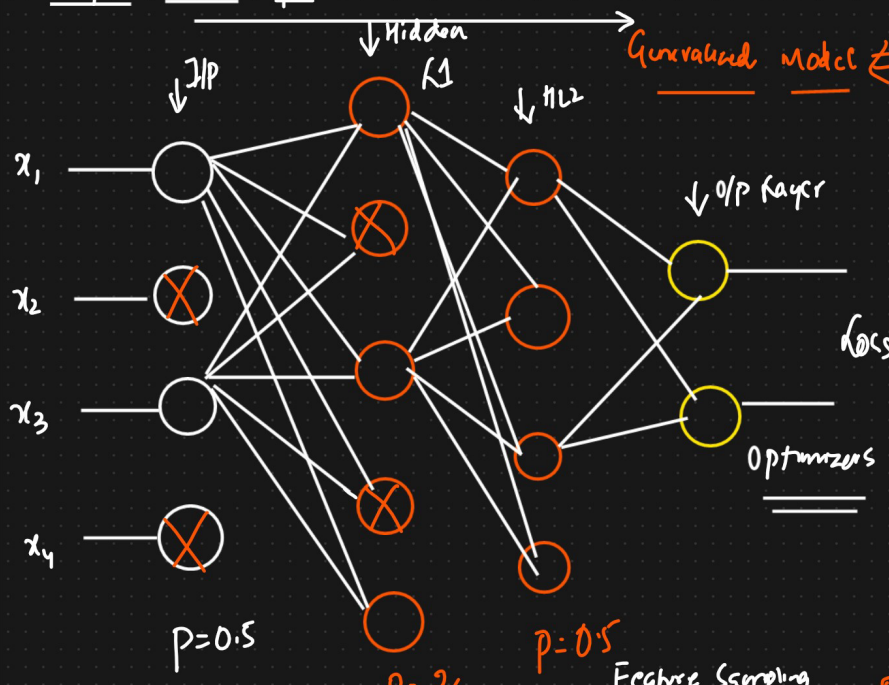
Drop Out Layer



Generalized Model ∈ ⇒ Overfitting

Model → Training Acc ⇒ 90%
Test Acc ⇒ 60%

Focus ↓↓

Optimizers

Machine Learning

DT

⇒ Overfitting

⇓

Generalized Model

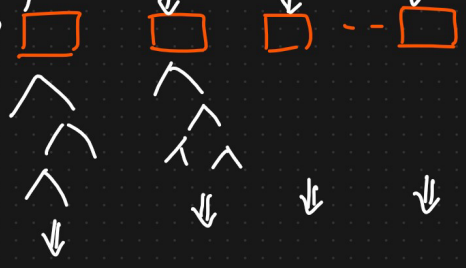
$0 \leq P \leq 1$

⇓

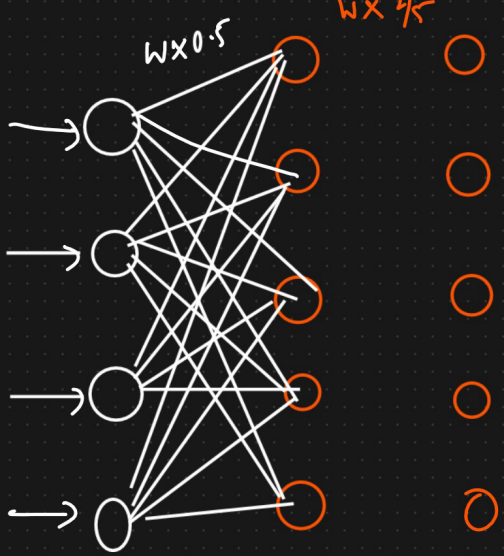
Hyperparameter

Feature Sampling
Row Sampling

Random Forest



Test data



🧠 What is a Dropout Layer (in Deep Learning)?

> A **Dropout layer** is a regularization technique used in neural networks to **prevent overfitting**.

🧪 How it works:

During **training**, the Dropout layer:

- **Randomly turns off (drops)** a percentage of neurons in a layer.
- This means those neurons don't **contribute to forward or backward passes** for that batch.

For example, if you set:

```python
Dropout(rate=0.5)
```

➡️ 50% of the neurons in that layer are randomly "shut off" during each training step.

very important

📌 Why use Dropout?

- It forces the network to **not rely too heavily** on specific neurons.
- Encourages the network to **learn redundant representations**, making it more **robust**.
- Great for **reducing overfitting**, especially in large networks.

🧰 In Code (Keras Example):

```python
from tensorflow.keras.layers import Dense, Dropout

model.add(Dense(128, activation='relu'))
model.add(Dropout(0.5))  # Drop 50% of neurons
model.add(Dense(10, activation='softmax'))
```