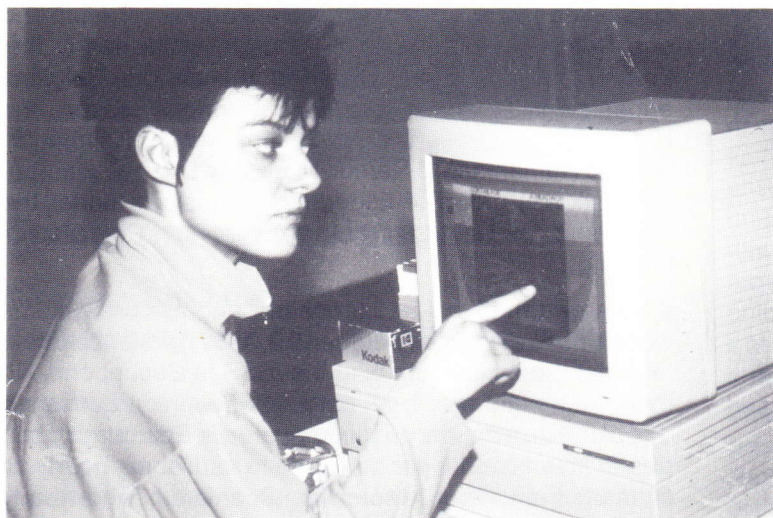




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INTERACTIVE ART — THE ARTIST RECEIVES AN IMAGE ON THE COMPUTER SCREEN, ALTERS IT AND SENDS IT BACK.

Foto: Sokoloff

ART AS INTERACTION

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Art does not reside in the object alone, nor is meaning fixed or stable within the physical limits of the artist's work. Art is all process, all system.

Art—like other forms of communication—arises out of interaction.

"According to the metaphor of the tube, communication is something generated at a certain point. It is carried by a conduit (or tube) and is delivered to the receiver at the other end. Hence there is **something** that is communicated, and what is communicated is an integral part of that which travels in the tube. Thus, we speak of the 'information' contained in a picture, an object, or, more evidently, the printed word. It is evident, however, even in daily life, that such is not the case with communication: each person says what he says or hears what he hears according to his own structural determination . . . communication depends not on what is transmitted, but on what happens to the person who receives it. And this is a very different matter from 'transmitting information'. (H.R. Maturana & F. J. Varela, *The Tree of Knowledge: the Biological Roots of Human Understanding*, 1987).

In both cases we see that meaning is created out of interaction between people rather than being "something" which is sent from one to another. If there is an author of this "meaning" then it may be the system of interaction itself, in all its particulars, which should be described as the author, or we might want to refer to a "dispersed authorship" covering all those involved in negotiating for meaning in a given context. Where the context includes artificial memory in a telematic system, the potential for the creation of meaning is greatly enlarged. And when such systems are activated globally, in an art context, we can expect to see quite richly layered fields of "meaning" being created.

The Renaissance and the modern vision of art

If, in the past, we have thought that a work of art is an object, or that the artwork "carries" a definitive meaning "created" by the artist and received by the viewer, this can perhaps be

understood in the light of our Renaissance heritage. The ordering of space in Renaissance painting, with its absolute rules of representation and of viewing, a space subject to the authority of the vanishing point, which also positioned the viewer in relation to the "world" and established a control of a reality consisting of separate and discrete parts (everything in its place and a place for everything), can be seen as the perfect metaphor for the ordering of parts in the societies to which it gave expression. Renaissance space is authorised as "real" space by many of those societies in which information flows one-way, from the apex of the social pyramid to the base, where it informs the thinking, the orthodoxies, the rules of conduct of a culture. This one-way despatch fashions consciousness and enforces a dominant scientific paradigm just as the vanishing point and the rules of representation determine, within the pyramid of space based at the picture plane, a coherent view of a world presented as "reality". Under these circumstances, the art object could well be understood as embodying not only unambiguous meaning and beauty but also absolute truth. This form of representation and this status of the object as art continues today, of course, in some quarters, and has to some extent been automated by the photographic process. Its persistence is well understood, given the seductive nature of the apparent certainty and coherence it claims to depict.

