



**Summer Internship Report
on
Model Evaluation Metrics**

Submitted by

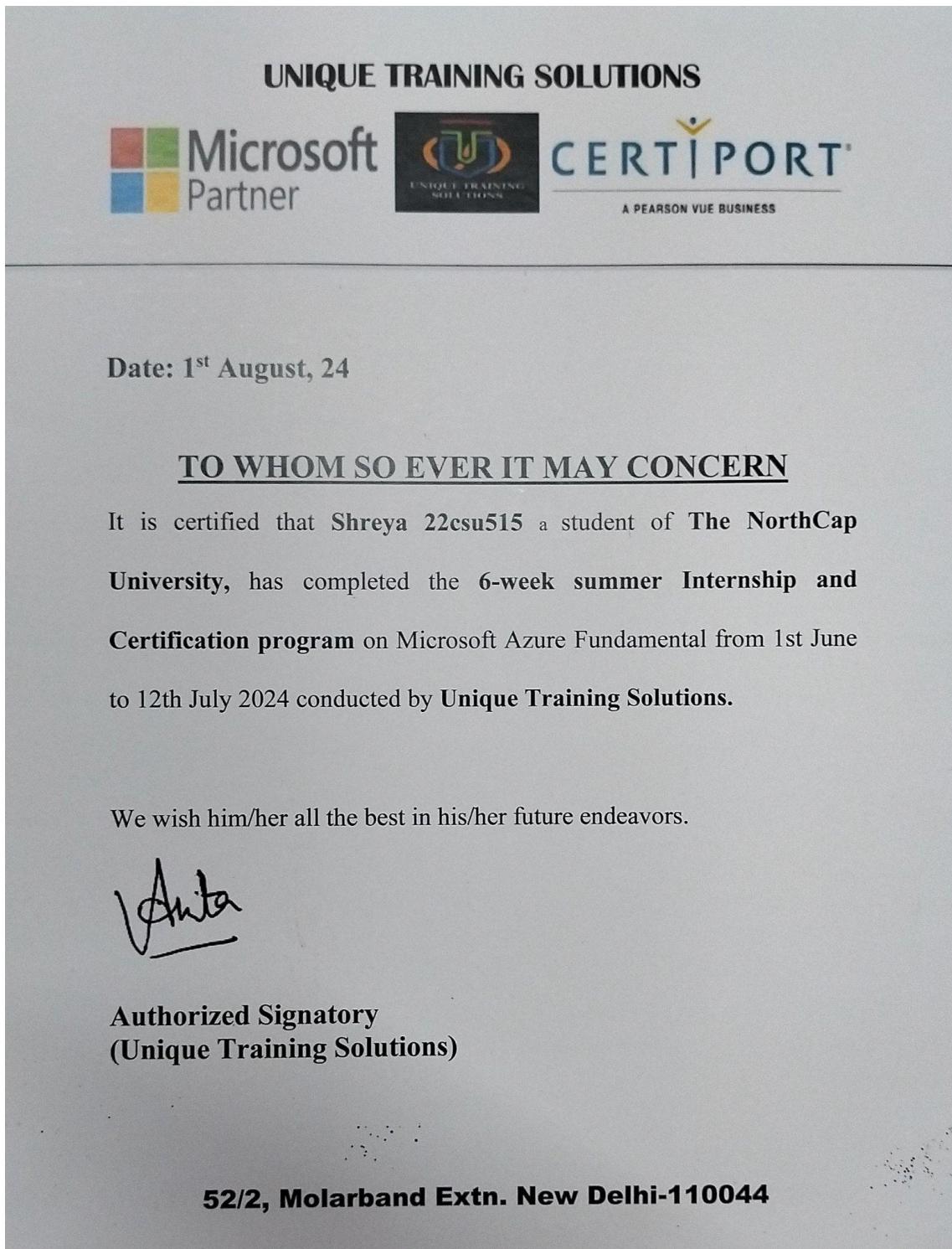
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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING,
SCHOOL OF ENGINEERING AND TECHNOLOGY**

**THE NORTHCAP UNIVERSITY
GURUGRAM-122017**

Internship Period:01/06/2014 TO 12/07/2024

Copy of Certificate of completion (issued by the industry you have done an internship)



UNIQUE TRAINING SOLUTIONS



Date: 1st August, 24

TO WHOM SO EVER IT MAY CONCERN

It is certified that **Aashna Bansal 22csu006** a student of **The NorthCap University**, has completed the **6-week summer Internship and Certification program** on Microsoft Azure Fundamental from **1st June to 12th July 2024** conducted by **Unique Training Solutions**.

We wish him/her all the best in his/her future endeavors.

A handwritten signature in black ink, appearing to read "Anita".

**Authorized Signatory
(Unique Training Solutions)**

52/2, Molarband Extn. New Delhi-110044

UNIQUE TRAINING SOLUTIONS



Date: 1st August, 24

TO WHOM SO EVER IT MAY CONCERN

It is certified that **Himanshi Yadav 22csu085** a student of **The NorthCap University**, has completed the **6-week summer Internship and Certification program** on Microsoft Azure Fundamental from 1st June to 12th July 2024 conducted by **Unique Training Solutions**.

