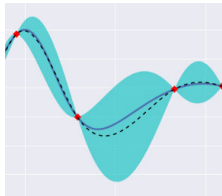# R244: Large-Scale Data Processing and Optimisation

Introduction

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My Research Interests

- Spanning over Distributed Systems, Networking and Database

- Current Focus:
  - Optimisation of Computer Systems (ML Compiler, Scheduling, DB, HW design…)
  - Exploiting Bayesian Methodology and Reinforcement Learning for Optimisation

- Side projects: Remote sensing + analysis in Cloud with African and South American countries
  - AIRBORNET: Data-Driven Modelling for her Airborne Diseases (Tanzania)
  - BUGALERT: Pest and Disease Monitoring with Raspberry-Pi Network (Kenya, Brazil)
  - ROOTGROW: Root image analysis on selection of sustainable species (Ethiopia)

MPhil project Suggestions:
http://www.cl.cam.ac.uk/~ey204/teaching/Projects/2022_2023

2

MPhil Project Suggestions

1. Tensor expression superoptimisation via deep reinforcement learning
2. Bayesian Optimisation for tensor code generation
3. Inferring reward function via Inverse Reinforcement Learning
4. Advancing Computer Systems Optimisation through Model-Based Reinforcement Learning
5. Enabling fast and efficient hyper-parameter tuning with search space partitions
6. Harnessing Structured Action Spaces for Efficient RL-based System Optimisation
7. Learning from Demonstration to Guide Query Rewrite
8. ML-compiler: Joint optimisation of tensor graph and GPU kernels
9. Structured Bayesian optimisation with probabilistic programs
10. Bayesian optimisation tuning with transfer Learning from simulation to databases
11. Explainable Reinforcement Learning for Device Placement
12. Hierarchical Device Placement from Probabilistic Perspective
13. Compiler Optimisation (or Database Query Planner Optimisation) using Equality Saturation with Reinforcement Learning

Some former project writeup: https://www.cl.cam.ac.uk/~ey204/pubs/MPHIL_P3/   3

Introduce Yourself

- Now tell about yourself

  1. Your name and where and what you studied before

  2. What is your research interests (topics): a few words
  What kind of project you are currently thinking to do?

  3. Why are you interested in R244?

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MPhil	wl446	Wenxuan	Li
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