But the art of our time is one of system, process, behaviour, interaction. As artists, we deal in uncertainty and ambiguity, discontinuity, flux and flow. Our values are relativistic, our culture is pluralistic, and our images and forms are evanescent. If it is processes of interaction between human beings which create meaning and, consequently, cultures, then those systems and processes which facilitate and

amplify interaction are the ones that we shall employ for more richly differentiated cultures and meanings to emerge. This is precisely the potential of telematic systems. Rather than limiting the individual to a narrow, parochial level of exchange, computer-mediated cable and satellite links, spanning the whole planet, open up a whole world community, in all its diversity, within which we can interact. Telematic networks are ubiquitous and can be accessed from virtually any location — the home, public institutions, libraries, hospitals, prisons, bars, beaches, mountain tops, as well as studios, museums, galleries, academies and colleges. Anywhere, in fact, that is reached by telephone, including mobile telephones in cars, trains, ships and planes. The primary effect of creative interaction within such networks is to render obsolete the distinction in absolute terms between the artist and the viewer as producer and consumer respectively. The new composite role becomes that simply of **participant** in a system creating meaning seen as art. This contrasts forcibly with the Renaissance paradigm of the artist standing apart from the world and depicting it, and the observer standing outside of the artwork and receiving this depiction. It was a paradigm which also placed the scientist outside the world looking in, and led to all kinds of alienation and separateness in society.

The implications

Our cultural participation in intelligent telematic networks has long-term implications which we can scarcely imagine. The symbiosis of computers and human beings, and the integration of natural and artificial intelligence, will be realised in forms and behaviours the understanding of which is beyond our present conceptual horizon.



Charles François

OUR UNKNOWN BROTHERS

Charles Francois

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One of the strangest features of the cybernetics-systemics movement is its nearly total lack of coordination. Recently I took part in the 33rd Annual Meeting of the ISSS in Edinburgh, and in the 12th Congress of Cybernetics in Namur. It completely dumbfounded me to discover that, notwithstanding the closeness of both meetings in time and space, I was the only person participating in both of them.

Moreover, it was strange to note a neat cleavage along geographical lines. Numerous Americans were in Edinburgh, but only twelve in Namur, none of whom were connected with the ISSS. There were only two French and one Dutch participants in Edinburgh, while nearly fifty French, more than ten Dutch and at least forty Belgians appeared in Namur. For some mysterious reason, the Hungarians, Swedes and Australians went to Edinburgh, and the Rumanians to Namur. Moreover, that peculiar (but international) group of Esperanto enthusiasts under the leadership of Helmar Frank appears at every Namur Meeting.

If we now turn to the 1st European Congress on Systems Science in Lausanne (October 3-6, 1989), we once again find that the connection with the ISSS is a scant one. No more than eight members of the ISSS were in Lausanne and of these only George Klir appeared in Edinburgh. Only about fifteen Namur people came to Lausanne, nearly all of them Frenchmen. Moreover, Spaniards, who nearly ignored Edinburgh and Namur, were more numerous in Lausanne.

In all three meetings it is strange to note the near invisibility of the Austrians, who have a very lively systemics-cybernetics movement, and of the Russians, perestroika notwithstanding.

When reading the programmes of the meetings, one remains, however, struck by their close common approaches on many subjects. One gathers the strange and disturbing feeling of different groups of people groping in the dark, isolated from each other, but searching for a common understanding.

This is strange, because all of them obviously have the same goals: understanding complexity, finding a common transdisciplinary language, seeking good epistemological foundations, looking for tools for practical action. None of these groups seems to suspect the existence of the others and their community of endeavours. They conform to unconnected systems; they do not offer each other the richness of their variety and they do not provide each other with feedback. The same is, of course, also true of other organizations not explicitly mentioned here.

This is disturbing, because these small bands of systemic-cyberneticians quite probably possess the keys to a reintegrated future for mankind and, in some cases, they do not even seem to suspect it.

Shouldn't we all unite somehow? Or, at least, establish communication channels? We are in dire need of each other.

Can we really be "international", "federated", "worldwide", etc. while we are living in reciprocal ignorance? Couldn't and shouldn't we forget our particularisms, without losing our identities?



