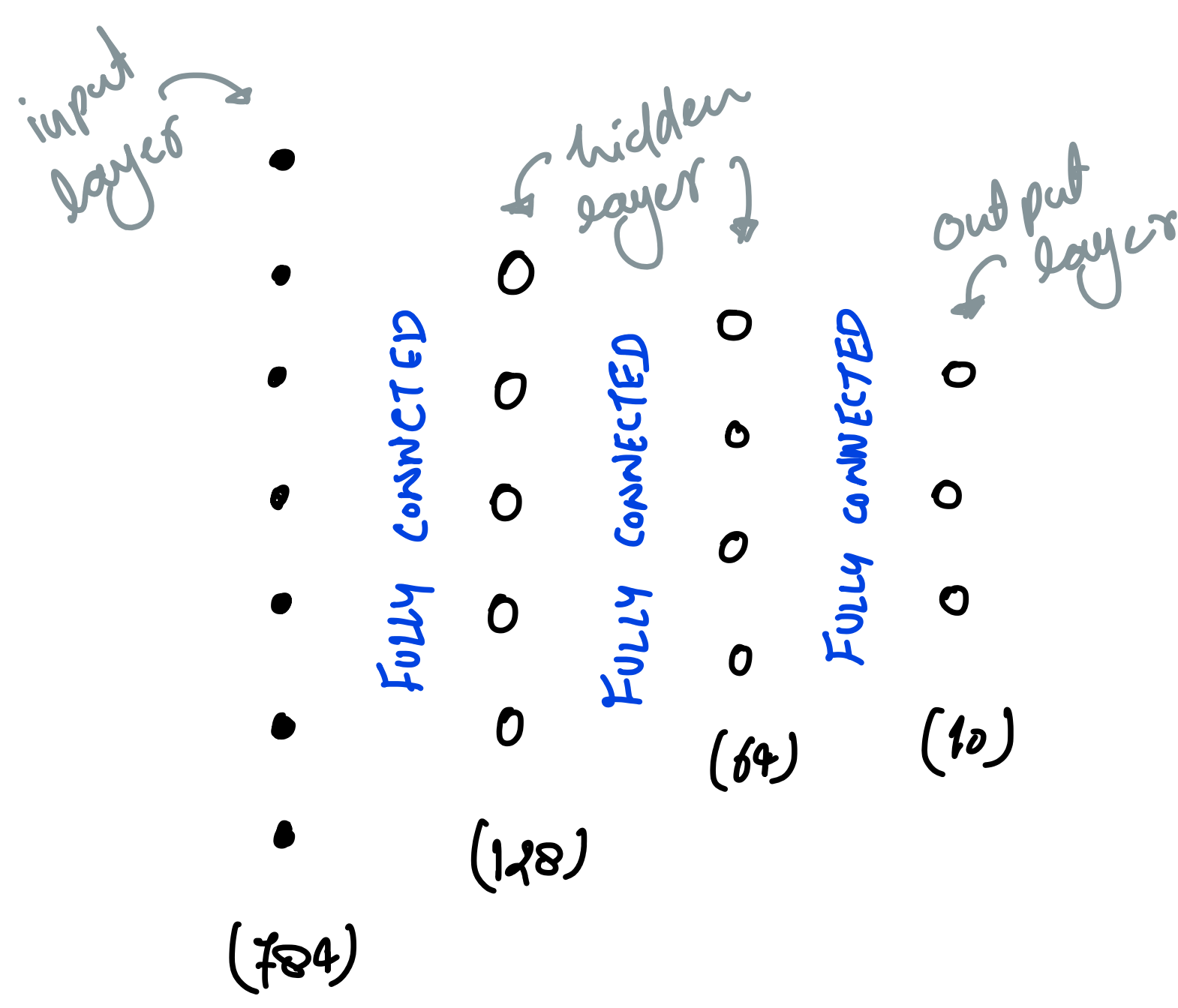


10.0 HYPERPARAMETER TUNING OF THE ANN

USING Optuna

24 August 2025 02:48 AM 8= Avinash Yadav



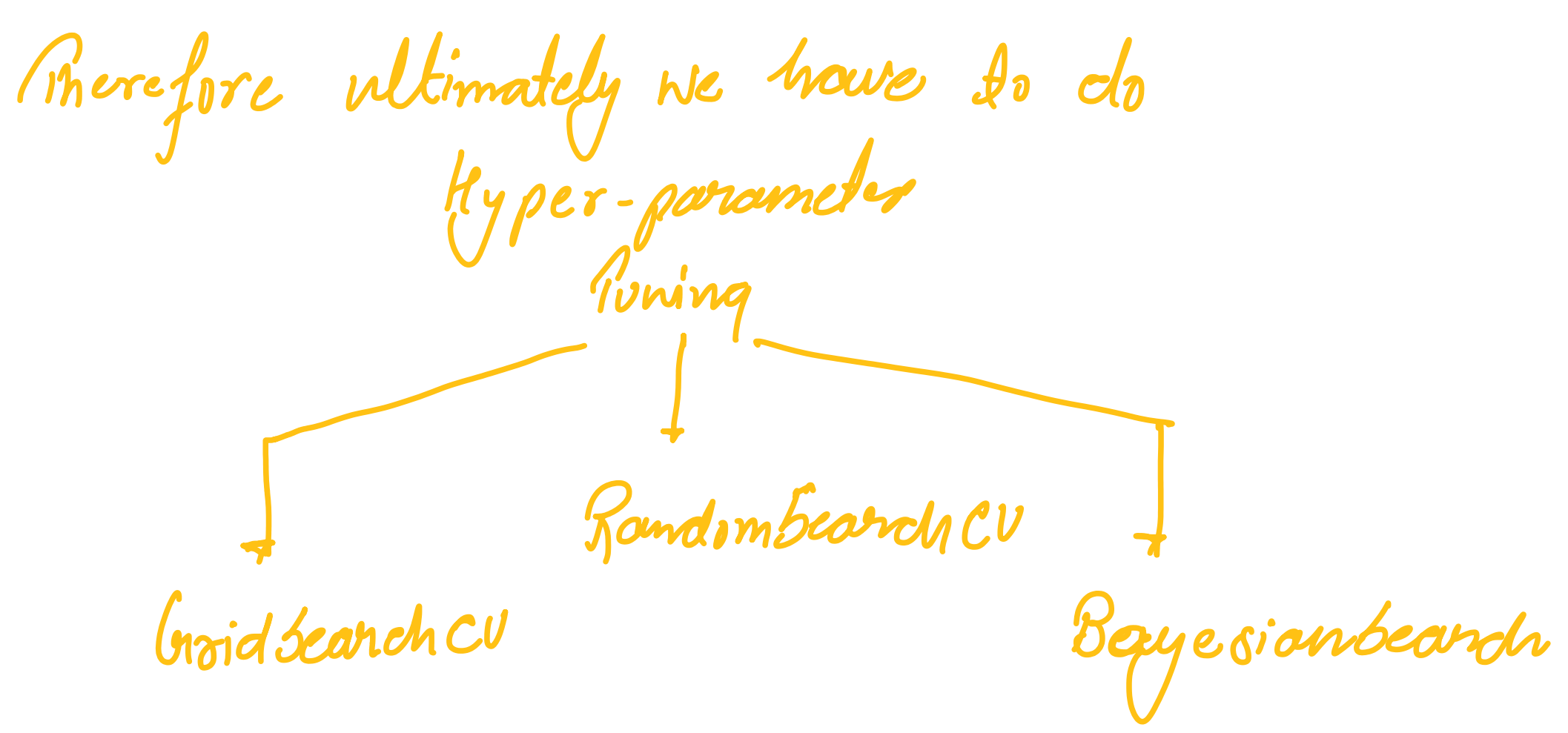
Architecture of our NN

Now we have taken 128 neurons in 1st hidden layer and 64 neurons in the 2nd hidden layer but we want to know the correct architecture with how many hidden layers should be there, how many neurons should be there in each of them.

Apart of this there were many other values that we took based on our intuition as of now :-

epochs = 100
batch-size = 32
lr = 0.1
drop out rate = 0.3
etc.

But we can't use our intuition to solve a real world problem so we shift to a better approach to find the values of these variables by doing experimentations to find out which values are giving better results.



Bayesian search, or Bayesian optimization, is an advanced hyper-parameter tuning method that efficiently finds optimal model configurations by using a probabilistic model (a "surrogate") to guide its search, unlike grid or random search which rely on brute-force or random sampling.

It works by building a model of the objective function (e.g., model accuracy) and an acquisition function to balance exploring new, potentially high-performing regions and exploiting known good regions, learning from each evaluated hyper-parameter combination to minimise the number of expensive model training calls needed to find the best parameters.

We will perform Bayesian Search hyper-parameter tuning method by using Optuna library.

Therefore, by using Optuna, we will tune the following hyper-parameters :-

1. No. of hidden layers
2. No. of neurons per layer
3. Number of epochs
4. Optimizer
5. Learning Rate
6. Batch Size
7. Drop out rate
8. Weight Decay (λ)

① General Workflow:-

