SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

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 :Pattern recognition approaches.

Pattern recognition is a field within machine learning and artificial intelligence that focuses on the recognition and classification of patterns and regularities in data.

It involves the identification of patterns or trends within raw data by algorithms that learn from training data.

1. Template Matching Approach:

Template matching involves comparing a predefined pattern (template) to segments of a given input, such as an image or signal, to find the best match.

**Example:** Finding a specific character, like the letter "A," in a scanned document.
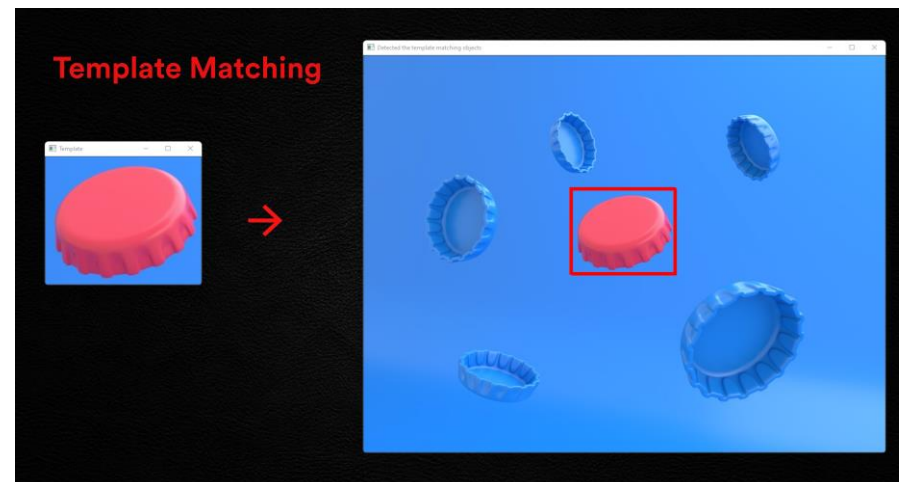
2. Statistical Pattern RecognitionApproach:

This approach uses statistical methods to classify data points into different categories based on their features.

It often involves probability and decision-making based on data distributions.

Example: Classifying data points into two categories, like "red" and "blue," based on their position in a 2D space.

