**Bayes search for hyperparameters:**

In this study, we performed a Bayesian search on the dropout and hidden size hyperparameters for the given model. Since dropout is directly dependent on the number of hidden neurons, it was important to analyze their relationship. Bayesian search requires continuous values for parameter optimization; therefore, while dropout was used as a continuous variable, the hidden size and number of layers values were cast within the model function to ensure compatibility.

* Dropout values ranged from 0 to 1.0, where 1.0 results in dropping all neurons, preventing any learning.
* Hidden size values ranged from 16 to 512, typically chosen in powers of 2.
* The number of layers ranged from 1 to 8.

To understand the impact of these hyperparameters, we visualized the results using a parallel coordinates plot. From the visualization, we observed that larger hidden sizes were generally associated with higher accuracy, whereas higher dropout values negatively impacted performance. Similarly, the higher number of layers tends to produce less accurate models. This suggests that while dropout is essential for regularization, excessive dropout prevents neurons from learning meaningful weights. By analyzing this relationship, we were able to identify the best-performing hyperparameter configurations, allowing us to further fine-tune the model for optimal accuracy. The best-performing model has a dropout of value 0.1, hidden size of 446 and number of layers are suggested as 4.

A diagram of a diagram

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