We wish him/her all the best in his/her future endeavors.

A handwritten signature in black ink, appearing to read "Himanshi Yadav".

**Authorized Signatory
(Unique Training Solutions)**

52/2, Molarband Extn. New Delhi-110044

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ABSTRACT

Training Summary

Location and Organization:

The project was conducted at The Northcap University in Gurugram, Haryana.

Training Goals:

- Understand the basics of AI and ML.
- Develop basic projects using Microsoft Azure services.
- Prepare for and pass the AI-900 Microsoft Certification Exam.

Activities:

- Active Learning: Engaged in theoretical and practical sessions on AI/ML concepts.
- Project Work: Created and deployed AI/ML projects using Azure services.
- Azure Framework: Learned how to navigate and utilize Azure tools effectively.
- Exam Preparation: Focused on AI-900 exam structure and key concepts.

Accomplishments:

- Successfully passed the AI-900 Microsoft Certification Exam.
- Developed hands-on experience with Azure and a solid understanding of AI/ML fundamentals.
- Worked on a hands-on project on the topic Life Expectancy Prediction Model.

Key Takeaways:

Technical:

- Azure Proficiency: Gained familiarity with Azure tools for AI/ML projects.
- AI/ML Knowledge: Built a strong foundation in AI/ML concepts.

Non-Technical:

- Collaboration: Enhanced teamwork and knowledge-sharing skills.
- Time Management: Balanced study, project work, and exam prep efficiently.
- Communication: Improved the ability to explain technical concepts clearly.

This training provided essential skills in AI/ML and Azure, laying a strong foundation for future work.

INTRODUCTION

Company: The training was carried out in collaboration with UTS (Unique Training Solution), a company specializing in providing educational and professional training services across various industries. UTS is known for its focus on enhancing the practical skills of students and professionals through tailored training programs that bridge the gap between academic learning and industry requirements.

Location: The training took place at The Northcap University in Gurugram, Haryana, which served as the primary facility for the training sessions. The university provided a conducive environment for hands-on learning and interaction with industry professionals from UTS.

Position: During the training, I held the position of an intern. This role involved engaging in a structured training program designed to develop practical skills and knowledge in key engineering areas.

Engineering Areas:

- Artificial Intelligence and Machine Learning (AI/ML): Gained foundational knowledge in AI and ML, including algorithms, data processing, and model development.
- Microsoft Azure Services: Worked with Azure's cloud computing services, focusing on deploying AI/ML models and understanding cloud infrastructure.
- Project Development: Participated in the end-to-end process of developing and implementing projects using AI/ML concepts and Azure tools.

This training provided valuable experience in applying engineering concepts to real-world scenarios, with a strong emphasis on emerging technologies and practical problem-solving.

PROBLEM STATEMENT

Objective: Assess the effectiveness of various metrics in evaluating life expectancy prediction models. This includes identifying the best metrics for different types of models (e.g., linear regression, machine learning, survival analysis) and ensuring they meet practical needs.

Key Issues:

1. **Metric Selection:** Determine which evaluation metrics (e.g., MAE, MSE, RMSE, R²) best reflect model accuracy and reliability.
2. **Suitability and Bias:** Evaluate the suitability of metrics for different models and check for potential biases in predictions.
3. **Practical Application:** Ensure metrics align with stakeholder needs and provide actionable insights for real-world applications

SOCIAL RELEVANCE OF THE LIFE EXPECTANCY PREDICTION

1. **Public Health Planning:** Helps allocate resources and prepare for healthcare needs and aging populations.
2. **Insurance and Financial Planning:** Informs policy pricing and retirement planning, ensuring financial stability.
3. **Policy Development:** Guides the creation of effective policies on healthcare, retirement, and social services.
4. **Addressing Inequality:** Highlights disparities among groups, aiding targeted interventions to reduce health inequities.

5. **Community and Individual Decision-Making:** Supports informed choices about health behaviors and long-term planning.
6. **Economic Disparities:** Wealthier regions tend to have higher life expectancies due to better access to healthcare, education, and nutrition.

In summary, evaluating a life expectancy dataset through these metrics allows for a comprehensive understanding of how social, economic, and environmental factors influence health outcomes. This analysis is crucial for informing public health policies and interventions aimed at improving the overall well-being and life expectancy of populations.

TRAINING DESCRIPTION

In this Internship, We have learned about Fundamentals of AI and How AI works:

Given below:-

- a) We have learned about the workloads of AI in brief and how they works.
- b) We have learned that how we can use various Microsoft Azure Services to create AI and also others services Data Analytics, Web development etc.
- c) We worked on the hands-on-labs which give us exposure to practical understanding of AI worloads(Computer vision, Regression Analysis etc).
- d) In this internship we have that how we can apply theoretical knowledge into real -world applications.

