

Osterreichische Studiengesellschaft für Kybernetik

Schottengasse 3
A-1010 Wien 1
Tel. 63 61 12
Austria

Bank Account:

CA-BV, Acc.No.26-34400
A-1010 Vienna

Re.: 5th European Meeting on Cybernetics
and Systems Research 1980

Dear Colleague,

thank you for returning the postcard attached to the Preliminary Programme.

- X We shall forward further details as they become available, including the Final Programme (due to be mailed early in 1980).
- O We appreciate your intention to submit a paper to be presented at the meeting and look forward to receiving an Abstract, latest by December 1st, 1979. This must not exceed four A4 pages and we recommend earliest dispatch to facilitate refereeing procedures.
- X We have received the Extended Abstract of your paper and we passed it to the referees. Information regarding acceptance will be mailed to you not later than two months after our receipt of your Abstract.
- O We have received your Extended Abstract, which, unfortunately, exceeds four A4 pages. We regret, therefore, to have to return it to you in the enclosure and we encourage you to submit a shortened version not exceeding this limit.
- O We acknowledge receipt of your registration fee as participant/contributor.
- O We regret that you will not be able to come to the meeting. Particulars of the Proceedings of the EMCSR 80 will be sent to you as soon as they are available. Meanwhile, we should like to draw your attention to the details of the Volumes of earlier meetings (Vols. I through V of Progress in Cybernetics and Systems Research) to be found in the Preliminary Programme already sent to you.
- O We thank you for your interest in the Journal of Cybernetics. Having exhausted their stocks of the current issue, the publishers will forward a complimentary copy of the next issue as soon as they receive it from the printers.

Yours sincerely,

Robert Trappl
Chairman EMCSR 1980

P.S.: Please add Symposium N to your list: "Computer Assisted Modelling Methodology", to be chaired by Professor Bernard P. Zeigler.

Osterreichische Studiengesellschaft für Kybernetik

Schottengasse 3
A-1010 Wien 1 AUSTRIA
Tel. 63 61 12

Wien, am May 1980

Re.: Fifth European Meeting on Cybernetics and Systems Research

Dear Colleague,

the Fifth European Meeting on Cybernetics and Systems Research saw more than 400 participants from 36 European and non-European countries.

Since you informed us some time ago that you were interested in receiving particulars about the written material of the Meeting, here it is:

1. Abstracts:

We have published all (exactly!) 300 abstracts which were accepted by the Programme Committee, in one volume of more than 800 pages.

You can receive it at Austrian Schillings 200,-- (appr. US\$ 16,--) including postage. Please use the enclosed order form.

2. Proceedings:

The proceedings will be published in 4 volumes as "Progress in Cybernetics and Systems Research, Vol. 8, 9, 10, and 11". The enclosed list shows the allocation of the symposia to the different volumes.

While the normal sales price of each volume will be US\$ 40,-- to US\$ 50,--, the publisher has, on request of the Society, enabled us to offer each volume at US\$ 16,-- including postage, if ordered prepaid at the Meeting.

Orders which receive us before June 30, 1980, can be processed at these "conference conditions". The publisher guarantees that the volumes will be mailed in 1980.

All orders have to be sent to the Society only!

I look forward to hearing from you.

Very sincerely,



Robert Trappl
Chairman, EMCSR 1980

Encl.: List of proceedings + order form.

Progress in Cybernetics and Systems Research
Vol 10, 11 Hemisphere Publishing Corporation, Washington, D.C.

Osterreichische Studiengesellschaft für Kybernetik

Schottengasse 3
A-1010 Wien 1
Tel. 63 61 12

Wien, am March 6, 1980

Re.: Fifth European Meeting on Cybernetics
and Systems Research.

Dear Colleague,

I have the pleasure of forwarding to you in the enclosure the Final Programme of the Meeting. It is the first time we can provide it already one month before the Meeting. This was made possible by printing directly from a computer-printout.

298 abstracts, contributed by 389 scientists from 42 European and non-European countries, have been accepted by the Programme Committee.

We have tried to assign the papers to those symposia which were selected by the contributors, however, owing to several reasons this was not always possible. Please use the index at the end of the Programme to find the time and location of your presentation.

You should have meanwhile received the special forms ("mats") which were provided by the publisher for typing your manuscript. In case you have not yet received them, please contact the publisher:

Hemisphere Publishing Corporation
Attn. Ms. Reilly
1025 Vermont Avenue, NW
Washington, D.C. 20005
USA

Please send your typed paper registered to the Society (not to the publisher!) or hand it over at the Registration Desk.

I hope I have the pleasure of welcoming you either at the Informal Reception in the Society on Monday, April 7, from 5 p.m. onwards or at the Official Opening in the Great Festival Hall of the University of Vienna on Tuesday, April 8, at 10 a.m.

