SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING-IoT Including CS & BCT

COURSE NAME :19SB701 PATTERN RECOGNITION TECHNIQUES IN CYBER CRIME

IV YEAR / VII SEMESTER

Unit I- **INTRODUCTION**

Topic :Learning and Adaptation

Learning and Adaptation in Pattern Recognition Systems

Learning and adaptation are crucial aspects of pattern recognition systems, enabling them to improve their performance over time.

It typically involve learning from data (training) and adapting to new, unseen data.

There are two primary forms of learning in pattern recognition systems

1. Supervised Learning

2. Unsupervised Learning

Supervised Learning:

The system is trained on **labeled data**, meaning that the correct output (class label) is provided for each input in the training set.

Unsupervised Learning:

The system learns patterns and structures from **unlabeled data,** without explicit instructions on what the output should be.

Key Concepts in Learning and Adaptation

1. Training Phase

During this phase, the pattern recognition system is exposed to a dataset where the correct classifications are known.

Process:

Input data is fed into the system.

The system adjusts its parameters (e.g., weights in a neural network) to minimize the difference between its predictions and the actual labels.

2. Testing Phase

The system is evaluated on a separate dataset that it has not seen during training.

Process:

The trained model is applied to new, unseen data.

The system's performance is measured using accuracy, precision, recall, etc.

3. Adaptation

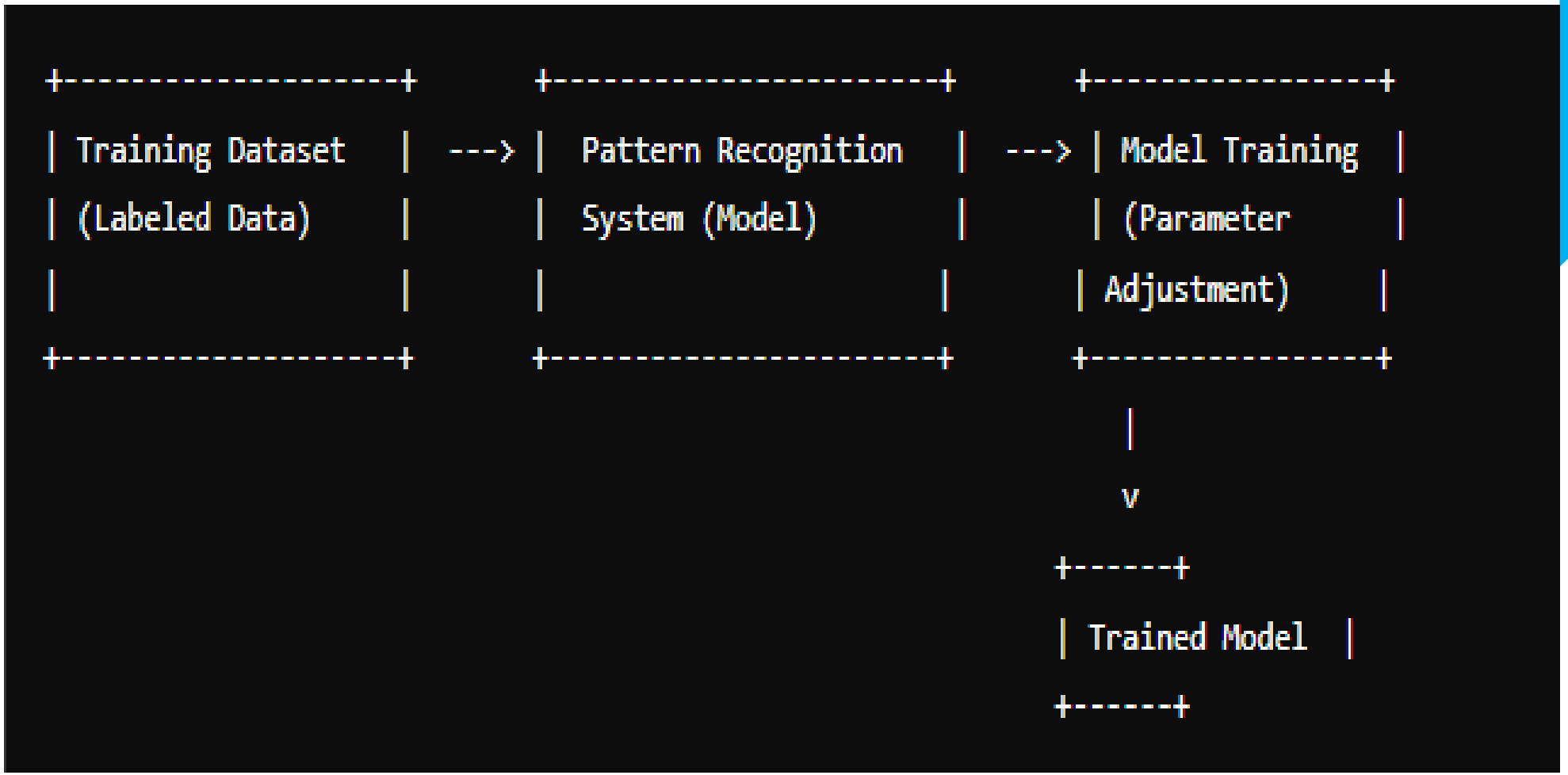
The ability of the system to adjust to new data, especially when the environment or input patterns change over time.