Benefits

Real-World Experience: Gain hands-on experience that complements your academic studies.

Skill Development: Enhance your professional skills and build your resume.

Career Exploration: Explore career paths and gain insight into the Artificial Intelligence

PROJECT ON MODEL EVALUATION METRIC

In this internship we have worked on hands-on-project. Title of our project is Model Evaluation metric. In this we have taken Data taken of Life Expectancy and Trained our model and Deployed it .

The screenshot shows the Microsoft Azure Resource groups page. At the top, there's a search bar and a Copilot button. The main heading is "Resource groups". Below it, there's a sub-header "Default Directory". A toolbar with icons for Create, Manage view, Refresh, Export to CSV, Open query, and Assign tags is visible. A filter bar shows "Subscription equals all" and "Location equals all". The table below lists one record: "Name: AIML", "Subscription: Azure for Students", and "Location: South India".

The screenshot shows the "Create a resource group" page. The title is "Create a resource group". A green success message says "Validation passed.". There are three tabs: Basics, Tags, and Review + create. The Basics tab is selected, showing fields for Subscription (Azure for Students), Resource group (Evaluation), and Region (Central India). The Tags tab shows "None". At the bottom, there are "Create", "< Previous", and "Next >" buttons, along with a "Download a template for automation" link.

The screenshot shows the Microsoft Azure Resource groups page again. The table now lists two records: "Name: AIML" (Subscription: Azure for Students, Location: South India) and "Name: Evaluation" (Subscription: Azure for Students, Location: Central India).

Step 2:- We made Azure Machine learning Studio For AI.

All services | AI + Machine Learning

Filter services Service providers : All Release Status : All

Azure AI + Machine Learning platforms

Azure Machine Learning

Description: Workspaces are where you manage all the models, assets, and data related to your machine learning projects. Create one now to start using Azure Machine Learning.

Free training from Microsoft:

- Introduction to the Azure Machine Learning SD... 8 units · 1 hr
- Train a machine learning model with Azure Ma... 7 units · 40 min
- Work with Data in Azure Machine Learning 8 units · 45 min

Useful links:

- Overview

Intelligent Recommendations Accounts

Azure Synapse Analytics

All services > Azure Machine Learning

Default Directory

Create Recently deleted Manage view Refresh Export to CSV Open query Assign tags

New workspace For ML projects and teams
New workspace For sharing ML assets across workspaces
New registry

equals all Type equals all Resource group equals all Location equals all Add filter

No grouping List view

Resource group ↑ Type ↑ Location ↑ Subscription ↑

No workspaces to display

Workspaces are where you manage all the models, assets, and data related to your machine learning projects. Create one now to start using Azure Machine Learning.

Learn more

All services > Azure Machine Learning

Create a machine learning workspace

Basics Networking Encryption Identity Tags Review + create

Resource details

Every workspace must be assigned to an Azure subscription, which is where billing happens. You use resource groups like folders to organize and manage resources, including the workspace you're about to create.

Learn more about Azure resource groups

Subscription * Azure for Students
Resource group * Evaluation
Create new

Workspace details

Configure your basic workspace settings like its storage connection, authentication, container, and more. Learn more

Name * Regression
Region * South India
Storage account * (new) regression1436864897
Create new
Key vault * (new) regression6259375711
Create new
Application insights * (new) regression1167307873
Create new
Container registry * None
Create new

Review + create < Previous Next : Networking

Azure Machine Learning X

Create a machine learning workspace

Basics Networking Encryption Identity Tags Review + create

Network isolation

Choose the type of network isolation you need for your workspace, from not isolated at all to an entirely separate virtual network managed by Azure Machine Learning. [Learn more about managed network isolation](#)

Public • Workspace is accessed via public endpoint
• Compute can access public resources
• Outbound data movement is unrestricted

Private with Internet Outbound • Workspace is accessed via private endpoint
• Compute can access private resources
• Outbound data movement is unrestricted

Private with Approved Outbound • Workspace is accessed via private endpoint
• Compute can access private resources
• Outbound data movement is restricted to approved targets

Review + create [< Previous](#) [Next : Encryption](#)

Azure Machine Learning X

Create a machine learning workspace

Basics Networking **Encryption** Identity Tags Review + create

Data encryption

Azure Machine Learning service stores metrics and metadata in an Azure Cosmos DB instance where all data is encrypted at rest. By default, the data is encrypted with Microsoft-managed keys. You may choose to bring your own (customer-managed) keys.

Encryption type Microsoft-managed keys Customer-managed keys

⚠️ When using a customer-managed key, the costs for your subscription will be higher because of the additional resources in your subscription. To estimate the cost, use the Azure pricing calculator. To learn more, see [Use customer-managed keys](#).

Review + create [< Previous](#) [Next : Identity](#)

Microsoft Azure Copilot aashnab09@gmail.com DEFAULT DIRECTORY

All services > Azure Machine Learning >

Azure Machine Learning

Create a machine learning workspace

Basics Networking Encryption Identity Tags Review + create

Managed identity

A managed identity enables Azure resources to authenticate to cloud services without storing credentials in code. Once enabled, all necessary permissions can be granted via Azure role-based access control. A workspace can be given either a system assigned identity or a user assigned identity.

