

Warping

Victor Picheny · Coralie Picard · Gael Thebaud

Received: date / Accepted: date

Abstract On peut [Victor's comment: faire un commentaire] [Coralie's comment: chacun avec sa couleur], on peut aussi ~~enlever des trucs~~ ou bien ajouter d'autres trucs, et Gael aussi.

Keywords to do

1 Introduction

[Victor's comment: toi ou moi] Mathematical modelling for design, in particular in epidemiology

[Victor's comment: pour toi... mais peut-être plus facile faire une fois que le reste aura avancé]

The sharka model and objectives

[Victor's comment: le reste de l'intro pour moi]

Generalities on optimization

Bayesian optimization

Problem at hand: dealing with local invariances

Outline

2 Model description and problem set-up

V. Picheny
MIAT, Université de Toulouse, INRA, Castanet-Tolosan, France
Tel.: +33561285551
E-mail: victor.picheny@inra.fr

C. Picard
BGPI, Montpellier SupAgro, INRA, Univ. Montpellier, Cirad, TA A-54/K, 34398, Montpellier

G. Thebaud
to do

[Victor's comment: Section remplir par toi ! Suggestion de plan dtaill.]

What does it model

How the model works

What problem do we want to solve

Inputs description

Invariances descriptions

Table of inputs with range of variation

Table of invariance relations

Table 1 Add caption

		Min	Max
Epidemiological parameters			
q_K	Quantile of the connectivity of the patch of first introduction	0	1
ϕ	Probability of introduction at plantation (before management)	0,02	0,02
	Probability of introduction at plantation (during management)	0,0046	0,0107
p_{MI}	Relative probability of massive introduction (before management)	0,4	0,4
	Relative probability of massive introduction (during management)	0	0,1
W_{exp}	Expected value of the dispersal weighting variable	0,469	0,504
β	Transmission coefficient	1,25	1,39
θ_{exp}	Variance of the latent period duration (years)	1,71	2,14
Management parameters			
ρ	Probability of detection of a symptomatic tree	0	0,66
γ_O	Duration of observation zones (years)	0	10
ζ_s	Radius-distance of security zones (m)	0	5800
ζ_f	Radius-distance of focal zones (m)	0	1
ζ_{eO}	Radius-distance of observation epicenter (m)	0	1
$1/\eta_0$	Maximal period between 2 observations (year)	1	15
η_s	Observation frequency in security zones (year-1)	0	8
η_f	Observation frequency in focal zones (year-1)	0	8
η_{f*}	Modified observation frequency in focal zones (year-1)	0	8
χ_o	Contamination threshold in the observation epicenter, above which the observation frequency in focal zone is modified	0	1

3 Methods Bayesian optimization

3.1 Overview

3.2 Bayesian optimization of stochastic simulators

3.3 Bayesian optimization with invariances

3.3.1 Definitions

3.3.2 Simple warping

3.3.3 Warping based on linear relations

3.3.4 Combining warpings

4 Experiments on toy problems

4.1 Problem descriptions

4.2 Comparison metrics

4.3 Results

5 A warping-based Bayesian optimization of the Sharka model

5.1 Numerical setup

5.1.1 Experiments description

[Victor's comment: Premier jet par toi ?]

5.1.2 Comparison with standard BO

Description of comparison metrics

[Victor's comment: Idem juste pour les mthodes de comparaison, je me charge du paragraphe pour dire quoi on se compare et je m'occupe de la partie krigeage et warping.]

5.2 Results and insights into the Sharka model

6 Conclusion

What we did (the problem we solved)

What we proposed: warping to tackle invariances. Proof of concept

Possible extensions

References