

Mind Masters

ITAI 2376

January 31, 2024

Comparative Analysis of MXNet

Activities Performed:

The activities performed to complete this assignment included exploring online sources for information regarding MXNet. These sources included MXNet documentation, articles discussing MXNet and platforms like it, and finding examples of use-cases for MXNet.

Results Obtained:

The results of the performed activities were that team members gained an understanding of MXNet, what its purpose is, how it can be used, and how it compares to other deep learning platforms. This knowledge was then used for the creation of this report and a presentation regarding what the team learned about MXNet.

What Was Learned:

As a team, we learned that MXNet is a deep learning framework developed by The Apache Software Foundation from 2015 to 2023. It was created to help software developers, especially those working with neural networks, take advantage of the computing capabilities of GPUs (Graphics Processing Units) and cloud computing. The creators recognized the growing computational needs of increasingly complex neural networks and that the parallel processing abilities of GPUs made them excellent candidates for fulfilling those needs. However, programming GPUs for these computations is very difficult. MXNet was developed as a solution to this problem by making GPU computation easy to implement using high-level programming languages such as Python. MXNet supports both symbolic and imperative programming, offering flexibility for various use cases. It also delivers efficient resource utilization for easy scalability to multiple GPUs and runs well on diverse hardware platforms, including edge devices. MXNet has a wide range of real-world applications that benefit from neural networks such as image recognition software, natural language processing, and autonomous vehicles.

Our performance activity allowed us to explore MXNet's framework and its broad applications, including seamless integration with AWS services like SageMaker, DeepLens, and AWS IoT, emphasizing cloud computing and edge devices. We also investigated its real-time data processing role, especially within autonomous vehicles like TuSimple's freight network. Recognizing MXNet's importance in education, "Dive into Deep Learning" (D2L) effectively

bridges theory and practice. Tools like GluonCV, GluonNLP, and AutoGluon within its ecosystem showcased its adaptability in computer vision and natural language processing, highlighting its significance in machine learning and data analysis.

References:

https://mxnet.apache.org/versions/1.9.1/api/faq/why_mxnet

<https://insights.sei.cmu.edu/blog/mxnet-a-growing-deep-learning-framework/>

<https://www.nvidia.com/en-us/glossary/mxnet/>

<https://aws.amazon.com/blogs/aws/excited-about-mxnet-joining-apache/>

<https://github.com/apache/incubator-mxnet>

<https://arxiv.org/abs/1512.01274>