# Deep learning for protein model quality assessment

## Introduction

Write last - mehehe

### Background

Deep learning/machine learning.

What? How? Why important? Läget idag. Problems?

”The key aspect of deep learning is that these layers of features are not designed by human engineers: they are learned from data using a general-purpose learning procedure.” [2]

### Aim

Goals? Research questions?

* Better representations/features?
* Optimization?
* Automatic feature extraction?? – är det något jag kan titta på?

### Process

Lite text om hur det gått att följa planen osv. GANTT-schemat.

## Theory

### Structure models/ MQA

Hur applicerbart med deep learning på detta?

### An introduction to deep learning

A subfield of machine learning.

supervised

#### Convolutional Neural Networks

* Se LeCun! Asbra!
* There are four key ideas behind ConvNets that take advantage of the properties of natural signals: local connections, shared weights, pooling and the use of many layers.

Architecture

Layers / Activations

Training - features

Fitting & overfitting

“Effects of model structure on uncertainty”

## Methods

Datasets / Training / testing

## Results

## Discussion

Where to put process analysis?

## Conclusions

### Future prospects

## References

[1] D. Kihara, H. Chen, and Y. Yang, ‘Quality Assessment of Protein Structure Models’, *Curr. Protein Pept. Sci.*, vol. 10, no. 3, pp. 216–228, Jun. 2009.

[2] Y. LeCun, Y. Bengio, and G. Hinton, ‘Deep learning’, *Nature*, vol. 521, no. 7553, pp. 436–444, May 2015.