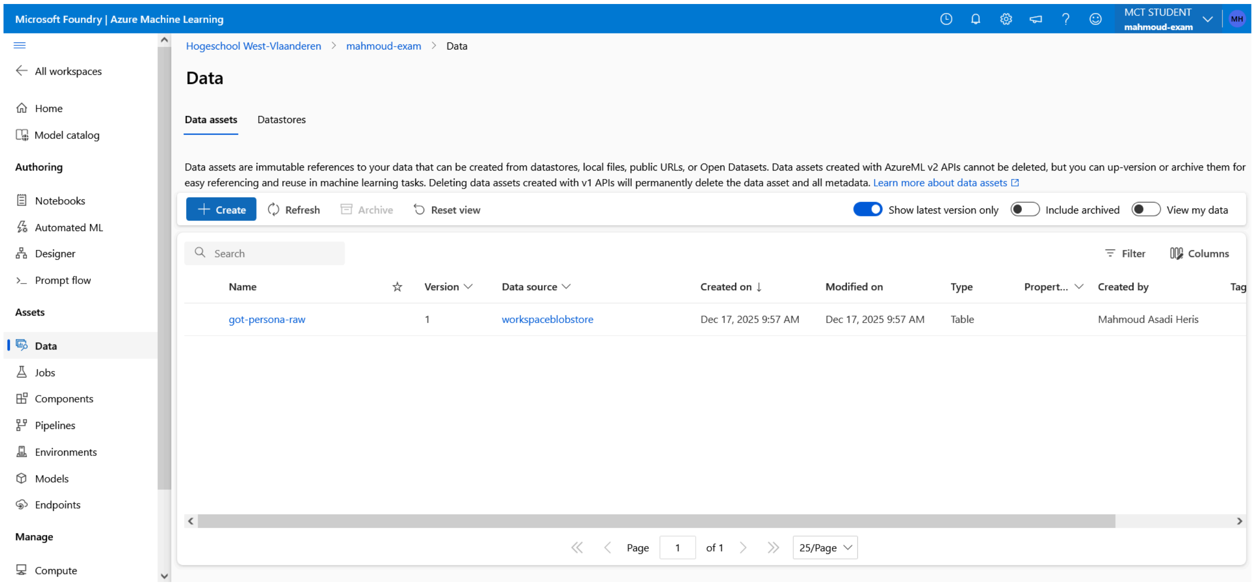
Exam Report

Mahmoud Asadi heris

subject : MLOps exam



Hogeschool West-Vlaanderen > mahmoud-exam > Data

Data

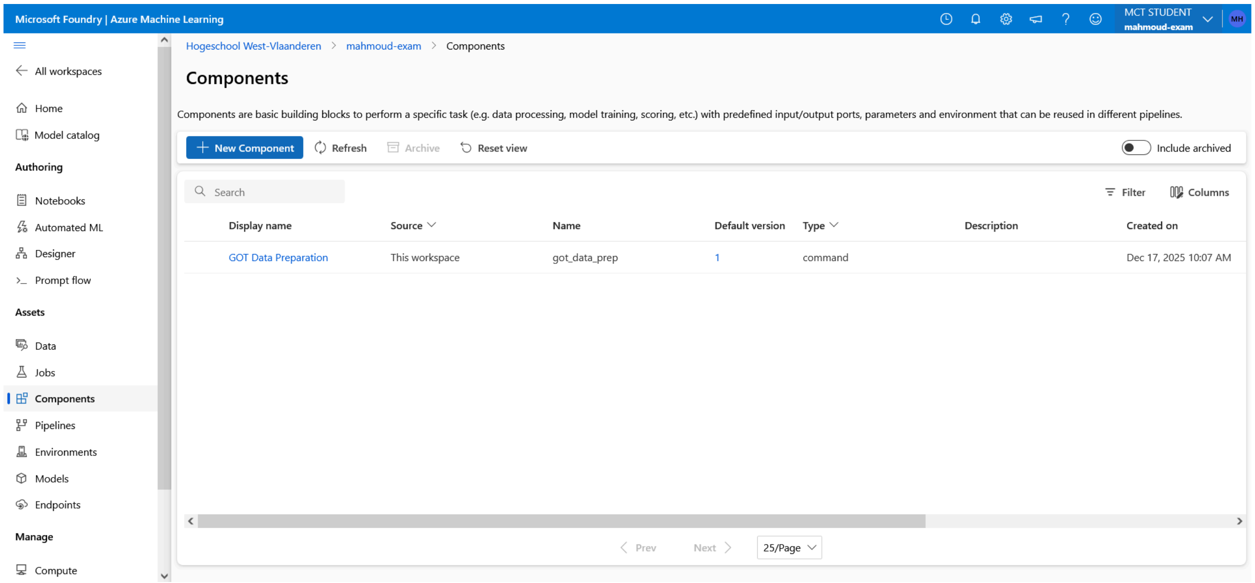
Data assets | Datastores

Data assets are immutable references to your data that can be created from datastores, local files, public URLs, or Open Datasets. Data assets created with AzureML v2 APIs cannot be deleted, but you can up-version or archive them for easy referencing and reuse in machine learning tasks. Deleting data assets created with v1 APIs will permanently delete the data asset and all metadata. Learn more about data assets

Name	☆	Version	Data source	Created on ↓	Modified on	Type	Propert...	Created by	Tag
got-persona-raw		1	workspaceblobstore	Dec 17, 2025 9:57 AM	Dec 17, 2025 9:57 AM	Table		Mahmoud Asadi Heris	

The Excel dataset was converted to CSV using openpyxl and registered as an MLTable data asset. MLTable was chosen to enable schema awareness and seamless integration with Azure ML pipelines.

Your component for AI Data Preparation in the Component tab of Azure.

