Research Article

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Theoritical Review and Apllication of Statistical Pattern Recognition

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ABSTRACT

This paper is presented in the sense of discussion in the pattern recognition community based on the structural differences between statistical pattern recognition and its related disciplines in order to produce present the cultural identify and the core research issues, as far as encyclopedia textbooks are considered pattern recognition can be defined as a discipline to study theories and methods in designing machines that can be recognize patterns in noisy data from the engineering perspective on pattern recognition. It theory has multi-disciplinary roots, as the engineering disciplines aim to bridge the gap between real-world applications and the pure disciplines, such as mathematics, statistics ,physics and regarding the relationship between pattern recognition and artificial intelligence.Tveter has stated that artificial intelligence methods can be regarded as different ways of doing pattern recognition.

Keywords: Representation; Statistical pattern recognition; Theories.

1. INTRODUCTION

Pattern recognition has a lot of methods in developing an application in different fields. It is also commonly used as estimation theories and statistical decision. It has developed by machine learning community, like a decision trees, multi-layer perceptrons and pattern classifiers. Knowledge representation and symbolic processing are used in pattern recognition systems. It is also developing under the artificial intelligence field. Theoritical development have been accepted of pattern recognition community .As our goal is to develop the pattern recognition community is a clear answer. The perspective of other main approaches syntactic, structural, symbolic knowledge based and neural approaches.

2. STATISTICAL PATTERN RECOGNITION

Statistical pattern recognition studies elaborating from a set of examples of objects to description .They include 5 steps. These are sensing, data pre-processing, feature extraction, and classification. The sensors are determined by the initial feature vector representation is defined by expert. Statistical pattern recognition is starts with the classification task. Statistical pattern recognition considered as a direct application. Statistics is feature-vector-based "modeling" of the pattern recognition task. Statistical pattern recognition system problem and the effective application of available classifiers tools. Constructing statistical pattern recognition systems must address.

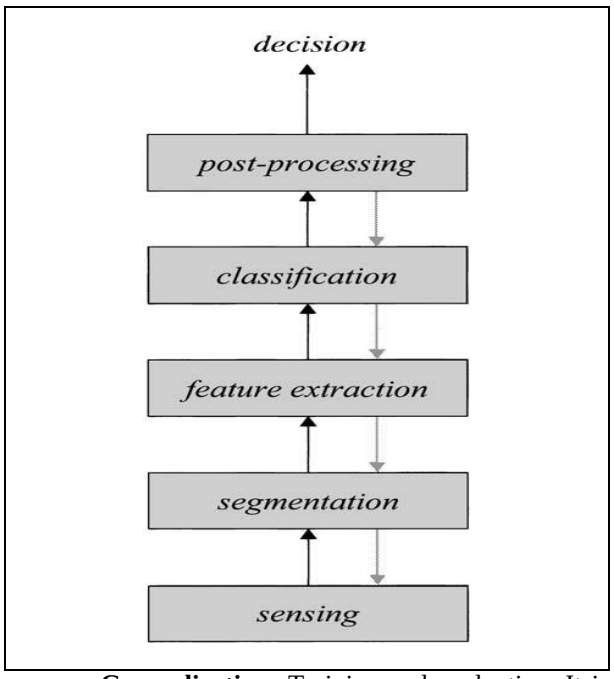
- Designing of the sensors
- Choice of feature selection
- Classifier training using small and unbalanced dataset
- The need for error rejects options
- Exploitation of prior knowledge
- The development of control mechanisms
- Guidelines for choosing the classification tool.

The disciplines of machine learning, statistics, neural network, artificial intelligence are useful processing levels.

Statistical pattern recognition discipline should focus on the issues. It is related to the modelling of real pattern recognition tasks and on all those issues that the limit the effective application of methods developed by other disciplines. It limit of support vector machines related to multi-class tasks. The application of tool like perception analysis to some objects recognition problem:

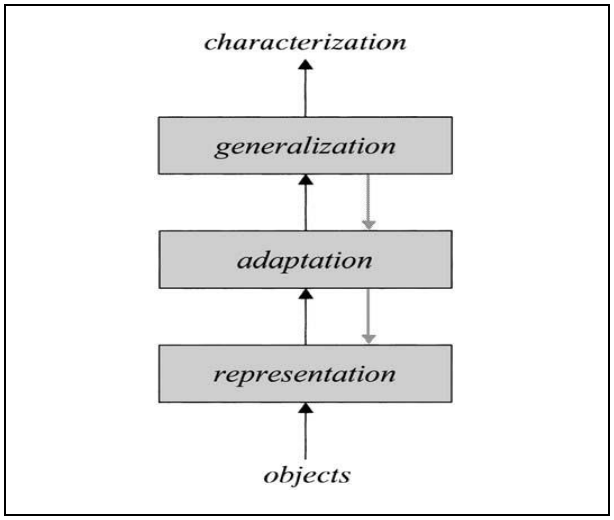
Representation: To represent an object by numbers. It has been using a CCD camera to create a pixel representation, but perhaps also finding a contour description to represent the shape.