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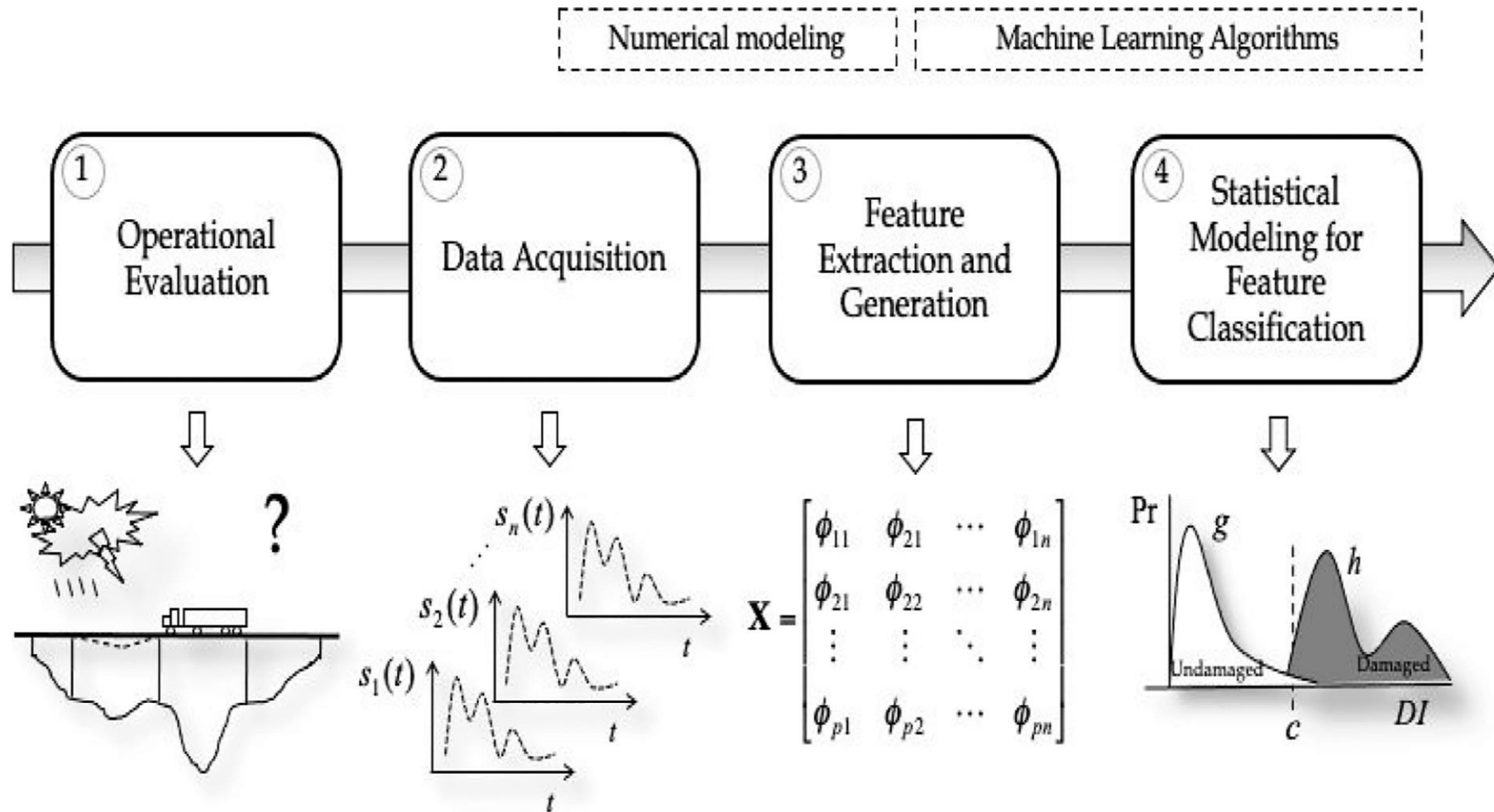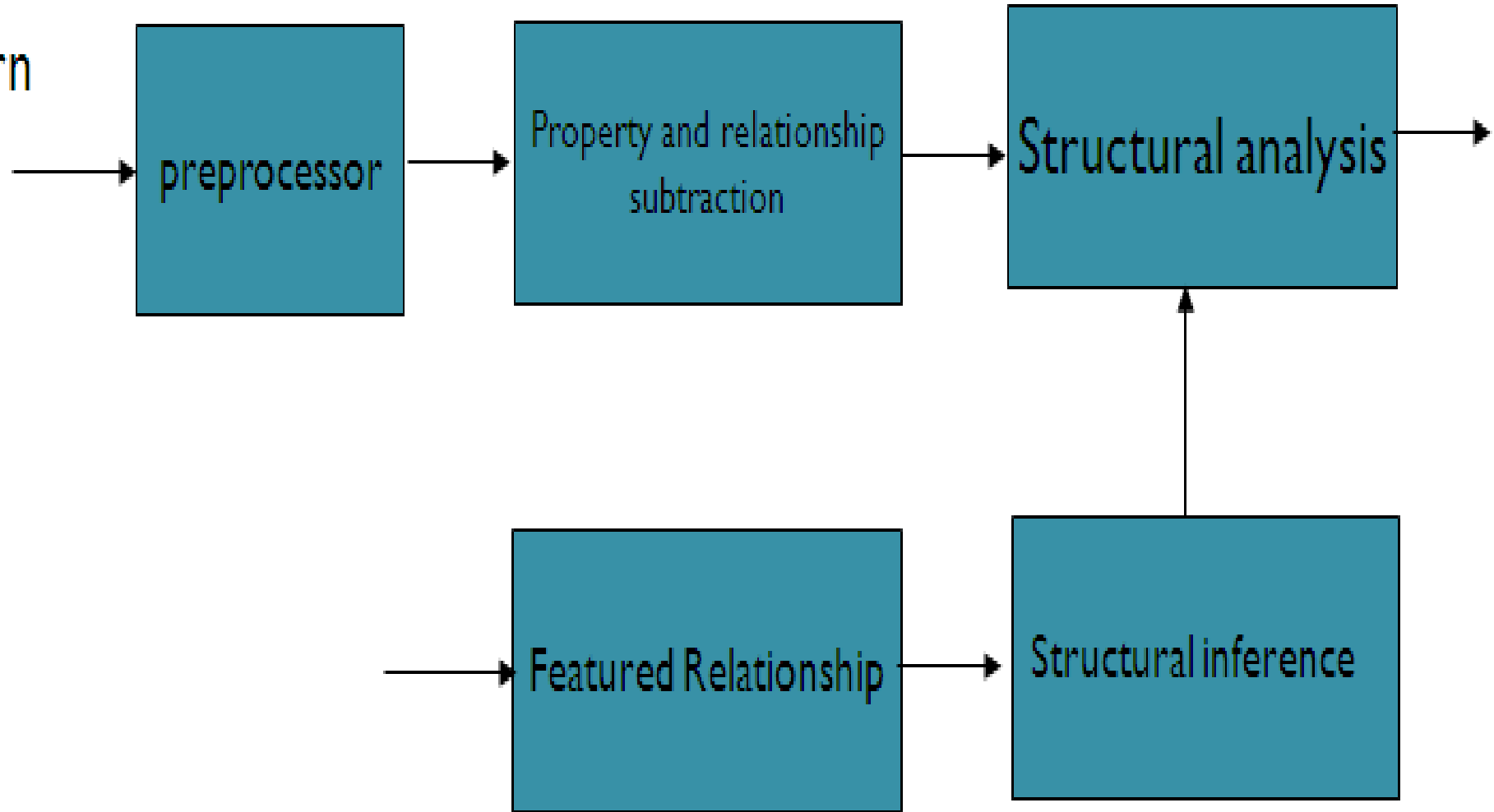
3. Structural Pattern Recognition Approach:

Structural pattern recognition focuses on the relationships between features and their arrangements, often using graph-based methods.