Process:

Incremental Learning: Continuously updating the model as new data arrives.

Online Learning: The model learns one data point at a time, making it adaptable to real-time changes.

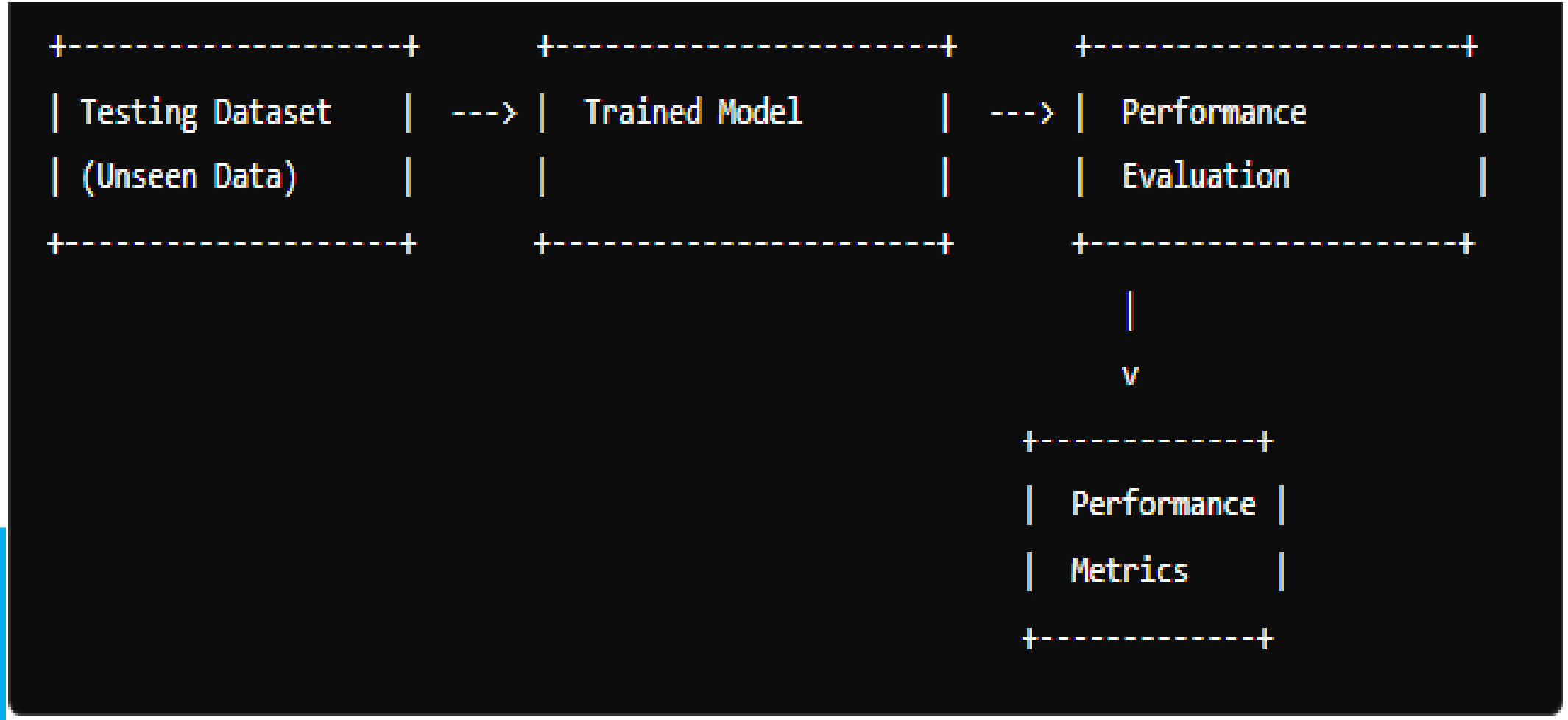
1. Supervised Learning Process



The system is trained on a labeled dataset where the correct outputs are known.