STEPHEN SOKOLOFF

Overcoming Isolation

Stephen Sokoloff

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Convinced of the nobility of its endeavor, an army of specialists is now diligently at work producing ideas, results, data. Within many institutions the feeling prevails that there is no other pursuit as worthy of a first-rate mind as scientific research. But who is the ensuing inundation of research reports and articles intended for? The only persons capable of understanding them are the specialists themselves and they don't have sufficient time to systematically survey the literature even in their own fields. Therefore, oversights are common, and wasteful duplications of work occur. Furthermore, many valuable publications are only infrequently consulted, and merely gather dust in libraries and archives. There simply aren't enough readers. After all, a scientist earns merits by doing original work — and not by knowing what others have done.

That leads to unfortunate consequences! Instead of a worldwide network of scholars, we have a series of islets — a very ineffective deployment of our intellectual resources. A better one could be achieved by restructuring our academic institutions. That would, in my opinion, involve affording equal prestige (and employment) to both specialists and generalists.

Members of the latter group could be engaged in teaching and writing (literature surveys of broader fields; high-level popular books, articles and lectures).

Generalists could join the islets together. They could, for example, read a broader range of literature and attend various conferences; they would then report new developments to the specialists at their own institutions — and also inform and instruct lay audiences. We shouldn't forget that more widespread interest in the sciences would inevitably lead to better funding for them.

To sum it up — qualified generalists could overcome the current isolation of the individual disciplines by forming links from specialist to specialist and from specialist to student or layman. This they would do by finding out about research results and communicating and sometimes interpreting what they have learned. We need more teachers and explainers — and not just scientists hell-bent on originality at whatever price.

OOO - 1990* INTERNATIONAL AWARD

FOR THE BEST PAPER ON THE THEME OF "INTERACTIVE INTERFACES BETWEEN COLLECTIVE SUPPORT SYSTEMS AND THEIR USERS"

The author of the best paper will be awarded \$2,500 and invited to present his or her ideas at the next Conference on "Problems of ...*" (Amsterdam, March/April '91).

* "OOO" IS AN ACRONYM FOR "ONDERSTEUNING, OVERLEVING EN CULTUR", DUTCH FOR "SUPPORT, SURVIVAL AND CULTURE".

The OOO Program

The OOO Program is at the moment the main research program of the Center for Innovation and Co-operative Technology at the University of Amsterdam. The objective of the Center is to study externally-structured problems, i.e. problems arising when an indefinite number of actors (broadly defined) try to increase their competence for action at about the same time, in about the same environment. Such problems change unpredictably and chaotically as more people and additional environments become relevant. 'Solution' therefore requires commitment and participation, 'systematic evolution' and the design of agreements in terms of appropriate language structures (presently often computer supported). The OOO program concentrates on agreements called collective support systems and on the people who use them.

The OOO Program has been developed under the leadership of Prof. Dr. Gerard de Zeeuw, Prof. Dr. Gordon Pask & Dr. Mike Robinson; several eminent scientists served as consultants. The prize is being offered to encourage thinking which may deepen and broaden the scope of the program.

Examples of 'collective support systems' are organizations that support community development and local economic initiatives, mental and physical development, education, social advice and case work. They include various forms of co-operative technology such as e-mail, computer supported problem solving environments and public transportation. The concept is wide enough to encompass most organizations in some way, but it is usually restricted to those with explicit social aims and a tendency to non-profit status. Collective support systems are not expert systems; they help increase the competence with which users implement their activities without restricting their services by indexing the users.

Interactive interfaces both make possible and constrain the interaction of users and systems. They can take different forms. They may be high-or low-level natural or artificial languages (though not formal languages in the usual sense). They may be objects such as theatre stages,

mailboxes or computers. They may be people or groups. They may also be any systemic combinations of languages, objects and/or people.

The quality of the interaction is defined from both sides of the interface. Activity by the user(s) should increase both their competence and their confidence, while simultaneously increasing the responsiveness and flexibility of the support system. The challenge is to find theoretical and practical ways of increasing this quality — especially by means of new user languages.

Decrease in quality is relatively common. It occurs when collective support systems become unresponsive, cease to help, create a 'world of their own'. The OOC Program defines this atrophy as 'dealing with a model of the user rather than with the user her- or himself'. The results are that the efforts by the user to get help are greater than the value of the help, or they result in the creation of new dependency relations ('helplessness'). In these cases the internal and closed language of the intended supporting system (now more like an expert system) prevents the expression of the users' problems and aspirations.

