

The background of the slide features a large, faint, light-gray watermark of the NITCE logo. The logo consists of the letters 'NITCE' in a stylized font, with a circular emblem to the right containing a book and a torch.

GRID SEARCH

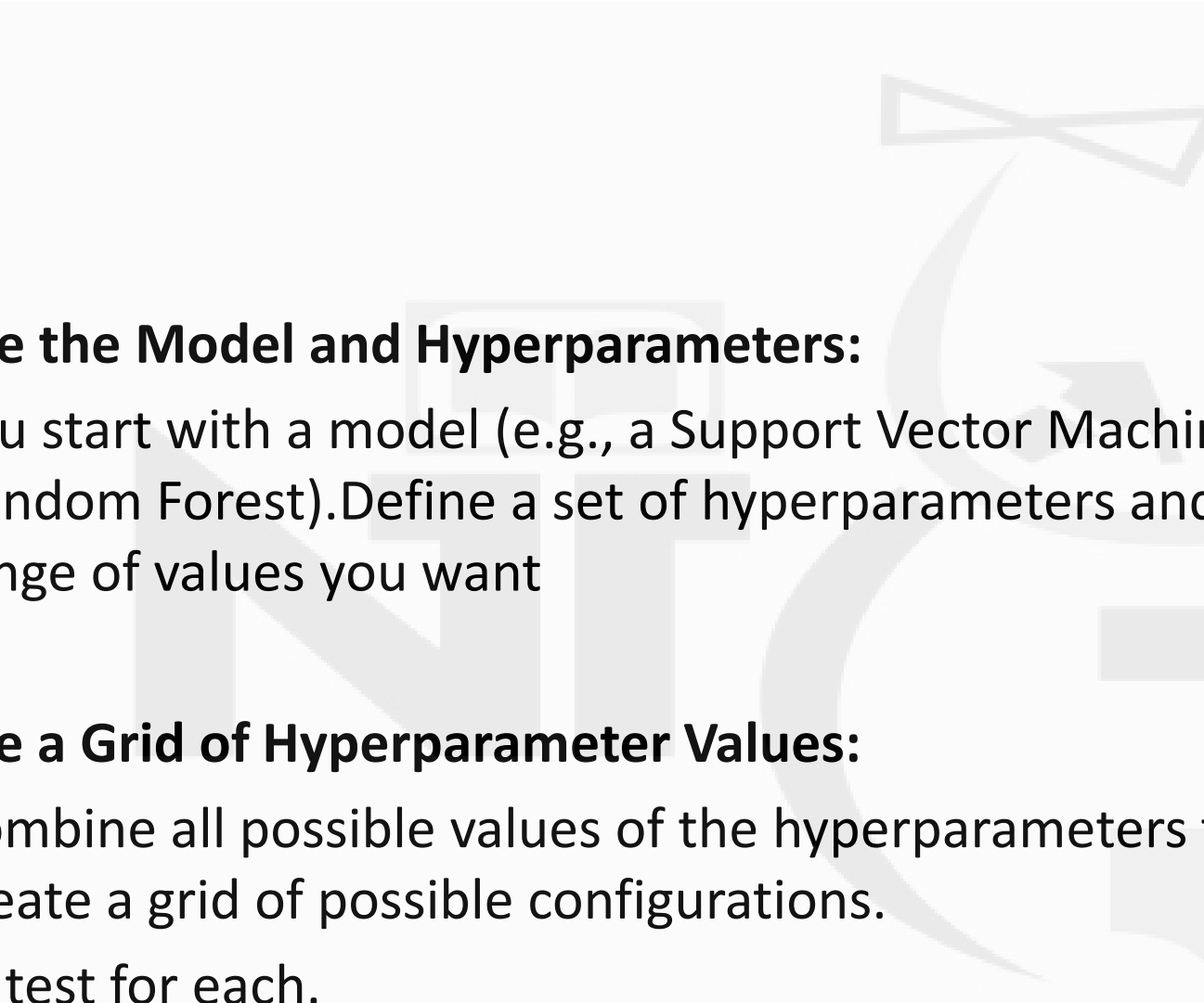
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Grid Search

- **Grid Search** is a technique used in machine learning to find the best hyperparameters for a model.
- Hyperparameters are parameters that are not learned during training but are set prior to training, such as the learning rate, number of layers, or the type of regularization.
- Grid Search systematically works through multiple combinations of parameter tunes, cross-validates each combination, and determines which combination gives the best performance.



HOW GRID SEARCH WORKS:

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- **Define the Model and Hyperparameters:**
 - You start with a model (e.g., a Support Vector Machine or a Random Forest). Define a set of hyperparameters and the range of values you want
 - **Create a Grid of Hyperparameter Values:**
 - Combine all possible values of the hyperparameters to create a grid of possible configurations.
 - to test for each.

- **Cross-Validation:**

- For each combination of hyperparameters, the model is trained and validated using cross-validation (typically k-fold cross-validation).

- **Evaluation:**

- After cross-validation, the performance (e.g., accuracy, F1 score) is evaluated, and the best-performing set of hyperparameters is selected.

- **Best Model Selection:**

- The model is then re-trained on the entire training set using the best hyperparameters and evaluated on the test set.



WHAT IS RANDOMIZED GRID SEARCH?

- Randomized Grid Search, or more commonly known as **RandomizedSearchCV** in scikit-learn, is a hyperparameter optimization technique. Unlike GridSearchCV, which evaluates all possible combinations of hyperparameters, RandomizedSearchCV evaluates a fixed number of random combinations from the parameter grid. This can be much more efficient when the hyperparameter space is large or when you're unsure which hyperparameters are the most important.

When to Use RandomizedSearchCV?

- **Large Hyperparameter Space:** When you have a large number of hyperparameters and/or values to try, and it's computationally expensive to evaluate all possible combinations.
- **Exploration:** When you want to explore the hyperparameter space more broadly, potentially discovering effective hyperparameters you hadn't considered.

Advantages of RandomizedSearchCV

- **Efficiency:** Faster when searching large hyperparameter spaces.
- **Flexibility:** Allows using distributions for hyperparameters, enabling the exploration of a wider range of values.