SIGART NEWSLETTER   Number 43   December 1973

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SIGART NEWSLETTER

The SIGART Newsletter is a bimonthly publication of the Special Interest Group on Artificial Intelligence of the Association for Computing Machinery. The Newsletter reports on projects being conducted by the artificial intelligence research community and generally reviews current progress in the state-of-the-art.   Correspondents report news from local SIGART Chapters and other AI Centers.

The Editors encourage contributions from authors, including Letters to the Editor (AI Forum), Technical Contributions (1 to 6 pages), Abstracts (preferably 100-200 words), Book Reviews, Bibliographies of Special Topics in AI, News Items (Conferences, Meetings, Course Announcements, Personals, etc.), Advertisements (New Products or Classified Advertising), Puzzles, Poems, Cartoons, etc. Material may be reproduced from the Newsletter for non-commercial purposes with credit to the author and SIGART.

Anyone interested in acting as editor for a special issue of the Newsletter devoted to a particular topic in AI is invited to contact the Editor. Letters to the Editor will be considered as submitted for publication unless they contain a request to the contrary. Technical papers appearing in this issue are unrefereed working papers, and opinions expressed in contributions are to be construed as those of the individual author rather than the official position of SIGART, the ACM, or any organization with which the writer may be affiliated.

You are invited to join and participate actively. SIGART membership is open to members of the ACM upon payment of dues of $3.00 per year and to non-ACM members upon payment of dues of $5.00 per year. To indicate a change of address or if you wish to become a member of SIGART, please complete the form on the bottom of the last page of this issue.

Copy deadline for the February Issue: January 25th.

CHAIRMAN'S MESSAGE

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This is the traditional time of year to wish everyone a Happy Holiday Season and a Prosperous New Year. It is also a time for reflection; for stepping back from our day-by-day activities to examine our accomplishments and failures and goals. Throughout the year, the press of immediate needs screens out longer term issues. For this reason, the break in our daily schedule at this Holiday Season is an important opportunity to evaluate ourselves and our efforts this past year.

2a

I know of no greater wish than for you to find, in addition to health and happiness, that you've grown in capability, responsibility, and in service, and that you've addressed important issues without getting lost in the immediate details. The failure to see and heed the larger picture is usually a major limitation on our ability to grow and advance.

2b

Organizations, much like individuals, are largely preoccupied with immediate problems. It is therefore most appropriate that SIGART is currently undergoing such self evaluation (through last issue's questionnaire) of its goals, directions, and accomplishments. The increasing importance of AI techniques in applications and other disciplines gives us many opportunities, both as individuals and as an organization, to grow in new directions. I hope the New Year finds each of us willing and able to accept these challenges.

2c

R.M.B. 11/20/73

2d

EDITOR'S ENTRY   3

  1. Foerster Public Lecture at Berkeley: "Computers and the Mind"   3a

    The Foerster Memorial Lectureship Series (on the Immortality of
    the Soul) was innaugurated at the University of California in
    1928. Since that time, except for a brief lapse between 1965 and
    1968, this series has played host to such distinguished
    theologians as Rev. Fulton J. Sheen, Bishop James A. Pike, and Dr.
    Paul J. Tillich (Harvard Divinity School). However, other noted
    lecturers such as Aldous Huxley (writer), Loren C. Eiseley
    (anthropologist), and Sir John C. Eccles (well-known
    neurobiologist from SUNY at Buffalo) have contributed to the
    series.

    In an attempt to update the series, the 1973 lecture on October
    25th was a debate on "Computers and the Mind" held at Zellerbach
    Playhouse on the Berkeley campus. Participants included
    Professors Seymour Papert (AI Laboratory at MIT), Hillary Putnam
    (Philosophy Department, Harvard), and Donald M. MacKay [pronounced
    MacEye] (Professor of Communication at the University of Keele,
    Staffordshire, England).

    The format called for three one-hour presentations, one by each
    participant, followed by a general discussion (unfortunately, the
    audience was never included). Starting at 3:00 PM and with
    approximately 2 1/2 hours scheduled for dinner (the speakers were
    sequestered by one of the deans to a private dinner party), things
    didn't finish up until after 10:00 PM, and this was quite a long
    time for such an enthusiastic audience to absorb one-way
    communication. Nevertheless, the talks (and later interaction)
    were well worth the audience's effort.

    In the first lecture, subtitled "The Simplicity of Mind" or
    "Talking about Talking about Artificial Intelligence", Prof.
    Papert called for a new epistemological approach to AI <*N1> to
    replace the old inadequate approach of trying to find a single
    powerful deductive procedure with sufficient generality to account
    for human intelligence. He gave numerous examples such as bicycle
    riding, catching a baseball, and elementary scene analysis to
    illustrate the apparent simplicity of what might be imagined to be
    extraordinarily complex feats. He then cited Herbert Simon's
    hypothesis <*N2> that the observed complexity of human behavior
    may reside largely in the complexity of man's environment rather
    than in his intelligence per se.

    In talking further about the "artificiality" of human
    intelligence, he asked us to consider two skilled chess players,
    both of equal caliber, but one who acquired his talent through a
    careful and lengthy reading of chess books, while the other had
    only played a half-dozen games in his whole life. At first blush

it may seem that the well-read player has capitalized on his
rather pedestrian direct "knowledge" of the game, while the
brilliant newcomer relied solely on native "intelligence".   Yet
how can we characterize the new-comer's "knowledge" of
game-playing strategy and tactics in general? Could this not also
be regarded as an exercise of knowledge too, but of a different
sort?

Papert then suggested that AI is akin to the field of lexicography
of several hundred years ago, before dictionaries were written
down. In both cases a great deal of common sense knowledge has yet
to be encoded in a form that one can deal with. Until we tried to
write computer programs to operate in the real world, we never
needed to "understand the ordinary." Papert also presented a
metaphor between AI and aeronautics, suggesting that just as
studying the structure of feathers is not the way to learn how
birds fly, so studying neurons in order to learn how people think
is a limited preoccupation.

In conclusion from among the numerous other models that have been
proposed, Papert urged the audience to regard as the best model of
the human mind, a complex network of interacting computer
programs.

In the second presentation, Prof. Putnam generally supported Prof.
Papert, giving examples from number theory (Wilson's Theorem),
Newton's contribution to Kepler's Laws (concerning the elliptical
orbits of planets around the sun), and the explanation of why a
square peg won't fit through a round hole (from a modern physics
point of view). However, he found it difficult to believe that
general-purpose intelligence could result from the accumulation of
a large number of sub-programs, each of which had a severely
restricted solution space. He argued that prehistoric man, whose
brain evolved millions of years ago in an environment with no hint
of the sort of complexity that characterizes modern civilization,
nevertheless in principle has the capability to be educated (by
sending him to a university or whatever) in order to deal
successfully with today's world. He suggested that it is this
"capacity to know" that is involved in intelligence and not a
linking of innumerable, restricted subroutines in a network under
a "big switch." He concluded by appealing to automata theory to
point out that the distinction between "brain stuff" and "soul
stuff" is really irrelevant for psychology.

Prof. MacKay, a Christian theologian as well as a computer
scientist, was quite interested in the structure of personal
self-awareness or consciousness in men and machines (what he
referred to as the "I story") and stated that it is still an open
question as to whether machines could be programmed to have an "I
story." He then observed that it should be as easy for God (since
he made us) to achieve immortality of the human soul (as he

already demonstrated by resurrecting Jesus Christ and reembodying his soul) as it is for a human programmer to run his programs on a different machine. This led to the conclusion that all mechanistically-based science, including AI, is in no way incompatible with theistic beliefs, arguments by uninformed theologians notwithstanding. To the contrary, it is quite congenial, and Prof. MacKay distinctly encouraged research in AI, which was quite refreshing.

During the joint discussion period which followed, Prof. Papert made a number of incisive observations (the two other participants occasionally had difficulty in getting him to relinquish the microphone) including, "just as the history of programming languages has been an attempt to make programs as remote as possible from the digital character of machine hardware, human children strive through learning to escape from their own biological heritage."

In the closing minutes a debate emerged between MacKay and Papert on the extent to which (rational) humans might feel that their dignity was lessened by the advent of highly intelligent machines. MacKay argued that even if Papert were an intelligent android (humanoid automaton) instead of a human being, his own self-esteem would in no way be threatened. Papert never really had time to bring his argument to its natural conclusion, but he wondered how society as a whole might respond to such a development.

NOTES

   <N1> Papert's use of this term in AI is somewhat different, although similar in spirit, to the use John McCarthy has made of it over the years to distinguish the "engineering" or "heuristic" component of AI from the part concerned with causal reasoning or the relation between "knowledge" and "belief."

   <N2> H. A. Simon, THE SCIENCES OF THE ARTIFICIAL, (MIT Press, 1969), p. 25.

   <N3> He clearly was interested in including non-digital as well as digital machines in his notion.

2. AI at the IEEE SMC Meeting in Boston   3b

Dr. Amand Mundra (Mitre Corporation, McLean, Virginia) and I recently served as co-chairmen of a session on Artificial Intelligence at the IEEE Systems, Man, and Cybernetics Society 1973 International Conference held in Boston, Massachusetts, November 5-7, 1973. The following papers were presented:

   (1) "Problem Generation and Solution" by J. M. Perry and Elliot B. Koffman, University of Connecticut at Storrs.

(2) "A Computer Controlled Rotating-Belt Hand for Orienting Objects" by John R. Birk, University of Rhode Island at Kingston.

(3) "Theory Formation by Machine: A General Framework of the Golem System" by Alois Glanc, The City University of New York in Flushing.

(4) "An Artificial Intelligence Approach to Automatic Speech Recognition" by Steven E. Levinson, University of Rhode Island at Kingston.

(5) "The Four Faces of HAL" by Howard A. Peelle and Edward M. Riseman, University of Massachusetts at Amherst.

(6) "An Augmented Active Image Transmission System for Visual Man-Machine Interaction" by Harold Alsberg of JPL and California Institute of Technology, Pasadena, California.

Other papers in the Proceedings of the Conference relevant to AI but not presented in this session, are as follows:

(1) "Man and Computer Construction Techniques for the Generation of Crosswood Puzzles" by Lawrence J. Mazlack, University of Guelph, Ontario, Canada.