Papers may:

- describe situations or organizations where the quality of interaction has been increased or decreased, or both;
- describe the emergence, construction or application of 'user languages';
- describe the emergence and functioning of a 'model of the user', in relation to actual support (positive or negative);
- consider either traditional case studies, experimental set-ups or more anecdotal evidence for the above. (While 'user languages' can often only be described anecdotally, reflections on general principles will be valued.)
- present theoretical work or perspectives on interaction with collective support systems, on interfacing or on 'user language'.

Submissions

Papers may be submitted between 1. March 1990 and 15. November 1990. The prizewinner and the authors of papers accepted for publication will be notified by 15. January 1991.

The prize will be made available after notification. However, the prizewinner should be prepared to present the paper to the "Problems of Support, Survival, & Culture" Conference, Amsterdam, March / April 1991.

The search for the best international papers on the theme of the OOC Research Program commenced in 1989. The first Award was won by Pal Sorgaard from Abo University in Finland with the paper: "Object Oriented Programming and Computerised Shared Material".

Instructions to Authors

The paper including figures and references should not exceed 15 A4 pages in length.

The paper should be submitted in printed form and on Macintosh or IBM compatible disk in a common word processor format (eg. Word, WordPerfect, Multimate) or as a text file.

Papers should be accessible to a multi-disciplinary audience.

Papers should be in English. To avoid favoring 'native speakers' we will (if necessary) make assistance available to the award winner and the authors of papers selected for publication in editing, revising, or 'grammaticising' their papers.

Copyright

The University of Amsterdam "Support, Survival, & Culture" Program will have the right to publish any paper submitted for the Award in book or paper form. The Copyright will, however, remain with the author.

Where papers have been published prior to submission for the Award, a copyright release from the publisher must accompany the paper.

Further Information and Submissions

University of Amsterdam

Research Program "Support, Survival and Culture" (OOC)
1013 KS Amsterdam

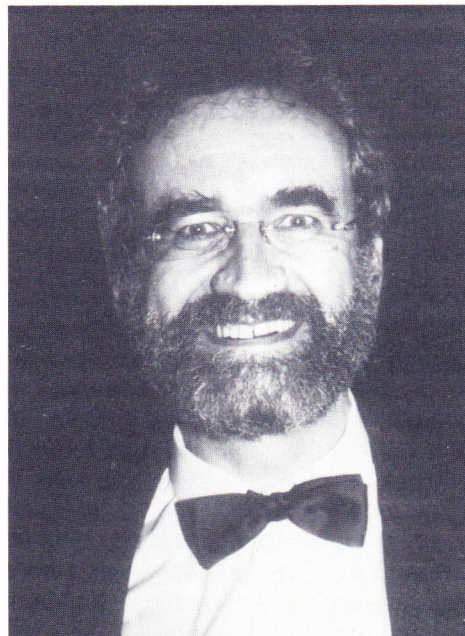
The Netherlands

tel. 020-5251250

fax. 020-5251211

Earlier meetings included 'Problems of Context', 'Problems of Actors and Actions', 'Problems of Levels and Boundaries', 'Problems of (Im)possible Worlds', 'Problems of (Dis)appearing Knowledge'; in 1989 the meeting dealt with 'Mutual Uses of Cybernetics and Systems'.

REPORT OF THE AUSTRIAN SOCIETY FOR CYBERNETIC STUDIES



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Cybernetics: Univ.-Lektor Dipl.-Ing.Dr.Othmar LADANYI

Ecological

System Research: Univ.-Prof.Dr.Adolf ADAM

Publicity: Univ.-Lektor Dipl.-Ing.Dr.Johannes RETTI

Main Activities and Projects

— The biennial **"European Meeting on Cybernetics and Systems Research"** is recognized as the leading international conference in these fields. 249 active participants from 29 countries and 5 continents attended the Ninth EMCSR in 1988; their contributions provided an excellent overview of the current status of research worldwide. The Proceedings, edited by R. Trappl, have been published as "Cybernetics and Systems '88" by Kluwer Academic Publishers, Dordrecht.

— **"Cybernetics and Systems"** — An International Journal" (Editor-in-Chief: Robert Trappl) is put out by Hemisphere Publishing Corporation (6 issues per year). Subscription orders should be addressed to:

Hemisphere Publishing Corporation
Journals Division
79 Madison Avenue
New York, N. Y. 10016
U. S. A.

