
BNNs with Stan and Edward

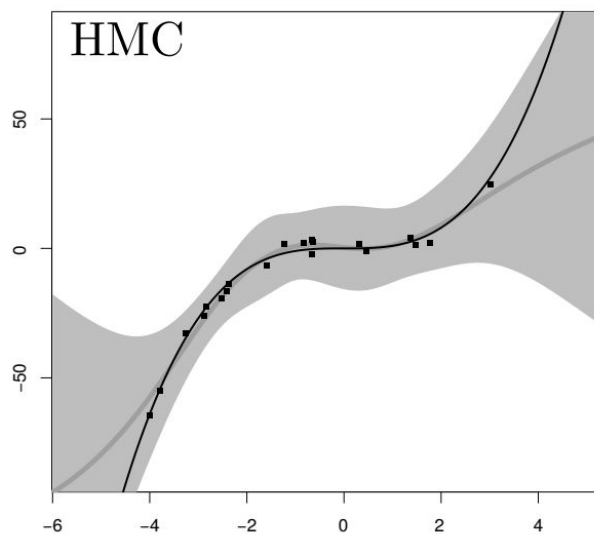
— May 18, 2018 —

Edward

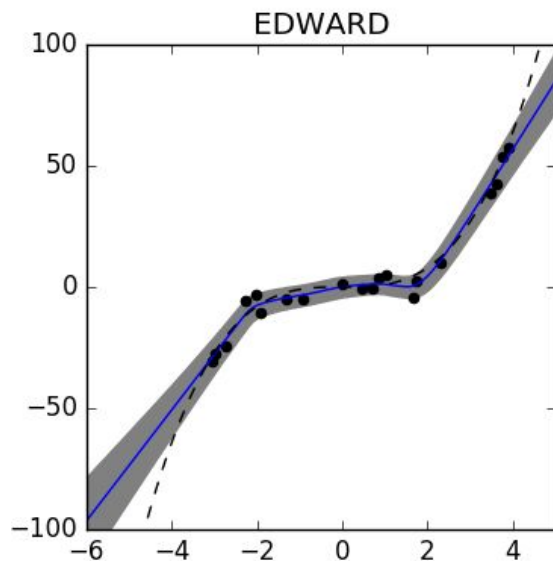
- TensorFlow wrapper for probabilistic programming
- Can re-use a lot of TF code
- Built for variational methods
- HMC seems newer
- edwardlib.org

Stan

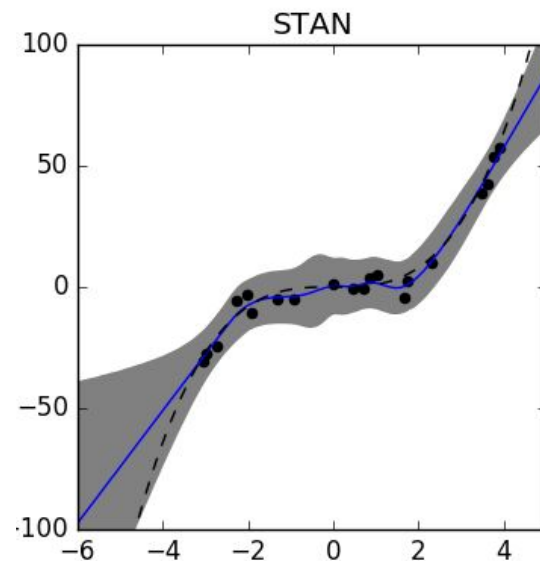
- ML language with interfaces in Python, R, MATLAB, Julia, cmd, ...
 - Can port models across interfaces
- Built for HMC / NUTS (no u-turn sampler)
- Need to compile STAN code (programmatically)
 - Requires C++ compiler, cython
 - Comes with BOOST, Eigen, etc., but can customize
- mc-stan.org



Original paper:
MCMCstuff in MATLAB



15,000 samples rather
than 30,000



| | Edward | Stan |
|-----------------------------------|---|------------------------|
| Posterior predictive draws | VI: easy HMC: finicky | HMC: easy |
| NN features (ReLU, etc.) | Easy, part of TF | Time-consuming |
| HMC model parameters | Automatically transformed, not obvious | Straightforward |
| Functions with many parameters | Trivial | Bookkeeping |
| Ragged arrays | TF: no Python: yes | None |
| Parallel chains | Manual | Yes |
| Broadcasting | Easy, part of TF | Sometimes |