**Compare HPOs  
Coelho et al. 2024 combined Simultaneous Perturbation Stochastic Approximation (SPSA) algorithm with the ADAM**

**Creating new HPOs**

Mallik et al 2024 worked on PriorBand, an HPO algorithm for DL researchers. They added the incumbent-based sampling to existing uniform sampling, and prior-based sampling that are in the Hyperband algothim

**Combined HPO**

Mirjalili et al. proposed a method based on the hybridization of two optimization algorithms: Particle Swarm Optimization (PSO) and Grey Wolf Optimization (GWO). By combining the strengths of these algorithms, the researchers aimed to improve the hyperparameter optimization procedure's efficacy and efficiency.  
According to Ulutas et al., (2024), PSO is a population-based optimization algorithm inspired by the flocking or schooling behaviour of birds and fish. Utilising a swarm of particles that iteratively explore the search space, the optimal solution is found. GWO is a nature-inspired algorithm that is based on the social hierarchy and hunting behaviour of grey wolves. It imitates the leadership dynamics between the alpha, beta, and delta wolves in order to direct the search for the global optimum. By combining PSO and GWO, the proposed algorithm capitalizes on the exploration and exploitation capabilities of both algorithms to conduct a more exhaustive search of the hyper parameter space. This hybrid strategy seeks to strike a balance between exploration to identify promising regions and exploitation to fine-tune hyper parameters for enhanced model performance.

**Combined HPO and ML**

developed a novel hybrid model, GA-BART, that integrates a genetic algorithm (GA) with the Bayesian additive regression [tree](https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/tree) (BART) model for hourly streamflow forecasting. The GA-BART approach produced better results compared to the MLR and GA-SVR models. In comparison to models using different input predictors, the statistical results showed that the hybrid GA-BART model performed better than the other models for the hourly streamflow estimate with an RMSE = 25.12 m3 /s, MAE = 8.00 m3 /s, NSE = 0.96, CC = 0.98, and MAPE = 9.0%,( Nguyen et al, 2022)

**Improving HPO**

 focuses on iterative methods, which use linear system solvers, like conjugate gradients, alternating projections or stochastic gradient descent, to construct an estimate of the marginal likelihood gradient, Lin et al 2024). selected the RMSE, MAE, and CPU running times as evaluation metrics to thoroughly analyse the performance of each algorithm.

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**Questions**

Do I write about the performance metrics in detail?

Can I add the reference doi link at the end of the reference?

Do I mention what every reference used even if I will not use?

What do I do when some of the related do not have metric performances?