

# **ADAMS**

**A**dvanced **D**ata mining **A**nd **M**achine learning **S**ystem

Module: adams-cntk

# **CNTK**

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# Chapter 1

## CNTK

CNTK, the Microsoft Cognitive Toolkit[2], is a deeplearning C++ library which can be configured via the BrainScript Network Builder<sup>1</sup> or Python. It comes with binaries for 64-bit Windows and Linux.

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<sup>1</sup><https://docs.microsoft.com/en-us/cognitive-toolkit/BrainScript-Network-Builder>



## Chapter 2

# Flow

The following standalines are available:

- *CNTKSetup* – for overriding the global CNTK settings.

The following sources are available:

- *CNTKBrainScriptExec* – executes a brainscript and forwards the output (stdout/stderr)
- *CNTKModelGenerator* – uses the specified model generator to output model specification strings.





## Chapter 3

# Open MPI

When installing the LLVM version of the Open MPI library on Ubuntu (and derivatives), CNTK will not find the `libiomp5.so` library, as it is called `libomp.so.5`. You can simply symlink the library as follows:

```
cd /usr/lib/x86_64-linux-gnu  
sudo ln -s libomp.so.5 libiomp5.so
```



## Chapter 4

# Intel MKL

Intel provides high-performance BLAS libraries for download as well[3]:

After installation, you have to add the libraries to your environment variables for CNTK to pick up.

First, locate the directory that contains the MKL runtime library:

- Linux/OSX: `libmkl_rt.so`
- Windows: `mkl_rt.dll`

Second, add this directory to your environment variables:

- Linux/OSX: add the path to `LD_LIBRARY_PATH`

```
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/path/to/mkl_rt
```

- Windows: add the path to your `%PATH%` variable, either through the control panel or on the command prompt:

```
set PATH=%PATH%;path\to\mkl_rt
```

Furthermore, for Windows you also need to add the OpenMP runtime libraries to the path. Locate the directory that contains the `libiomp5md.dll` library and add this directory to your `%PATH%` environment variable as well.



# Bibliography

- [1] *ADAMS* – Advanced Data mining and Machine learning System  
<https://adams.cms.waikato.ac.nz/>
- [2] *CNTK* – Microsoft Cognitive Toolkit (CNTK), an open source deep-learning toolkit.  
<https://github.com/Microsoft/CNTK>
- [3] *MKL* – Math Kernel Library  
<https://software.intel.com/en-us/mkl>