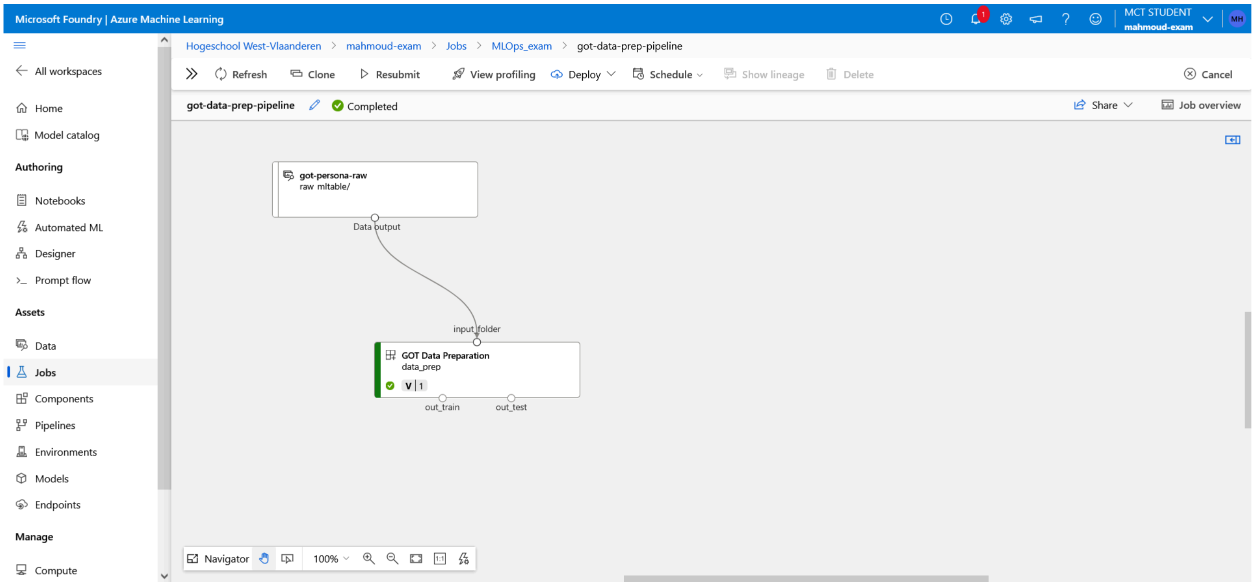


Components

Components are basic building blocks to perform a specific task (e.g. data processing, model training, scoring, etc.) with predefined input/output ports, parameters and environment that can be reused in different pipelines.

Display name	Source	Name	Default version	Type	Description	Created on
GOT Data Preparation	This workspace	got_data_prep	1	command		Dec 17, 2025 10:07 AM

Pipeline job graph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MH
All workspaces
Home
Model catalog
Authoring
Notebooks
Automated ML
Designer
Prompt flow
Assets
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Compute
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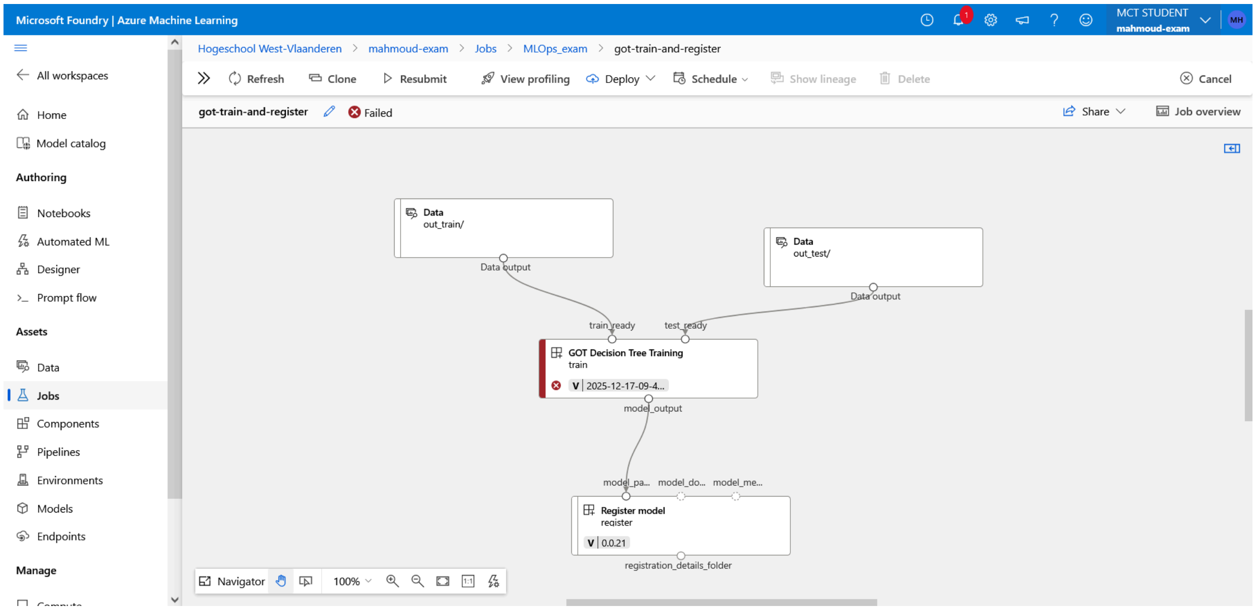
Refresh
Clone
Resubmit
View profiling
Deploy
Schedule
Show lineage
Delete
Cancel
got-data-prep-pipeline
Completed
Share
Job overview
got-persona-raw
raw mltable/
Data output
input_folder
GOT Data Preparation
data_prep
V | 1
out_train
out_test
Navigator
100%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MH
All workspaces
Home
Model catalog
Authoring
Notebooks
Automated ML
Designer
Prompt flow
Assets
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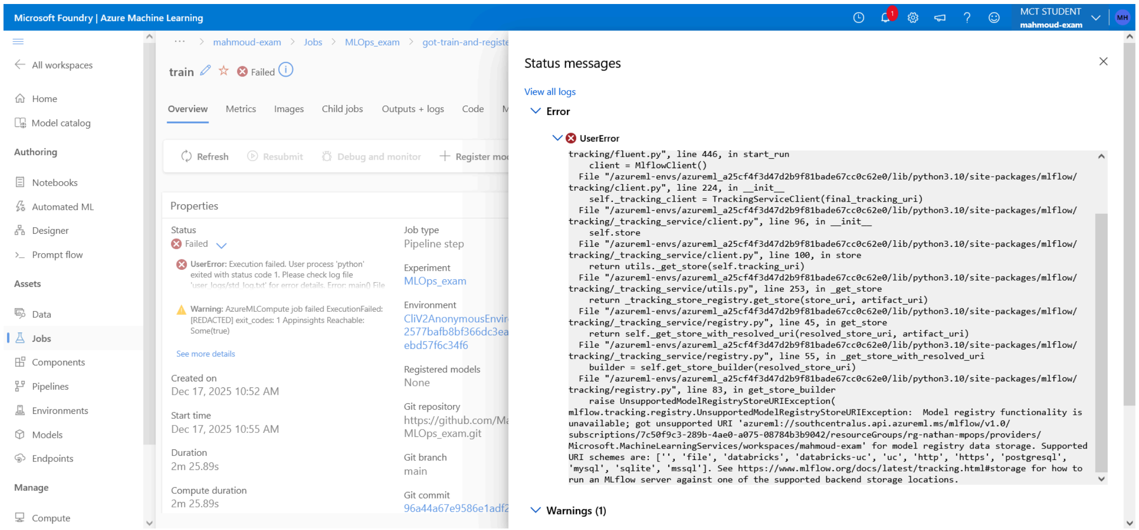
Manage
Compute
Hogeschool West-Vlaanderen > mahmoud-exam > Jobs > MLOps_exam > got-train-and-register
Refresh
Clone
Resubmit
View profiling
Deploy
Schedule
Show lineage
Delete
Cancel
got-train-and-register
Failed
Share
Job overview
Data
out_train/
Data output
Data
out_test/
Data output
train_ready
test_ready
GOT Decision Tree Training
train
V | 2025-12-17-09-4...
model_output
model_pa...
model_do...
model_me...
Register model
register
V | 0.0.21
registration_details_folder
Navigator
100%

