ML Training Tutorial

Micah Groh

Teaching machines to take over.

Resources

All of the below can be found on the NOvA Tutorials page

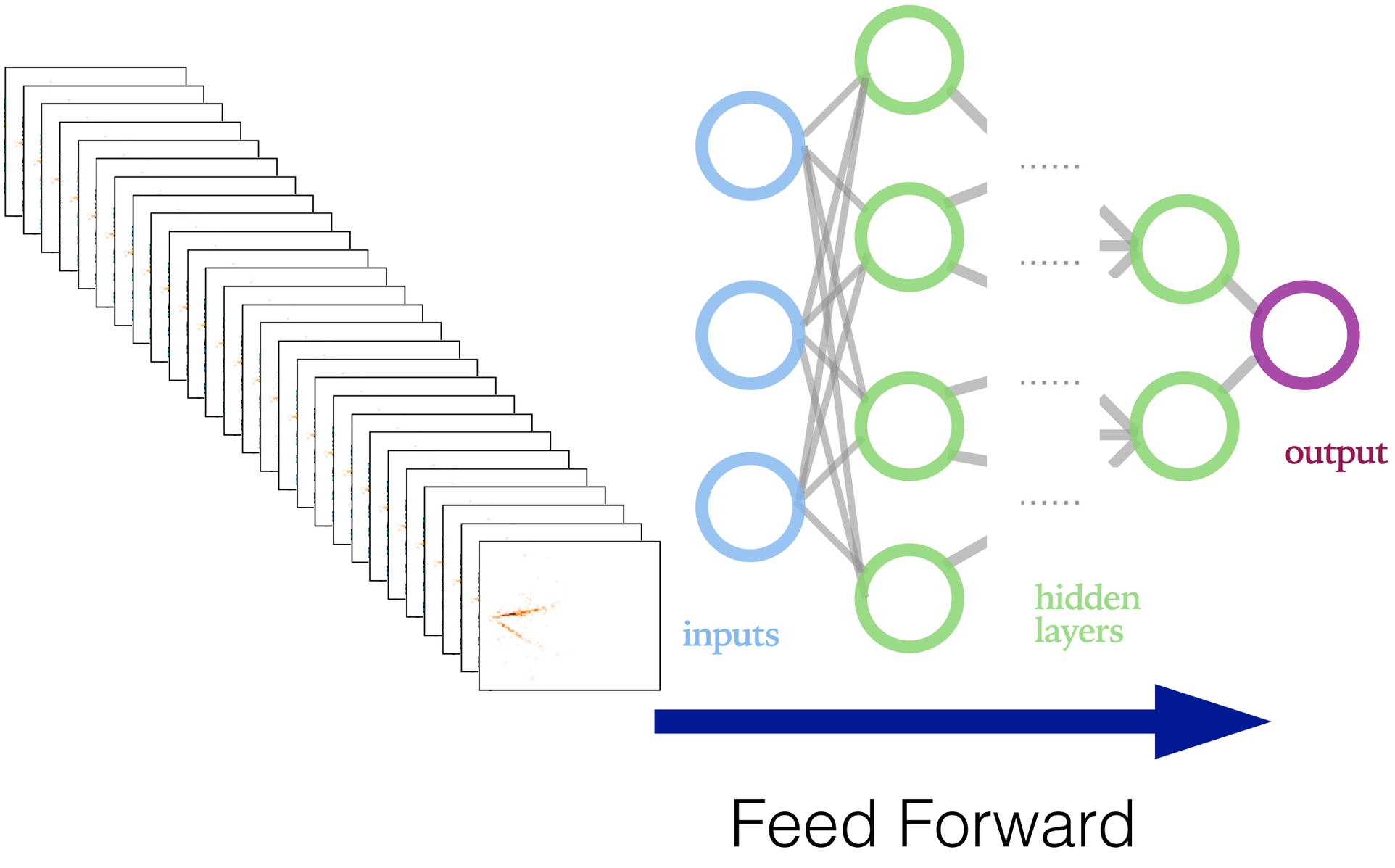
PandAna Tutorial - Micah Groh, Young NOvA Workshop 2019