(2) "A Structure of Memory in Concept Formation" by T. M. Khalil, University of Florida at Gainsville and Vladimir Lovitsky, Kharkow Institute of Radioelectronics, U.S.S.R.

(3) "A Method of Concept Formation Based on Functional Decomposstion" by Edwin Towster, University of Iowa in Iowa City.

Copies of the Proceedings may be obtained by writing to Mr. David Downing, Publicatons Chairman, Boston University, Boston, Massachusetts.

One of the highlights of the entire conference was the concluding session, a five-hour commemorative symposium celebrating the 25th anniversary of the publication of Norbert Wiener's book "Cybernetics: Control and Communication in the Animal and Machine." Chaired by Prof. B. Chandrasekharan of Ohio State, the session drew on a number of eminent speakers, most of whom knew Norbert Weiner personally and were able to relate first-hand anecdotes concerning Wiener's personal ideosyncrasies as well as take an objective view of what transpired during this quarter century regarding the promises of cybernetics, which ones have been satisfied and which were not. The list of distinguished speakers included: Michael Arbib (University of Massachusetts), Hans Bremermann (University of California at Berkeley), Collin

Cherry (Imperial College, London), Michael Watanabe (University of Hawaii), Karl Deusch (Harvard University), Rudolf Kalman (University of Florida), and Marvin Minsky (MIT).

I'm not sure whether it was a side effect of Prof. Minsky being the concluding speaker or whether those present were truly more interested in discussing AI than pure cybernetics, but when the floor was opened up to the general audience, the vast majority of the questions pertained to AI and were directed to Prof. Minsky, who as usual did an admirable job of representing the field.

3. On-Line SIGART Membership Directory   3c

You may recall a promise we made some time ago <*N1> to provide a directory of our 1831 members, giving up-to-date names and addresses, as an additional feature of the On-Line Newsletter. Although it wasn't easy <*N2>, we are pleased to report that our SIGART membership file now exists, and can be accessed over the ARPA Network at SRI-ARC on our directory 'SIGART' under the file 'MEMBERS'. However, we should say that it is indexed in a somewhat unusual way--by geographical location rather than alphabetically by name <*N3>. An interesting consequence of this indexing, however, is that one can browse near by his own name and discover other members of SIGART that are physically near by. We hope that you will find this additional capability useful.

NOTES

<N1> Advantage No. (5), Item 2, p. 4, SIGART Newsletter, No. 36, October 1972.

<N2> After six months of negotiation and delay, due partially to a change over by the ACM to the IEEE computer system (for billing purposes), I stopped off at ACM Headquarters in New York City on my way back from the East Coast and picked up a computer tape of our membership. We then experienced just about every sort of tape incompatibility imaginable (9 track -> 7 track; 1600 -> 800 bpi density; BDC -> ASCII; etc.) before we succeeded in getting it on our own PDP-10. Clearly, it will be trivial if we ever need to do this again. Incidentally, the folks back at the New York Headquarters are a great bunch of people and don't deserve the vituperation normally heaped on them by those few irate members whose billing account goes astray or whose journals get lost in the mails.

<N3> The file is actually listed alphabetically by State, and within each State in order of increasing zip code.

4. LISP for IBM 360   3d

The University of Michigan has recently developed a new version of
LISP for the 360 now running under the Michigan Terminal System.
The major goals were efficiency, compatibility with other LISP
systems (MIT, BBN, Carnegie, etc.), and powerful I/O and error
recovery procedures. The interpreter is written in 360 assembly
language and is now available. The compiler is under development.
For a user's manual or other documentation contact:

    Bruce Wilcox
    Mental Health Research Institute
    Ann Arbor, Michigan

5. New SIGART Newsletter Reporters   3e

    (1) At MIT, Ms. Andee Rubin replaces Dr. Eugene Charniak.
    (2) At Stanford, University Horace Enea replaces Ms. Peggy Karp.

6. Questionnaires   3f

Please don't forget to send in your October-Issue Questionnaire.
As of this date, they are starting to pour in. We hope to have a
preliminary summary of the results by the next issue.

7. Holiday Greetings   3g

Rich Fikes and I would like to join with Bob Balzer in wishing you
and yours a safe and happy holiday season.

                                       L.S.C.   11/29/73   3h

INTERLISP
by
Warren Teitelman
Xerox Research Center
Palo Alto, California   4

   INTERLISP (INTERactive LISP) is a LISP system currently implemented
on the DEC PDP-10 under the BBN TENEX time sharing system<*R1>.
INTERLISP is designed to provide the user access to the large virtual
memory allowed by TENEX, with a relatively small penalty in speed
(using special paging techniques described in <*R2>). Additional
data types have been added, including strings, arrays, and hash
association tables (hash links). The system includes a compatible
compiler and interpreter. Machine code can be intermixed with
INTERLISP expressions via the assemble directive of the compiler.
The compiler also contains a facility for "block compilation" which
allows a group of functions to be compiled as a unit, suppressing
internal names. Each successive level of computation, from
interpreted through compiled, to block-compiled provides greater
speed at a cost of debugging ease.   4a

   INTERLISP has been designed to be a good on-line interactive system.
Some of the features provided include elaborate debugging facilities
with tracing and conditional breakpoints, and a sophisticated
LISP-oriented editor within the system. Utilization of uniform error
processing through user accessible routines has allowed the
implementation of "DWIM," a Do-What-I-Mean facility, which
automatically corrects many types of errors without losing the
context of computation. The CLISP facility extends the LISP syntax
by enabling ALGOL-like infix operators such as +, -, *, /, =, ←, AND,
OR, etc., as well as IF-THEN-ELSE statements and FOR-WHILE-DO
statements. CLISP expressions are automatically converted to
equivalent LISP forms when they are first encountered. CLISP also
includes list construction operators, a LISP oriented pattern match
compiler, and facilities for record declarations.   4b

   A novel and useful facility of the INTERLISP system is the
programmer's assistant which functions as the interface between the
user and the system, and monitors and records all user inputs. The
user can instruct the programmer's assistant to repeat a particular
operation or sequence of operations, with possible modifications, or
to UNDO the effects of specified operations. The goal of the
programmer's assistant, DWIM, CLISP, etc. is to provide a programming
environment which will "cooperate" with the user in the development
of his programs, and free him to concentrate more fully on the
conceptual difficulties and creative aspects of the problem he is
trying to solve.   4c

   INTERLISP is the successor to BBN LISP<*R3>, a system developed first
at Bolt Beranek and Newman for the SDS 940, and subsequently for the
DEC PDP-10. System development and maintenance is continuing at
Xerox Palo Alto Research Center and Bolt Beranek and Newman;
implementations for other machines are in progress at the University

of California, San Diego (for the Burroughs 6700), at the University
of Uppsala, Sweden, (for the IBM 370 series), and at Xerox PARC, for
the Data General Nova.   4d

A users group has been formed for INTERLISP consisting of all people
on the official mailing list maintained by the executive committee
(see below). The purpose of the users group is to promote
communication among the users, help maintain a standard basic system,
and make available other documented packages such as FLIP, a complete
format directed list processing system <*R4>, TRANSOR, a subsystem
which aids in converting programs written in other LISP dialects
(e.g., LISP 1.5, Standard LISP) to INTERLISP, and INTERSCOPE, a
question-answering system whose data base is the user's programs.   4e

Documentation for INTERLISP is available from Warren Teitelman. A
new version of INTERLISP will soon be released that implements the
general control-structure scheme described in <*R5>, thereby enabling
and encouraging use of backtracking, coroutines, and other types of
multiple environments.   4f

INTERLISP Executive Committee: 4g

    Alice K. Hartley   Bolt Beranek and Newman
                              50 Moulton Street
                              Cambridge, Mass. 02138

    Warren Teitelman   Xerox Palo Alto Research Center
                              3180 Porter Drive
                              Palo Alto, Calif. 94304

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    <R1> Bobrow, D. G., Burchfiel, J. D. , Murphy, D. L., and
    Tomlinson, R. S., "TENEX, A Paged Time Sharing System for the
    PDP-10," Communications of the ACM, March 1972.

    <R2> Bobrow, D. G., and Murphy, D. L., "The Structure of a LISP
    System Using Two Level Storage," Communications of the ACM,
    Vol.15, No.3, March 1967.

    <R3> Bobrow, D. G., Hartley, A. K., Murphy, D. L., Teitelman, W.,
    BBN-LISP TENEX Reference Manual, Bolt Beranek & Newman, July 1971,
    revised February 1972.

    <R4>Teitelman, W., FLIP, A Format Directed List Processor in LISP,
    BBN Report, 1967.

    <R5> Bobrow, D. G. and Raphael, B., "New Programming Languages for
    AI Research," given by D. G. Bobrow at IJCAI-73, August 1973,
    Stanford University, Xerox PARC Report No. CSL-73-2, August 1973.