Identity type System assigned identity User assigned identity

⚠️ The managed user assigned identity option is only supported if an existing storage account, key vault, and container registry are used.

Storage account access

Azure machine learning allows you to choose between credential-based or identity-based access when connecting to the default storage account. When using identity-based authentication, the Storage Blob Data Contributor role must be granted to the workspace managed identity on the storage account. [Learn more](#)

Storage account access type Credential-based access Identity-based access

Data impact

If your workspace contains sensitive data, you can specify a high business impact workspace. This will control the amount of data Microsoft collects for diagnostic purposes and enables additional encryption in Microsoft managed environments.

High business impact workspace

Review + create < Previous Next : Tags

Microsoft Azure Copilot aashnab09@gmail.com DEFAULT DIRECTORY

All services > Azure Machine Learning >

Azure Machine Learning

Create a machine learning workspace

Basics Networking Encryption Identity Tags Review + create

Tags are name/value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more about tags](#)

Note that if you create tags and then change resource settings on other tabs, your tags will be automatically updated.

Name Value

Review + create < Previous Next : Review + create

Azure Machine Learning

Create a machine learning workspace

Validation passed

Basics

Subscription	Azure for Students
Resource group	Evaluation
Region	South India
Name	Regression
Storage account	(new) regression1436864897
Key vault	(new) regression6259375711
Application insights	(new) regression1167307873
Container registry	None

Networking

Connectivity method	Enable public access from all networks
Network isolation	Public

Encryption

Encryption type	Microsoft-managed keys
-----------------	------------------------

Identity

Identity type	System assigned
Enable HBI Flag	Disabled

Create < Previous Next > Download a template for automation

Microsoft.MachineLearningServices | Overview

Your deployment is complete

Deployment name : Microsoft.MachineLearningServices
Subscription : Azure for Students
Resource group : Evaluation

Start time : 6/7/2024, 12:04:08 PM
Correlation ID : cd4ac3ae-1419-4ddc-b49f-a2f73047b747

Deployment details

Resource	Type	Status	Operation details
Regression	Azure Machine Learning worksp	OK	Operation details
regression1167307873	Application Insights	OK	Operation details
regression1436864897	Storage account	OK	Operation details
regression6259375711	Key vault	OK	Operation details
regression1969344524	Log Analytics workspace	OK	Operation details

Next steps

Go to resource

Cost management
Get notified to stay within your budget and prevent unexpected charges on your bill.
Set up cost alerts >

Microsoft Defender for Cloud
Secure your apps and infrastructure
Go to Microsoft Defender for Cloud >

Free Microsoft tutorials
Start learning today >

Work with an expert
Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.
Find an Azure expert >

Regression

Azure Machine Learning workspace

Download config.json Delete

Overview

Activity log Access control (IAM) Tags Diagnose and solve problems Events Settings Monitoring Automation Support + troubleshooting

Essentials

Resource group	: Evaluation
Location	: South India
Subscription	: Azure for Students
Storage	: regression1436864897
Studio web URL	: https://ml.azure.com/?id=0b1c6f4c-b611-47b1-a58d-97cdc...
Container Registry	: ...
Key Vault	: regression6259375711
Application Insights	: regression1167307873
MLflow tracking URI	: azurerm://southindia.api.azureml.ms/mlflow/v1.0/subscripti...

JSON View



Work with your models in Azure Machine Learning Studio

The Azure Machine Learning Studio is a web app where you can build, train, test, and deploy ML models. Launch it now to start exploring, or learn more about the Azure Machine Learning studio.

Launch studio

Step 3:- In this we created our data and assigned Job to train our model in Automated ML.

The screenshot shows the 'Create data asset' wizard in the Azure Machine Learning Studio. The current step is 'Choose a source for your data asset'. The left sidebar shows the progress: 'Data type' (selected), 'Data source' (selected), 'Destination storage type', 'File or folder selection', 'Settings', 'Schema', and 'Review'. The main area displays five options:

- From Azure storage**: Create a data asset from registered data storage services including Azure Blob Storage, Azure file share, and Azure Data Lake.
- From local files**: Create a data asset by uploading files from your local drive. This option is highlighted with a blue border.
- From SQL databases**: Create a dataset from Azure SQL database and Azure PostgreSQL database.
- From web files**: Create a data asset from a single file located at a public web URL.
- From Azure Open Datasets**: Create a dataset with one-click from pre-made data sets. These data sets are created by the general public and published as Azure Open Datasets.

At the bottom are 'Back', 'Next', and 'Cancel' buttons.