CVN Tutorial - Micah Groh, Young NOvA Workshop 2018

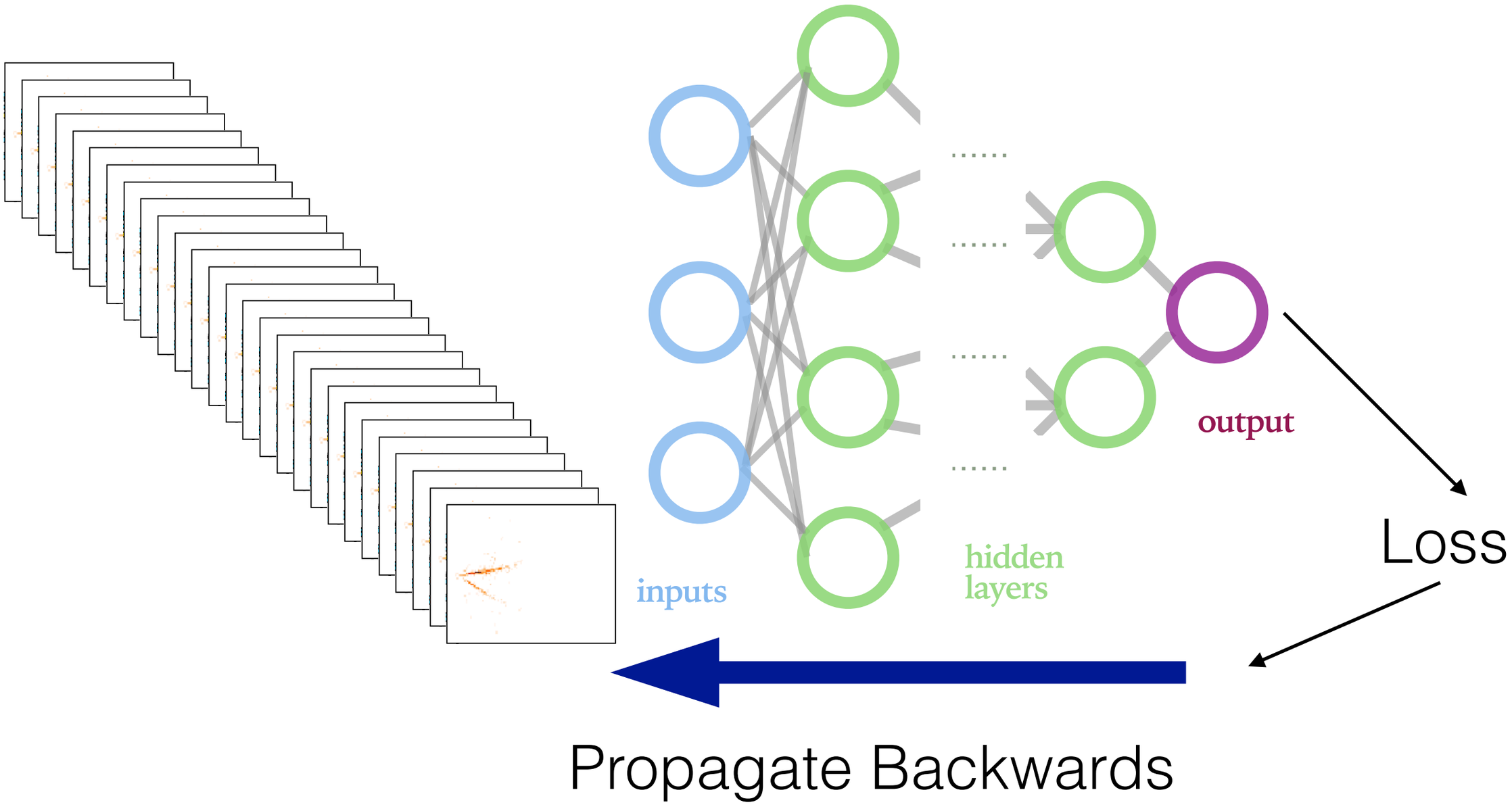
Everything You Wanted to Know About CVN But Were Too Afraid to Ask - Fernanda Psihas, Young NOvA Workshop 2017

