# Design and Acceleration of Machine-Learning back-ends on modern Architectures

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# Background and Goals

MagmaDNN

- Neural network framework implemented with MAGMA.

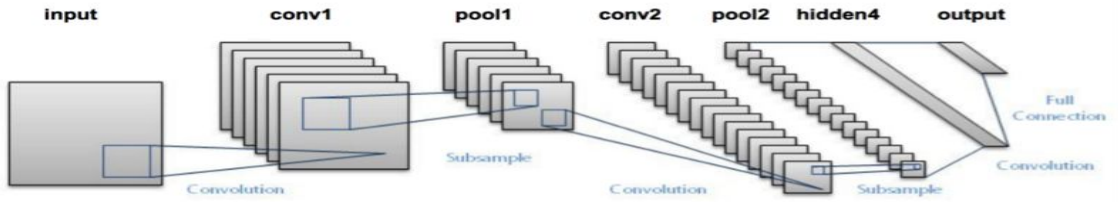
Goals

- Implement various neural networks using common tools (Keras).
- Discover performance bottlenecks.
- Implement a chosen network in MagmaDNN and compare the results.

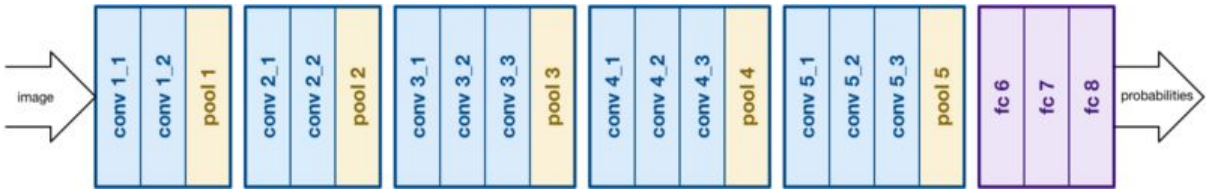
# Current Work and Findings

Implemented two CNN architectures testing on variety of  Image benchmarks.

Lenet-5

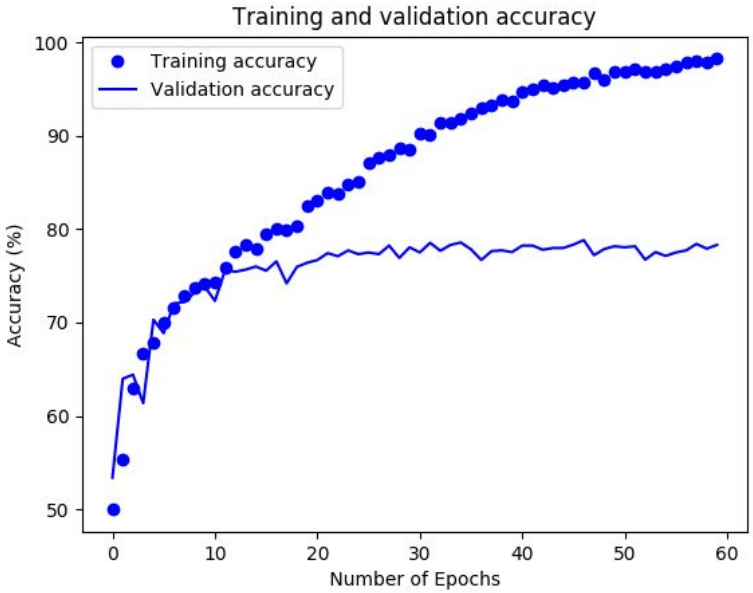



VGG-16




https://medium.com/@siddharthdas_32104/cnns-architectures-lenet-alexnet-vgg-googlenet-resnet-and-more-666091488df5

# Current Work and Findings




Lenet-5
Dog/ Cat Images

Datasets Used:

- MNIST
- Dog/Cats
- CIFAR-10
- ImageNet subset

General Problem:

- Model is overfitting

# Current Work and Findings

Causes

- To much noise.
- Not Enough data.
- Size of the image matters.

Potential Solutions

- Data augmentation / pre processing
- Regularization
- Tune hyperparameters

# Future Work

Implement a Network that performs well on ImageNet subset benchmark.

Implement the same network within MagmaDNN.

Compare results in terms of accuracy/ loss and time to train.

Looking into parameter tuning applications such as OpenTuner.