The screenshot shows the 'Create data asset' wizard in the Azure Machine Learning Studio. The current step is 'Select a datastore'. The left sidebar shows the progress: 'Data type' (selected), 'Data source' (selected), 'Destination storage type' (selected), 'File or folder selection', 'Settings', 'Schema', and 'Review'. The main area shows the 'Datastore type' dropdown set to 'Azure Blob Storage' with a 'Create new datastore' link. Below it is a table to select a datastore:

Name	Storage name	Created on
workspaceblobstore	regression1436864897	Jul 6, 2024 12:05 PM
workspaceartifactstore	regression1436864897	Jul 6, 2024 12:05 PM

At the bottom are 'Back', 'Next', and 'Cancel' buttons.

Azure AI | Machine Learning Studio

Create data asset

Choose a file or folder

Choose files or folders to upload from your local drive. If you upload multiple folders or files, they will be stored in a containing folder.

Upload path: azureml://subscriptions/5a22753d-4ced-4e8e-acfe-71ac554c34fb/resourcegroups/evaluation/workspaces/Regression/datastores/workspaceblobstore/paths/UI/2024-07-06_070557_UTC/GOOG.csv

Upload files or folder

Overwrite if already exists

Upload list: GOOG.csv (143.11 KB/143.11 KB)

Information

What file types can I use? Supported file types include: delimited (such as csv or tsv), Parquet, JSON Lines, and plain text.

Where are files uploaded? Files will be uploaded to the selected datastore and made available in your workspace.

Back Next Cancel

Azure AI | Machine Learning Studio

Create data asset

Review

Review the settings for your data asset and make any changes as needed.

Data type

Name: GoogleStock	Description: Google Stock prediction	Type: tabular
-------------------	--------------------------------------	---------------

Data source

Type: Local

File selection

Upload path: azureml://subscriptions/5a22753d-4ced-4e8e-acfe-71ac554c34fb/resourcegroups/evaluation/workspaces/Regression/datastores/workspaceblobstore/paths/UI/2024-07-06_070557_UTC/GOOG.csv

Files uploaded: GOOG.csv

Storage

Datastore type: AzureBlob	Datastore name: workspaceblobstore
---------------------------	------------------------------------

Schema

symbol	String
date	Date
close	Decimal
high	Decimal
low	Decimal

(showing 5 of 15 columns)

Azure AI | Machine Learning Studio

Create data asset

Storage

- Datastore type: AzureBlob
- Datastore name: workspaceblobstore

Settings

- Delimiter: Comma
- Encoding: UTF-8
- File format: Delimited
- Column headers: All files have same headers
- Number of rows to skip: None
- Dataset contains multi-line data: false

Azure AI | Machine Learning Studio

... > RegressionEvaluation > Jobs > LifeExpectancy > amusing_holiday_tpkjfb63nr > neat_spring_37dkjklm

This job is using the new compute runtime to improve performance. You can expect to see a different log structure along with the new runtime.

neat_spring_37dkjklm Completed

Overview **Model** Explanations (preview) Responsible AI (preview) Metrics Data transformation (preview) Test results (preview) Outputs + logs Images Child jobs Code Monitoring

Refresh Deploy Download Explain model View generated code Test model (preview) Register model Cancel Delete

Model summary

Algorithm name: VotingEnsemble

Ensemble details

- View ensemble details
- Normalized root mean squared error: 0.03459 [View all other metrics](#)

Sampling: 100.00 %

Registered models: [amusingholiday51:1](#)

Deploy status: No deployment yet!

Azure AI | Machine Learning Studio

The Northcap university > RegressionEvaluation > Jobs > LifeExpectancy > amusing_holiday_tpkjfb63nr

amusing_holiday_tpkjfb63nr Completed

Overview Data guardrails Models + child jobs Outputs + logs Child jobs

Refresh Edit and submit (preview) Register model Cancel Delete Compare (preview)

Properties

Status: Completed	Script name: --
Warning: No scores improved over last 20 iterations, so experiment stopped early. This early stopping behavior can be disabled by setting enableEarlyStopping = False in the job configuration.	
Created on: Jul 7, 2024 12:18 PM	Created by: himanshi22csu085
Start time: Jul 7, 2024 12:18 PM	Job type: Automated ML
Duration: 42m 41.79s	Experiment: LifeExpectancy
Compute duration: 42m 41.79s	Arguments: None
Compute target: himanshi22csu0851	See all properties: Raw JSON
Name: amusing_holiday_tpkjfb63nr	See YAML job definition: Job YAML

Inputs

Input name: training_data
Data asset: [WholifeExpectancy1](#)
Asset URI: [azureml!WholifeExpectancy1](#)

Outputs

Output name: best_model
Model: [azureml!amusing_holiday_tpkjfb63nr_51_output_miflow_log_model_1965625841:1](#)
Asset URI: [azureml!azureml!amusing_holiday_tpkjfb63nr_51_output_miflow_log_model_1965625841:1](#)