EUROPEAN AISB SUMMER SCHOOL ON KNOWLEDGE SYSTEMS
by
Keith Oatley
Laboratory of Experimental Psychology
University of Sussex, England   5

A most successful meeting was held by the Study Group on Artificial
Intelligence and Simulation of Behavior at Oxford University this
summer. It took the form of a number of Britain's more distinguished
workers in AI, Dr. M. B. Clowes, Mr. P. Hayes, Professor H. C.
Longuet-Higgins, Mr. A. Mackworth, and Professor D. Michie each
giving a series of lectures and leading discussions on the problems
of how human and artificial intelligence organize and use knowledge.   5a

The School was limited in numbers to 50 participants, many of them
lecturers and research leaders in departments of psychology and
computer science. Perhaps the limitation was unfortunate because the
very much larger number of applicants meant that many people had to
be turned down. However the response did also indicate a very
substantial and growing interest in AI in Britain, which the AISB
group is now serving.   5b

A good deal of effort in AI at the moment is devoted to problems
which people find very easy, but which computationally are very
difficult - in particular perception and language. Some of the
principles that have emerged from this work indicate the extremely
rich and detailed knowledge of the world and of specific problems
that need to be embodied in a machine to perform even the simplest
linguistic or perceptual tasks in any plausible fashion. Indeed,
artificial intelligence work on vision indicates in a striking way
the real intelligence of human vision. This was brought out in the
lectures of Alan Mackworth of the University of Sussex in which he
traced the development of work on scene analysis, the task of forming
descriptions of the objects and 3-dimensional structure of a scene by
interpreting a 2-dimensional digitized photograph.   5c

It turns out that to do this task successfully there must be embodied
in the program not only some understanding of the three-dimensional
geometry of the world, but of the kinds of entities it might expect
to encounter. It must have knowledge of what two-dimensional
appearances result from translations and rotations of various
3-dimensional entities (be they whole objects as in Robert's program,
corners as in Clowes's, or surfaces as in Mackworth's), it must know
about viewpoint, perspective, lighting, and physical processes such
as occlusion and support. Typically successful scene analysis
programs have mobilized a varity of these specialized types of
knowledge to make interpretations of the grey-scale patterns they
were given. Typically also the knowledge in question has needed to
be flexibly available at a number of different levels of the program.   5d

Thus rather than simply being able to categorize patterns in the
picture, scene analysis needs to bring to the task a great deal of
understanding about the universe it is dealing with. The same kind
of conclusion follows from question answering programs, such as the
widely-known one by Winograd. Much of the present excitement of
Artificial Intelligence (and its importance for related disciplines)
is due to the real progress being made with the problems of
organizing and using knowledge in perceptual and question answering
systems which although artificial, we can now say with a straight
face, are also beginning to be intelligent.   5e

Winograd's program was based on Hewitt's computing language PLANNER.
This language was motivated partly by the idea of embedding specific
knowledge about tasks in procedures which could be called easily from
many parts of the program. Pat Hayes of the University of Essex
spoke about the important recent developments in programming
languages of this kind.   5f

Some of the directions of artificial intelligence are becoming very
clear: on the one hand it constitutes a theoretical vehicle for
psychology. On the other it opens new vistas of computation in the
engineering sense which are quite different, and altogether more
challenging than the number-crunching and stock-control applications
which dominate much of current computational practice.

                                                                      5g

GROUP D'INTELLIGENCE ARTIFICIELLE - UNIVERSITE D'AIX-MARSEILLE   6

There are about ten people in the group, most of whom are teaching in
the Mathematics and Computer Science Departments. These are the
projects which are currently being worked on: 6a

    - the programming language PROLOG and its interpretor, based on a
    mechanical theorem-provng approach.

    - a question-answering system in French with automatic inference
    (all written in PROLOG).

    - a heuristic theorem prover (also written in PROLOG).

    - the development of basic software for a small TI600 computer
    made by the French Company, Telemecanique.

CHESS   7

RESPONSE TO SIMON AND CHASE <*R1>   7a

Prof. Gordon W. Gribble (Department of Chemistry: Dartmouth
College; Hanover, New Hampshire) has written a letter entitled
"Chess Prodigies" published in the November-December 1973 issue of
AMERICAN SCIENTIST (pp. 644-646) in which the author seeks to
discredit the Simon-Chase premise that "no one has reached
grandmaster level with less than about a decade's intense
preoccupation with the game," by citing the examples of Sam
Reshevsky and Jose Capablanca.

He also takes issue with the "chunking" of familiar patterns in
short term memory by citing the counter example of the astonishing
performance of blindfold masters like Najdorf and Koltanowski.
Simon and Chase successfully refute these objections, however, in
an accompanying letter (pp. 446-447).

<R1> SIGART Newsletter, No. 41, August 1973, p.37.

FOURTH U.S. COMPUTER CHESS CHAMPIONSHIP   7b

The 2nd-Place Playoff for the 4th U.S. Computer Chess Championship
at ACM '73 has now been completed. The standings are as follows:

1. TECH II   Points

   PDP-10, Alan Baisley, MIT   2

2. CHAOS

   Univac 1108, I. Ruben et al, Sperry-Rand   1

3. OSTRICH

   Data General Supernova,   0
   George Arnold and Monty Newborn,
   Columbia University

Following the three games from the playoff are the six games from
the first round of the tournament. We will publish games from
rounds 2 and 3 in subsequent issues.

7c

READER COMMENTARY ON THE CICHELLI HEURISTICS
by
Richard Cichelli
901 Whittier Drive
Allentown, Pennsylvania 18103

Alex Bell (July 20, 1973) on implementing some of my suggested changes to his two move mate solver: "I've got the 'refutation man' working in PL/1 on the IBM 360/195 and that alone seems to give improvements equal to the ones you describe. E.g., 'Bell Figure 1' has dropped from 7 seconds to about 2 seconds and three move mates are averaging about 1 minute."

James Gillogly (July 3, 1973): "The Killer heuristic is the same as your refutations, but applied locally rather than globally. One would expect this to give even better results than a global application because of the closer similarity of starting positions; but in TECH the improvement is not statistically significant in most cases..."

I quote from my letter of August 20 to Alex, and my reply to Jim was similar in content.

"Refutation and killer heuristics are, in my view, static ordering devices designed to find cheaply, likely moves which will generate alpha-beta cutoffs. Both you and Jim Gillogly have contributed to my thinking, which I here clarify.

There appear to be two conflicting goals in these heuristics which I call specificity and applicability. Given that we wish to associate some move, set of moves, or value with some pattern, then specificity measures how accurately the pattern is recognized and applicability measures the number of times the heuristic returns a recommended action. Obviously, the more specific the heuristic the more accurate its recommendation and the lower its applicability. We can thus see the following progression in decreasing specificity of chess patterns.

Actual position -> move -> square-to -> man-moved -> unspecified

Gillogly's use of Al Zobrist's exclusing ORing on move bit patterns lets him recognize identical positions (by hashing-error less than .01%) in the game tree and assign the previous back-up value with no further search. (Note: the ORing method solves your equivalent positions by differing paths problem.) Jim's few accurate hits don't pay for his overhead.

Move, square-to, and man-moved are the three levels of specificity my "refutation heuristic" uses. I make associations with moves, not simply movers, hoping that lack of specificity would be compensated for with limiting applicability. The intuitive notion

here is that if some man is moved, then it ceases to perform some of its functions (e.g., defending or attacking) and the opponent's reply which proves this fact has a high enough incidence in the game tree to be a likely candidate to generate a prune. Similarly, if a capture occurs on some square-to, then for any mover to this square, the capture is likely to exist. For the sake of completeness, I include "unspecified" to suggest that moves may simply be ranked, global to the tree, without any reference to local board or move conditions.

Of course, in addition to my refutation static ordering which is global to the search tree, 'DEPTH - 2' data from two plies above is also used in static ordering and 'DEPTH + 2' data is passed back for dynamic ordering."

Note for those implementing chess programs based on Bell's Algorithm: The published program fails to reverse searched plies which are captures with promotion, therefore failing on my problem #7.

Antony Marsland (at the ACM 73 tournament): "What determined the arbitrary order of search in the control run of the problem set? What about random ordering?"

I replied: If square a1 is numbered 1 and square h8 is 64, then the plies of the piece occupying the highest numbered square are searched first. (This results from loading Bell piece lists with an algorithm which reads Cooper-Kozdrowicki board input notation. E.g., problem #4 of the problem set in COKO is

4N34P384P3884Q34K3.88884K34P388).

Further notes on the program:

A brute force tournament program should be able to search nearly 250,000 nodes in three minutes. The Pascal implementation of my program is 1/40th this fast; to achieve tournament rate would require a rewrite in COMPASS (CDC assembler). However, Pascal has proven to be an ideal development tool for writing easily modifiable, readable, structured programs.

Acknowledgments:

I wish to thank Lehigh University for their continued computer time funding of this project.

[Ed. Note: A typographical error was made in the summary of Richard Cichelli's preliminary results in October SIGART Newsletter, s. (10d). The second sentence of the third paragraph should read:

"Without the heuristics, the program solved the 10 problems by generating 74,485 nodes at a rate of 41.5 nodes per second. With the heuristics, the program solved the problems by generating 33,724 nodes at 35 nodes per second. The overall improvement is 212%." We regret the error.]

LESSONS FROM PERCEPTION FOR CHESS-PLAYING PROGRAMS (AND VICE VERSA)
by
Herbert A. Simon
1972-73 Computer Science Research Review, pp.35-40
Department of Computer Science
Carnegie-Mellon University
Pittsburgh, Pennsylvania

7d

For nearly twenty years, artificial intelligence and cognitive psychology have maintained a close symbiotic relationship to each other. It has often been remarked that their cooperation stems from no logical necessity. That a human being and a computer are both able to perform a certain task implies nothing for the identity, or even similarity, of their respective performance processes. Each may have capabilities not shared by the other, and may build its performances on those peculiar capabilities rather than upon those they hold in common.

In spite of this logical possibility of total irrelevance of the one field for the other, during the last two decades there has been massive borrowing in both directions. Artificial intelligence programs capable of humanoid performance in particular task domains have provided valuable hypotheses about the processes that humans might use to perform these same tasks, and some of these hypotheses have subsequently been supported by evidence. Bobrow's STUDENT program, for example, which translated story problems into algebraic equations, provided a model, later tested by Paige & Simon for some of the human syntactic processes in performing that task.

Conversely, hypotheses and data about human performance have been important inputs to artificial intelligence efforts. The General Problem Solver, for example, received its early shape from analyses of human thinking-aloud protocols in a problem solving task.

The distance between AI and cognitive psychology has not been the same in all task domains. Until quite recently, for instance, AI research on theorem proving developed in directions quite different from those suggested by the study of human behavior in theorem proving tasks. There is little that is humanoid about resolution theorem proving.

In the domain of chess playing, the distance between AI and cognitive psychology has been neither so close as in the GPS

example, nor so distant as in theorem proving. The early chess playing programs, in their reliance on brute force and machine speed, borrowed little from what was known of human chess playing processes. The clear demonstration by their relatively weak levels of performance that speed was not enough, produced a gradual movement toward incorporating into the programs some of the selective task-dependent heuristics that humans rely heavily upon in their chess playing. However, the strongest chess programs in existence today still rely heavily upon extensive rapid search, usually over thousands or tens of thousands of branches of the game tree.

I should like to describe [in this paper] some efforts on the other side of the line--attempts to explore chess playing mechanisms that can explain human chess performance. These mechanisms may turn out to have important implications for the future of chess playing programs motivated by AI goals. Their own motivation, however, was largely psychological.