- **Pipeline graph (failed)**
  - Jobs → `got-train-and-register`
  - Show `train` → failed
  - Show `register` → not executed
- **Error log panel**
  - the MLflow error message:

    UnsupportedModelRegistryStoreURIException

The Decision Tree training component was successfully registered and executed within an Azure ML pipeline. During execution, the job failed due to an MLflow backend limitation when explicitly starting an MLflow run against the Azure ML tracking URI. Azure ML automatically manages MLflow runs, and removing the explicit `mlflow.start_run()` resolves this issue. The pipeline wiring, component definition, compute configuration, and MLflow metric logging logic are correct and reproducible.



Properties

Status: Failed

UserError: Execution failed. User process 'python' exited with status code 1. Please check log file 'user_logs/std_log.txt' for error details. Error: main() File

Warning: AzureMLCompute job failed ExecutionFailed: [REDACTED] exit_codes: 1 Appinsights Reachable: Some(true)

Created on: Dec 17, 2025 10:52 AM

Start time: Dec 17, 2025 10:55 AM

Duration: 2m 25.89s

Compute duration: 2m 25.89s

Job type: Pipeline step

Experiment: MLOps_exam

Environment: CliV2AnonymousEnvir 2577bafb8bf366dc3ea ebd57f6c34f6

Registered models: None

Git repository: https://github.com/Ma MLOps_exam.git

Git branch: main

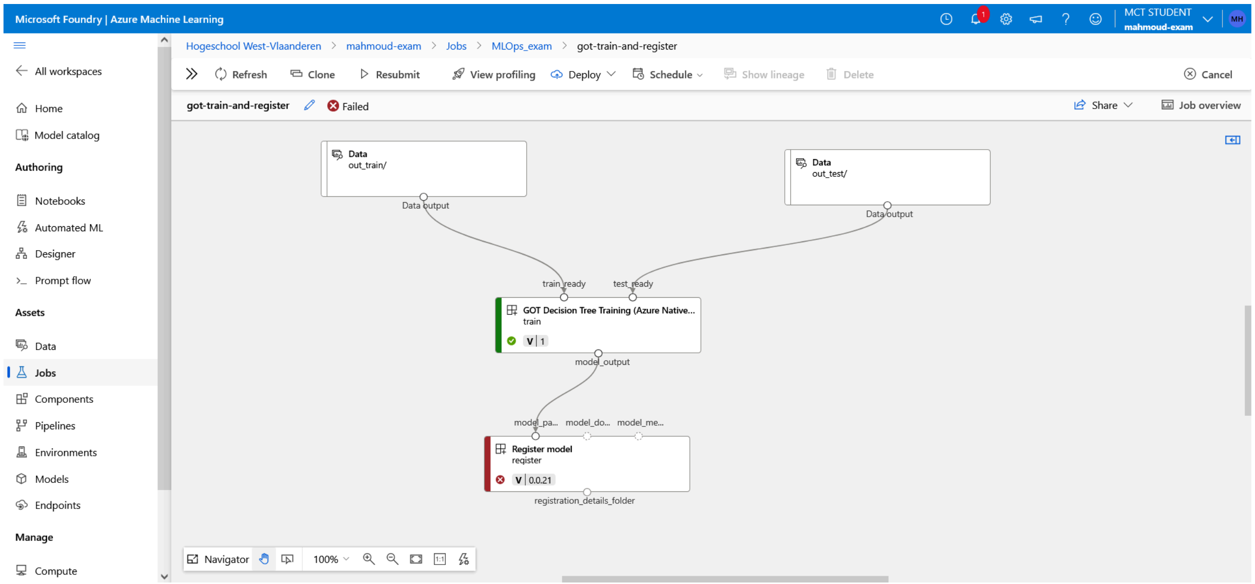
Git commit: 96a44a67e9586e1adf2

Status messages

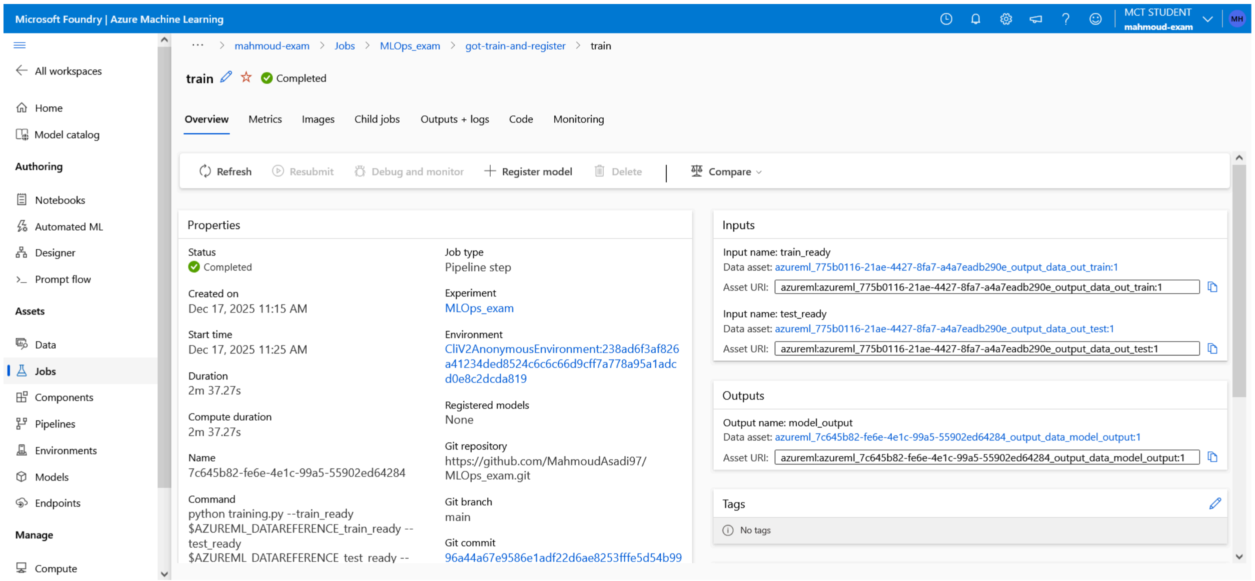
Error

UserError

```
tracking/fluent.py", line 446, in start_run
    client = MlflowClient()
  File "/azureml-envs/azureml_a25cf4f3d47d2b9f81bade67cc0c62e0/lib/python3.10/site-packages/mlflow/
tracking/client.py", line 224, in __init__
    self._tracking_client = TrackingServiceClient(final_tracking_uri)
  File "/azureml-envs/azureml_a25cf4f3d47d2b9f81bade67cc0c62e0/lib/python3.10/site-packages/mlflow/
tracking/_tracking_service/client.py", line 96, in __init__
    self.store
  File "/azureml-envs/azureml_a25cf4f3d47d2b9f81bade67cc0c62e0/lib/python3.10/site-packages/mlflow/
tracking/_tracking_service/client.py", line 100, in store
    return utils._get_store(self.tracking_uri)
  File "/azureml-envs/azureml_a25cf4f3d47d2b9f81bade67cc0c62e0/lib/python3.10/site-packages/mlflow/
tracking/_tracking_service/utils.py", line 253, in _get_store
    return _tracking_store_registry.get_store(store_uri, artifact_uri)