Looking forward to meeting you in Vienna,

Very sincerely yours,



Robert Trappl
Chairman, EMCSR 1980

Encl.: 1

Österreichische Studiengesellschaft für Kybernetik

Schottengasse 3
A-1010 Wien 1
Tel. 63 61 12

Wien, am November 28, 1980

Professor
A. Gisolfi
Istituto di Scienze dell'Informazione
Università degli Studi di Salerno
I-84100 Salerno
Italia

Dear Professor Gisolfi,

today I received the following question from the Publisher
of the Proceedings of the 5th European Meeting on Cybernetics
and Systems Research:

See the attached Xerox of question
regarding the art for Fig. A in
paper by Gisolfi et al. in vol. 9.
Two copies of the art were provided,
and they don't seem to be really
the same. Does it matter which
one we use?

Please reply immediately. *Many thanks!*

Very sincerely,



Univ.-Prof.Dr.Robert Trappl

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FIFTH EUROPEAN MEETING ON CYBERNETICS AND SYSTEMS RESEARCH 1980

A D V A N C E I N F O R M A T I O N

Vienna, November 14, 1979

Dear Colleague,

just a few facts to keep you informed about our forthcoming Fifth European Meeting on Cybernetics and Systems Research:

Papers: To date 182 scientists and practitioners from 33 European and non-European countries have registered and sent us their abstract or informed us about the title of their presentation.

Symposia: Upon proposals from contributors, three Symposia have been added:

- N Computer Assisted Modelling Methodology
(Chairman: Prof. B.P.Zeigler)
- O Systems Research on Science and Technology
(Chairman: Prof. W.W.Gasparski)
- P Cybernetics and Philosophy
(Chairman: Prof. R.Wohlgenannt)

Plenary Lecture: The Opening Plenary Lecture will be given by Professor Michael A. Arbib, University of Amhearst, Mass., on "Computers and the Cybernetic Society" in the Great Festival Hall of the University of Vienna, Austria.

Receptions: The Society will be happy to welcome you to an informal reception in its rooms at Schottengasse 3, Vienna 1, on Monday, April 7, 1980 from 3 p.m. onwards.

The Mayor of the City of Vienna invites all participants and contributors to a Reception in the Town Hall on Thursday, April 10, 1980 at 8 p.m.

Abstracts: Please kindly facilitate organizing this Meeting by mailing your abstract by December 1, 1979.

Fees: Reduced registration fee prior to January 31, 1980 is Austrian Shillings 850,-- for contributors and AS 1700,-- for participants (after this date: AS 950,-- for contributors and AS 1900,-- for participants).

Please transmit your fees directly to our Account 36-24400/00 at the Creditanstalt-Bankverein, A-1010 Vienna, or send us a cheque, payable to the Society (not to a special person!).

If you know of colleagues or institutions who might be interested in this Meeting, would you kindly let us know? Many thanks!

Looking forward to meeting you in Vienna,
yours sincerely,

Organizing Committee EMCSR 1980


Robert Trappl

PROGRESS IN CYBERNETICS AND SYSTEMS RESEARCH

Volume VI

Cybernetics in Biology and Medicine
Systems Analysis
Systems Engineering Methodology
Mathematical Systems Theory

Edited by

FRANZ R. PICHLER

Professor of Systems Theory
University of Linz, Austria

and

ROBERT TRAPPL

Professor of Medical Cybernetics
University of Vienna Medical School, Austria

WITH INTRODUCTION BY

R. THOM



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A Method for Classifying and Filtering Textures

A. GISOLFI and S. VITULANO
 Istituto di Scienze dell'Informazione
 Università degli Studi di Salerno

M. MŁODKOWSKI
 Institut of Biocybernetics and Biomedical Engineering
 Polish Academy of Sciences

tract.

In the paper some results of investigation of a one-dimensional transform, C-Matrix, and filtering of textures are presented.

The described approach to texture analysis is based on C-calculus and theorem on reconstruction of picture. The C-Matrix is nothing but a transform of signals from which we may extract some features of the examined signal.

For instance, from the C-Matrix of textures we may extract the dimension and shape of the "shape" and its spatial frequency in the visual field.

C-MATRIX

Let L be a mono or two-dimensional discrete signal and D be its range. Let's make a partition of D by a subset S whose dimensions are less or equal than D 's. For each element of this partition let's compute the absolute minimum and maximum that the signal exhibits within the element itself.

Let S be ordered set of the element of a partition, thus S is a string of quadruples whose first two elements single out the element of the partition over the signal range, and the second element indicates the absolute minimum and maximum of the signal within the element itself. In other words, S is nothing but a possible description of our signal and this one is as rougher as larger are the dimensions of the element of partition.

We'll call the S set "Composit-Set" and on this subject we refer the reader to our earlier works, for a more detailed description. (References).