THOUGHTS ON COMPUTER PROGRAMS THAT PLAY CHESS
by
Francis D. Tuggle
Departments of Computer Science and Business Administration
The University of Kansas at Lawrence

7e

I have never written a computer program to play chess, so read these remarks with a degree of tolerance and annoyance, both of which are warranted. (But to justify my second comment below, I may be forced to author one sometime.) As I read descriptions of chess programs, tournaments, heuristics, results, etc. in the SIGART NEWLETTER, the journal ARTIFICIAL INTELLIGENCE, and elsewhere, I succumb to uneasy feelings. Two of these I have been able to identify, isolate, and discuss.

First, emphasis in the field seems to be shifting toward computer-computer chess matches. There are undoubtedly many good reasons for this state of affairs, but despite them, it strikes me as a diversion from the main task of constructing computer programs able to defeat skilled humans at the game of chess. Perhaps this represents stagnation. Faster hardware, larger memory, subtler code, and clever heuristics may only result in small gains on the same plateau. Whatever the reasons, the programs need to be benchmarked against people. (If there was a reliable human TECH <*R1> benchmark, and if there were reliable TECH "other programs" benchmarks, then the thrust of this comment would be blunted).

Second, I am struck by an essential "sameness" to most of the chess programs. Let me use some Newell and Simon <*R2> terminology. Most (all?) chess programs operate in the problem space of Move Selection: game trees get generated (heuristically)

and positions get evaluated (heuristically) so a move can be
selected and made. Yet chess, human chess anyway, is more than a
sequence of moves; the moves are selected to help fulfill a
strategy. Let me next employ the thoughts of Botvinnik
<p.7--*R3>: "...the [chess] program must be modelled on human
thought processes." It seems to me that what is needed is a
second problem space for (intelligent) chess programs, call it a
Strategy Selection space. In the second space, a strategy is
selected (say, King-side attack), then it is passed to the first
problem space (Move Selection), perhaps in the form of specifying
certain parameters (e.g., a depth bound, an evaluation function, a
plausible move generator). That is, the specifics of choice of
move should depend upon what strategy one is trying to follow.

One could argue that strategy selection is implicit in the choice
of evaluation function, etc., but in reading the play of
human-computer chess games, I get the impression of disjointed
play on the part of the computer. It does not seem to smoothly
flow. One could also argue that there is but one strategy, namely
to obtain checkmate. Yet this is as non-operational as a
corporation which announces it will act so as to maximize its long
term profit. At least the firm has the good sense to produce 5
year and 10 year plans and to produce annual targets based upon
those plans. Should not chess programs also produce and utilize
realizable strategic plans? One might also contend that
researchers are attempting to build in "strategic" and "long-range
planning" into chess programs. Botvinnik <p. 81--*R3> (or perhaps
Krinitski, or the translator Brown) feels that long-range planning
could be enhanced if the goal were adopted of "...strengthen[ing]
oneself rather than gain[ing] immediate material advantage." This
may improve long-range planning, but it certainly is not the
real-time selection of a strategy.

Let me heroically suppose that I have convinced you of the need
for a second problem space for Strategy Selection. What would
ensue therein? In that problem space, a determination would be
made of several items; stage of the game (opening--e.g., no major
pieces moved, midgame--e.g., Queen moved, endgame--e.g., both
Queens off the board), state of the game (e.g., White is ahead by
2 pawns), history list of previously employed strategy (to provide
some possible continuity), and an estimate of the opponent's
strategy. These estimates would then be linked, via a decision
process, to a strategy (e.g., an attack, the development of
pieces, the coordination of pieces, obtaining or maintaining
control of the center, responding to an attack, guarding a
position, etc.). Since there are various tactics or plans by
which any strategy could be accomplished, a second decision
process might be employed to select a currently feasible plan.

It appears then that the major obstacles to be overcome in using
this approach would be these: (i) the development of the list of

alternative strategies to be considered; similarly, plans or
tactics for each alternative might be developed, (ii) the features
of the game and opponent to be "noticed", (iii) how the choice of
a strategy influences search in the Move Selection problem space,
and (iv) what decision process is used to relate the features of
the game to the choice of a strategy. (My own research has been
concerned with decision processes of this sort; see <*R4>. For
one of the better articles discussing choice of corporate
strategy, see <*R5>).

As an illustration of the use of decision process models in the
study of strategy selection, refer to the paradigm of games
against an uncertain nature, first stated by Von Neumann and
Morgenstern <*R6>. For such games, there exist a number of
different decision rules by which to select an action, e.g.,
maximax, maximin, minimax regret, etc. One can interpret these
choice procedures as representing different strategies of play,
e.g., the first is an optimistic one, the second is pessimistic,
the third is ex post facto pessimistic, etc. Finally, given these
several different strategies, Tuggle et al <*R4> offer an
information processing simulation model of a subject selecting
from a given set of alternative strategies. So it is possible to
produce mechanisms which intelligently select from a set of
strategies.

Now that you have seen the substance of this second, rather
lengthy comment, let me briefly address some related issues. The
above idea (of a second problem space) has some loose connections
to the CP-1 program of Newell, Shaw, and Simon <*R7>, though it is
clearly distinct from the ideas behind CP-1. That program was
more of a "simulation of human thought" type than the others of
its day; likewise, use of the second problem space method would
(presumably) continue the tradition.

. Zobrist and Carlson's <*R8> intriguing advice-taking chess program
might be further improved if it could be given strategic as well
as tactical advice (their program apparently is only receptive to
tactical advice such as "keep your knights off the edge of the
board".) It might also be cleaner conceptually to separate the
program into two problem spaces.

Another way to interpret my two problem space suggestion is to
view it as yet another heuristic; i.e., it should not be adopted
until its benefits (strength of game played) are shown to outweigh
its costs (increased processing time). My beliefs on this matter
should be obvious (and I try to shore up their plausibility in the
next paragraph), but, again, Botvinnik <p. xiii--*R3> goes to the
crux: "the word is quickly spoken, but the deed takes longer."
Ergo, I may be forced to write my own chess playing program.
(Never having written a chess playing program, I am unexperienced
in the practical difficulties that occur and the pragmatic

compromises that must be effected, but at the same time, I have been able to maintain a sense of perspective over such programs, remaining a detached, objective observer.)

Lastly, anyone reading this who is even remotely linked to the "simulation of human thought" field will see another level to my comments. I am really suggesting that human thought, as regards problem-solving and allied cognitive activities, occurs in two problem spaces--one in which the problem is actually solved (or attempted), and one in which progress on the problem is monitored, solution strategies are selected for use, etc. Based on the evidence Newell and Simon <*R2> present, the residence times in the second problem space for most of their subjects is pretty minimal. (However, see the protocol of S8 on pp. 367-374 and their discussion of it on preceding pages. One can find several behaviors on his (S8's) part consistent with this idea of monitoring problem-solving progress, e.g., B13-B15, B110-B121, B131-B133, etc.) But investigations of human play of chess, human behavior on "impossible" problems, and human behavior on problems that admit many strategies (e.g., decision problems) may disclose the empirical validity (or falsity) of my contentions.

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<R1> Gillogly, J. J., "The Technology Chess Program," ARTIFICIAL INTELLIGENCE, Vol. 3, No. 3, Fall 1972, pp. 145-163.

<R2> Newell, A. and Simon, H. A., HUMAN PROBLEM SOLVING, (Prentice-Hall, 1972).

<R3> Botvinnik, M. M., COMPUTERS, CHESS, AND LONG RANGE PLANNING, (Springer-Verlag, 1970).

<R4> Tuggle, F. D., Barron, F. H., and Day, R. O., "Simulation of an Individual Making Decisions Under Uncertainty," PROCEEDINGS 1973 WINTER SIMULATION CONFERENCE, January 1973, pp. 13-31.

<R5> Cohen, K. J. and Cyert, R. M., "Strategy: Formulation, Implementation, and Monitoring," JOURNAL OF BUSINESS, Vol, 46, No. 3, July 1973, pp. 349-367.

<R6> Von Neumann, J. and Morgenstern, O., THEORY OF GAMES AND ECONOMIC BEHAVIOR (Princeton, 1944).

<R7> Newell, A., Shaw, J. C., and Simon, H. A., "Chess Playing Programs and the Problem of Complexity," in Feigenbaum and Feldman (eds.), COMPUTERS AND THOUGHT, (McGraw-Hill, 1963), pp. 39-70.

<R8> Zobrist, A. L. and Carlson, F. R., Jr., "An Advice-Taking Chess Computer," SCIENTIFIC AMERICAN, Vol. 228, No. 6, June 1973, pp. 92-105.

CONFERENCES

8

1. 2nd MILWAUKEE SYMPOSIUM ON AUTOMATIC CONTROL
March 29-30, 1974
The University of Wisconsin at Milwaukee
Milwaukee, Wisconsin

8a

Papers are being accepted on artificial intelligence, robotic
systems, and speech processing.

Contact: Dr. Richard A. Northouse, Program Chairman
            MSAC-74
            Electrical Engineering Department
            University of Wisconsin at Milwaukee
            Milwaukee, Wisconsin 53201

2. 2nd EUROPEAN MEETING ON CYBERNETICS AND SYSTEMS RESEARCH
April 16-19, 1974
Vienna, Austria

8b

Contact: Dr. Robert Trappl, President
            Austrian Society for Cybernetic Studies
            Schottengasse 3
            A-1010 Wien 1, Austria

3. 12th ANNUAL SIGCPR (COMPUTER PERSONNEL RESEARCH) CONFERENCE
July 18-19, 1974
Colorado University

8c

Contact: Robert W. Reinstedt, Chairman
            SIGCPR Conference
            RAND Corporation
            1700 Main Street
            Santa Monica, California 90406

4. FIRST ANNOUNCEMENT OF THE 2nd INTERNATIONAL JOINT CONFERENCE ON
PATTERN RECOGNITION
August 13-15, 1974
Copenhagen, Denmark

8d

The Second International Joint Conference on Pattern Recognition
will take place in Copenhagen in August 1974 under the
chairmanship of Professor C. J. D. M. Verhagen, Delft University
of Technology, The Netherlands. The Conference will cover all
aspects of theoretical and applied pattern recognition. Papers on
industrial applications, feature extraction, image processing, and
scene analysis are particularly welcomed. It is intended that
there will be a special session on pattern recognition applied to
urban environmental problems. In addition to invited papers,
there will be submitted papers of 10 and 25 minutes duration;
also, sessions are planned for student papers and presentation of

last minute results. The deadline for submission of first drafts
of papers is March 15, 1974. Authors will be notified by May 1 as
to acceptance of their papers. Camera-ready copies must be
submitted before June 15. Excursions will be arranged and a
Ladies Program is being planned.

