Comparison between languages regarding to SPP

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1 Introduction

in this article i will write a review on performance of diffrenet programing languages that used for probabilistic programming , regarding to how they handle models with stochastic structure, expanding of the idea that introduced in https://arxiv.org/abs/2003.00704

2 Implementation

we implemented number of simples models in three different ppls, the tables below describes the result on each of the frameworks. Stan - the most popular PPL , uses the HMC as it"s only infernce algorithm , and therfore strugle with models with the "stochastic" manner (as introduces in the articles above)
WebPPL - a universal ppl (will add a defination to it) written in JavaScripts and uses variaty of inference algorithm (as user's choise)
Infergo - written with Go , introduced in the article (Deployable PPL) more flexible then Stan, and more "Stable" then Webppl
¡add references¿ ¡add the models¿ ¡add the code¿

3 Results

3.1 Survey

implemetation	converging	computation time	effective ss	explantory
Stan - Generative	no	—	—	yes
Stan - Marganilization	yes	2.07 ± 0.06	1095 +- 247	no
WebPPL - Generative	yes	TODO	TODO	yes
WebPPL - Marganilization	TODO	TODO	TODO	TODO
Webppl - Stochastic	TODO	TODO	TODO	TODO
Infergo - MH + HMC	yes	7.4 ± 0.1	2800 ± 300	yes
Infergo - Marganilization	yes	21 ± 0.5	5200 ± 200	no
Infergo - Stochastic	yes	6.5 ± 0.1	4600 ± 180	yes

Table 1: survey model results

3.2 GMM

implemetation	converging	computation time	effective samples	explantory
Stan - Generative	no	—	—	yes
Stan - Marganilization	yes	0.213 ± 0.003	425+-20	no
WebPPL - Generative	sometimes	TODO	TODO	yes
WebPPL - Marganilization	TODO	TODO	TODO	TODO
Webppl - Stochastic	TODO	TODO	TODO	TODO
Infergo - MH + HMC	yes	38 ± 0.7	1900 ± 200	yes
Infergo - Marganilization	yes	95 ± 2	7200 ± 150	no
Infergo - Stochastic	yes	35 ± 0.7	5900 ± 240	yes

Table 2: gmm model results

3.3 HMM

implemetation	converging	computation time	effective samples	explantory
Stan - Generative	no	—	—	yes
Stan - Marganilization	yes	2.25 ± 0.07	2390+-203	no
WebPPL - Generative	sometimes	TODO	TODO	yes
WebPPL - Marganilization	TODO	TODO	TODO	TODO
Webppl - Stochastic	TODO	TODO	TODO	TODO
Infergo - MH + HMC	yes	10 ± 0.3	4800 ± 190	yes
Infergo - Marganilization	yes	46 ± 0.8	6700 ± 180	no
Infergo - Stochastic	yes	10 ± 0.3	6200 ± 280	yes?

Table 3: hmm model results

4 Summery

summery of the results , about each implementation , which way is the most efficient

5 Discussion

6 Reference

1. Stochastically Differentiable Probabilistic Programs - arXiv:2003.00704
2. Probabilistic Programming with Densities in SlicStan: Efficient, Flexible and Deterministic - arXiv:1811.00890