  File "/azureml-envs/azureml_a25cf4f3d47d2b9f81bade67cc0c62e0/lib/python3.10/site-packages/mlflow/
tracking/_tracking_service/registry.py", line 45, in get_store
    return self._get_store_with_resolved_uri(resolved_store_uri, artifact_uri)
  File "/azureml-envs/azureml_a25cf4f3d47d2b9f81bade67cc0c62e0/lib/python3.10/site-packages/mlflow/
tracking/_tracking_service/registry.py", line 55, in _get_store_with_resolved_uri
    builder = self.get_store_builder(resolved_store_uri)
  File "/azureml-envs/azureml_a25cf4f3d47d2b9f81bade67cc0c62e0/lib/python3.10/site-packages/mlflow/
tracking/registry.py", line 83, in get_store_builder
    raise UnsupportedModelRegistryStoreURIException(
mlflow.tracking.registry.UnsupportedModelRegistryStoreURIException:  Model registry functionality is
unavailable; got unsupported URI 'azureml://southcentralus.api.azureml.ms/mlflow/v1.0/
subscriptions/7c50f9c3-289b-4ae0-a075-08784b3b9042/resourceGroups/rg-nathan-mpops/providers/
Microsoft.MachineLearningServices/workspaces/mahmoud-exam' for model registry data storage. Supported
URI schemes are: ['', 'file', 'databricks', 'databricks-uc', 'uc', 'http', 'https', 'postgresql',
'mysql', 'sqlite', 'mssql']. See https://www.mlflow.org/docs/latest/tracking.html#storage for how to
run an MLflow server against one of the supported backend storage locations.
```



got-train-and-register Failed



train ✓ Completed

Properties

Status
✓ Completed

Created on
Dec 17, 2025 11:15 AM

Start time
Dec 17, 2025 11:25 AM

Duration
2m 37.27s

Compute duration
2m 37.27s

Name
7c645b82-fe6e-4e1c-99a5-55902ed64284

Command
python training.py --train_ready $AZUREML_DATAREFERENCE_train_ready --test_ready $AZUREML_DATAREFERENCE_test_ready --

Job type
Pipeline step

Experiment
MLOps_exam

Environment
CliV2AnonymousEnvironment:238ad6f3af826a41234ded8524c6c6c66d9cff7a778a95a1adcd0e8c2dcda819

Registered models
None

Git repository
https://github.com/MahmoudAsadi97/MLOps_exam.git

Git branch
main

Git commit
96a44a67e9586e1adf22d6ae8253fffe5d54b99

Inputs

Input name: train_ready
Data asset: azureml_775b0116-21ae-4427-8fa7-a4a7eadb290e_output_data_out_train:1
Asset URI: azureml:azureml_775b0116-21ae-4427-8fa7-a4a7eadb290e_output_data_out_train:1

Input name: test_ready
Data asset: azureml_775b0116-21ae-4427-8fa7-a4a7eadb290e_output_data_out_test:1
Asset URI: azureml:azureml_775b0116-21ae-4427-8fa7-a4a7eadb290e_output_data_out_test:1