Deep Learning Workshop 2017

Batches



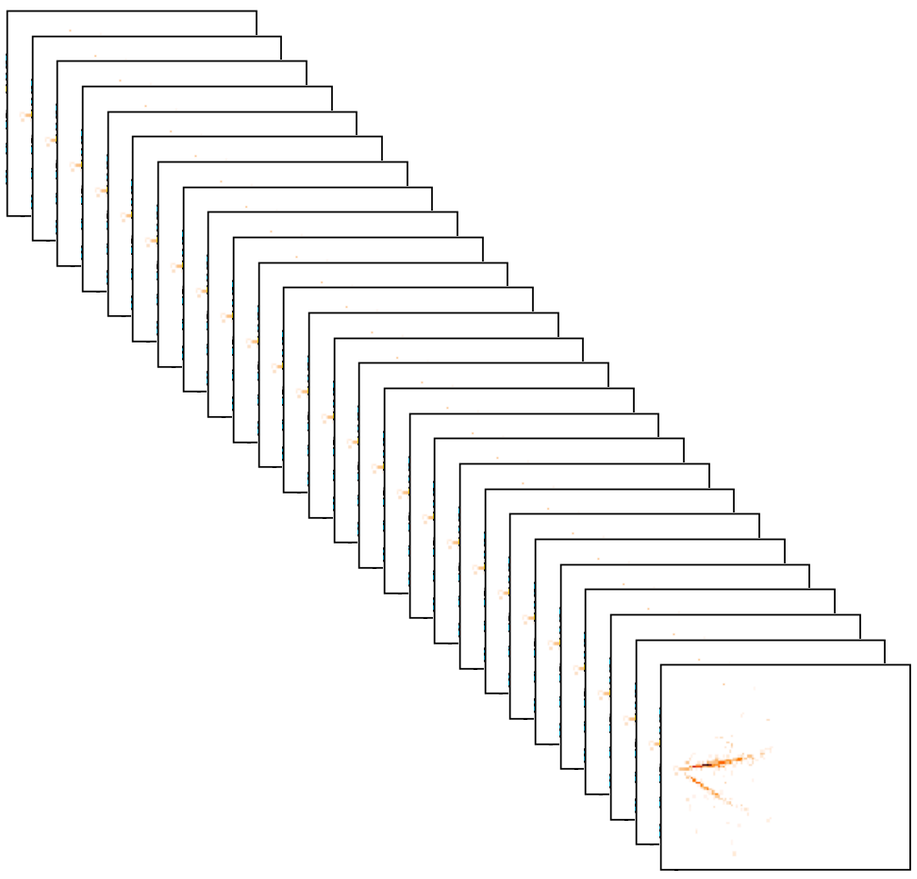
Batches

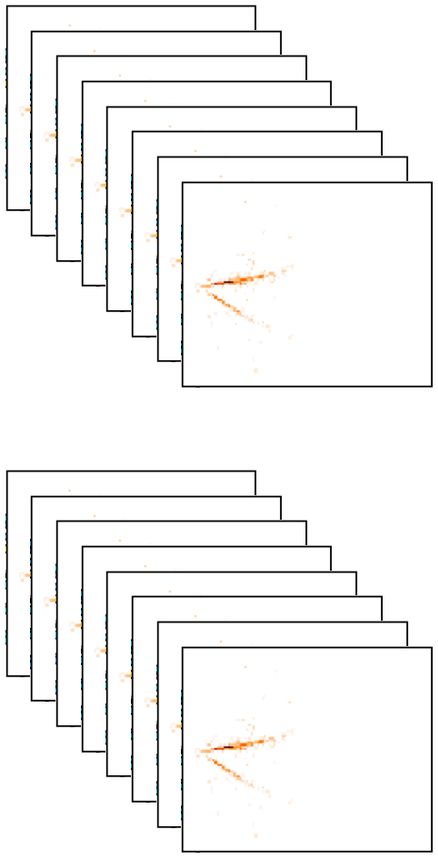


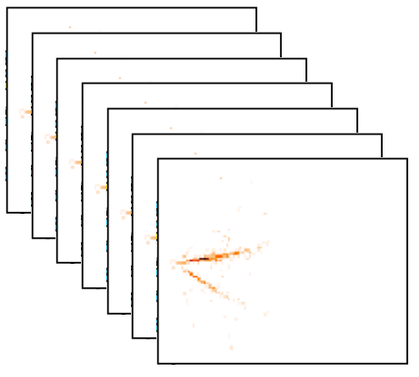
Batches

Storing the entire nova dataset in memory at once is impossible

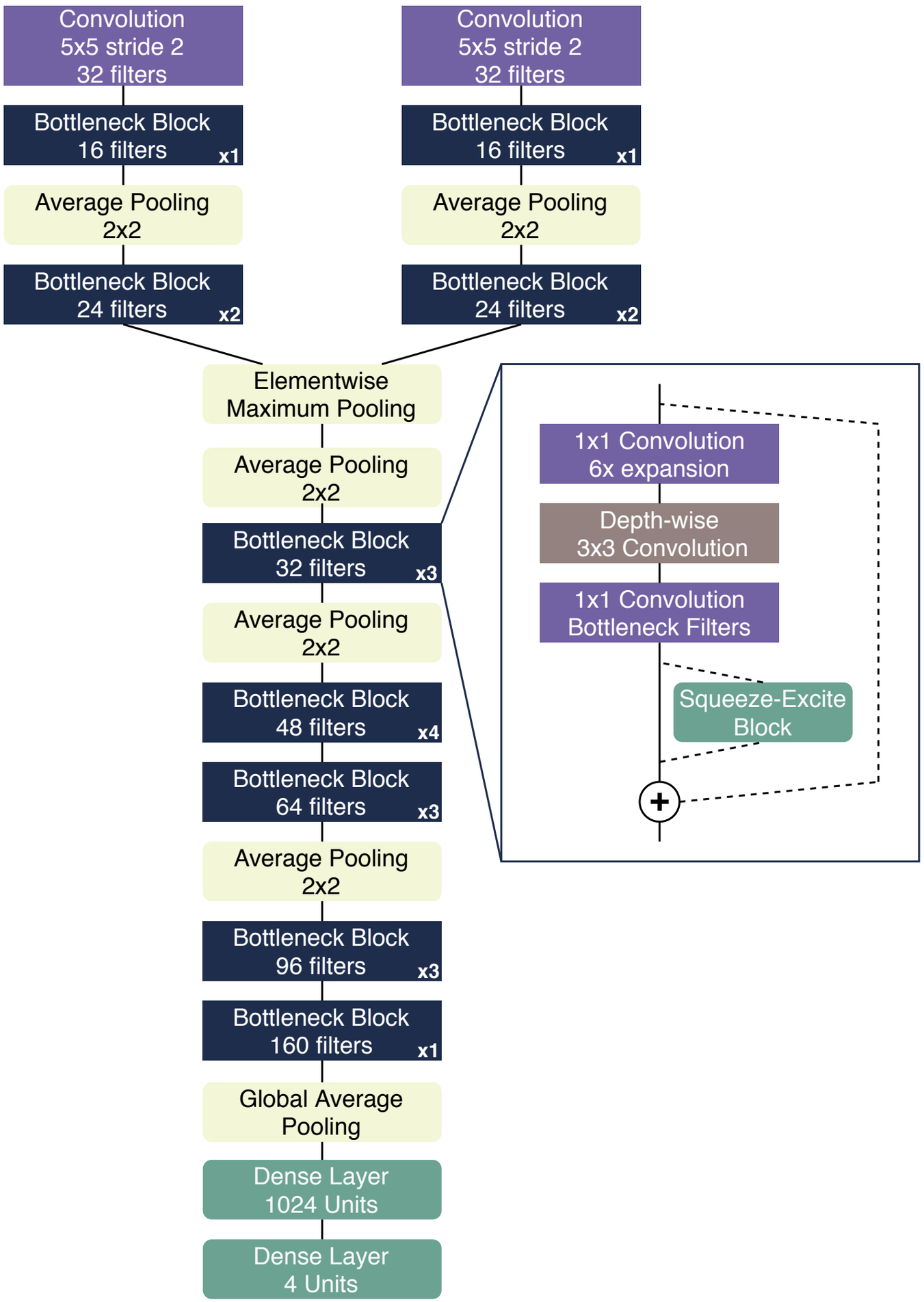
Employ mini-batch training where each batch is representative of the full dataset







Architecture



When you write out a network in keras, you are really defining a tensor flow graph.

A tensor flow graph is just a series of operations that you can call from an input.

The inputs in this case are pixelmaps

Python Script + Configuration

Train Generator

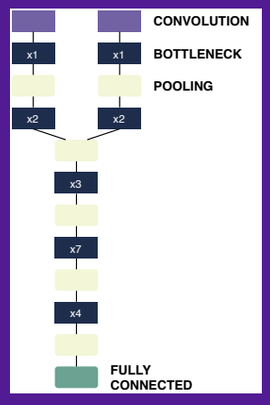
Dataset

Eval Generator

Dataset

Model

Architecture



Train Generator

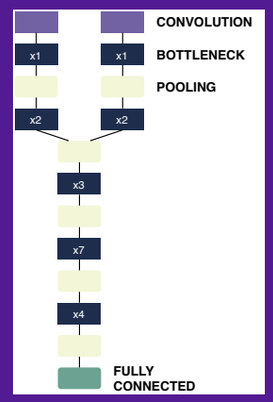
Dataset

Eval Generator

Dataset

Model

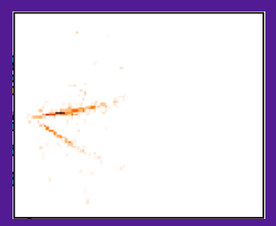
Architecture



CPU-
Generates Batches

GPU-
Evaluates Model
(if you do GPU training)

Dataset

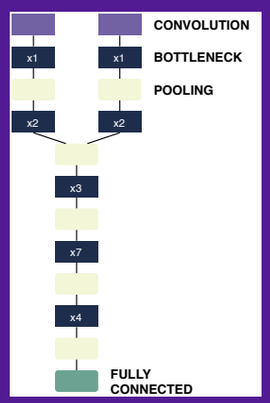


The dataset knows how to read inputs and labels from another file.

Train Generator

The generator knows how to use the dataset to construct a mini-batch and pass it to the model.

Architecture



The architecture defines the tensorflow graph to call for evaluation.

Model

The model knows how to call the architecture and make predictions.

Python Script + Configuration

All objects are configured the same as defined by the script the user writes.

Python Script + Configuration

Train Generator

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Architecture