Let C be a matrix in which the rows indicate the dimensions of the set related to a partition and the columns of which indicate the "dynamics" of the signal.

Let's define dynamics of the signal the difference between the absolute maximum and minimum at the signal exhibits within a certain subset.

Each element of this matrix indicates the frequency, for a given dimension of the partition (width), with which the signal exhibited a certain

dynamics, order of the column.

The C matrix is nothing but a transform of signals from which we may extract some features of the examined signal.

In the successive sections we'll illustrate the rules for extracting the features of a signal from C-Matrix.

2. DEFINITIONS.

Let's consider, with the objective of simplicity, a monodimensional signal (fig.1) and introduce a 2n normal Oxy space in which we report the signal range along the x-axis, the dynamics of signal itself along the y-axis.

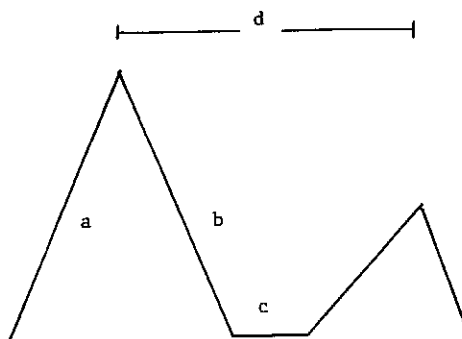


Fig.1

1) Let's define maximum shape zone of the signal (the front of increment (a)) the part of the signal contained between a relative or absolute minimum and maximum which are contiguous and for which we have

$$\frac{\Delta y}{\Delta x} = \max$$

where Δy = maximum-minimum and Δx = distance between maximum and minimum.

2) Let's define the second front of increment of the signal (b) the part of the signal for which

$$\frac{\Delta y}{\Delta x} \neq \max \text{ and } \neq 0$$

3) Let's define eventual "plateaux" of the signal (c) the part of the signal for which

$$\Delta y = 0 \text{ for } \Delta x \neq 0$$

4) Let's define the "period" of the signal (d) the distance between two absolute maximi.

Let's define "a" (fig. 1) the front of increment and "b" the front of decrement of the signal.

Let's define "piece" of the signal the union between the front of increment and the of decrement.

We'll call symmetric piece that one for which

$$a = b$$

3. FEATURE EXTRACTION FROM THE C-MATRIX.

The part "a" of the signal is represented in the C-Matrix, by a set of points, say S_1 , that we determine by the following rules: for each row of the C-Matrix we consider the element

$c_{h,k} \in C$ so that $c_{h,k} > 0$ and $K = \max$.

Each element $s_i \in S_1 = c_{h,k}$ represents the smallest subset that is fit for seeing the signal variation corresponding to the k-rh column.

The feature "b" of the signal is represented in the C-Matrix by a set of points that we'll call S_2 ; the element $s_i \in S_2$ are extracted from C by the following rule: for each row of the C-Matrix we consider the element $c_{h,k} \in C$ such that $c_{h,k} > 0$ and $k = \max$ and $s_i \notin S_1$.

The feature "c" of the signal is represented in the C-Matrix by a set of points that we'll call P; the elements $p_i \in P$ are extracted from C by the following rule: let $p_i = c_{h,k} \in C$; let's consider in the first column, to which a zero dynamics corresponds, the elements $c_{h,k} > 0$.

The last element of the ordered set

P provides us the dimension of the constant zone of the signal.

The feature "d" of the signal is represented in the C-Matrix, by a set of points that we'll call D_1 ; the elements $d_i \in D_1$ are extracted from C^1 by the rule: let $d_i = c_{h,k} \in C$, let's consider for each column k of C the elements $c_{h,k} : c_{h,k} > 0$ and $h = \max$.

Other features of the signal can be easily extracted from the C-Matrix and in the following we'll give some examples of it.

4. CLASSIFICATION OF SIGNALS AND INVERSE TRANSFORM.

1) The C-Matrix of a symmetric piece presents the following features:
a) it exists only one front of increment for each $s_i \in S_1$ we have $\forall i$
 $s_i = c_{h,k} \in C$ $s_{i+1} = c_{h+y, k+\theta} \in C$ (y and θ constant), the difference of cardinality $S_i - S_{i+1} = \text{constant}$.

b) the elements $d_i \in D_1$ have the same cardinality and if $d_i = c_{h,k} \in C$ $d_{i+1} = c_{h+y, k+\eta} \in C \forall i$ where $y = n2$ with n integer different from zero, and η integer.

c) each element $d_i \in D_1$ has the cardinality of the least element of S_1 and indicates how many times the front of increment "a" is contained in the signal range.

d) all the matrix elements that don't belong to S_1 , D_1 or to the least non zero column of the C-Matrix have the same cardinality.

Example 1.