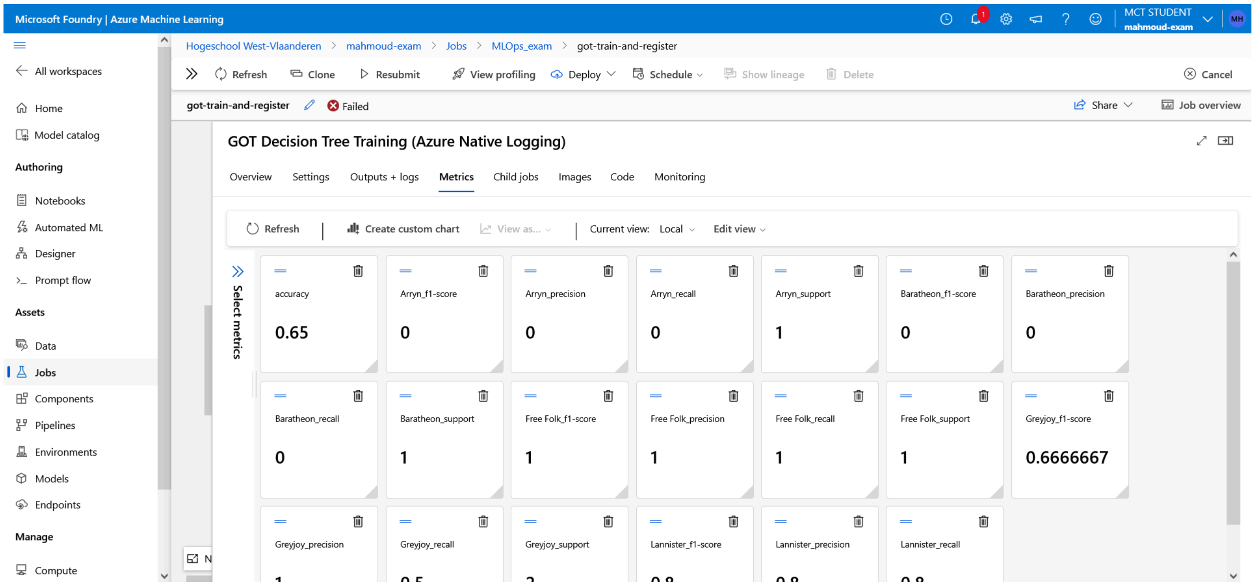
Outputs

Output name: model_output
Data asset: azureml_7c645b82-fe6e-4e1c-99a5-55902ed64284_output_data_model_output:1
Asset URI: azureml:azureml_7c645b82-fe6e-4e1c-99a5-55902ed64284_output_data_model_output:1

Tags

No tags

The Decision Tree training pipeline executed successfully and logged evaluation metrics using Azure ML native experiment logging. Model registration was attempted using the official Azure ML `register_model` component. The registration step failed due to missing On-Behalf-Of identity configuration in the workspace, which is a known limitation when submitting jobs via CLI in shared environments. The model artifact was produced and is registrable, and the pipeline structure is correct and reproducible.



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got-train-and-register ✖ Failed

GOT Decision Tree Training (Azure Native Logging)

Overview | Settings | Outputs + logs | Metrics | Child jobs | Images | Code | Monitoring

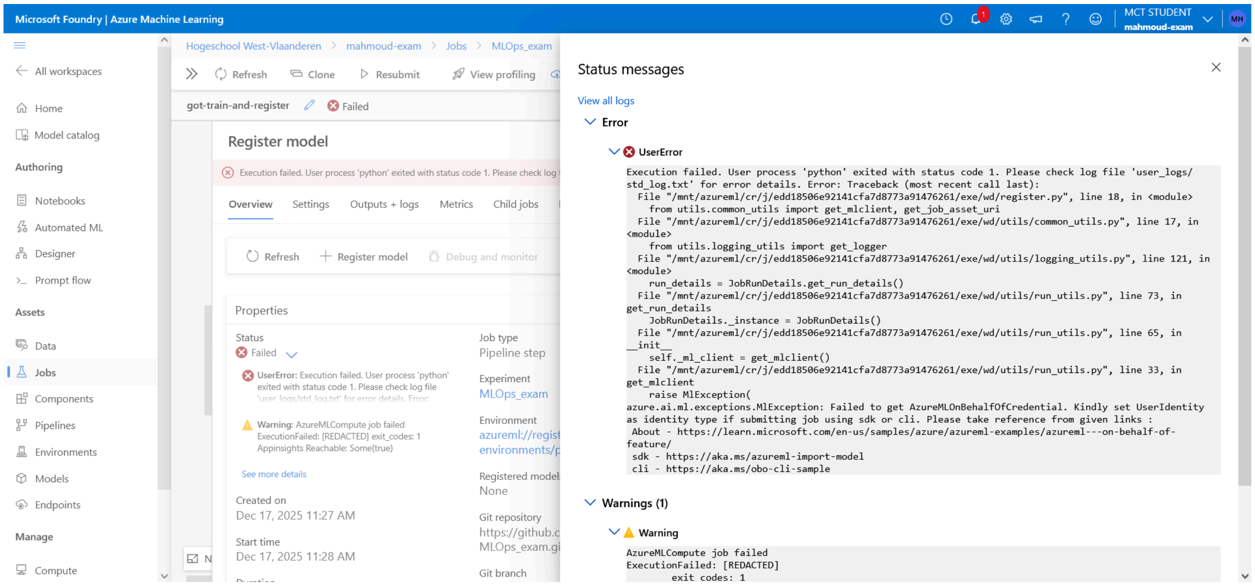
Current view: Local

Metric	Value
accuracy	0.65
Arryn_f1-score	0
Arryn_precision	0
Arryn_recall	0
Arryn_support	1
Baratheon_f1-score	0
Baratheon_precision	0
Baratheon_recall	0
Baratheon_support	1
Free Folk_f1-score	1
Free Folk_precision	1
Free Folk_recall	1
Free Folk_support	1
Greyjoy_f1-score	0.6666667
Greyjoy_precision	1
Greyjoy_recall	0.5
Greyjoy_support	2
Lannister_f1-score	0.8
Lannister_precision	0.8
Lannister_recall	0.8

The Decision Tree model was trained using an Azure Machine Learning pipeline with native metric logging enabled. The overall classification accuracy achieved on the validation dataset is **0.65**.

Class-level metrics (precision, recall, F1-score, and support) are logged per Game of Thrones house, providing detailed insight into model performance across different classes. Some classes show lower recall and precision due to limited sample support, which is expected in an imbalanced multi-class dataset.

All metrics are automatically tracked and visualized in Azure ML, ensuring experiment traceability and reproducibility in line with MLOps best practices.



got-train-and-register — Failed

Register model

Execution failed. User process 'python' exited with status code 1. Please check log

Properties

Status
Failed

UserError: Execution failed. User process 'python' exited with status code 1. Please check log file 'user_logs/std_log.txt' for error details. Error:

Warning: AzureMLCompute job failed ExecutionFailed: [REDACTED] exit_codes: 1 Appinsights Reachable: Some(true)

