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Practical 1:

2CSDE85 – Artificial Intelligence

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Aim:

Explore open-source AI tools. Submit a Write-up on AI tools.

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| **Tool Name** | **Advantages/ Best Suitable Scenarios** | **Disadvantages** | **Applications** |
| Scikit Learn | * Open Source * Classical Machine Learning algorithms implemented * Well known | * Not best for achieving the state-of-the-art results * No GPUs support | * Classical Machine Learning Algorithms |
| TensorFlow | * Deep Learning Library * Open Source * GPU / TPU compatible * Managed by Google * Scalable to multiple GPU * Quite used in research work | * Steep Learning Curve * Installation can be troublesome for some system | * Computer Vision * NLP * Time series * Heavy Computing |
| Auto ML | * Easy for non-Machine Learning experts | * Congruence to flexible specifications | * Can tackle almost most problems like vision and NLP |
| Theano | * Execution Speed Optimization * GPU support * Scalable to multiple GPU | * Substantial learning curve * Single GPU support * Unclear error messages | * Evaluation of the mathematical operation of higher dimensional arrays |
| PyTorch | * Deep Learning Library * Open Source * GPU / TPU compatible * Managed by Facebook AI * Scalable to multiple GPU | * Not as good as TensorFlow for production models and scalability | * Computer Vision * NLP * Time series * Heavy Computing |
| Caffe | * Deep Learning Framework * expression, speed, and modularity * GPU | * Need to write C++ / Cuda code for new layers * Bad to experience new architectures | * Computer Vision * NLP * Time series |
| MxNet | * Flexible library for deep learning * 8 Language Bindings | * The comparatively smaller open-source community * Not very popular, hence less support | * Computer Vision * NLP * Time series |
| Keras | * Wrapper library over TensorFlow 2.0 * Easy to use deep learning work * Beginner-friendly * GPU support | * Inefficient Errors * Gives low-level errors many times * Can’t modify everything you want | * Computer Vision * NLP * Time series |
| H20: Open-Source AI Platform | * AutoML available * Big Data Support * Flexible modeling including Ensemble | * Some people asked for Better Documentation * Containerization facilities like Docker should be given | * End-to-end platform * Computer Vision and NLP * Production-Ready Environment |
| CNTK | * Clear documentation * Directed graph visualization * Good support from the Microsoft team | * Not as good community support as TensorFlow or PyTorch | * Computer Vision * NLP * Time series |