1. <https://github.com/nipunbatra/pml2022/blob/main/notebooks/Bayesian-Optimization.ipynb>
2. [Gaussian Processes for Machine Learning](http://gaussianprocess.org/gpml/chapters/)
3. [Understanding Gaussian Process, the Socratic Way | by Wei Yi | Towards Data Science](https://towardsdatascience.com/understanding-gaussian-process-the-socratic-way-ba02369d804)
4. [Bayesian Optimization Concept Explained in Layman Terms | by Wei Wang | Towards Data Science](https://towardsdatascience.com/bayesian-optimization-concept-explained-in-layman-terms-1d2bcdeaf12f)
5. [The Beauty of Bayesian Optimization, Explained in Simple Terms | by Andre Ye](https://towardsdatascience.com/the-beauty-of-bayesian-optimization-explained-in-simple-terms-81f3ee13b10f): Member-only story
6. [How to Choose an Optimization Algorithm - MachineLearningMastery.com](https://machinelearningmastery.com/tour-of-optimization-algorithms/)
7. [Bayesian optimisation with skopt](https://scikit-optimize.github.io/stable/auto_examples/bayesian-optimization.html#sphx-glr-auto-examples-bayesian-optimization-py)
8. [How to Implement Bayesian Optimization from Scratch in Python - MachineLearningMastery.com](https://machinelearningmastery.com/what-is-bayesian-optimization/)
9. [Taguchi Orthogonal Arrays](https://www.me.psu.edu/cimbala/me345/Lectures/Taguchi_orthogonal_arrays.pdf): Taguchi design good document
10. [Biostatistics and Design of Experiments - YouTube](https://www.youtube.com/playlist?list=PLo4xQ9e-YcMkCDJrLo3GJ29rvCscVl_-4)
11. [Black-Box Optimization using Bayesian Optimization - UBC Wiki](https://wiki.ubc.ca/Black-Box_Optimization_using_Bayesian_Optimization#:~:text=Functions%20that%20are%20smooth%20and,well%2Dsuited%20for%20Bayesian%20optimization)
12. [Bayesian optimization](https://colab.research.google.com/github/krasserm/bayesian-machine-learning/blob/master/bayesian_optimization.ipynb#scrollTo=T1_zIdJ9rdyM): Google Colab implementation Martin Kresser
13. [GP:](https://colab.research.google.com/github/krasserm/bayesian-machine-learning/blob/dev/gaussian-processes/gaussian_processes.ipynb?authuser=4) Google colab implementation Martin Kresser
14. <https://www.youtube.com/playlist?list=PLo_UxqI8EF9TWfqVUi9AfGTUJQvx3RRLt>: Process optimisation in chemical engineering link
15. [IITK PML Course has BO](https://www.cse.iitk.ac.in/users/piyush/courses/pml_autumn22/pml.html)
16. [Github repo implementation of BO package](https://github.com/bayesian-optimization/BayesianOptimization)
17. [Scikit learn kernels for Guassian processes](https://scikit-learn.org/stable/modules/gaussian_process.html#gp-kernels)
18. [GP-hedge: using a portfolio of acquisition function](https://arxiv.org/pdf/1009.5419.pdf)

# [GPyOpt: external objective function evaluation](https://nbviewer.org/github/SheffieldML/GPyOpt/blob/master/manual/GPyOpt_external_objective_evaluation.ipynb)

1. [Gpy-Opt package for BO](http://sheffieldml.github.io/GPyOpt/index.html)
   1. [Reference manual](https://nbviewer.org/github/SheffieldML/GPyOpt/blob/devel/manual/index.ipynb) (V useful..you would have to uset this if you are trying for Gpy-opt implementation)
   2. [Introduction to BO on Gpy-opt](https://nbviewer.org/github/SheffieldML/GPyOpt/blob/devel/manual/GPyOpt_reference_manual.ipynb) (contains guide with starting examples on how to start using), [fixed constraints](https://nbviewer.org/github/SheffieldML/GPyOpt/blob/devel/manual/GPyOpt_constrained_optimization.ipynb), [mixing diff types of variables](https://nbviewer.org/github/SheffieldML/GPyOpt/blob/devel/manual/GPyOpt_mixed_domain.ipynb), model hyperparameters (not sure what it is), initial design (not sure what it is and dont think it would be required in our work)
   3. [Using an external objective](https://nbviewer.org/github/SheffieldML/GPyOpt/blob/master/manual/GPyOpt_external_objective_evaluation.ipynb)
   4. [New acquisitions](https://nbviewer.org/github/SheffieldML/GPyOpt/blob/devel/manual/GPyOpt_creating_new_aquisitions.ipynb)
   5. [Documentation](https://gpyopt.readthedocs.io/en/latest/) (might not be that useful)
   6. [Github source](https://github.com/SheffieldML/GPyOpt)
2. GP Tutorial Zeel Patel
   1. [YouTube Tutorial](https://www.youtube.com/watch?v=92-98SYOdlY)
   2. [Distil Article](https://distill.pub/2019/visual-exploration-gaussian-processes/)
   3. [Visualisation Tool](http://www.infinitecuriosity.org/vizgp/)
3. Optimising [Bayesian Optimization](https://www.robots.ox.ac.uk/~sjrob/Theses/mark_mcleod_final_thesis.pdf) (Oxford Uni Doc)
4. [GP Book MIT](https://gaussianprocess.org/gpml/chapters/RW.pdf)

Dear Mr Gonzalez and Mr Dai,

I am using GPyOpt for applying **Bayesian Optimisation** to a dataset with **three discrete variables** in the input dataset. I am using the functionality for **external objective evaluations** and using the following methods for suggesting the next point to evaluate in the lab.

bo\_step = GPyOpt.methods.BayesianOptimization(f = None, domain =dom-ain, model\_type='warpedGP', X = X\_updating, Y = Y\_updating, initial\_design\_numdata=12,acquisition\_type='EI', exact\_feval=False, maximize=True)

x\_next\_eval = bo\_step.suggest\_next\_locations()

The following model types do not work:

1. **InputWarpedGP:** It gives the error " 'NoneType' object has no attribute 'analytical\_gradient\_prediction'".

2. **warpedGP:** It gives the error "". The source code file (GPyOpt/models/warpedgpmodel.py) for this has a comment which says "TODO: not fully tested yet."

I searched the community discussions for these but they could not find a solution for these. Just wanted to confirm whether these two model\_types were implemented and fully functional before the repository was archived?

I would be highly grateful to you if you could please provide a clarification for these. Please let me know if any more information is required from my end.

Thank you

Regards,

Somesh