The model's parameters are adjusted during training to minimize errors, resulting in a trained model ready for testing or deployment.

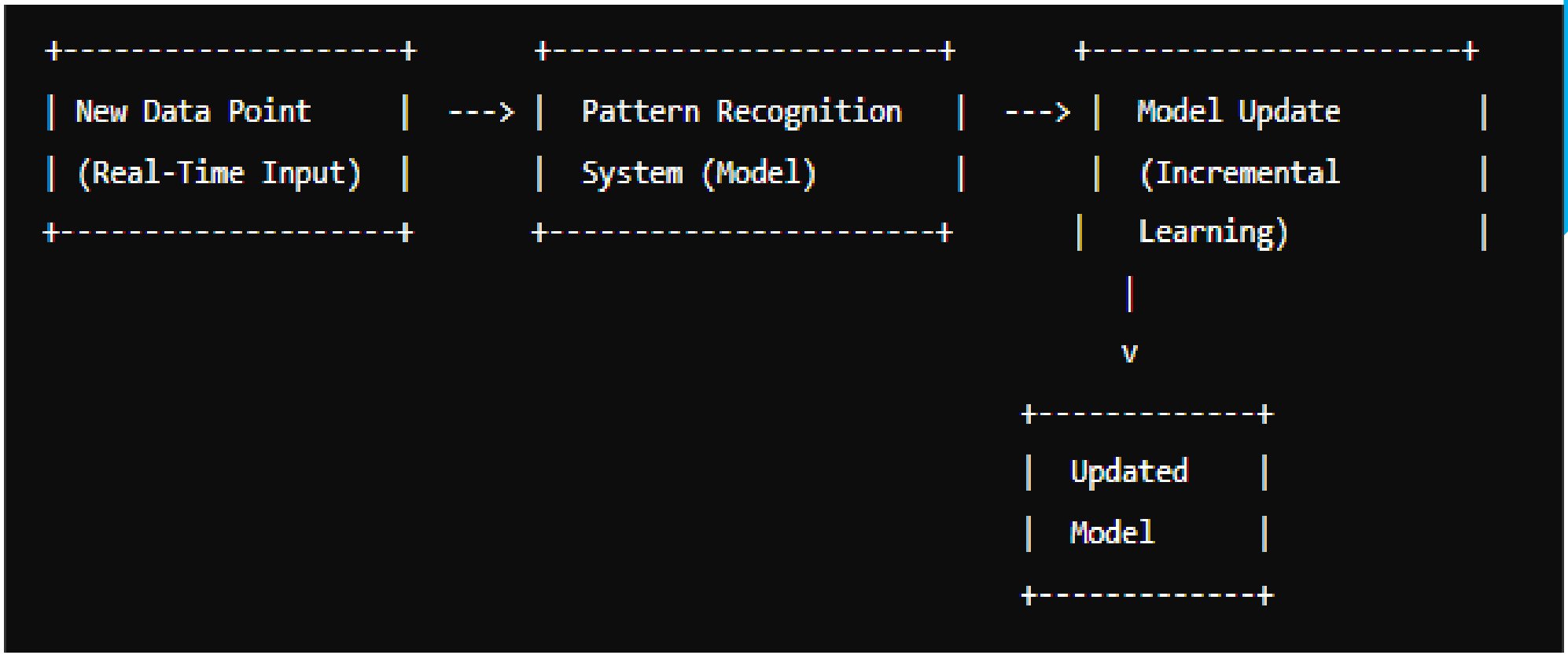
2. Testing and Evaluation Phase



The trained model is applied to new data (testing dataset).

The system's performance is evaluated, helping assess how well it generalizes to unseen data.

3. Adaptation via Incremental Learning



As new data becomes available, the system incrementally updates its model.

This allows the system to adapt to changing patterns and maintain performance over time.

Key Note:

Learning in a pattern recognition system involves training a model on a labeled dataset (supervised learning) or finding patterns in unlabeled data (unsupervised learning).

Adaptation allows the system to adjust to new data, ensuring it remains effective even as input patterns change over time.

Any Query????

Thank you……