

Bayesian optimisation using Stan

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Intelligence

Bayesian optimisation using Stan

(maybe include a nice illustration of BO here)

In this tutorial, we

- ...
- ...
- ...

Where to sample next to find global minimum?

Learning outcomes for today's tutorial

After this session, you will be able to

- ...
- ...
- ...

Schedule for today's tutorial

| Time | Activity |
|--------|---------------------------------------|
| 5 min | Warmup |
| 15 min | Introduction to Bayesian optimisation |
| 20 min | Surrogates |
| 20 min | Acquisition functions |
| 10 min | Break |
| 15 min | Computational tricks |
| 15 min | Cost- and propensity-aware BO |
| 15 min | Hands-on summary |

What is Bayesian optimisation?

The goal of BO and its components

The BO loop

Let's take a break! (10 min)

Some suggestions for recharging during breaks :)

- move your body
- open a window or go outside
- drink some water
- try to avoid checking e-mails, messengers, or social media

A primer on XYZ

$$p(\theta \mid y) \propto p(\theta)p(y \mid \theta)$$

XYZ (ctd.)

| | mpg | cyl | disp | hp | drat | wt | qsec | vs | am | gear | carb |
|-------------------|------|-----|------|-----|------|-------|-------|----|----|------|------|
| Mazda RX4 | 21.0 | 6 | 160 | 110 | 3.90 | 2.620 | 16.46 | 0 | 1 | 4 | 4 |
| Mazda RX4 Wag | 21.0 | 6 | 160 | 110 | 3.90 | 2.875 | 17.02 | 0 | 1 | 4 | 4 |
| Datsun 710 | 22.8 | 4 | 108 | 93 | 3.85 | 2.320 | 18.61 | 1 | 1 | 4 | 1 |
| Hornet 4 Drive | 21.4 | 6 | 258 | 110 | 3.08 | 3.215 | 19.44 | 1 | 0 | 3 | 1 |
| Hornet Sportabout | 18.7 | 8 | 360 | 175 | 3.15 | 3.440 | 17.02 | 0 | 0 | 3 | 2 |
| Valiant | 18.1 | 6 | 225 | 105 | 2.76 | 3.460 | 20.22 | 1 | 0 | 3 | 1 |

Summary

What we learnt today:

- BO

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More resources

Reading materials

- a paper on ...:
- a paper on ...:

Case studies

- a case study on ...: add url
- a case study on ...: add url

References