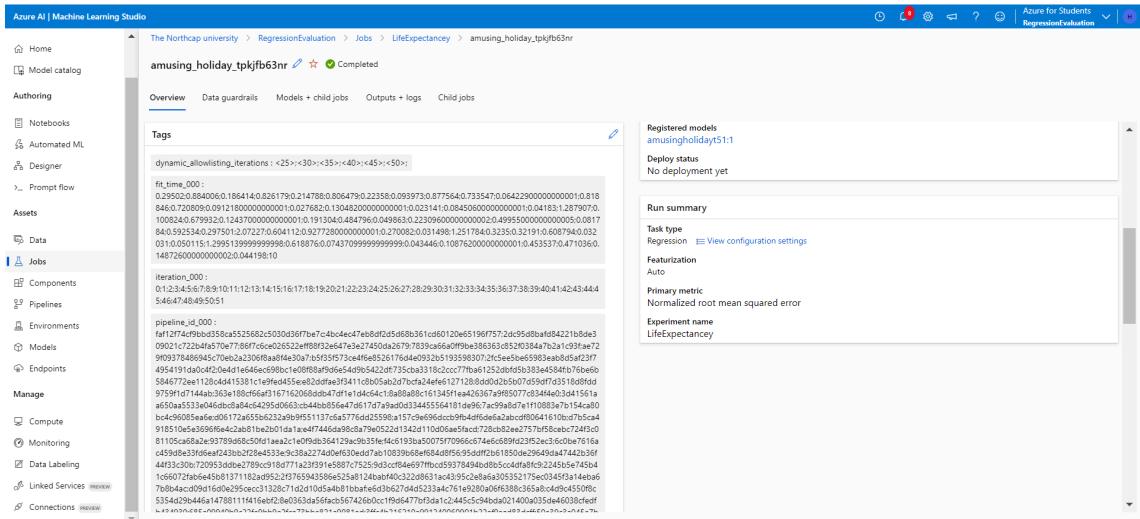
Best model summary

Algorithm name: VotingEnsemble

Ensemble details

- View ensemble details
- Normalized root mean squared error: 0.03459 [View all other metrics](#)

Sampling: 100.00 %



EXPERIMENTAL RESULTS (IF ANY)

DEPLOYMENT OF LIFE EXPECTANCY MODEL

The screenshot shows the Azure AI | Machine Learning Studio interface. The left sidebar navigation includes: All workspaces, Home, Model catalog, Authoring (Notebooks, Automated ML, Designer, Prompt flow), Assets (Data, IoT, Components, Pipelines, Environments, Models, Endpoints), Manage (Compute, Monitoring, Data labeling, United Services, Connectors). The main content area displays the 'regressionevaluation-keulp' endpoint under 'The Norchae university > RegressionEvaluation > Endpoints'. The 'Details' tab is selected, showing the following details:

- Endpoint attributes:**
 - Service ID: regressionevaluation-keulp
 - Description:
 - Provisioning state: Succeeded
 - Error details: -
 - Compute type: Managed
 - Created by: amusingholiday51-1
 - Created on: July 7, 2024 1:50 PM
 - Last updated on: July 7, 2024 1:50 PM
 - Authentication type: None
 - Public network access: Enabled
 - Swagger URL: <https://regressionevaluation-keulp.southindia.inference.ml.azure.com/swagger.json>
 - REST endpoint: <https://regressionevaluation-keulp.southindia.inference.ml.azure.com/score>
 - Metrics: View metrics
- Deployment summary:**
 - Use traffic allocation:
 - amusingholiday51-1 (100%)
 - Mirrored traffic allocation
 - Deployment **amusingholiday51-1**:
 - Name: amusingholiday51-1
 - Use traffic: 100%
 - Scoring script: Auto-generated
 - Provisioning state: Succeeded
 - Error details: -
 - SKU: Standard_D2as_v4
 - Quota type: Dedicated
 - Egress public network access: Enabled
 - Instance count: 1
 - Scaling: Configure auto scaling
 - Model ID: amusingholiday51-1
 - Environment: Default (nodev-sazureml-automl174)
 - Application Insights enabled: false

TESTING OF MODEL WITH RANDOM VALUES

```

import requests
import json
url = "https://regressionevaluation-keuxp.southindia.inference.ml.azure.com/score"

headers = {
    'Content-Type': 'application/json',
    'Authorization': 'Bearer XtoNb9IGkDJeefGL56k5G7f6caWsfCfmq'
}

data = {
    "input_data": [
        {
            "data": [
                {
                    "Country": "Albania",
                    "Year": 2015,
                    "Status": "Developing",
                    "AdultMortality": 263,
                    "infantdeaths": 62,
                    "Alcohol": 62,
                    "percentageexpenditure": 71.27962,
                    "HepatitisB": 65,
                    "Measles": 1154,
                    "BMI": 19.1,
                    "under-fivedeaths": 83,
                    "Polio": 6,
                    "Totalexpenditure": 8.16,
                    "Diphtheria": 65,
                    "HIV/AIDS": 0.1,
                    "GDP": 584.2592,
                    "Population": 33736494,
                    "thinness1-19years": 17.2,
                    "thinness5-9years": 17.3,
                    "Incomecompositionofresources": 0.479,
                    "Schooling": 10.1
                }
            ]
        }
    ]
}
input_data = json.dumps(data)

response = requests.post(url, data=input_data, headers=headers)

print(response.json())

