AMLD 2018

Using Monte Carlo dropout to identify novel phenotypes

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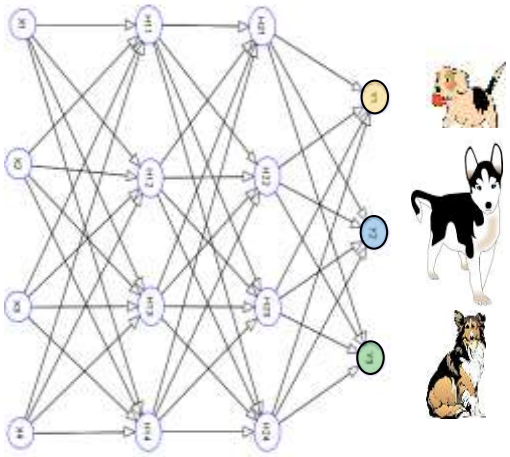
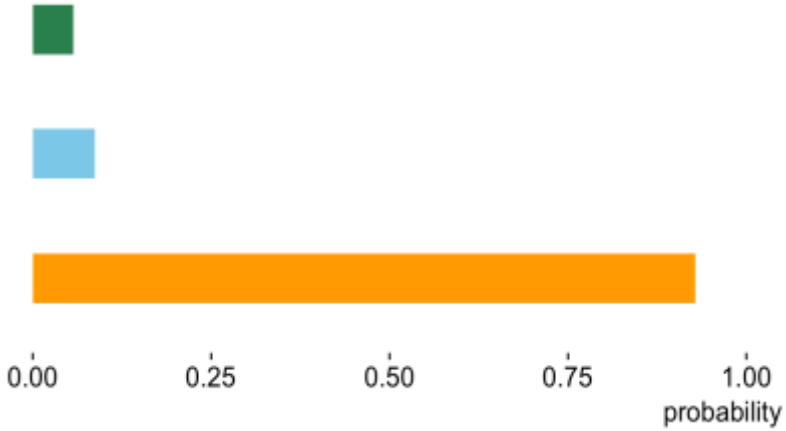
The usual deep learning success story…

A network trained to classify dog breads

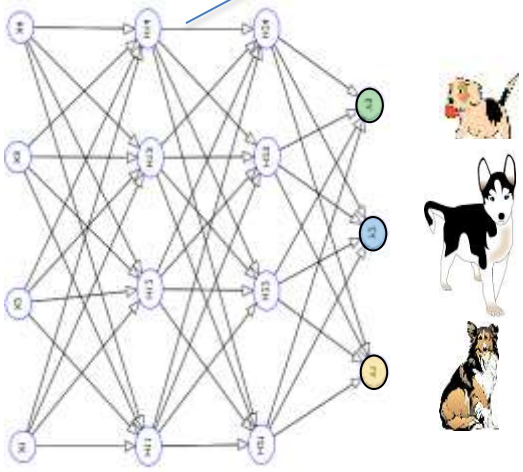




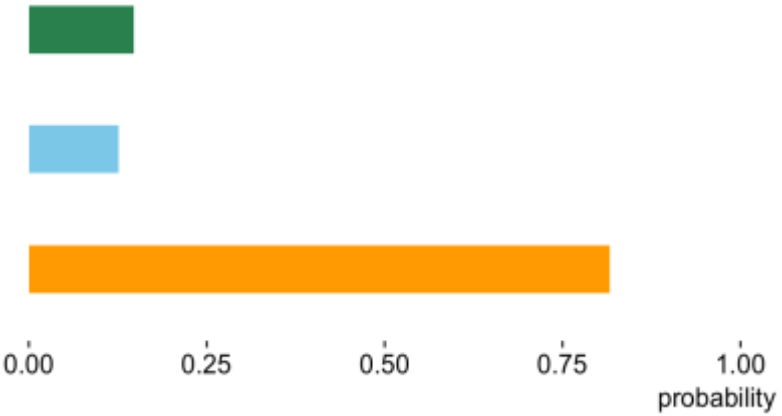
Deep neural networks can't voice their doubts…

You call me a collie? #@*$!! Are you serious?