Adaptation: It is a process to change the representation such that it is suitable for the desired tool. To finding a small set of features.



Generalization: Training and evaluation .It is perspective for solving the recognition problem at hand.

The pattern recognition system discard rooms for solution that do not include segmentation are not feature based.



The use of other representation is shapes and dissimilarities. To differentiate the pattern recognition area clearly from artificial intelligence where the step of representation is integrated with reasoning.

2.1 Representation

An application have real world object. In order to use tools developed within other disciplines. They have to represent in an appropriate way. In a feature space other representation are possible as well as contours or distances to a representation set. Domain knowledge should be used here. The search for capable representation requires knowledge of the application as well as of the set of tools one to use. An improvement of the representation over a set of examples and for a given tool set may be included in the statistical pattern recognition task. The improvement of representation are feature selection, prototype, select feature extraction, based on very general criteria.

2.2 Adaptation

The representation is often not directly convenient for the tools are desired. The tools that have to be trained. The most common mismatch is between the size of the set of examples and the complexity of the representation. The example of adaptation is non-linear of feature, such that a classification tool can be used that makes certain thoughts on the distribution of data. In this case this adaptation should really be focused on the solutions tools that are finally used.

2.3 Generalization

The tools itself has to be applied. In an example a classifier has to be trained. This has to be followed by an evaluation from which previous steps can be judged, or by which a comparisons between different tools can be made. Classifiers like a decision trees and neural network and many density estimation used in the decision rule are entirely developed outside the pattern recognition area. The nearest neighbor rule on the contrary and many of its derivation have received much attention with in this area, as they can often directly be used on the representation, without much need for adaptation.

2.4 System Design

Computational aspects may be important: speed, memory demands, and possibilities for user interaction. The integration of sensors and a reduction in their number. Generally speaking methods for a obtaining a satisfactory trade-off between recognition accuracy and required computation resources should be investigated.

2.5 Application Issues

The pattern recognition applications are related to two-dimensional signals. To the historical reasons in the pattern recognition field are one-dimensional problems are speech and time-signal processing .The complete pattern recognition area is closely related to sensors and real-world objects. Problems like sensor noise, outliers, missing data and object variability. In many applications user interaction is allowed or demanded. It may be important to be able to explain the outcome of the total system in terms of the problem.

3. THE RESEARCH ISSUES FOR STATISTICAL PATTERN RECOGNITION

Give examples of practical problems;

Representation: The objects can be represented features, point sets, characteristic curves, similarities and spatial information is used.

Adaptation: Artificial data generation, semi-parametric, feature reduction adaptive pattern recognition tools, practical trade-offs between representation complexity and classifier complexity.

Generalization: Classifier training using very small and unbalanced data sets with ambiguous, missing, or wrong training data, need of error rejects options taking into account the application requirements, systematic criteria and guidelines for choosing the classification tool.

System design: Development of control mechanism for handling feedback among processing levels, special purpose hardware and software tradeoff between recognition accuracy and computational resources.

Application issues: Design of sensing and sensors modalities tailored to application requirements, analysis by synthesis, and exploitation of prior knowledge modelling the pattern generation processes.

4. OUTLOOK

In this paper, pointed out that statistical pattern recognition involves a number of issues that are not addressed by other research communities. Theories developed by other communities, in the context of real-world applications. Theories and methods that bridge the gap between real-world applications and the pure disciplines. Pattern recognition researchers to use the engineering paradigm in their work, because their final goal is the design and construction of pattern recognition machines.

5. CONCLUSION

Pattern recognition related to describing the general principles underlying the engineering tools between object, observation and generalization. Pattern recognition is the one with strongest connection with the physical world. Research shift from the pure generalization issues to developing convenient representation and modifications, adaptation to methods developed in areas of machine learning and statistics.

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CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

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