```

✓ 0.1s

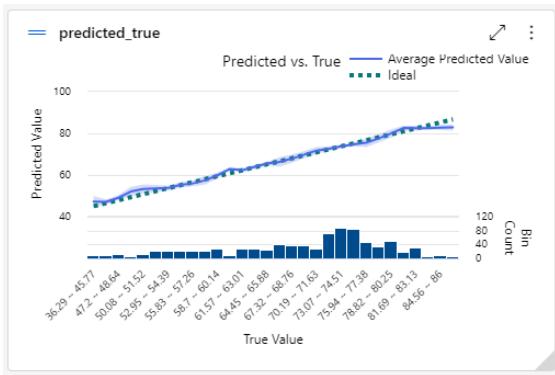
[64.48174877450128]

Metric	Value
explained_variance	0.9680532
mean_absolute_error	1.077188
mean_absolute_percent_error	1.637869
median_absolute_error	0.6319802
normalized_mean_absolute_error	0.02154375
normalized_median_absolute_error	0.01263960
normalized_root_mean_squared_error	0.03458828
normalized_root_mean_squared_percent_error	0.03398464
r2_score	0.9679745

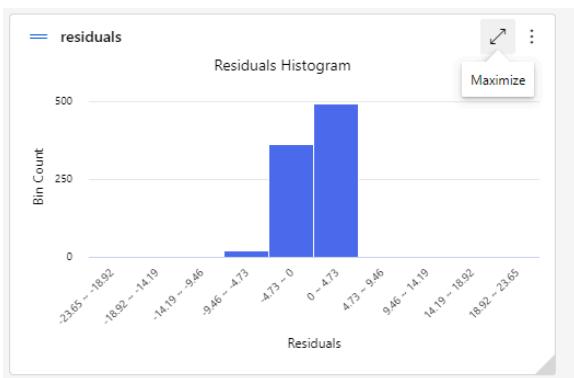
IMPLEMENTATION OF VARIOUS MODEL EVALUATION METRIC FOR LIFE EXPECTANCY PREDICTION

Run Metrics	
Explained variance	0.96805
Mean absolute error	1.0772
Mean absolute percentage error	1.6379
Median absolute error	0.63198
Normalized mean absolute error	0.021544
Normalized median absolute error	0.012640
Normalized root mean squared error	0.034588
Normalized root mean squared log error	0.033985
R2 score	0.96797
Root mean squared error	1.7294
Root mean squared log error	0.027559
Spearman correlation	0.97857

RUN METRICS



Results:- Show that how many values we predicted and out of which we get how many actually true.



Histogram graph

ANALYSIS

During my internship with UTS (Unique Training Solution) at The Northcap University, Gurugram, I had the opportunity to deepen my understanding of the engineering profession, particularly in the fields of Artificial Intelligence (AI) and Machine Learning (ML). This hands-on experience was crucial in bridging the gap between theory and practice, allowing me to develop both technical and non-technical skills essential for a successful engineering career.

Key Learning Outcomes:

Technical Proficiency:

- AI/ML Skills: Gained a solid foundation in AI and ML, learning to develop and deploy machine learning models, work with algorithms, and manage large datasets. This experience has equipped me to leverage AI/ML in solving complex engineering challenges.
- Cloud Computing with Azure: Acquired practical experience with Microsoft Azure services, focusing on deploying AI/ML projects in a cloud environment. This has enhanced my understanding of how cloud platforms support scalable and efficient engineering solutions.

Professional Growth:

- Team Collaboration: Developed strong teamwork skills, contributing effectively to group projects and often taking on leadership roles. This experience reinforced the importance of collaboration in achieving project goals.

- Client Interaction: Learned the importance of translating technical concepts into understandable terms for clients and delivering solutions that align with their needs. This customer-centric approach is crucial in the engineering field.

Company Insights:

- Organizational Structure: Gained valuable insights into how UTS operates, emphasizing structured training, effective communication, and continuous learning. Observing these initiatives reinforced the importance of staying current with industry trends.

Performance Highlights:

Strengths:

- Adaptability: Demonstrated a strong ability to quickly learn and apply new concepts, particularly in AI/ML and Azure services. Successfully developed and deployed a basic ML model on Azure, showcasing my ability to turn knowledge into practical outcomes.
- Leadership and Collaboration: Excelled in teamwork, often leading project tasks and ensuring successful outcomes. My ability to collaborate and communicate effectively was a key contributor to project success.

Areas for Improvement:

- Time Management: While I managed to meet deadlines, I recognized the need to improve my time management skills, particularly when balancing multiple tasks.

Moving forward, I plan to prioritize tasks more effectively and use project management tools to optimize my workflow.

- Advanced Technical Skills: While I built a strong foundation in AI/ML, I aim to deepen my expertise in more advanced machine learning algorithms. I plan to dedicate more time to studying these topics and seek out challenging projects to further my skills.