A network trained to classify dog breads



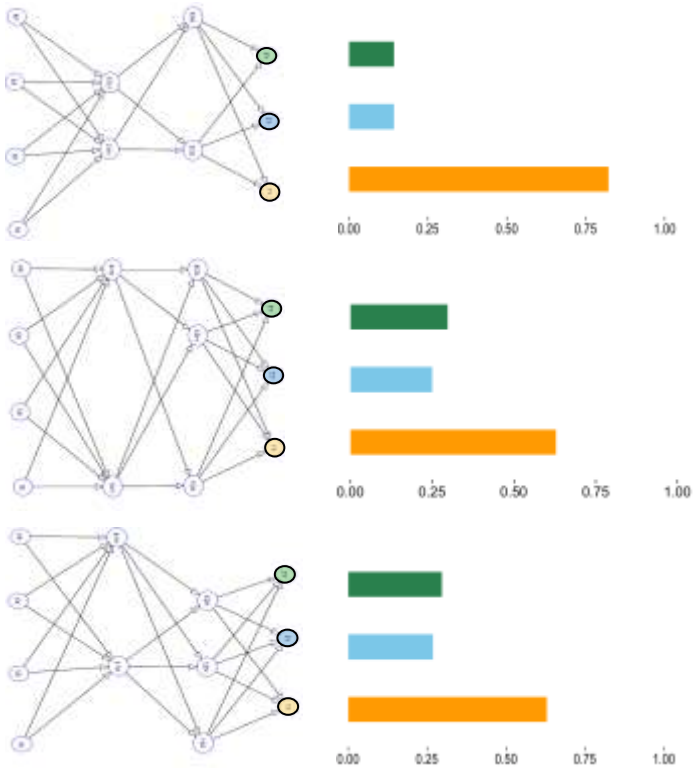
Plain wrong



We need an uncertainty measure!

Sampling over many forward passes…

Many Dropout Runs in forward pass



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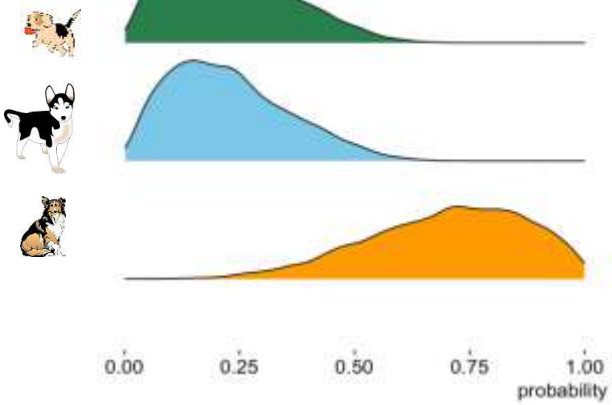
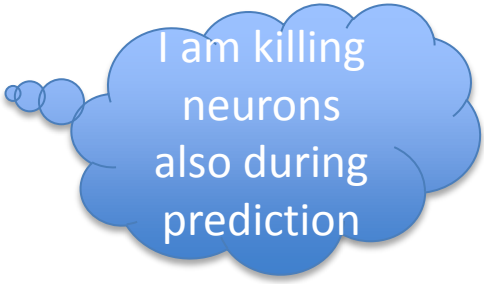
I am killing neurons also during prediction



