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# Introduction

Background, recent spike in interest, motivation, future possibilities, thesis outline

# Background and terminology

## From AI to NN

AI is a name for everything we consider to be intelligent and that can be implemented artificially.

Machine learning is the part of AI where the machine takes on the actual learning about the world around us and then puts that learning into good use.

Neural networks are one method for realizing Machine learning. Inspired by how the neurons and synapses in a brain functions, neural networks use the same general idea.

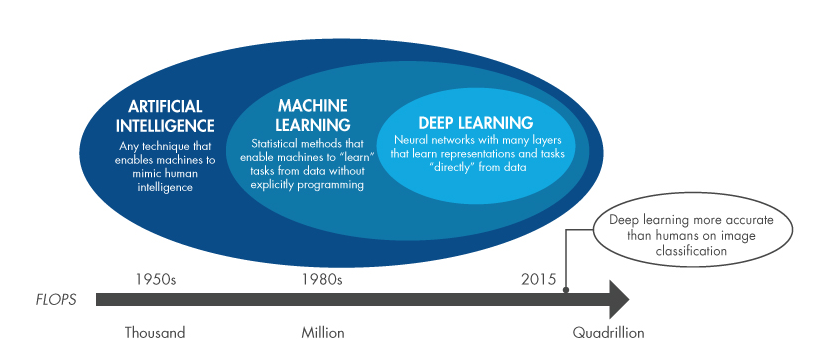


Figure 1. Från AI till Deep learning, en del av ML [1].

Gsdgsdg

dhdh

## Neural Networks

Neural networks [2]

Training vs classification/inference

Image classification vs object detection

Batching, what is it used for?

### CNN

Convolutional layer, pooling layer, FC layer, weights, activation function, eBNN.

### BNN

What makes a network binary, pros and cons, reference previous research

Xnor networks

Weight, bias

### RNN

How does it work and what is it used for?

## Hardware

### FPGA

History, uses, benefits for ML (parallelism, flexibility)

Construction (slices, LUTs, Flip-Flops, Block RAM)

Programming and implementation (HDL, Soft core CPUs)

Arty Z7-20 (Zynq 7000), CPU + FPGA – pros and cons – Software used (SDSoc, Vivado, ?)

### GPU

History, uses in general, ML uses

Construction, architecture

NVIDIA Jetson Nano – pros and cons, specs, software

### Google Coral dev board (maybe)

???

### Summary of hardware specs



Figure 2. Summary of hardware specs.

# Method

## Comparison

## Models/networks used

### AlexNet

### GoogLeNet

### VGG

### YOLOv3

## Datasets

## Implementation

# References

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