— **"Applied Artificial Intelligence"** — An International Journal" (Editor-in-Chief: Robert Trappl) was started three years ago and has already established itself as an international forum for the exchange of experience. Subscription orders should be sent to the Hemisphere Publishing Corporation (address above).

— At regular intervals the ASCS offers lectures and intensive courses on different topics of AI. These are organized jointly with the Austrian Society for Artificial Intelligence.

— The Austrian Research Institute for Artificial Intelligence was founded in 1984.

— EMCSR conferences are held biennially

10th EMCSR: April 17 - 20, 1990

11th EMCSR: April 21 - 24, 1992

12th EMCSR: April 5 - 8, 1994

R & D Projects

1. Basic Research

1.1. Expert Systems

1.1.1. Second Generation Expert Systems

The goal of this project is to identify the principles and basic methods for reasoning about causal and qualitative relations. Special emphasis is put on the integration of surface knowledge acquired by experts from years of experience with profound knowledge which gives a partial model of the domain. This permits a rapid solution of frequent problems while, in the case of more complex and rare problems, causal links help one to arrive at acceptable solutions. The current focus of the project is the model-based diagnosis of rheumatology.

1.1.2. Development of Knowledge Engineering Tools

A set of modular tools for knowledge engineering will be developed and implemented, with modules supporting both object-oriented and rule-based knowledge representation schemata. Modules representing and processing single knowledge units or scanning whole knowledge bases will permit the design of flexible user interfaces. The modules can be freely combined, so that each user system may use only those parts needed by the knowledge-based system. This provides the basis for a more efficient implementation of knowledge-based systems on powerful personal computers.

1.1.3. Integration of a Speech Component to Improve Expert System User Interfaces

The aim of this project was to examine how the use of spoken language can improve user interaction with expert systems. To this effect, an expert system with a speech interaction component has been realized in the domain of fault diagnosis in electronic circuits. The expert system supports the serviceperson in his/her fault diagnosis by asking relevant questions and providing repair instructions to him/her.

1.2. Natural Language Systems

1.2.1. A Second Generation Natural Language Information System

With current database interfaces, natural language questions are translated into formal queries, e.g. in the form of an SQL statement, which are then in turn processed. Such systems, even those with considerable linguistic competence, lack essential components of human dialogue. The background knowledge of such systems is neither sufficient to identify the intention behind the user's question nor does it enable the system to evaluate the relevance of the information stored in the database.

This forces the user to continue "formalizing" the content of his query in order to get the desired results. The extension of natural language interfaces by components containing a model of the intentions and knowledge of the user, as well as background knowledge of the domain represented in the database, is therefore a necessary step towards the further improvement of the man-machine interaction. The aim of this project is to develop a system which, at least in part, meets the above-mentioned requirements.

1.3. Automatic Knowledge Acquisition

1.3.1. *Semiautomatic Extension of the Lexica of a Natural Language System*

The aim of this project is the semiautomatic extension of the lexicon of a natural language system, with entries comprising morphological, syntactical, and semantic knowledge. Among the essential parts of this system are a decomposition algorithm as well as strategies for the compositional semantic analysis of compounds. In the course of this project, this approach is to be extended to compounds of other classes of words as well as to derivations.

1.3.2. *Knowledge-Based Learning in 'Learning Apprentice' Systems*

The goal of this project is the development of flexible learning methods for so-called 'Learning Apprentice Systems'; these are computer programs that learn to solve problems in a given domain by observing a human expert in problem-solving and interacting with him in various ways. Recognizing the attractiveness of Explanation-Based Learning as well as its problems, we are concentrating our research efforts on the development of new hybrid learning models which integrate Explanation-Based learning methods with empirical ones in order to get the best of both worlds. So far, the work has resulted in a new, Determination-Based reasoning. It has been implemented in the context of an interactive Learning Apprentice for a musical problem (two-voice counterpoint composition); however, it is domain-independent in that it should be applicable to at least a whole class of problems.

1.4. Sub-symbolic AI

1.4.1. *Sub-symbolic AI Models and Natural Language*

One of the main objectives of this project is to examine the natural language understanding capabilities of connectionist models, e. g. to determine, whether their language modeling capabilities are superior to those of traditional approaches.