Example: Recognizing a human face by identifying the relative positions of eyes, nose, and mouth.

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4. Neural Network-Based RecognitionApproach

Neural networks use layers of interconnected nodes (neurons) to learn patterns from data.

This approach is especially powerful for complex tasks like image recognition.

Example: Handwriting digit recognition.

Diagram:A neural network diagram with input nodes representing pixels, hidden layers processing the information, and an output layer classifying the digit.

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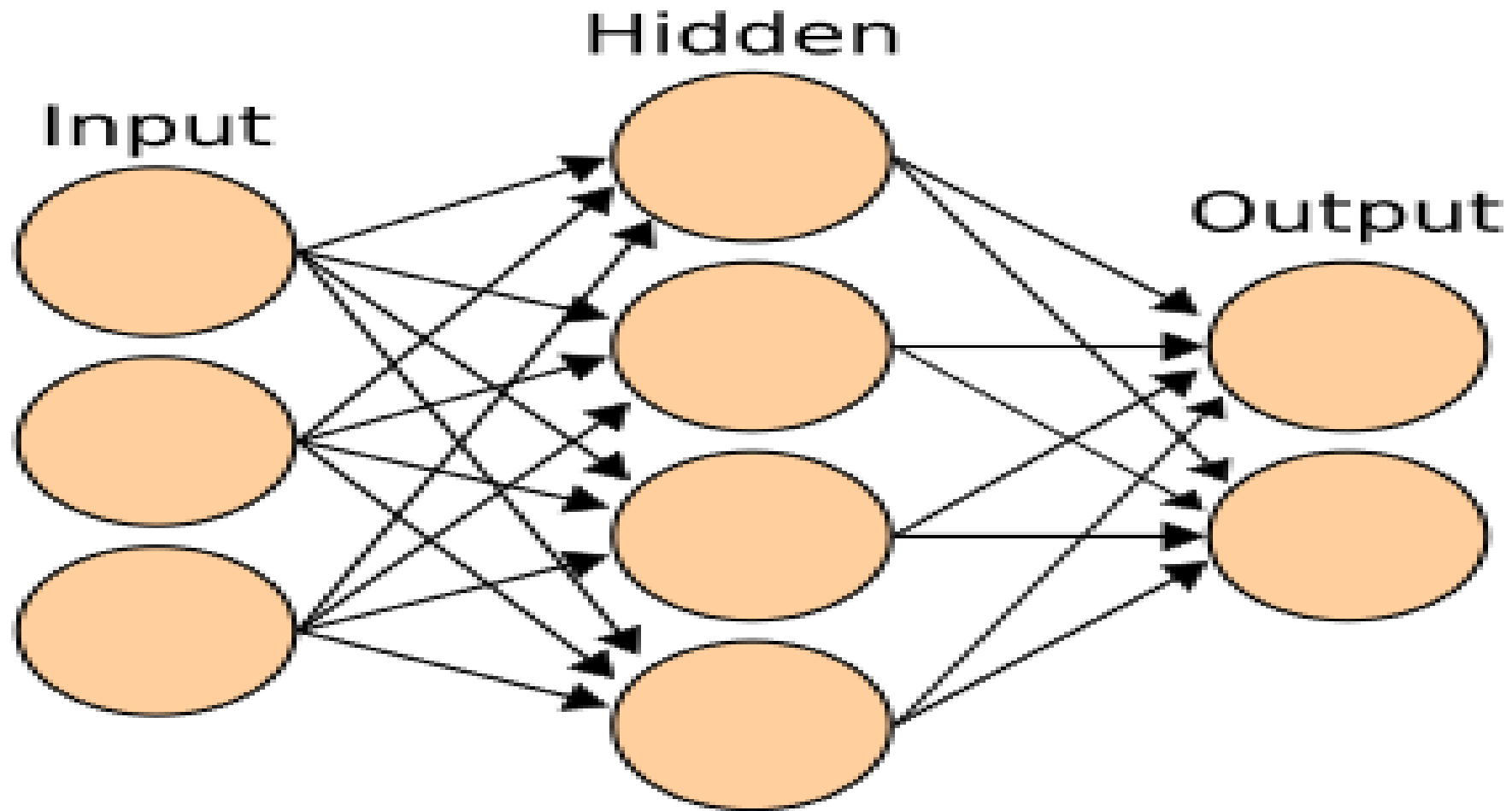
Summary of Approaches:

Template Matching: Simple, good for specific pattern detection.

Statistical: Effective for problems with well-defined classes

Structural: Useful when the relationships between features are crucial.

Neural Networks: Best for complex, non-linear problems.

	Statistical	**Structural**
Foundation	Statistical decision theory	Human perception and cognition
Description	Quantitative features	Morphological primitives
	Fixed number of features	Variable number of primitives
	Ignores feature relationships	Captures primitive relationships
	Semantics from feature position	Semantics from primitive encoding
Classification	Statistical classifiers	Parsing with syntactic grammars

Any Query????

Thank you……

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