Computer-Oriented Methods in Pattern Recognition

AN INTENSIVE SHORT COURSE

July 12-15
(9:00 a.m. — 4:00 p.m.)
Los Angeles, California

Faculty: Dr. William S. Meisel, Dr. David C. Collins (Technology Service Corporation)
Dr. Richard E. Bellman, Dr. Harry C. Andrews (University of Southern California)

Summary:

Patterns can be sensory or abstract. Sensory patterns are those recognized directly by the human senses, such as visual patterns; abstract patterns are in data, a type of pattern that humans are not particularly adapt at recognizing. With the decreasing cost of computational power, researchers in pattern recognition are increasingly concentrating on computationally oriented approaches to both classes of patterns. These methods have the goal of extracting the most information from the data available.
This course should leave the attendee with the ability to solve practical sensory or abstract pattern recognition problems using computationally oriented methods. Heavy emphasis has been placed on continuity of presentation and usefulness of suggested methods.

To make the best use of the attendee's time, extensive use of visual displays and an avoidance of long theoretical derivations in lecture are combined with a complete set of printed material and references. The principal lecturers will conduct an optional evening question and discussion session.

Course Outline:

I. Basic Concepts and Methods — Dr. W. Meisel
Problem statement
A statistical formulation
Concepts in feature extraction
Simple pattern classification algorithms
Direct vs. indirect methods
Parametric methods

II. Linear Discriminant Functions — Dr. D. Collins
The gradient technique
Linear programming
Nonlinear programming

III. Nonlinear Discriminant Functions — Dr. W. Meisel
Approximation to probability densities
Potential function methods
Piecewise-linear discriminants
Cluster-seeking methods

IV. Numerical Tranforms for Pattern Recognition and Image Processing — Dr. H. Andrews
One- and two-dimensional transforms
Image pre-processing

V. Advanced Methods in Feature Selection — Dr. W. Meisel
Direct vs. indirect methods
Measures of quality
Preservation of structure
Linear and nonlinear transformations
Feature ranking

VI. Dynamic Programming in Pattern Recognition — Drs. R. Bellman & D. Collins
The principle of optimality
Conceptual considerations
Feature selection with unequal cost of features

VII. Application Examples — Dr. D. Collins & W. Meisel
Biomedical data analysis
Waveform analysis
Radar/Sonar target recognition
Character recognition
Characterization of urban/transportation systems

Course Notes: Computer-Oriented Approaches to Pattern Recognition, W. S. Meisel, (Academic Press, in press), about 400 pages of integrated state-of-the-art material.

TECHNOLOGY SERVICE CORPORATION

☐ PLEASE REGISTER ME in the "COMPUTER-ORIENTED METHODS IN PATTERN RECOGNITION" course at the Airport Marina Hotel, Los Angeles, California, July 12-15. The fee for this course is $325.00.

☐ PLEASE INFORM ME OF FUTURE COURSES IN:

- ☐ Interactive Systems
- ☐ Advanced Data Analysis
- ☐ Large-Scale/Complex Systems
- ☐ Biomedical Applications
- ☐ Radar Systems
- ☐ Modeling & Simulation
- ☐ Communications
- ☐ Pattern Recognition
- ☐ Phased Arrays
- ☐ Digital Techniques
- ☐ Sonar
- ☐ Control Theory & Optimization

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