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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.

| Tool Name | Advantages/ Best Suitable Scenarios | Disadvantages | Applications |
|---|---|---|---|
| Scikit Learn | • Open Source<br>• Classical Machine Learning algorithms implemented<br>• Well known | • Not best for achieving the state-of-the-art results<br>• No GPUs support | • Classical Machine Learning Algorithms |
| TensorFlow | • Deep Learning Library<br>• Open Source<br>• GPU / TPU compatible<br>• Managed by Google<br>• Scalable to multiple GPU<br>• Quite used in research work | • Steep Learning Curve<br>• Installation can be troublesome for some system | • Computer Vision<br>• NLP<br>• Time series<br>• 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<br>• GPU support<br>• Scalable to multiple GPU | • Substantial learning curve<br>• Single GPU support<br>• Unclear error messages | • Evaluation of the mathematical operation of higher dimensional arrays |

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|---|---|---|---|
| PyTorch | • Deep Learning Library<br>• Open Source<br>• GPU / TPU compatible<br>• Managed by Facebook AI<br>• Scalable to multiple GPU | • Not as good as TensorFlow for production models and scalability | • Computer Vision<br>• NLP<br>• Time series<br>• Heavy Computing |
| Caffe | • Deep Learning Framework<br>• expression, speed, and modularity<br>• GPU | • Need to write C++ / Cuda code for new layers<br>• Bad to experience new architectures | • Computer Vision<br>• NLP<br>• Time series |
| MxNet | • Flexible library for deep learning<br>• 8 Language Bindings | • The comparatively smaller open-source community<br>• Not very popular, hence less support | • Computer Vision<br>• NLP<br>• Time series |
| Keras | • Wrapper library over TensorFlow 2.0<br>• Easy to use deep learning work<br>• Beginner-friendly<br>• GPU support | • Inefficient Errors<br>• Gives low-level errors many times<br>• Can’t modify everything you want | • Computer Vision<br>• NLP<br>• Time series |

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|---|---|---|---|
| H20: Open-Source AI Platform | • AutoML available<br>• Big Data Support<br>• Flexible modeling including Ensemble | • Some people asked for Better Documentation<br>• Containerization facilities like Docker should be given | • End-to-end platform<br>• Computer Vision and NLP<br>• Production-Ready Environment |
| CNTK | • Clear documentation<br>• Directed graph visualization<br>• Good support from the Microsoft team | • Not as good community support as TensorFlow or PyTorch | • Computer Vision<br>• NLP<br>• Time series |