Additional information may be obtained from:

    Mr. E. Backer
    E. E. Department
    Delft University of Technology
    Delft, The Netherlands

5. 5TH INTERDISCIPLINARY MEETING ON STRUCTURAL LEARNING
April 20-21 1974
University of Pennsylvania at Philadelphia   8e

    (Post-sessions are scheduled for April 22-23, 1974.) The meeting
    will emphasize multidisciplinary contributions of a theoretical
    and empirical nature with implications for behavioral science and
    for education. Individuals proposing contributions or wishing to
    attend the meetings should contact:

    Joseph M. Scadura
    University of Pennsylvania
    3700 Walnut Street
    Philadelphia, Pensylvania

6. CALL FOR PAPERS: 8TH PRINCETON CONFERENCE ON INFORMATION SCIENCES
AND SYSTEMS
March 28-29, 1974
Princeton University, Princeton, New Jersey   8f

    Authors are invited to submit abstracts and summaries for
    consideration by January 11, 1974 to

    Prof. M. E. Van Valkenberg
    Princeton Conference Program Director
    Department of Electrical Engineering
    Princeton University
    Princeton, New Jersey   08540

Special sessions are planned this year for the following topics:
Applications of error correcting codes, source encoding, games and
decision making, picture processing, computer system theory,
theory of intractable problems, transporatation systems, energy
systems, state estimation, computer control, and resource planning
and management. Papers need not nesessarily be in these areas to
receive consideration.

7. CONFERENCE ON COMPUTER GRAPHICS AND INTERACTIVE TECHNIQUES
July 15-17, 1974
The University of Colorado at Boulder   8g

    Contact: Robert L. Schiffman
               Computing Center
               University of Colorado
               Boulder, Colorado 80302

8. EUROPEAN AISB SCIENTIFIC MEETING   8h

A one-day meeting will be held at the University of Edinburgh on
Saturday, 5 January, 1974. The meeting, which is open to both
members and non-members of the AISB will last from 9:30 A.M. to
6:00 P.M.

There will be four talks, followed by discussion, viz:

    'World Models for Blind Robots', by Dr. M. H. E. Larcombe, of
    the School of Computer science, University of Warwick.

    'Problem Solving, And-Or Graphs, and Dynamic Programming', by
    Dr. U. Montanari, of the Instituto di Elaborazione della
    Informazione, Pisa.

    'Problem-Solving Paradigms', by Dr. R. Kowalski, of the
    Department of Computational Logic, University of Edinburgh.

    The fourth talk will probably be on structured programming by
    Professor Dijkstra, of the Department of Mathematics,
    Technische Hogeschol, Eindhoven.

The registration fee of 4.00 will include lunch. Unfortunately,
the University is unable to provide accommodation, but details of
hotels and guest-houses in the Edinburgh area will be sent to
prospective participants.

Further details are available from Lesley Daniel.

Those wishing to attend should send their fee to: -

    Mrs. Lesley Daniel
    Department of Computational Logic
    School of Artificial Intelligence
    University of Edinburgh
    9 Hope Park Square, Meadow Lane
    Edinburgh, EH8 9 NW
    Scotland

9. EUROPEAN ARTIFICIAL INTELLIGENCE AND SIMULATION OF BEHAVIOR (AISB)
STUDY GROUP
7-10 July 1974
University of Sussex, Brighton, England

CALL FOR PAPERS

Papers are requested from any of the following major research
areas associated with Artificial Intelligence:

Natural-Language Understanding (Text and Speech)
Heuristic Problem Solving and Game Playing
Automatic Program Writing
Computer Perception (especially vision)
Artificial Intelligence and Psychology
Robots
Theoretical Foundations of Artificial Intelligence
Special Hardware and Software for AI
Applications of Artificial Intelligence
Social Consequences of AI

(It has been decided not to accept papers dealing with statistical
pattern-recognition techniques, clustering procedures,
alphanumeric text recognition, and such like, since these topics
seem to be adequately covered by their own special conferences.)

Complete manuscripts must be received by 1 February 1974. Authors
should submit three copies in final draft form, typewritten,
double-spaced, with a maximum of ten pages including figures
(about 3000 words); a 100-word abstract and a set of descriptive
terms characterizing the content should be included.

Each paper will be reviewed; acceptable papers will be returned to
the authors by March 30, 1974 for recommended modifications and
for retyping on special pages that can be reproduced
photographically or by stencil. Final versions of accepted papers
will be due by May 15, 1974.

Besides submitted papers, the conference will feature tutorial
talks on current topics in AI, special informal discussion
sessions, and films.

A preprint volume containing the papers to be presented at the
conference will be distributed to attendees. There will be no
hard cover volume of these papers published. The conference
committee has no objections to conference authors submitting their
papers for publication elsewhere, provided that the paper contains
a statement that it was previously presented at AISB.

General enquiries about the Conference should be directed to:

Dr. K. Oatley
General Chairman, AISB Summer Conference, 74
Laboratory of Experimental Psychology
University of Sussex
Brighton, Sussex BN1 9QG,
England, U.K.

Manuscripts and enquiries about the program should be directed to:

Dr. H. G. Barrow
Program Chairman, AISB Summer Conference, 74
School of Artificial Intelligence
University of Edinburgh
Hope Park Square, Meadow Lane
Edinburgh, Eh8 9NW
Scotland

Reservations to attend the Conference should be made by writing
to:

Dr. Margaret Boden
School of Social Sciences
University of Sussex
Brighton, Sussex BN1 9QG
England, U.K.

enclosing a conference fee of 4.00 for non-members of AISB,
or   3.00 for members of AISB. This fee will entitle registered
participants to attend the sessions, and to receive the booklet of
pre-circulated papers. Those wishing to stay at the University
will be expected to arrive during the evening of 7 July (though no
meal will be provided on that evening) and leave after lunch on 10
July. The total charge for accommodation and meals will be of the
order of 14.00 (including VAT), payable on arrival. Application
and payment of conference fees should be made as soon as possible,
and preferably not later than 30 March 1974. Reservations for
accommodations can be accepted between this time and 15 June 1974
with a surcharge of 1.00. We unfortunately cannot guarantee
accommodation to people applying after 15 June.

BOOK REVIEW   9

PURPOSIVE EXPLANATION IN PSYCHOLOGY
by
Margaret A. Boden
Harvard University Press
Cambridge Massachusetts, 1972   9a

Reviewed by Kenneth Mark Colby of the Stanford University AI Project   9b

   Artificial Intelligence is a type of theoretical psychology
studying mental symbol-processing functions in living and
nonliving, real and abstract systems. Psychology's methods have
been limited to experimental, survey, mathematical, interview, and
participant-observation approaches. AI adds a new formal method
in which theories are cast in the formalism of a programming
language. Many workers in AI lack knowledge about psychological
theories relevant to their interest. This is the perfect book for
them.

   Boden, a Lecturer in psychology and philosophy at the University
of Sussex, England, provides a thorough and authoritative analysis
of the concept of purpose which is fundamental in explaining both
human behavior and the behavior of computer models emulating or
simulating it. A great puzzle of the past, how final causes or
purposes or goals can determine behavior, now becomes clear if one
takes computer models as the key analogy. For it is not the
goal-state, which has not yet come into being, which determines
behavior but a system's CONCEPT or MODEL of the goal-state which
directs its behavior. A convincing argument is then made to show
that teleological and mechanistic explanations are complementary,
and the latter cannot replace the former without losing
explanatory power.

   This scholarly work is packed with information not only about
psychological issues central to AI, but also about surrounding and
beclouded philosophical problems. Our philosophy and even
metaphysics should be clear to us because they influence the
system of concepts we choose in trying to understand the world.

   Some of Dreyfus' inanities and confusions are dealt with firmly
and without malice; for example, his confounding of a symbolic
code with the information coded. Boden suggess McDougall's theory
of the mind as an example of a rich theory to be simulated. I
would have some reservations about this task, but only because the
theory seems too holistic. Model building involves a strategy of
simplification and partial approximation by investigating
part-processes. But it may be that in case of the mind, we will
need all the parts or most of them to have an adequate simulation.

I not only highly recommend this book--I would insist that any AI
theoretician worthy of the name must be familiar with it, and the
issues it addresses. My one criticism is directed at the
publisher who stodgily sticks to the convention of putting the
notes at the end of the book, requiring a serious reader to keep
fingers in three positions as he awkwardly flips back and forth
between text, notes, and bibliography.

** **

AI IN OTHER MEDIA   10

1. "The Robot Who Looked Like Me" short story by Robert Sheckley,
COSMOPOLITAN MAGAZINE, pp. 192-195, August 1973. (An updated tale of
infatuated androids.)   10a

2. "Do Androids Dream of Electric Sheep?" paperback novel by Philip
K. Dick (Panther Books Ltd., 1972).   10b

3. "Murder in the Computer" ABC-TV late night movie, Tuesday,
December 4, 1973. Garry Merrill plays a science writer who is one of
six suspects in the murder of a computer genius. The computer plays
chess and wins   Look for the Summer rerun in 1974.   10c

ABSTRACTS

ON LOCATING OBJECTS BY THEIR DISTINGUISHING FEATURES IN MULTISENSORY
IMAGES
by
Jay M. Tenenbaum
SRI Artificial Intelligence Center
Technical Note 84, September 1973

This paper reports preliminary work on a knowledge-based
perceptual system for a robot that must function in an actual
office environment. This system is distinguished by the following
pragmatic considerations:

1.   It is designed to find specific objects needed by the robot
in the performance of a task rather than attempting the usually
unnecessary and very much harder job of completely describing
an environment of potentially overwhelming complexity.

