

Azure ML Studio

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BE BOUNDLESS



Introduction

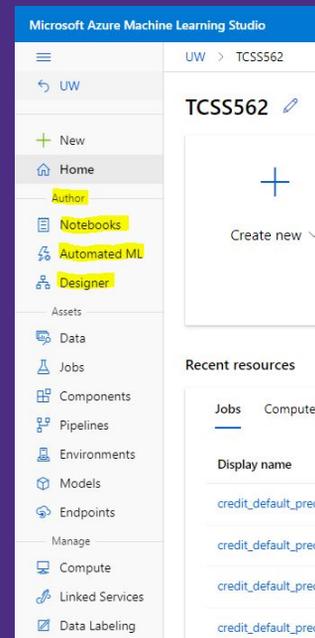
What is it? What does it do? Who is it for?

- **Microsoft Azure**
- **ML as a Service**
- **Azure Machine Learning (AzureML)**
- **Azure ML Studio**

Feature summary

Author

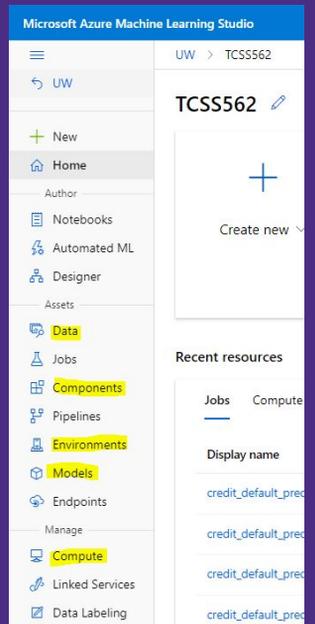
- Notebooks
- Automated ML (AutoML)
- Designer



Feature summary

Resources

- Infrastructural resources:
 - Workspace
 - Compute
- Assets
 - Model
 - Environment
 - Data/Datstores
 - Components



Example use cases

- Data and analytics
- AI
- IoT
- Industry level
 - Gaming
 - Entertainment
 - Healthcare
 - ... and many more!



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Applications In Healthcare

- > Disease Diagnosis & Healthcare Systems
 - Detect symptoms and make diagnoses
 - Personalized therapy/treatment
 - Predict outbreaks with data analysis
 - Process and analyze photos (integrated with Microsoft Tools)



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The Process

- > Use Azure ML to deploy a Python boolean program to track/predict health condition through different parameters(age, blood pressure, physical activity etc)

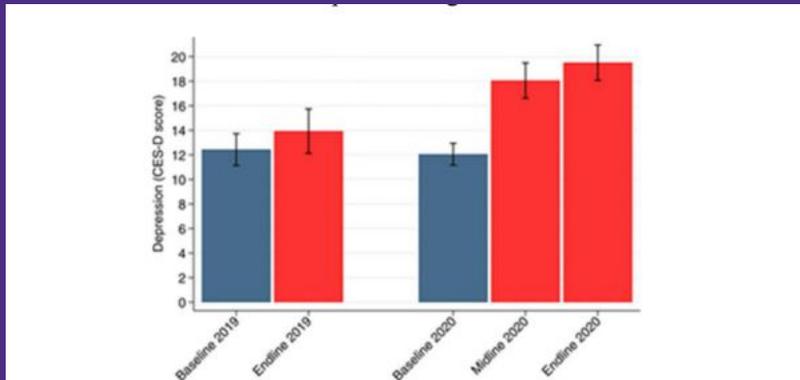
TABLE III. RESEARCH SCENARIO FEATURES

Age;
Chest_pain_type;
Blood_pressure;
Cholesterol_level;
Blood_sugar_level;
Lowest_pulse_rate;
Highest_pulse_rate;
Slope_of_peak_exercise

age;	35	34	.....	33	34
chest_pain_type;	4	2	.....	2	3
blood_pressure;	184	187	.....	183	182
cholesterol_level;	182	185	.....	186	187
blood_sugar_level;	1	1	.....	2	1
lowest_pulse_rate;	77	76	.....	79	80
highest_pulse_rate;	138	129	.....	135	136
slope_of_peak_exercise.	2	3	.....	1	1

