



BA/SA:

Neural Theory

In recent times, neural networks are all the rage in tackling all kinds of practical problems. Fine, you might say, but I'm more interested in theory. Aren't these neural networks completely useless there? Admittedly, asking a neuronal network to directly prove or disprove a theoretical statement will in most cases (at the present stage of research) result in a lot of wasted brain power. But does that mean that neural networks cannot be used for anything good in theory?

We think there is a lot of potential in utilizing the power of neural networks to obtain useful insights into theoretical problems. Take as an example problems that can be thought of as two-player games, like Cops & Robbers or even Online Graph Exploration. Not much is known about how a good strategy looks like for the contestants, but if one would know more, e.g., by having neural networks refining those strategies, it might for



instance be possible to formulate conjectures that are not just based on a few personal observations, but on more concrete evidence. Of course, proving these statements is then still up to the humans, but even there using neural networks might be of help in some sense.

We already have a lot of ideas this thesis may explore, but of course we are always happy to hear your own ideas.

Requirements: An affinity to theory will be very helpful. But don't worry, you will meet on a weekly basis with your advisor to discuss progress and open questions. Additionally, some programming experience will come in handy as you probably will have to write code in this thesis.

Interested? Just drop us an email and we fix a time for a small chat.

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