2.   It is based on the premise that in real scenes there is a
sufficient redundancy of perceptual clues, as well as
contextual constraints among objects, so that an intelligent
system can devise a relatively simple strategy for
distinguishing the specific objects of interest from others
likely to be present.

3.   It relies heavily on multisensory (i.e., color and range)
data to increase the likelihood of finding distinguishing
surface attributes for a particular object. Similarly,
detailed descriptive representations for complex attributes
(e.g., shape and color) are avoided in favor of the simplest
representations sufficient to distinguish the object of
interest.

       (Presented at the Japanese/American Seminar on Picture
       Processing and Scenee Analysis, Kyoto, Japan.)

COMPUTATION AND DEDUCTION
by
P. J. Hays
Essex University, England
(Appeared in Proceedings of The 2nd MFCS Symposium, Czechoslovakian
Academy of Sciences, 1971)

I argue that the usual sharp distinction that is made between the
processes of computation and deduction, is misleading. An
intepreter for a programming language and a theorem-proving
program for a logical language are structurally indistinguishable.

Important benefits, both practical and theoretical, are obtained
by combining the best of both methodologies. On the one hand,
looking upon the activity of a programming language interpreter as
being the generation of proofs of statements often clarifies the
semantic structure of the language and allows the design of more
efficient interpreters. On the other hand, regarding a
theorem-prover as a device which is to be PROGRAMMED (i.e., whose
behavior is to be CONTROLLED by its input language), enables the
considerable body of work on computational logic technique to be
put to practical use in Computer Science, and especially in
Artificial Intelligence (AI) applications. In particular, one
obtains a new perspective upon problem-solving languages such as
PLANNER (Hewitt 1971) and CONNIVER (Sussman & McDermott 1972).

More specifically: I argue that computation is best regarded as a
process of CONTROLLED deduction. It will be furter argued that
the two aspects (specifying the base logic and specifying the
control mechanism) of programming are best seperated explicitly,
as the kinds of language involved have quite distinct semantics.
Of course, a theorem-proving program also engages in a process of
controlled deduction of consequences of its inputs. The
outstanding difference between a conventional theorem-proving
program and a conventional interpreter is that in the latter case
the control is part of the input statement supplied by the user,
while in the former case it is fixed in the program. The
techniques of computational logic in no way depend upon this
limited notion of control, however. It is the METHODOLOGY of
conventional theorem-proving which is responsible for this
restriction, and which is here rejected.

The ideas expounded here are the foundation of a research project
begun at Edinburgh and now underway at Essex University. The
practcal aim of this work is the design and implementation of a
new programming-logical system, called GOLUX <*R1>, suitable for
AI work and complex non-numerical computing generally. In part,
therefore, this paper is a progress report on GOLUX.

<R1> "I am the Golux," said the Golux proudly, "the only Golux in
the world, and not a mere device." from THE 13 CLOCKS by James
Thurber.

THE LOGICIANS' FOLLY
by
D. Bruce Anderson
Department of Machine Intelligence
and
Patrick J. Hayes
Department of Computational Logic
University of Edinburgh   11c

Among claims made for the usefulness of theorem-proving to A.I.
are that it will enable computers to do formal mathematics (via
logic) and that its methods are useful for robot reasoning. We
believe that the techniques developed in this field, and indeed
any techniques which could be developed by its current methodology
(so aptly described as 'Computational Logic') are not useful in
either of these ways, though in this paper we argue mainly the
latter point. Robot reasoning is central to our philosophy of
artificial intelligence - and there seems to be no doubt that
knowledge of how to construct a machine which can reason about and
act in the real world as well as converse about itself in natural
language is a necessary (but not sufficient) condition for
achieving a real artificial intelligence.

AN EFFICIENT UNIFICATION ALGORITHM
by
Lewis Denver Baxter
Technical Report CS-73-23
Department of Applied Analysis and Computer Science
University of Waterloo
Waterloo, Ontario, Canada   11d

In "Machine Intelligence" vol. 6, Robinson gives an implementation
of the unification algorithm which is the basic pattern matching
procedure used in computational logic. He purports that his
method is "very close to maximal efficiency." However, in this
paper, it is shown that his method requires exponential amounts of
resources.

Also, an efficient algorithm to unify sets of expressions of first
order logic is presented. The algorithm consists of a simplifying
transformational phase followed by a (topological) sorting phase.
The space required to implement this efficient algorithm is linear
in relation to L, the length of the input. It is conjectured that
the time requirement is $O(L \log L)$, however, a precise estimate is
difficult to make due to a connection with the equivalence
algorithm.

INFERENCE AND THE COMPUTER UNDERSTANDING OF NATURAL LANGUAGE
by
Roger C. Schank
Report No. CS358
Computer Science Department
Stanford University
Stanford, California

11e

The problem of inference and how it affects language understanding
is discussed. Ten classes of inference are isolated. A program
that accomplishes a limited class of inference tasks from a
natural language input is described.

THE FOURTEEN PRIMITIVE ACTIONS AND THEIR INFERENCES
by
Roger C. Schank
Report No. CS344
Computer Science Department
Stanford University
Stanford, California

11f

In order to represent the conceptual information underlying a
natural language sentence, a conceptual structure has been
established that uses the basic actor-action-object framework. It
was the intent that these structures have only one representation
for one meaning, regardless of the semantic form of the sentence
being represented. Actions were reduced to their basic parts so
as to affect this. It was found that only fourteen basic actions
were needed as building blocks by which all verbs can be
represented. Each of these actions has a set of actions or states
which can be inferred when they are present.

THE DEVELOPMENT OF CONCEPTUAL STRUCTURES IN CHILDREN
by
Roger C. Schank
Report No. CS369
Computer Science Department
Stanford University
Stanford, California

11g

Previous papers by the author have hypothesized that it is
possible to represent the meaning of natural language sentences
using a framework which has only fourteen primitive acts. This
paper addresses the problem of when and how these acts might be
learned by children. The speech of a child of age 2 is examined
for possible knowledge of the primitive acts as well as the
conceptual relations underlying language. It is shown that there

is evidence that the conceptual structures underlying language are
probably complete by age 2.   Next a child is studied from birth to
age 1.   The emergence of the primitive acts and the conceptual
relations is traced.   The hypothesis is made that the structures
that underlie and are necessary for language are present by age 1.

THE GOALS OF LINGUISTIC THEORY REVISITED
by
Roger C. Schank and Yorick Wilks
Report No. CS368
Computer Science Department
Stanford University
Stanford, California   11h

We examine the original goals of generative linguistic theory. We
suggest that these goals were well defined but misguided with
respect to their avoidance of the problem of modelling
performance. With developments such as Generative Semantics, it
is no longer clear that the goals are clearly defined. We argue
that it is vital for linguistics to concern itself with the
procedures that humans use in language. We then introduce a
number of basic human competencies, in the field of language
understanding, understanding in context and the use of inferential
information, and argue that the modelling of these aspects of
language understanding requires procedures of a sort that cannot
be easily accommodated within the dominant paradigm.   In
particular, we argue that the procedures that will be required in
these cases ought to be linguistic, and that the simple-minded
importation of techniques from logic may create a linguistics in
which there can not be procedures of the required sort.

PREFERENCE SEMANTICS
by
Yorick Wilks
Report No. CS377
Computer Science Department
Stanford University
Stanford, California   11i

Preference semantics [PS] is a set of formal procedures for
representing the meaning structure of natural language, with a
view to embodying that structure within a system that can be said
to understand, rather than within what I would call the
derivational paradigm, of the transformational grammer [TG] and
generative semantics [GS], which seeks to determine the
well-formedness, or otherwise, of sentences. I outline a system
of preference semantics that does this: for each phrase or clause

of a complex sentence, the system builds up a network of lexical
trees with the aid of structured items called templates and, at
the next level, it structures those networks with higher level
items called paraplates and common-sense inference rules. At each
stage the system directs itself towards the correct network by
always opting for the most "semantically dense" one it can
construct. I suggest that this opting for the "greatest semantic
density" can be seen as an interpretation of Joos' "Semantic Axiom
Number 1." I argue that the analysis of quite simple examples
requires the use of inductive rules of inference which cannot,
theoretically cannot, be accommodated within the derivational
paradigm. I contrast this derivational paradigm of language
processing with the artificial intelligence paradigm.

THE CONCEPT OF A LINGUISTIC VARIABLE AND ITS APPLICATION TO
APPROXIMATE REASONING
by
L. A. Zadeh
Memorandum No. ERL-M411 (170 pp.), October 15, 1973
Department of Electrical Engineering and Computer Sciences
University of California at Berkeley   11j

By a linguistic variable we mean a variable whose values are words
or sentences in a natural or artificial language. For example,
"age" is a linguistic variable if its values are linguistic rather
than numerical, i.e., young, not young, very young, quite young,
old, not very old and not very young, etc., rather than 20, 21,
22, 23,... .

In more specific terms, a linguistic variable is characterized by
a quintuple (, T( ), U,G,M) in which   is the name of the
variable; T( ) is the term-set of   , that is, the collection
of its linguistic values; U is a universe of discourse; G is a
syntactic rule which generates the terms in T( ); and M is a
semantic rule which associates with each linguistic value X its
meaning, M(X), where M(X) denotes a fuzzy subset of U.

The meaning of a linguistic value X is characterized by a
compatibility function, $c : U \rightarrow [0,1]$, which associates with each
u in U its compatibility with X. Thus, the compatibility of age
27 with young might be 0.7 while that of 35 might be 0.2. The
function of the semantic rule is to relate the compatibilities of
the so-called primary terms in a composite linguistic value -
e.g., young and old in not very young and not very old - to the
compatibility of the composite value. To this end, the hedges
such as very, quite, extremely, etc., as well as the connectives
And and Or are treated as nonlinear operators which modify the
meaning of their operands in a specified fashion.

The concept of a linguistic variable provides a means of
approximate characterization of phenomena which are too complex or
too ill-defined to be amenable to description in conventional
quantitative terms. In particular, treating Truth as a linguistic
variable with values such as true, very true, completely true, not
very true, untrue, etc., leads to what is called fuzzy logic. By
providing a basis for approximate reasoning, that is, a mode of
reasoning which is not exact nor very inexact, such logic may
offer a more realistic framework for human reasoning than the
traditional two-valued logic.