Figure 2. Health data frame

Results



Other Research

- > IoT system for predicting underground mine air quality
- > Categorize cyber attacks for automatic detection using ML and deep learning



Cost

- Free to start
 - \$200 credits (first 30 days)
 - Monthly quota (first 12 months)
 - Pay as you go (12+ months)
- Price reservations
 - Month to month
 - 1 year reserve (up to 58% savings)
 - 3 year reserve (up to 73% savings)



Cost example

One day cost example

- VM
 - Compute instance
 - Standard_DS12_v2 (4 cores, 28 GB RAM, 56 GB disk)
 - \$0.30/hr (when running)
 - Cluster
 - Standard_DS11_v2 (2 cores, 14 GB RAM, 28 GB disk)
 - \$0.15/hr per node
- Blob storage - \$0.57/day
- Container registry - \$0.167/day
- $24 \times (0.30) + 24 \times (0.15) + 0.57 + 0.167$
- ~\$11.54/day

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Advantages

- + Has as many services as AWS counterparts
- + Supports the major ML libraries
- + Variety of different ways to perform model training
 - + AutoML, Designer, etc...

CLOUD MACHINE LEARNING SERVICES COMPARISON

	Amazon ML and SageMaker	Microsoft Azure AI Platform	Google AI Platform (Unified)	IBM Watson Machine Learning
Classification	✓	✓	✓	✓
Regression	✓	✓	✓	✓
Clustering	✓	✓	✓	✗
Anomaly detection	✓	✓	✗	✗
Recommendation	✓	✓	✓	✗
Ranking	✓	✓	✗	✗
Data Labeling	✓	✓	✓	✓
MLOps pipeline support	✓	✓	✓	✓
Built-in algorithms	✓	✓	✓	✗
Supported frameworks	TensorFlow, MXNet, Keras, Gluon, PyTorch, Caffe2, Chainer, Torch	TensorFlow, scikit-learn, PyTorch, Microsoft Cognitive Toolkit, Spark ML	TensorFlow, scikit-learn, XGBoost, Keras	TensorFlow, Keras, Spark MLlib, scikit-learn, XGBoost, PyTorch, IBM SPSS, PMML



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Advantages

- + **Managed by Microsoft**
 - + Integrates with other Microsoft products well (i.e. VSCode)
- + **Flexible in terms of pricing**
 - + Low priority
 - + Auto shutdown of compute instances
 - + Price reservations for long term savings

Disadvantages

- Steep learning curve
- **Better for smaller scale ML projects**
 - AWS offers more cost-effective options regarding Big Data
- **Not much flexibility within free tiers**
 - Very little storage
 - Quotas for available cores is similarly restrictive
 - Only 16 for students

Demo

- Using Azure ML Studio to train a model for credit default prediction
- Assets used:
 - Environments
 - Components
 - Data
 - Models
 - Endpoints
- Jupyter notebook [link](#)



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Conclusion

Azure ML may be for you if....

- You are already familiar with Microsoft development products like VS Code
- Are an individual or working with a small group of data scientists/MLEs
- Want to dive immediately into ML
- You have plans to use Azure for at least 1+ year

Conclusion

Azure ML may NOT be for you if....

- You have a large team
- You are working with Big Data
- You are using multiple languages for ML
 - Azure ML only supports Python and R, though CLI options exist
- You want more control of your storage resources

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Sources

- **Microsoft Azure website ([x](#))**
- *P. Rajyalakshmi, C. Balakrishna, E. Swarnalatha, B. S. Swapna Shanthi and K. Aravind Kumar, "Leveraging Big Data and Machine Learning in Healthcare Systems for Disease Diagnosis," 2022 3rd International Conference on Intelligent Engineering and Management (ICIEM), 2022, pp. 930-934, doi: 10.1109/ICIEM54221.2022.9853149.*
- **Azure ML in a day ([x](#))**
- **Additional sources linked throughout presentation in Speaker Notes**



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