A first model for basic language functions has been developed in the initial stage of this project. It has an architecture that learns 'words' by categorizing sensory input from two channels, 'phonetic' and 'visual', into concepts, and then associates co-occurring concepts from the two realms into arbitrary words or symbols. This basic system models many gross aspects of human linguistic behavior and can be extended to account for more complex aspects of word reference. Such extensions are currently

being developed.

The network simulation software VIE-NET developed at this Institute will also be extended within the framework of this research project.

1.4.2. *Neural Networks for the Interpretation of Heart Scans*

The aim of this project is to develop a system which evaluates data from heart scans (Thallium-201 Scintigrams) available as numeric tables or as graphic images, and thereby enables a diagnosis of cardiac diseases.

This involves the development of a suitable network architecture and training methods in order to arrive, on the basis of data compiled by the Cardiology Department of the University Hospital, at a system which performs this task satisfactorily. A network developed in a nine-month feasibility study resulted in an 80 to 90 per cent prediction of cases, distinguishing between normal cases and coronary artery disease (CAD). After having used relatively gross segmental data in this first study, the focus has now been shifted toward the analysis of pictorial input. In addition, the project aims at predicting the location and extent of the disease. Moreover the results obtained in the trial runs may enable us to interpret the data with regard to their relevance to the problem.

1.5. Knowledge Representation and Reasoning

1.5.1. *Constraint-based Inference Mechanisms*

Basic research in the field of constraint-based inference mechanisms, which are applied to the planning, design and simulation of technical systems, aims at the evaluation and integration/unification of existing representation schemata and algorithms. In particular this will involve the examination and elaboration of symbolic constraint propagation systems with respect to the possibility of integrating them with alternative (procedural, relational) forms of representation. This could be realized e.g. by extending a Prolog interpreter with semantic unification. The desired practical result is a programming or development environment for the modeling of situations which can be adequately described by constraints.

1.5.2. *Development of the Knowledge Representation Language VIE-KL*

The difficulties involved in the balancing efficiency and expressiveness in knowledge representation as well as the demand for a semantically sound knowledge representation language for natural language understanding programs have lead to the development of VIE-KL, a language based on term subsumption in the realm of KL-ONE. Clearly defined semantics allow the classifier and the realizer to compute and propagate the consequences of knowledge-base modifications. Extensions beyond KL-ONE include the support of dynamic modification and the retraction of knowledge of generic and individual concepts, increased expressive power concerning statements about individual concepts (by expressing assertions about number and kind of future role-fillers, thus enabling the realizer to draw more inferences on only partially specified individuals at an earlier point in time), reification of roles and inverse roles.

The project is being carried out in cooperation with the University of the Saarland, Saarbrücken, FRG.

Applied R & D

2.1. Natural Language Systems

2.1.1. Development of a German Database Interface

The natural language database interface DIALOG developed at the Institute interacts in German and offers a user-friendly interface to relational databases. A database search with DIALOG proceeds as follows: The user's question is entered in German from a keyboard, and translated by DIALOG into a search expression in the database query language SQL. The database system executes the search expression and the user is presented with the result of his query. DIALOG therefore constitutes the interface between (a subset of) the German language and (a subset of) SQL.

An operational prototype of DIALOG was developed and implemented in cooperation with an Austrian software house, with different versions for a variety of computers and database systems available. The system is currently being tested at several Alpha sites, the results serving as a basis for a continuous improvement of both its linguistic competence and its flexibility with regard to domain adaptation.

2.2. Expert Systems

2.2.1. A Decision Support System for the Village Health Worker

The prototype version of a diagnostic and therapeutic decision support system for village health workers in developing countries was implemented on a portable personal computer, with VIE-KET serving as the knowledge engineering tool. The core of the system is currently being reimplemented and extended on an Apple Macintosh. In particular, the flexibility of the user interface is to be increased so as to provide for such questions as 'What would happen if ...' and to allow the user to cancel or alter his/her input. First field tests have already been the subject of talks with potential partners in developing countries.

2.2.2. A Knowledge-Based Decision Support System for Primary Medical Care

Within the framework of VIE-MED, an interdisciplinary knowledge-based decision support system for primary medical care ('medical practitioner') is to be implemented on a personal computer. In a first step, the knowledge acquisition component and the diagnostic component will be implemented. The diagnostic component applies heuristics already well tested in successful medical expert systems, as well as special strategies which do justice to the enormous breadth of the domain in question. The experience gained in the implementation of the diagnostic component is intended to provide the basis for a therapy module.