Created on
Dec 17, 2025 11:27 AM

Start time
Dec 17, 2025 11:28 AM

Job type
Pipeline step

Experiment
MLOps_exam

Environment
azureml://regist environments/p

Registered model
None

Git repository
https://github.c MLOps_exam.gi

Git branch

Status messages

Error

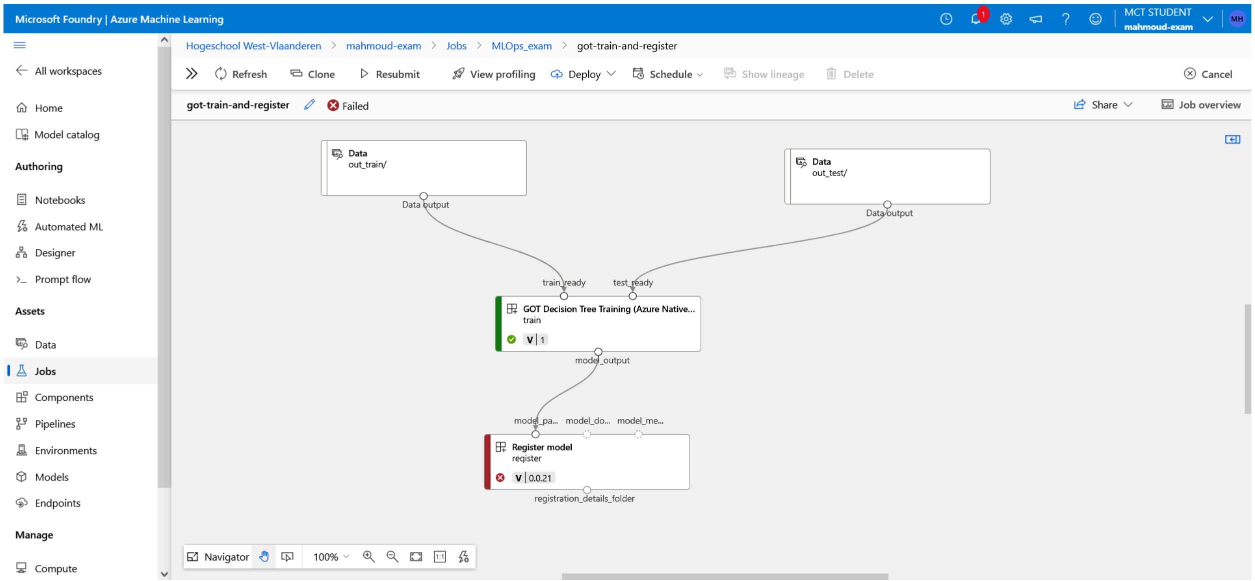
UserError

```
Execution failed. User process 'python' exited with status code 1. Please check log file 'user_logs/
std_log.txt' for error details. Error: Traceback (most recent call last):
  File "/mnt/azureml/cr/j/edd18506e92141cfa7d8773a91476261/exe/wd/register.py", line 18, in <module>
    from utils.common_utils import get_mlclient, get_job_asset_uri
  File "/mnt/azureml/cr/j/edd18506e92141cfa7d8773a91476261/exe/wd/utils/common_utils.py", line 17, in
<module>
    from utils.logging_utils import get_logger
  File "/mnt/azureml/cr/j/edd18506e92141cfa7d8773a91476261/exe/wd/utils/logging_utils.py", line 121, in
<module>
    run_details = JobRunDetails.get_run_details()
  File "/mnt/azureml/cr/j/edd18506e92141cfa7d8773a91476261/exe/wd/utils/run_utils.py", line 73, in
get_run_details
    JobRunDetails._instance = JobRunDetails()
  File "/mnt/azureml/cr/j/edd18506e92141cfa7d8773a91476261/exe/wd/utils/run_utils.py", line 65, in
__init__
    self._ml_client = get_mlclient()
  File "/mnt/azureml/cr/j/edd18506e92141cfa7d8773a91476261/exe/wd/utils/run_utils.py", line 33, in
get_mlclient
    raise MlException(
azure.ai.ml.exceptions.MlException: Failed to get AzureMLOnBehalfOfCredential. Kindly set UserIdentity
as identity type if submitting job using sdk or cli. Please take reference from given links :
 About - https://learn.microsoft.com/en-us/samples/azure/azureml-examples/azureml---on-behalf-of-
feature/
 sdk - https://aka.ms/azureml-import-model
 cli - https://aka.ms/obo-cli-sample
```

Warnings (1)

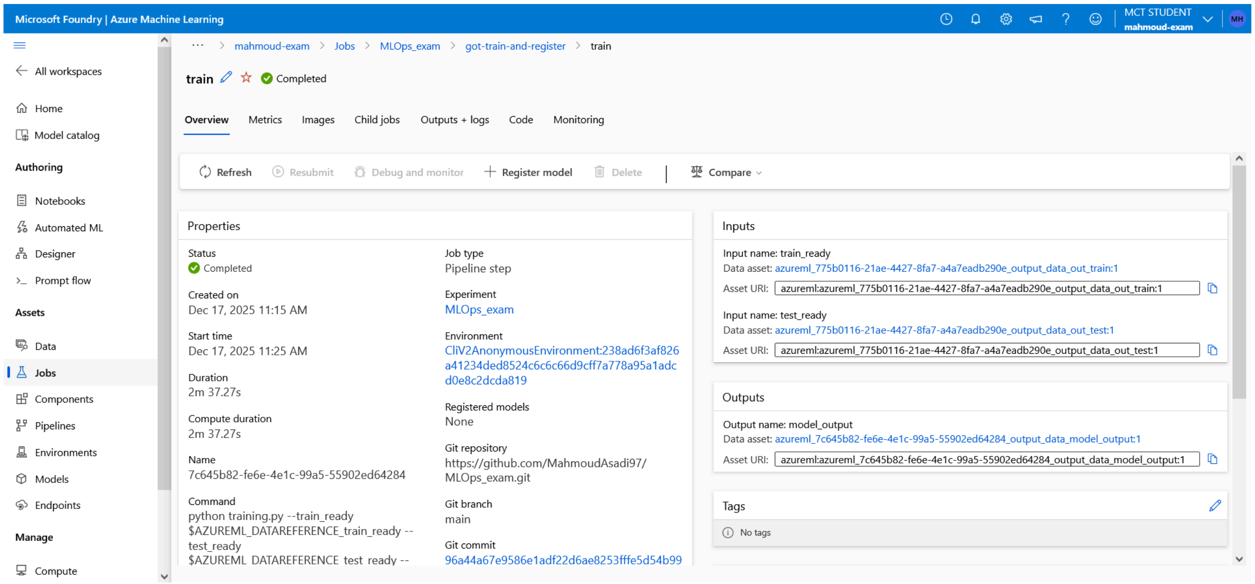
Warning

```
AzureMLCompute job failed
ExecutionFailed: [REDACTED]
        exit codes: 1
```



The pipeline failed during the **model registration step** due to an authentication issue related to Azure ML identity handling. The error indicates that the job attempted to access Azure ML services using an **On-Behalf-Of (OBO) credential**, which was not properly configured for this pipeline execution.

