

# Lecture Notes in Computer Science

Edited by G. Goos and J. Hartmanis

313

B. Bouchon L. Saitta R.R. Yager (Eds.)

## Uncertainty and Intelligent Systems

2nd International Conference on Information Processing  
and Management of Uncertainty in Knowledge-Based Systems  
IPMU '88

Urbino, Italy, July 1988

Proceedings



Springer-Verlag



93 95 00 22



Inflammatory Protein Variations: Medical Knowledge Representation  
and Approximate Reasoning  
R. Bartolin, V. Bonniol, E. Sanchez

306

Sequential Bayesian Test from Fuzzy Experimental Information  
M.R. Casals, A. Salas

314

An Intuitive Representation of Imperfect Information  
E. Charpentier, J.P. Daurès, P. Dujols, F. Grémy

322

A Method for Determination of Evidential Weighting Factors in a Medical  
Expert System  
D.L. Hudson, M.E. Cohen

330

A Study of Arab Computers Users: A Special Case of a General HCI  
Methodology  
M. Kallala, W. Bellin

338

Knowledge-Based Systems Application to Reduce Risk in Software  
Requirements  
J.D. Palmer, M. Myers

351

Prioritized, Non-Pointwise, Nonmonotonic Intersection and Union for  
Commonsense Reasoning  
R.R. Yager

359

#### LATE ARRIVALS

Multi-Criteria Decision Making in Terms of Probabilistic Sets  
E. Czogala

366

Putting into Practice Moreau's Extended Generalized Modus Ponens  
A.M. Petieau, A. Moreau, D. Willaëys

373

Evidence Aggregation in Expert Judgments  
S.F. Garribba, A. Servida

385

#### INVITED PAPER

Conditioning in Possibility and Evidence Theories - A Logical Viewpoint  
D. Dubois, H. Prade

401



# INFLAMMATORY PROTEIN VARIATIONS: MEDICAL KNOWLEDGE REPRESENTATION AND APPROXIMATE REASONING

Robert BARTOLIN,

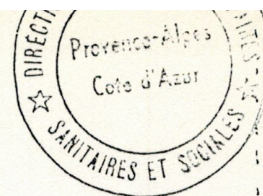
Service de Médecine Interne, Hôpital de l'Hôtel-Dieu,  
6 place Daviel, 13 224 Marseille cedex 1, France

Vincent BONNIOL,

Institut de Recherche en Thérapeutique, Hôpital de l'Hôtel-Dieu,  
6 place Daviel, 13 224 Marseille cedex 1, France

Elie SANCHEZ,

Service Universitaire de Biomathématiques, Faculté de Médecine,  
27 Bd Jean Moulin, 13 385 Marseille cedex 5, France



93 95 00 22

## ABSTRACT

It is proposed a medical knowledge representation of inflammatory protein variations involving complex relationships, frequently encountered in Internal Medicine. A linguistic model has been represented by a fuzzy set pattern expressing relative variations of serum proteins levels. Weights have been introduced into this pattern to translate relative importance among proteins. Three indexes or measures (possibility, necessity and truth-possibility) have been used for pattern matching purposes. Finally, a separating power yielding non fuzzy partitions has allowed to assign the corresponding diagnoses to patients (over 160 cases).

Keywords : Inflammatory proteins, Linguistic model, Medical knowledge representation, Approximate reasoning, Weights of importance, Fuzzy matching, Separating power.

## I - INTRODUCTION

In internal medicine, many diseases are associated with an inflammatory syndrome. Given an inflammatory syndrome (I.S.) observed on a patient, it is difficult to assign a right diagnosis, based on specific protein variations. The main reason is that some I.S. are typical but, unfortunately most of the I.S. are non typical. In a typical I.S., proteins are all increased in similar proportions and in the same way, as it is the case for severe Infections and Septicemias. In a non typical I.S., like Vasculitis and Collagen Diseases, protein variations are dissociated, for example two or three protein levels are increased while some others are normal or decreased. Moreover for a given I.S., proteins are not all equally important, so that relative weighting of proteins has to be adjusted.