3. AI and Society

3.1. Future and Impacts of AI

This project primarily deals with the following questions:

- A. To what extent will AI, as the "automation of mental work", bring about changes in the volume and distribution of work? can measures be suggested which guarantee that all human beings will profit from such a development?
- B. What will be the impacts of AI systems on their users? can standards be set to which AI systems have to conform before they are launched (user protection) ?
- C. Can AI systems, apart from their military applications, also be used to reduce international tensions and to improve mutual understanding ("AI for Peacefare") ?

Parts of these studies are carried out in close cooperation with Scandinavian research institutions. The results obtained in a first project phase were already published in 1986 as "Impacts of Artificial Intelligence", North-Holland, as well as in three other books which appeared in 1987 and 1988. Another volume with the title "Future and Impacts of Artificial Intelligence" will be published this summer (1990).

3.2. Video Series "Artificial Intelligence"

The aim of this series is to familiarize interested laypersons with the principles, main applications, and potential impacts of AI. No knowledge of computers or programming is required.

The series comprises eight sequels of 14'30" each, and is devoted to the following themes: (1) Challenge and Adventure, (2) Knowledge Representation, (3) Problem Solving, (4) Expert Systems, (5) Natural Language Systems, Part I, (6) Natural Language Systems, Part II, (7) Robots, Learning, Non-Vons, (8) Future and Impacts.

The series is produced in broadcast quality in close cooperation with a professional studio. It will also be available on U-matic (high- or low-band) or VHS cassettes from a Vienna-based marketing firm. It is due to be launched by October 1989.

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MEETINGS and COURSES

Title	Date	Place	Deadlines	Further Information
EMCSR 1990 10th European Meeting on Cybernetics and Systems Research	17. - 20. April 1990	Vienna Austria		Prof. Robert Trappl Department of Med. Cybernetics University of Vienna Freyung 6/2 A-1010 Vienna, Austria Tel. +43-1-53532810 Fax +43-1-630652
5th „CORE“ CONVERSATION Fuschl Lake Austria	23. - 27. April 1990	Fuschl Lake Austria		Prof. Bela H. Banathy 25781 Morse Drive Carmel, CA. 93923 USA Tel: (408) 625-3178
IFIP TC-11 Sixth International Conference and Exhibition on Information Security	23. - 25. May 1990	ESPOO (Helsinki) Finland	Expired	IFIP/SEC '90/CONGREX (Finland) Linnankatu 3 SF-00160 Helsinki, Finland Tel. +358-0-175355
8th International Congress of Cybernetics	11. - 15. June 1989	New York City, USA	Expired	Prof. Constantin V. Negoita Congress Chairman Department of Computer Science Hunter College, City University of New York 695 Park Ave New York, NY. 10021, USA
CECOIA II 2e Conférence Internationale sur l'Economie et l'Intelligence Artificielle	2. - 6. July 1989	Paris France		Prof. Robert Vallée 156, bld. Péreire F-75017 Paris France
3rd International Conference - IPMU Information Processing and management of Uncertainty in Know- ledge-based Systems	2. - 6. July 1990	Paris France	Expired	Bernadette Bouchon-Meunier Secrétariat de la Conférence IPMU ENST, 32 Boulevard Victor F-75015 Paris
DIAC 90 Directions and Implications of Advanced Computing	28. July 1990	Boston Mass. USA	Expired	Douglas Schuler Boeing Computer Services MS 7L-64, P.O. 24346 Seattle, WA 98124-0346, USA Tel. (206) 865-3226
ISINI International Society for Intercommunication of New Ideas	27. - 29. August 1990	Paris France		Prof. Anghel N. Rugina President ISINI 145 Moss Hill Road Jamaica Plain, Mass. 02130 Tel. (617) 524-4580
Operations Research 1990	28. - 31. August 1990	Vienna Austria	Abstracts 15. April 1990	Prof. G. Feichtinger Institut für Ökonometrie Technische Universität Wien Argentinierstraße 8 A-1040 Wien, Austria
International Conference on Signal Processing '90	22. - 26. Oct. 1990	Beijing (Peking) China	Expired	Professor Yuan Baozong Research Institute of Information Science Northern Jiaotong University Beijing 100044, China
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