

ML Theory — Project Proposal

djhsu + mjt [list up to two members here]

Due: 3pm on Wednesday, November 14. [delete this line...]

Interests. [List 1-5 sentences in this section. For example:

We have technical background in linear algebra, spectral methods, latent variable models, tensors, convex analysis, functional analysis, probability, and optimization. We are interested in sampling, optimization, representation, and generalization in the non-convex setting.

]

Proposal. [This section is also 1-5 sentences, but it needs to pass a “sniff test”; if you write a random sentence, don’t expect credit. Here are some project suggestions:

- Provide a *cohesive* survey of some collection of papers. Remember that your presentation is 2 slides and your handin is 1-2 pages (2 pages is a *maximum*). Therefore you can’t just summarize, you need to purify and unify.
- Provide a major simplification or reimagining of a single paper. For instance, I simplified the classical “universal approximation” proofs based on Stone-Weierstrass by using the activation $\exp(\cdot)$, amongst other things (Hornik et al., 1989). I learned a lot from this!
- Study one (or a few) fundamental classical papers, “modernize” their presentation and proofs, and tie them to present literature.
- Solve an open problem.

Your project needs to include *some* theoretical content.]

References

K. Hornik, M. Stinchcombe, and H. White. Multilayer feedforward networks are universal approximators. *Neural Networks*, 2(5):359–366, july 1989.

[Include 3-10 references via proper bibtex.]