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Microsoft Cognitive Toolkit (CNTK)
CNTK expresses (nearly) **arbitrary neural networks** by composing simple building blocks into complex **computational networks**, supporting relevant network types and applications.
Microsoft Cognitive Toolkit

• Microsoft’s open-source deep-learning toolkit
  • [https://github.com/Microsoft/CNTK](https://github.com/Microsoft/CNTK)
  • Created by Microsoft Speech researchers (Dong Yu et al.) in 2012, “Computational Network Toolkit”
  • On GitHub since Jan 2016 under MIT license
  • Renamed from CNTK to “Cognitive Toolkit”
  • Community contributions e.g. from MIT, Stanford and NVidia
Microsoft Cognitive Toolkit

• Runs over 80% Microsoft internal DL workload
• 1st-class on Linux and Windows, docker support
• Training: Python, C++, **Keras**
• Evaluation: C#, Java, Spark
• Internal == External
• New in GA:
  • Keras backend support
  • Java support, Spark support
  • Model compression (Fast binarized evaluation)
MICROSOFT COGNITIVE TOOLKIT
First Deep Learning Framework Fully Optimized for GPU

AlexNet training batch size 128, Grad Bit = 32, Dual socket E5-2699v4 CPUs (total 44 cores) CNTK 2.0b3 (to be released) includes cuDNN 5.1.8, NCCL 1.6.1, NVLink enabled
Multi-Node Training with NCCL 2.0
(ResNet-50)

- 8x P100
- 8x V100
- 16x V100
- 32x V100
- 64x V100

Hours: 0 8 16 24
Microsoft, Cray claim deep learning breakthrough on supercomputers

A team of researchers from Microsoft, Cray, and the Swiss National Supercomputing Centre (CSCS) have been working on a project to speed up the use of deep learning algorithms on supercomputers.

The team have scaled the Microsoft Cognitive Toolkit -- an open-source suite that trains deep learning algorithms -- to more than 1,000 Nvidia Tesla P100 GPU accelerators on the Swiss centre's Cray XC50 supercomputer, which is nicknamed Piz Daint.
Todays Speakers

• Sayan Pathak and Cha Zhang, Microsoft: The CNTK Toolkit
• Yanmin Qian, Shanghai Jiaotong University: Speech and Language Research with CNTK
Thank you