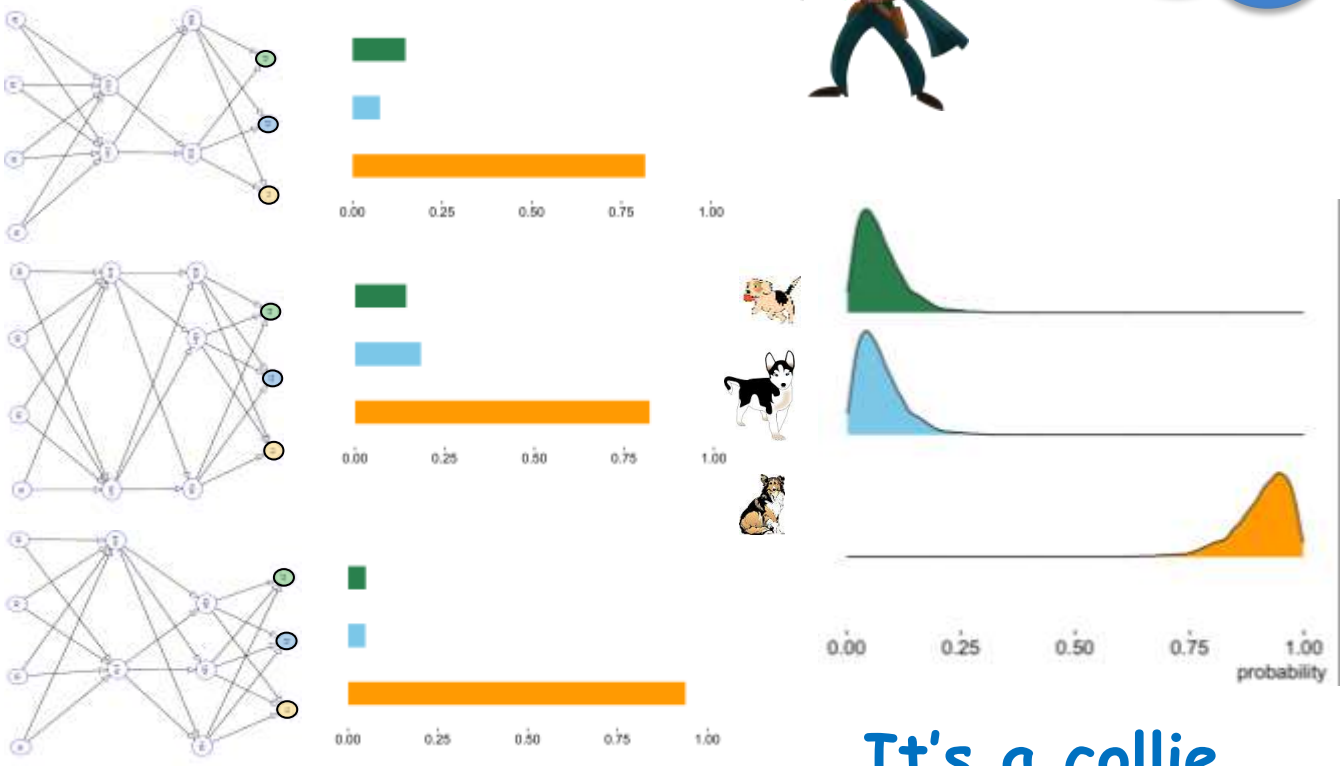
It's a collie, but I am not sure

Disclaimer: Theory developed by Yarin Gal, we just apply it to our use case.
See e.g. Representing Model Uncertainty in Deep Learning https://arxiv.org/abs/1506.02142

Sampling over many forward passes…



Many Dropout Runs in forward pass



…

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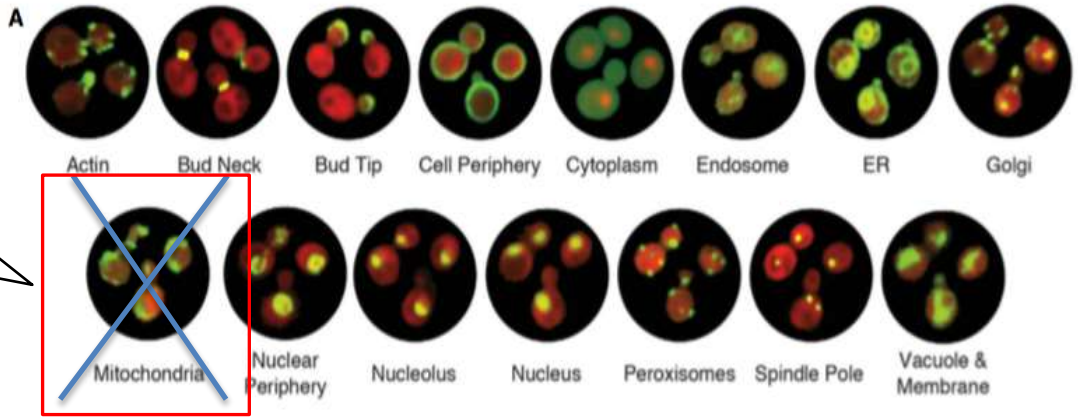
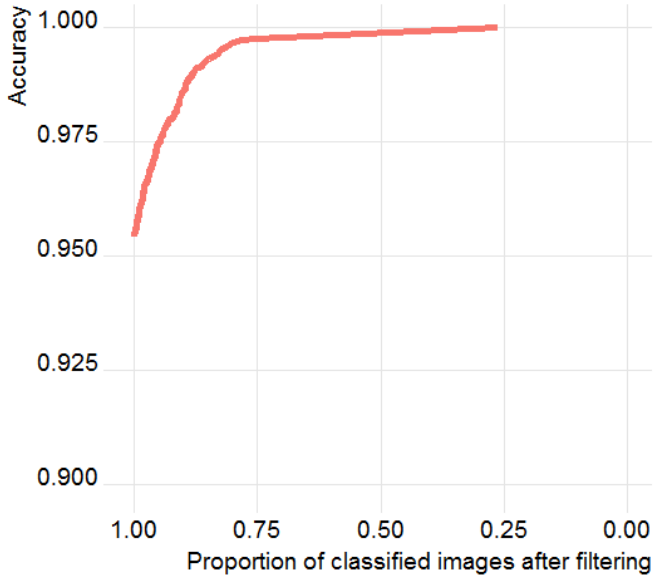
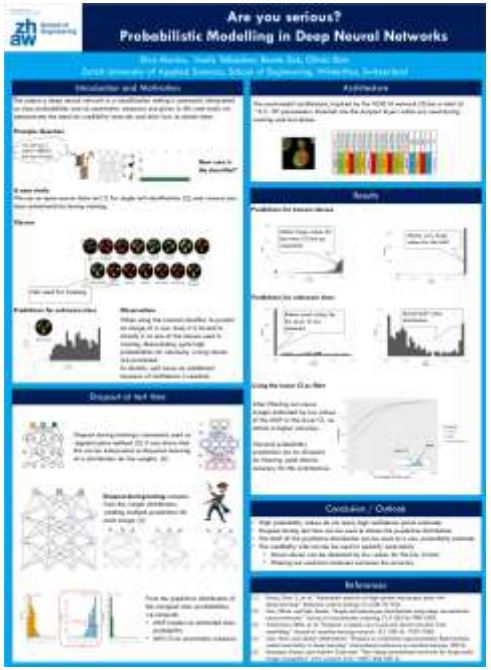
Using uncertainty to filter out unknown classes

Unknown Phenotype



Uncertainty can be used to filter out unknown classes





Meet us again, at the poster

Many more applications of uncertainty ...