Week 13

- Week to do list
  - ☑ finish Machine Learning and Opt homework
  - ☑ read some papers

1 About courses

1.1 CS6491-Topics in Optimization and its Applications in Computer Science

The main content of this week is "Unconstrained Optimization Algorithms" and an application in pagerank. Unconstrained minimization problems use two methods to solve including gradient method and newton method. Then the homework of this week is using the CVX toolbox to solve some given optimisation problem.

1.2 CS5489-Machine Learning:Algorit and Apns

The main content of this week is "Supervised Learning - Regression". Supervised learning means that each data has a label, and I have mastered linear regression and non-linear regression. The homework is to implement a face detection.

2 About research

This week I have not read the details of papers below. By searching the multi-objective combined robot, I have found there are many applications. I expect that I will develop from both the algorithm itself and the application.

2.1 basic

[1] "What Weights Work for You? Adapting Weights for Any Pareto Front Shape in Decomposition-based Evolutionary Multi-Objective Optimisation" It is used adapting weights to adjust pareto front.

2.2 application

The papers below include several applications of multi-objective genetic algorithm with robot, such as robot movement of freedom, robot soccer system, underwater Gliders and snake robot gait. The next step is to see if these papers can be reproduced.

[2] "Robot trajectory planning using multi-objective genetic algorithm optimization"

[3] "Expensive Multiobjective Optimization for Robotics"

[4] "Evolutionary multi-objective optimization in robot soccer system for education"

[5] "An Approach to Multi-Objective Path Planning Optimization for Underwater Gliders"

References

[1] Miqing Li and Xin Yao. What weights work for you? adapting weights for any pareto front shape in decomposition-based evolutionary multi-objective optimisation. *arXiv preprint arXiv:1709.02679*, 2017.

[2] EJ Solteiro Pires, JA Tenreiro Machado, and Paulo B de Moura Oliveira. Robot trajectory planning using multi-objective genetic algorithm optimization. In *Genetic and Evolutionary Computation Conference*, pages 615–626. Springer, 2004.

[3] Matthew Tesch, Jeff Schneider, and Howie Choset. Expensive multiobjective optimization for robotics. In *2013 IEEE International Conference on Robotics and Automation*, pages 973–980. IEEE, 2013.

[4] Jong-Hwan Kim, Ye-Hoon Kim, Seung-Hwan Choi, and In-Won Park. Evolutionary multi-objective optimization in robot soccer system for education. *IEEE Computational Intelligence Magazine*, 4(1):31–41, 2009.

[5] Carlos Lucas, Daniel Hernndez-Sosa, David Greiner, Ale Zamuda, and Rui Caldeira. An approach to multi-objective path planning optimization for underwater gliders. *Sensors*, 19(24):5506, 2019.