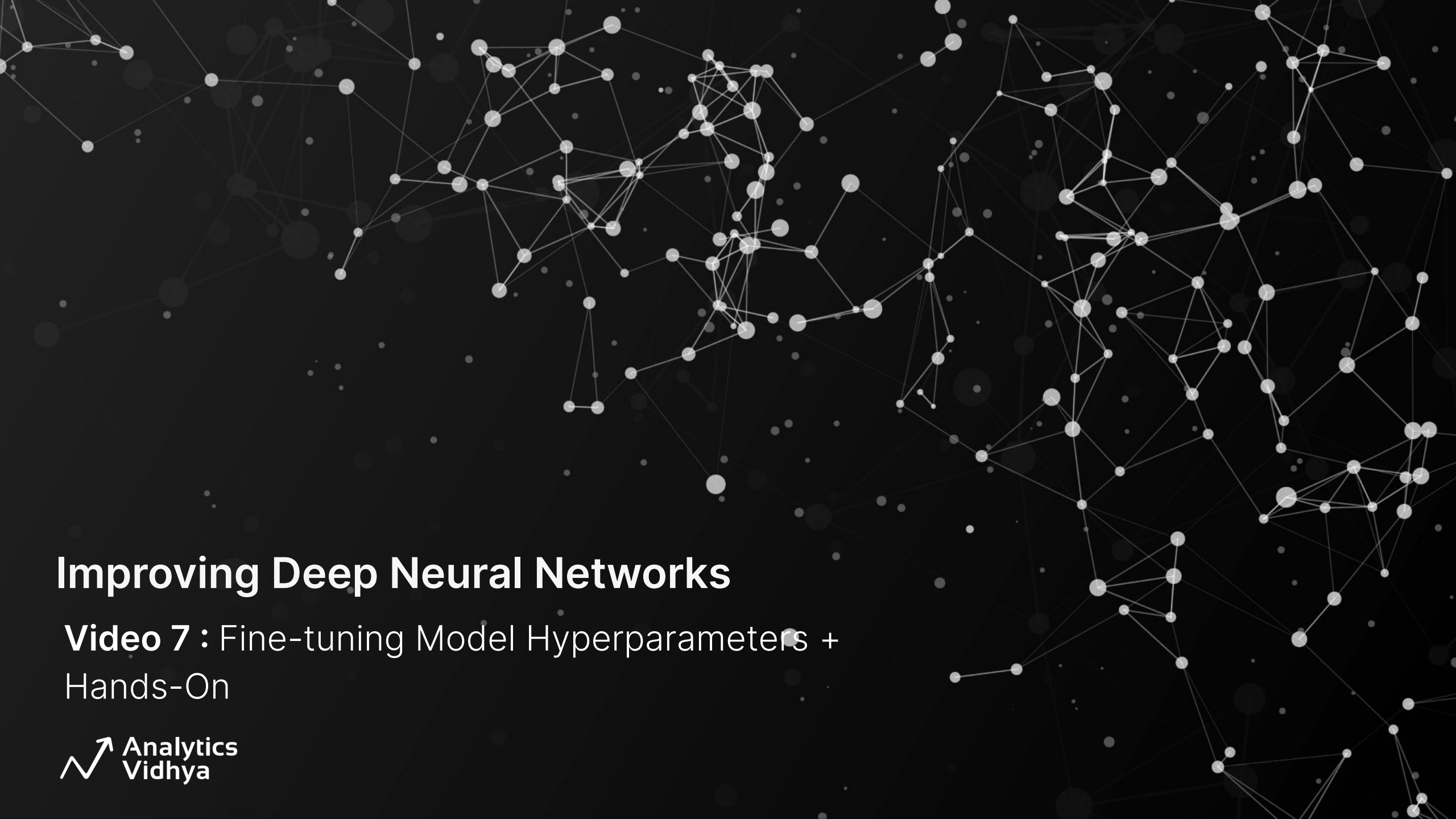


Improving Deep Neural Networks

Video 7 : Fine-tuning Model Hyperparameters + Hands-On

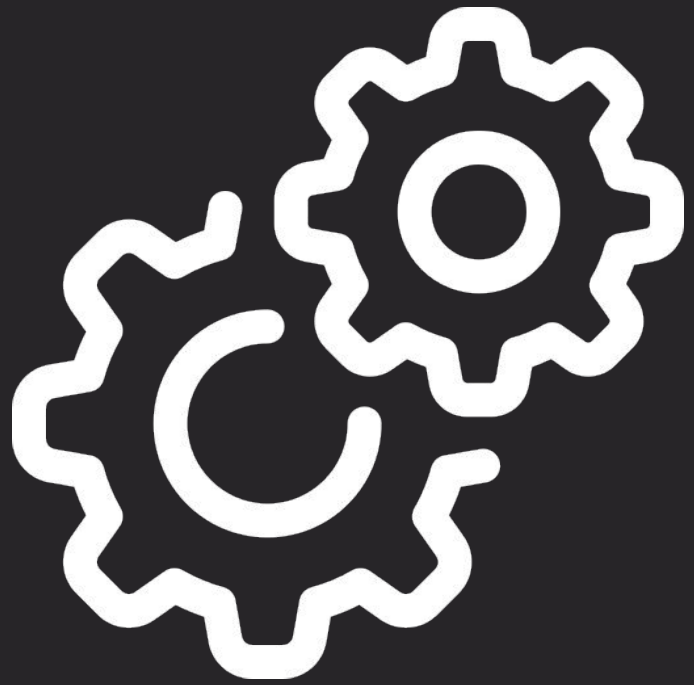
Analytics Vidhya

Analytics Vidhya

In Air

Analytics Vidhya

Hyperparameter Tuning



- Hyperparameters are external settings, not learned from data
- They critically influence training and model performance

