Statistical Learning Theory Term Project Ideas

The term project can be either of these three categories.

1. Identify one or more research papers on a topic and write a report on these papers.
2. Apply the concepts of PAC learning two any machine learning problem of your interest
3. Solve one of the practice problems of the text book

YOU ARE FREE TO PRPOSE YOUR OWN PROJECT!

Projects may be done in groups with no size constraints.

Some of the possible research paper/ideas in this regard are given below.

1. PAC Bayes Bounds https://arxiv.org/abs/2110.11216
2. PAC Learning in the Presence of Adversaries
   https://papers.nips.cc/paper_files/paper/2018/hash/8f85517967795eeef66c225f7883bdcb-Abstract.html
3. Fairness Aware PAC Learning https://www.jmlr.org/papers/volume23/21-1189/21-1189.pdf
4. PAC Reinforcement Learning https://cseweb.ucsd.edu/~ewiewior/06efficient.pdf
5. Multi-class ERM https://jmlr.org/papers/volume16/daniely15a/daniely15a.pdf
6. Alternatives to the VC dimension for average case analysis (e.g., Rademacher complexity)
7. Language Generation in the Limit https://arxiv.org/abs/2404.06757
8. Online learning and Multi-armed Bandits https://arxiv.org/abs/1904.07272
9. Analysing Hallucination of LLMs https://arxiv.org/abs/2311.14648
10. PAC Analysis of Deep Learning Algorithms
    https://users.cs.duke.edu/~rongge/stoc2018ml/Daniely_stoc_slides.pdf