Supervisor Feedback:

My supervisor provided positive feedback on my quick learning abilities and effective teamwork, noting that I consistently met project expectations and often took initiative in group settings. They also encouraged me to continue developing my time management skills and to explore more advanced technical areas to further enhance my expertise.

This internship has been an invaluable experience, providing me with the technical knowledge and professional skills necessary for a successful engineering career. I am excited to continue building on this foundation and contributing to the field.

CONCLUSION

Summary of Summer Training Experience

My summer training with UTS at The Northcap University was pivotal in advancing my understanding of the engineering profession, both technically and organizationally.

Technical and Organizational Learning:

Technical Advancement:

- AI/ML Proficiency: The training solidified my understanding of Artificial Intelligence and Machine Learning, allowing me to work on real-world projects and develop practical skills in deploying AI/ML models using Microsoft Azure.
- Cloud Computing: I gained hands-on experience with Azure, which enhanced my knowledge of cloud computing and its critical role in modern engineering solutions.

Organizational Insights:

- Team Dynamics: I learned the importance of teamwork and collaboration in a professional setting, observing how different roles and expertise come together to achieve common goals.
- Project Management: The training also provided insights into effective project management, including task prioritization, time management, and the importance of clear communication within a team.

Benefits and Knowledge Enrichment:

- Practical Application: The opportunity to apply theoretical knowledge to practical projects was one of the most significant benefits of this training. It reinforced the importance of hands-on experience in understanding complex engineering concepts.
- Professional Growth: The training enriched my knowledge of how engineering principles are applied in the industry, preparing me for future professional challenges. It also improved my soft skills, such as communication and leadership, which are essential in any engineering role.

Areas for Improvement and Suggestions:

- Educational Gaps: While the training was comprehensive, I realized that my education could be supplemented with more advanced coursework in AI/ML algorithms and cloud computing to better prepare for future projects.
- Program Suggestions: To enhance the training program, I would suggest incorporating more advanced topics and offering additional resources or mentorship for students interested in deepening their technical expertise. This would help bridge any educational gaps and ensure a more robust learning experience.

Overall, this summer training was highly beneficial, providing a strong foundation for my engineering career and highlighting areas for further development.

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APPENDIX

List all supporting material such as: a brief introduction to the hosting firm, its management and administrative structure; sample plans or drawings; technical documents and literature; design and calculation sheets; and other relevant material, daily project task.

Voting Ensemble Algorithm

Concept: A voting ensemble algorithm aggregates predictions from multiple models (often referred to as base learners or classifiers) to make a final prediction. The idea is that combining different models can lead to more accurate and robust predictions than any single model.

Types of Voting:

1. Majority Voting (Hard Voting):

- Classification: Each base model votes for a class, and the class with the majority of votes is chosen as the final prediction.
- Regression: The final prediction is usually the average of predictions from all base models.

Predictions vs. True Values

Purpose:

- To visually assess how close the predicted values are to the actual values.

Residual Plot:-

Purpose:

- To visualize the difference between predicted values and true values (residuals).

Description:

- Plots residuals (errors) on the y-axis against predicted values or true values on the x-axis.

PROJECT DAILY TASKS

1 June 2024	Introduction to AI and Machine Learning
3 June 2024	Introduction to AI workloads and Principles of AI
4 june 2024	Azure Machine learning services and Types of ML models
5 june 2024	Core Machine Learning Concepts And Evaluation metric for regression and classification. ML Solution Core Tasks(Data Pre Processing)
6 june 2024	Azure Machine Learning Workspace(No code policy)#Designer Hands-on-lab (Regression and Classification)
7th june 2024	Various types of Computer Vision Services and Various Types of NLP services
8th june 2024	Conversational AI
9 to 14 june 2024	Preparation Holiday for Microsoft Azure AI-900 Certification
15 june 2024	Exam Day
17 june 2024	Starting working on Project
18 june 2024	Setting up azure resources(VMs,Storage,Databases) and initial environment.
19 june 2024	Data collection and exploration for suitable dataset for our project
20 june 2024	Preprocessing data: Data Ingestion, Data Transformation and Data cleaning
21 june 2024	Feature Engineering: Selecting Suitable features for model to gain insights from it.

22 june 2024	Initial Model selection: Experimenting with Linear Regression and Using VotingEnsemble Algorithm
23 june 2024	Training and testing models with subsets of the data: evaluating initials
24 june 2024	Model Tuning and: optimizing hyperparameters for linear regression and votingEnsemble
25 june 2024	Implementing a model Evaluation metric and testing on prepared datasets.
27 june 2024	Comparing performances between models.
28 june 2024	Selecting Best working Models, Model validation:Performing cross validation.

29 june 2024	Deploying the best performing Model on Azure: Setting up endpoints for real time Life expectancy.
30 june 2024	Analyzing our ML model
1 july 2024	Final Performance evaluation,Preparing the Project for Submission and Creating Reports.
2 july 2024	Project Presentation and Project Hand-off and conclusion.