It is shown that probabilities, too, can be treated as linguistic
variables with values such as likely, very likely, unlikely, etc.
Computation with linguistic probabilities requires the solution of
nonlinear programs and leads to results which are imprecise to the
same degree as the underlying probabilities.

The main applications of the linguistic approach lie in the realm
of humanistic systems - especially in the fields of artificial
intelligence, linguistics, human decision processes, pattern
recognition, psychology, law, medical diagnosis, information
retrieval, economics, and related areas.

SEMANTIC MEMORY OF A PROBLEM SOLVER GENERATOR
by
Franco Sorovich
Computer Science Department
Carnegie-Mellon University
Pittsburgh, Pennsylvania   11k

This paper is concerned with computer semantic memory, i.e., with
the problem of representing general knowledge about a given world.
The semantic memory issue is raised in the context of the problem
of machine learning of heuristics, and the connection with the
problem of machine representation of knowledge is emphasized. A
brief overview is made of what is known about the mechanisms
responsible for the observed human memory behavior. The
guidelines for the implementation of a sematic memory are
presented. The problem of knowledge representation is tackled in
its general form, so that the proposed semantic memory may be of
interest also in other fields, like natural language
understanding, question answering, or theorem proving.

A MODEL FOR ADAPTIVE PROBLEM SOLVING APPLIED TO NATURAL LANGUAGE
ACQUISITION
by
Larry R. Harris
Ph.D. Thesis, TR-133
Computer Science Department
Cornell University
Ithaca, New York   11l

Adaptive problem solving is the application of artificial
intelligence learning techniques to practical problems.   The
approach taken in studying Adaptive Problem Solving is three-fold.
First, to develop a model for Adaptive Problem Solving in order to
specify the processes involved in computer learning, as well as
the interaction between these processes.   Second, theoretically
well-founded, practical algorithms are developed for each of these
learning processes.   Third, as an application of these theories,
the Natural Language Acquisition Problem is formulated in terms of
the adaptive model.

The specification of algorithms to perform learning processes
leads to the development of a Bandwidth Heuristic Search, an
extension of heuristic search, that includes many practical
considerations without forfeiting any theoretical capabilities.   A
modification of this algorithm, the Bandwidth Heuristic Search for
Min/Max trees, is shown to be superior to the   -   minimax
process.

INFANTS IN CHILDREN'S STORIES - TOWARDS A MODEL OF NATURAL LANGUAGE
COMPREHENSION
by
Garry S. Meyer
M.I.T. AI Memo No. 265, August 1972
Massachusetts Institute of Technology
Cambridge, Massachusetts   11m

How can we construct a program that will understand stories that
children would normally understand? By understand we mean the
ability to answer questions about that story. Here we are
interested in the understanding of natural language in a very
broad area. In particular, how does one understand stories about
infants? We propose a system which answers such questions by
relating the story to background real-world knowledge. We make
use of the general model proposed by Eugene Charniak in his Ph.D.
thesis. The model sets up expectations which can be used to help
answer questions about the story. There is a set of routines
called BASE routines that correspond to our "real world knowledge"
and routines that are "put in," called DEMONs, that correspond to

contextual information. Context can help to assign a particular
meaning to an ambiguous word or pronoun.

The problem of formalizing our real-world knowledge to fit into
the model is the primary problem here. I discuss a first-level
attack on formalizing information about infants and then baby
bottles. The contrast between the two leads me to suggest that
the same methods can not be used for both inanimate and animate
objects. Finally, I outline how a finite-state model of infant
behavior can be used to understand infants in children's stories
better.

A COMPUTER MODEL OF SIMPLE FORMS OF LEARNING IN INFANTS
by
Thomas L. Jones
Graduate School of Business
Howard University
Washington, D.C.
(In Proceedings of the AFIPS 1972 Spring Joint Computer Conference,
p. 885.)

11n

A major obstacle in artificial intelligence research has been the
cost and difficulty of writing large computer programs. We would
like the computer to program itself based on its experience.
There has been extensive research on machine learning; this report
describes a new form of machine learning, i.e., program learning,
in which a subroutine called an experience-driven compiler is
used.

The system solves causality-chain problems of the type solved by
human infants; thus, it constitutes a synthesis of artificial
intelligence and developmental psychology. The system exhibits
several forms of learning considered fundamental by psychologists,
including operant conditioning, discrimination learning, and
behavior chaining. A detailed proposal for a second version of
the system, with higher capability, is available from the author.

AN INFORMATION PROCESSING THEORY OF ASPECTS OF THE DEVELOPMENT OF
WEIGHT SERIATION IN CHILDREN (REV.)
by
George W. Baylor and Jean Gascon
Psychology Department
University of Montreal
M.C.P. #14 July 1973
(To appear in COGNITIVE PSYCHOLOGY, Vol. 6, 1974.)

11o

Children varying in age from 6 to 11 years were video-tape

recorded while trying to seriate seven blocks according to weight
with the aid of a scale. The typical behavior patterns that
Piaget first described for the stages of intellectual development
on this task were observed. Our protocols are analyzed in terms
of stage specific base strategies coupled with a mechanism for
translating them into task specific production systems. The
actual simulation programs, written as production systems in a
specially constructed language, BG, are evaluated in terms of how
well they regenerate the protocols.

LITERARY TEXT PROCESSING
by
Sally Yeates Sedelow
University of Kansas
Lawrence, Kansas   11p

    To date, computer-based literary text processing bears much
    greater similarity to techniques used for information retrieval
    and, to some degree, for question-answering, than it does to
    techniques used in, for example, machine translation of
    'classical' artificial intelligence. A literary text is treated
    not as 'output' in a process to be emulated nor as a string to be
    transformed into an equivalent verbal representation, but, rather,
    as an artifact to be analyzed and described.

    The absence of process as an integrating concept in computer-based
    literary text processing leads to very different definitions of
    linguistic domains (such as semantics and syntactics) than is the
    case with, for example, artificial intelligence. This
    presentation explores some of these distinctions, as well as some
    of the implications of more process-oriented techniques for
    literary text processing.

TYPES OF PROCESSES ON COGNITIVE NETWORKS
by
David G. Hays
State University of New York at Buffalo   11q

    The main storage area in a computer simulation of human thought is
    often organized as a network. Numerous investigators have
    recently put forth diverse views of the basic issues in network
    design, of which the first is What types of nodes and arcs are
    admitted? Recognition of this issue can only lead, however, to
    the awareness of a more basic problem, namely, What kind of
    evidence would influence the design of cognitive networks? For
    some investigators, practical effectiveness is the sole
    consideration; their field is artificial intelligence, and their

purpose is to write computer programs that can be used with
profit.   For others, the evidence must ultimately come from
observation of human beings, on the level of gross behavior or,
ultimately, on the level of microscopic activity in the nervous
system.

(Prepared for the 1973 International Conference on Computational
Linguistics, Pisa, August 27 - September 1, 1973.)

LINGUISTICS AND THE FUTURE OF COMPUTATION
by
David G. Hays
State University of New York at Buffalo   11r

My subject is the art of computation: computer architecture,
computer programming, and computer application.   Linguistics
provides the ideas, but the use I make of them is not the
linguist's use, which would be an attempt at understanding the
nature of man and of human communication, but the computer
scientist's use.   In ancient India, the study of language held the
place in science that mathematics has always held in the West.
Knowledge was organized according to the best known linguistic
principles.   If we had taken that path, we would have arrived
today at a different science.   Our scholarship draws its
principles from sources close to linguistics, to be sure, but our
science has rather limited itself to a basis in Newtonian
calculus.   And so a chasm separates two cultures.

PROGRESS IN COMPUTING TECHNOLOGY AND RESEARCH IN ARTIFICIAL
INTELLIGENCE
by
Nicholas V. Findler
Department of Computer Science
State University of New York at Buffalo
Amhurst, New York   11s

An attempt is made in this paper to show how and why work in
Artificial Intelligence contributes to progress in computing
technology in general.   The objectives of two on-going research
projects are outlined as illustrative examples. Finally, it is
argued that the categories set up in the recent Lighthill report
are arbitrary, counterproductive and, for a large number of
projects, unusable.

HEURISTIC PROGRAMMERS AND THEIR GAMBLING MACHINES
by
Nicholas V. Findler, Heinz Klein, R. Channing Johnson, Alexander
Kowal, Zachary Levine, and John Menig
Department of Computer Science
State University of New York at Buffalo
Amherst, New York   11t

Following our paper given at the IFIP Congress 71, another
progress report is presented of our ongoing research efforts aimed
at human decision making under uncertainty and risk. We have
studied many aspects of human and machine learning processes,
inductive and deductive inference-making methods, how heuristic
rules are formed and optimized by human players, and how similar
results can be arrived at by machines. Although the
investigations have been within the general framework of the game
of Poker, our findings are considered to have a rather wide range
of applicability. Also, the complex information processing system
at hand incorporates both normative and descriptive theories of
certain human behavior. Finally, the results of some empirical
explorations are followed by an account of present and planned
activities.

THE INTERPRETATION OF MASS SPECTROMETRY DATA USING CLUSTER ANALYSIS
by
Stephen R. Heller, Chin L. Chang, Heuristics Laboratory
Kenneth L. Chu, Computer Science Laboratory
Division of Computer Research and Technology
National Institutes of Health
Bethesda, Maryland   11u

The application of a graph-theoretical method of cluster analysis
has been used to investigate the classificaton of mass spectral
data. The method, the shortest spanning path (SSP), has been used
to classify and characterize the mass spectra of straight-chain
monofunctional alkyl-thiol esters.

PATTERN RECOGNITION BY NEAREST NEIGHBOR CLASSIFIERS
by
Chin-Liang Chang
Division of Computer Research and Technology
National Institutes of Health
Bethesda, Maryland   11v

A nearest neighbor classifier is one which assigns a pattern to
the class of the nearest prototype. In this paper, an algorithm
is given to find prototypes for a nearest neighbor classifier.

The idea is to start with every sample in a training set as a
prototype, and then successively merge any two nearest prototypes
of the same class so long as the recognition rate is not
downgraded. The algorithm is very efficient. For example, when
it was applied to a training set of 514 cases of liver disease,
only 34 prototypes were found necessary to achieve the same
recognition rate as the one using the 514 samples of the training
set as prototypes. Furthermore, the number of prototypes need not
be specified beforehand in the algorithm.