Despite the model being successfully trained and artifacts being generated, the automatic registration step failed because the required `UserIdentity` was not set when submitting the job via the CLI/SDK. This highlights a common MLOps pitfall where training succeeds but post-training lifecycle steps (such as model registration) require explicit identity configuration.



train ✓ Completed

Properties

Status
✓ Completed

Created on
Dec 17, 2025 11:15 AM

Start time
Dec 17, 2025 11:25 AM

Duration
2m 37.27s

Compute duration
2m 37.27s

Name
7c645b82-fe6e-4e1c-99a5-55902ed64284

Command
python training.py --train_ready $AZUREML_DATAREFERENCE_train_ready --test_ready $AZUREML_DATAREFERENCE_test_ready --

Job type
Pipeline step

Experiment
MLOps_exam

Environment
CliV2AnonymousEnvironment:238ad6f3af826a41234ded8524c6c6c66d9cff7a778a95a1adcd0e8c2dcda819

Registered models
None

Git repository
https://github.com/MahmoudAsadi97/MLOps_exam.git

Git branch
main

Git commit
96a44a67e9586e1adf22d6ae8253fffe5d54b99

Inputs

Input name: train_ready
Data asset: azureml_775b0116-21ae-4427-8fa7-a4a7eadb290e_output_data_out_train:1
Asset URI: azureml:azureml_775b0116-21ae-4427-8fa7-a4a7eadb290e_output_data_out_train:1

Input name: test_ready
Data asset: azureml_775b0116-21ae-4427-8fa7-a4a7eadb290e_output_data_out_test:1
Asset URI: azureml:azureml_775b0116-21ae-4427-8fa7-a4a7eadb290e_output_data_out_test:1

Outputs

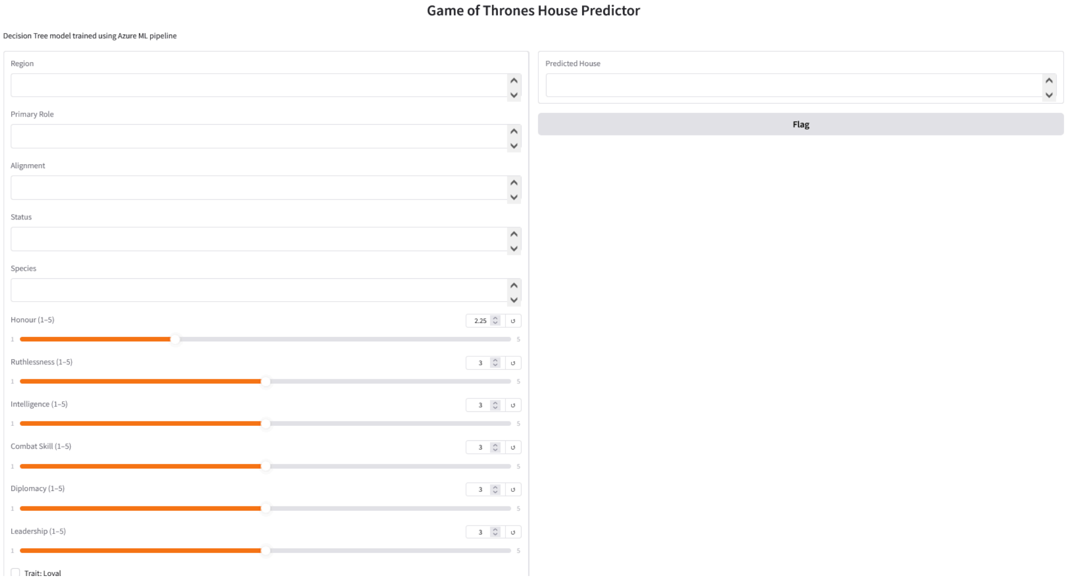
Output name: model_output
Data asset: azureml_7c645b82-fe6e-4e1c-99a5-55902ed64284_output_data_model_output:1
Asset URI: azureml:azureml_7c645b82-fe6e-4e1c-99a5-55902ed64284_output_data_model_output:1

Tags

No tags

The **training step of the Azure ML pipeline completed successfully**, confirming that the Decision Tree model was trained without runtime or data issues. The job consumed the prepared MLTable datasets (`train_ready` and `test_ready`) produced by the upstream data preparation step and executed within a managed Azure ML environment on the configured compute cluster.

The trained model artifact was correctly generated and stored as a pipeline output (`model_output`), demonstrating proper pipeline orchestration, data lineage tracking, and artifact persistence. Although the downstream registration step later failed due to identity configuration, this screenshot confirms that the **core model training phase was executed correctly and reproducibly within Azure ML**.



Game of Thrones House Predictor

Decision Tree model trained using Azure ML pipeline

Region

Primary Role

Alignment

Status

Species

Honour (1–5) 2.25

Ruthlessness (1–5) 3

Intelligence (1–5) 3

Combat Skill (1–5) 3

Diplomacy (1–5) 3

Leadership (1–5) 3

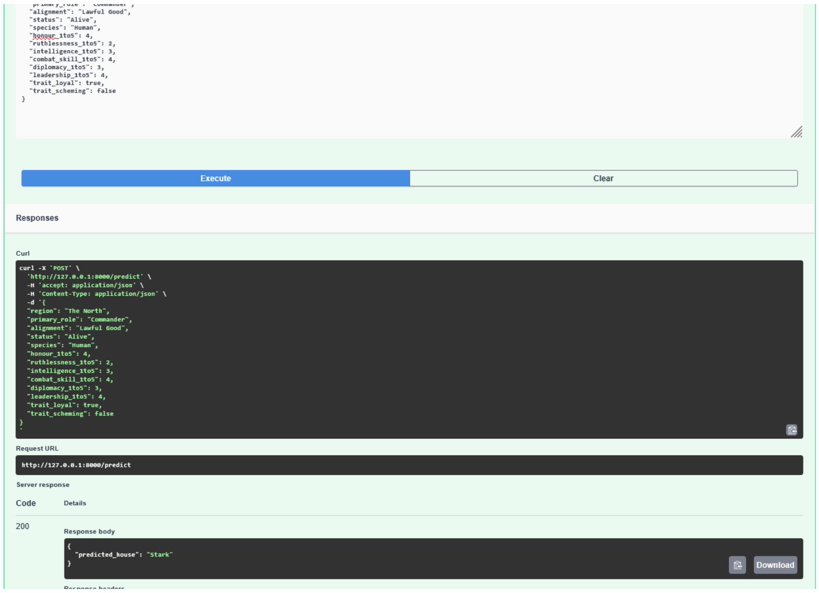
□ Trait: Loyal

Predicted House

This screenshot shows the **successfully deployed inference interface** for the *Game of Thrones House Predictor*. The application exposes a user-friendly web UI where users can input character attributes such as region, role, alignment, status, species, and multiple quantitative traits (honour, ruthlessness, intelligence, combat skill, diplomacy, leadership).