Learning Rate & Momentum

Analytics Vidhya

Learning Rate

- **Good Starting Point:** 0.001
- **Other Options:** 10^{-4} , 10^{-2}

Momentum (Beta)

- **Good Starting Point:** 0.9
- **Other Options:** 0.95, 0.99, 0.995, 0.999

No. of Layers & Hidden Units

Analytics Vidhya

No. of Layers

- **No. of Layers** affect chances of Overfitting and Underfitting

Hidden Units

- **Good Practice:** 64, 128, 256, 512.....

Analytics Vidhya

No. of Epochs & Batch Size

No. of Epochs

- **Insufficient Epochs:** Chances of Underfitting
- **Excessive Epochs:** Chances of Overfitting

Batch Size

- **Good Practice:** 16, 32, 64, 128, 256, 512, 1024

Analytics Vidhya

Weight Decay Strengths & Dropout Probabilities

Weight Decay Strengths

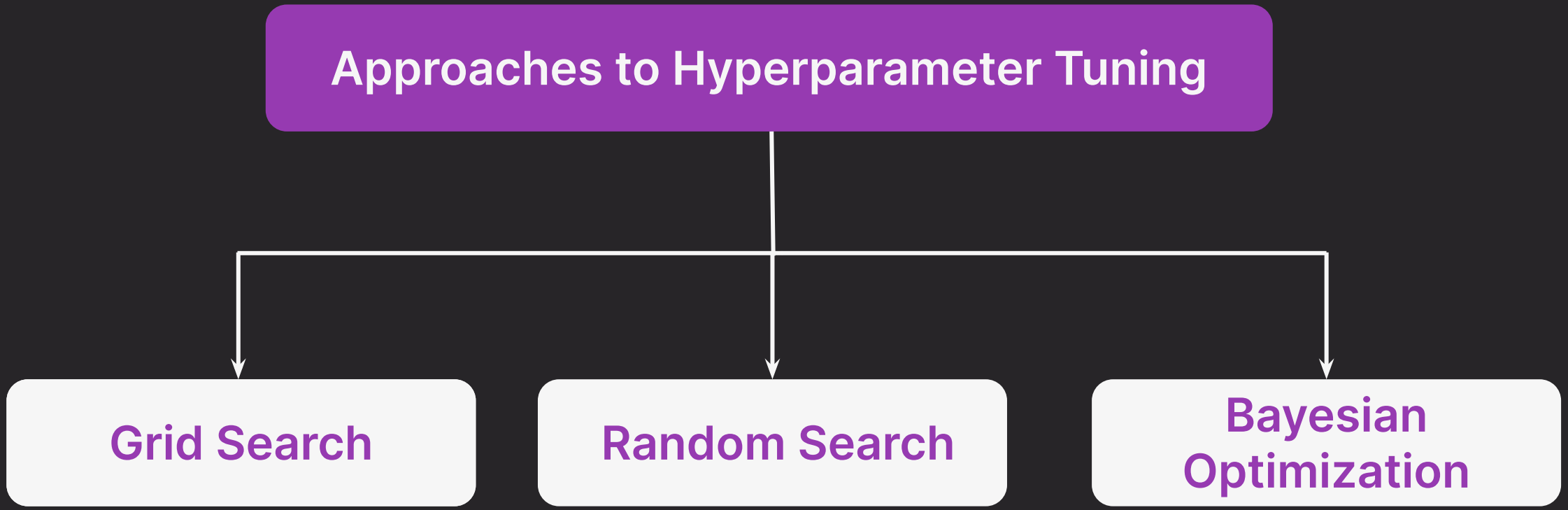
- Penalizes large weights to create simpler models

Dropout probabilities

- Encourages learning robust feature

Analytics Vidhya

Hyperparameter Tuning: Approaches



Analytics Vidhya

Hyperparameter Tuning: Approaches

Grid Search

- Explores every configuration
- Computationally intensive

Random Search

- Less time-consuming
- Bound to the range of parameters specified

Bayesian Optimization

- Uses probability to refine parameters to search
- Not bound to the parameter space

Hyperparameter Tuning: Approaches

Grid Search ❌

1. Complexity
2. Number of hyperparameters involved

Analytics Vidhya

Python Library for hyperparameter tuning:

Raytune

Analytics Vidhya

Raytune

Enables hyperparameter tuning through either the Function API or Class API

Functions for hyperparameter tuning:

- HyperOpt
- Optuna
- Grid Search
- BayesOpt Search

Analytics Vidhya

Optuna

Most preferred for hyperparameter optimization among deep learning enthusiasts

Optuna Ensures:

- Scalability
- Efficient search capabilities

Analytics Vidhya

Up-Next: Hands-On Hyperparameter Tuning