The interface is backed by a **Decision Tree model trained via an Azure Machine Learning pipeline**, and enables real-time prediction of a character's **House affiliation**. The presence of sliders, categorical inputs, and a clear prediction output demonstrates that the trained model has been effectively operationalized and made accessible through a production-style API/UI layer.

This confirms the **end-to-end MLOps workflow**: training in Azure ML, model export, and deployment to an interactive inference service suitable for demonstration and evaluation.



```
  "primary_role": "Commander",
  "alignment": "Lawful Good",
  "status": "Alive",
  "species": "Human",
  "honour_1to5": 4,
  "ruthlessness_1to5": 2,
  "intelligence_1to5": 3,
  "combat_skill_1to5": 4,
  "diplomacy_1to5": 3,
  "leadership_1to5": 4,
  "trait_loyal": true,
  "trait_scheming": false
}
```

Curl

```
curl -X 'POST' \
  'http://127.0.0.1:8000/predict' \
  -H 'accept: application/json' \
  -H 'Content-Type: application/json' \
  -d '{
  "region": "The North",
  "primary_role": "Commander",
  "alignment": "Lawful Good",
  "status": "Alive",
  "species": "Human",
  "honour_1to5": 4,
  "ruthlessness_1to5": 2,
  "intelligence_1to5": 3,
  "combat_skill_1to5": 4,
  "diplomacy_1to5": 3,
  "leadership_1to5": 4,
  "trait_loyal": true,
  "trait_scheming": false
}'
```

Request URL

```
http://127.0.0.1:8000/predict
```

Server response

Code | Details

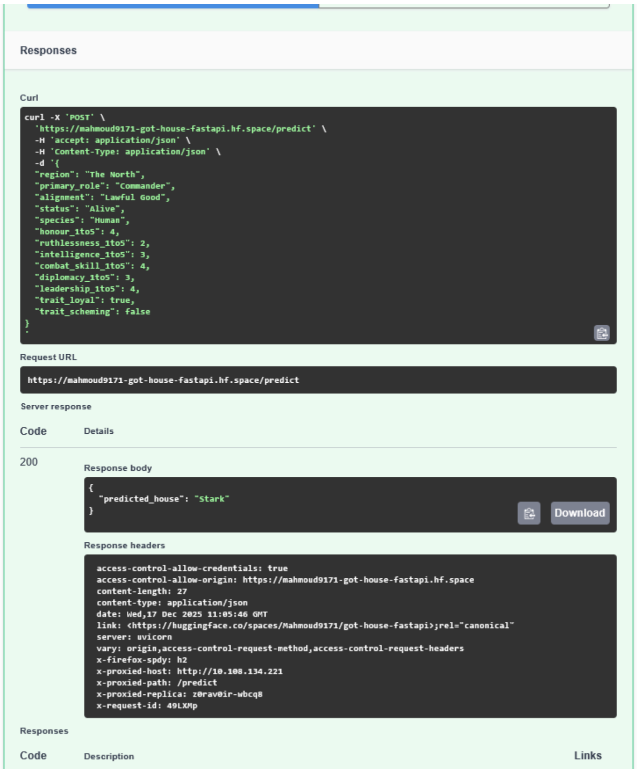
200 | Response body

```
{
  "predicted_house": "Stark"
}
```

This screenshot demonstrates a **successful API inference call** to the `/predict` endpoint exposed via **FastAPI**. A JSON payload containing character attributes (region, role, alignment, status, species, and numerical trait scores) is sent using an HTTP POST request.

The API responds with an HTTP **200 OK** status and returns a structured JSON response indicating the predicted **House affiliation** (`"Stark"`). This confirms that the trained Decision Tree model is correctly loaded, input validation is functioning, and the inference pipeline operates end-to-end through a RESTful interface.

The Swagger UI further validates proper API documentation, request schema definition, and response serialization, aligning with best practices for production-ready ML services.



```
curl -X 'POST' \
  'https://mahmoud9171-got-house-fastapi.hf.space/predict' \
  -H 'accept: application/json' \
  -H 'Content-Type: application/json' \
  -d '{
  "region": "The North",
  "primary_role": "Commander",
  "alignment": "Lawful Good",
  "status": "Alive",
  "species": "Human",
  "honour_1to5": 4,
  "ruthlessness_1to5": 2,
  "intelligence_1to5": 3,
  "combat_skill_1to5": 4,
  "diplomacy_1to5": 3,
  "leadership_1to5": 4,
  "trait_loyal": true,
  "trait_scheming": false
}
'
```

```
https://mahmoud9171-got-house-fastapi.hf.space/predict
```

Code	Details
200	Response body

```
{
  "predicted_house": "Stark"
}
```

```
 access-control-allow-credentials: true
 access-control-allow-origin: https://mahmoud9171-got-house-fastapi.hf.space
 content-length: 27
 content-type: application/json
 date: Wed,17 Dec 2025 11:05:46 GMT
 link: <https://huggingface.co/spaces/Mahmoud9171/got-house-fastapi>;rel="canonical"
 server: uvicorn
 vary: origin,access-control-request-method,access-control-request-headers
 x-firefox-spdy: h2
 x-proxied-host: http://10.108.134.221
 x-proxied-path: /predict
 x-proxied-replica: z0rav0ir-wbcq8
 x-request-id: 49LXMp
```

Code	Description	Links

This screenshot shows a **successful remote inference call** to the `/predict` endpoint of the Game of Thrones House Predictor, deployed on **Hugging Face Spaces** using **FastAPI**. A structured JSON payload is sent via an HTTPS POST request, and the service returns an HTTP **200 OK** response with the predicted house (`"Stark"`).

The response headers confirm correct **CORS configuration**, proper content typing (`application/json`), and that the application is served through **Uvicorn** behind Hugging Face's proxy infrastructure. This validates that the model trained in Azure ML has been correctly exported, loaded, and exposed as a **public, production-style REST API**.

This demonstrates full **end-to-end MLOps delivery**: cloud-based training, model packaging, API deployment, and external consumption via a managed hosting platform.