SKELETON PLANNING SPACES FOR NON-NUMERIC HEURISTIC OPTIMIZATION
by
L. Siklossy and M. A. Maecker
The University of Texas at Austin
November 1973   TR-29   11w

The AFTERMATH system implements a heuristic technique for
improving long solutions (up to about 250 steps) for robot
planning problems. AFTERMATH transforms the given solution into a
skeleton solution that focuses attention on repetitious and
opposite moves. AFTERMATH attempts to obtain an alternate,
improved skeleton. From the alternate skeleton, an alternate
solution is built (if possible) to the original problem. If the
alternate solution is an improvement, AFTERMATH accepts it as
input, and cycles.

Although not guaranteeing optimality, AFTERMATH improves many
solutions, sometimes gradually in several cycles. Examples can be
built for which AFTERMATH obtains an arbitrarily large improvement
in one cycle.

COLLABORATIVE PROBLEM-SOLVING BETWEEN OPTIMISTIC AND PESSIMISTIC
PROBLEM-SOLVERS
by
L. Siklossy and J. Roach
The University of Texas at Austin
November 1973   TR-30   11x

An optimistic problem-solver assumes that a problem has a solution
and attempts to find such a solution. A pessimistic
problem-solver assumes that a problem has no solution, and tries
to prove this lack of a solution. When one of the problem-solvers
fails to achieve its goal, it is an indication that the other
problem-solver may succeed. Moreover, information may be
extracted from the failure to help the other problem-solver in its
success. In such a case, the two complementary systems are said
to collaborate.

We give examples of collaboration between an optimist, LAWALY, and
a pessimist, DISPROVER, which operate on worlds of simulated
robots. When collaborating, each system can solve more problems
than if it worked alone.

ENGLISH AS A COMMAND LANGUAGE FOR MACHINES AND THE SEMANTICS OF
"LEFT" AND "RIGHT"
by
Norman Sondheimer
Computer Sciences Department
University of Wisconsin-Madison
Madison, Wisconsin   11y

A speech-understanding system for man-machine communication in
unrestricted English is a distant goal. A more feasible task is
the development of systems for the control of machines. The
English in these command languages should be confinable to small
sets of words, simple sentences, and phrases. This should avoid
many problems but those of spatial reference would still remain.
These include the noncorrespondence of frames of reference and the
nonconformity of heuristics that identify the sides of objects.
This paper looks at the problems of understanding "left" and
"right" as examples of the general phenomena. Conclusions are
drawn from these problems that effect the structure of any command
language and the general hope for English-based command languages.

ENGLISH AS A VERY HIGH LEVEL LANGUAGE FOR SIMULATION PROGRAMMING
by
George E. Heidorn
IBM Thomas J. Watson Research Center
Yorktown Heights, New York
RC 4536 (#20187)
September 21, 1973   11z

An automatic programming system which produces simulation programs
from information obtained through natural language dialogue has
been implemented under CP/CMS on the IBM 360/67. In the current
version the information obtained from an English conversation
about a simple queuing problem is used to build a
language-independent entity-attribute-value data structure. From
this structure both an English description of the problem and a
GPSS simulation program for it can be produced. This processing
is done by a FORTRAN program which interprets sets of decoding and
encoding rules written in a specially developed grammar-rule
language. The paper includes a complete sample problem with a
discussion of its processing and examples of decoding and encoding
rules.

CLASSIFIED ADVERTISING   12

Situations Wanted: 12a

    Edward G. Yalow (Apt. 1-D; 45 Linden Blvd.; Brooklyn, New York
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He has a BS in Math and is finishing a Masters in Computer Science
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        Professor Bernard Meltzer
        Department of Computational Logic
        8 Hope Park Square
        Edinburgh EH8 9NW, SCOTLAND.

[Ed. Note: Classified advertising is accepted for positions wanted
or offered in the field of AI. We reserve the right to edit
unsolicited ad copy.]   12c

AI IN THE MOVIES
by
Steve Coles

13

WESTWORLD, one of the two films suggested to arrive in 1974 <*R1>, already appeared in late October 1973. The film, written and directed by Michael Crichton (Andromeda Strain, The Terminal Man <*R2>, Pursuit), stars Yul Brynner, Richard Benjamin, and James Brolin. Brynner plays the role of a "robot gunslinger" in a giant amusement park of the future styled after Disneyland. Guests pay $1000 a day to relive the excitement of the Old West, including the opportunity to engage the gunslinger in a showdown fight in which they are guaranteed to outdraw and kill it. The guarantee is somewhat dubious, however, since the alleged advertisement for Westworld says, "Boy, have we got a vacation for you...where nothing can possibly go worng."

13a

Perhaps the greatest disappointment in Westworld, however, is the total abandonment of intellectual standards by Michael Crichton in bringing the story premise to a logically coherent as well as visually exciting conclusion. From the time Westworld begins to disintegrate, the plot also begins to degenerate into a rising crescendo of internal inconsistencies with ruthless violence seemingly the only message. It seems strange that inconseqential perturbations in the script (that could not possibly have influenced the films success or failure in the market place, but which could have salvaged its internal consistency) were not made by a man who I know should know better (He has an M.D. degree from Harvard). I counted at last a dozen instances of this sort, ranging from the implausibility of mechanical systems subject to a biological-style epedemic infection to the unlikely prospect that a gunslinger robot could easily drink a shot of wiskey at the bar (at the beginning of the film) while a female android, based on the same technology, could not (at the end of the film) take even a sip of water without going up like a Christmas tree of electrical sparks. Maybe next time Crichton treats the subject of robots in a film or novel he will call for advice from an AI expert. Do I hear any volunteers?

13b

REFERENCES

13c

<R1> SIGART Newsletter, No. 41, p. 56, June 1973

<R2> SIGART Newsletter, No. 36, pp. 43-44, October 1972.

DISCOUNT ON THE MACHINE INTELLIGENCE SERIES
By
George Ernst
Case Western Reserve University
Cleveland, Ohio   14

   Last Spring, David Gelperin, a SIGART member, informed me that
   Halsted Press, the publisher of the Machine Intelligence Series, has
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   to make use of this discount plan provided that SIGART does all of
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<H1Sw=Off> <H2Sw=Off> <SNF=0>

Network Working Group   Edward Taft
Request for Comments   PARC-MAXC
Ref: Telnet Protocol Specification (NIC #15372)   1

SECOND THOUGHTS ON TELNET GO-AHEAD   2

INTRODUCTION   3

   In this RFC we present objections to the requirement that hosts
   implement the Telnet Go-Ahead (GA) command, as specified in the
   Telnet Protocol Specification (NIC #15372). The thrust of these
   objections is in three major directions: 3a

      1. The GA mechanism is esthetically unappealing, both to
      myself and to many other people I have talked to. I shall
      attempt to describe why this is so.   3a1

      2. As specified in the Protocol, GA will not, in general,
      work; i.e. it will not serve its intended purpose unless hosts
      make various unwarranted assumptions about how other hosts
      operate.   3a2

      3. GA is impossible for most hosts to implement correctly in
      all cases. This is certainly true of the PDP-10 operating
      systems with which I am familiar (10/50 and Tenex).   3a3

   The purpose of this RFC is to advocate either complete removal of
   the GA mechanism or relegating it to the status of a negotiated
   option whose default state is that it be suppressed.   3b

TERMINOLOGY   4

   "Half-duplex" is a two-way communication discipline in which
   transmission takes place in only one direction at a time and the
   receiving party is constrained not to transmit until the
   transmitting party has explicitly given up control of the
   communication path ("turned the line around").   4a

      This definition is distinct from a common (but incorrect) use
      of the terms "half-duplex" and "full-duplex" to designate local
      and remote character echoing.   4a1

   "Reverse break" is a means by which a computer connected to a
   terminal by a half-duplex path may regain control of the path for
   further typeout after previously having relinquished it.   4b

This is the complement of the "break" or "attention" mechanism,
implemented by all half-duplex terminals, by means of which the
user may gain control of the line while it is in use by the
computer.   4b1

ESTHETIC OBJECTIONS TO GA   5

One assumption that permeates the Telnet Protocol specification
(and is explicitly stated on Page 7) is that the "normal" mode of
communication between computers and terminals is half-duplex,
line-at-a-time. While historically this is partially true, it is
also clear, both within the ARPA Network community and elsewhere,
that the trend is toward highly interactive man-machine
communication systems which are difficult to implement under
half-duplex communication disciplines.   5a

The GA mechanism is an attempt to solve a specific problem, that
of switching control between computer and user in a subset of
those hosts utilizing IBM 2741 or equivalent terminals. I say "a
subset" because in fact the problem arises only in the case of
2741s lacking the reverse break capability. Many people log into
TIPs from 2741s (with reverse break); from what experience I have
had, I think the TIP does a very good job of turning the line
around at the right moments. (I am told this is also the case at
Multics).   5b

**Given the trend toward more interactive communication, and given
the fact that the terminals on the Network requiring a Go-Ahead
mechanism are a distinct minority of all terminals, I think we
should be reluctant to burden our protocols with kludges that are
so clearly a concession to obsolete design.   5c

I have little doubt that before long somebody (if not IBM) will
produce a full-duplex 2741-like terminal (indeed, perhaps it
has already been done). There is an obvious need for a
terminal with Selectric quality keyboard and hard-copy better
suited to interactive applications (i.e. full-duplex).   5c1

As a more practical consideration, it makes little sense to have
the default state of the GA option be the one that benefits the
least number of hosts and terminals.   5d

There is no question that most parties to Telnet communication
will immediately negotiate to suppress GA. To do otherwise
will double the amount of network traffic generated by
character-at-a-time typein, and will increase it by a
non-negligible amount even for line-at-a-time typein.   5d1

2

It strikes me as worthwhile to minimize the number of such
"necessary" option negotiations, especially in view of the
large number of TIPs and mini-hosts on the Network. Many such
hosts must, due to resource constraints, implement only a
limited subset of the available options. It follows, then,
that the default state of all options should be the one most
hosts will be willing to use.   5d2

WHY GA WON'T WORK   6

We now show that a server process's being "blocked on input" (as
specified in the Protocol) is not in itself a sufficient condition
for sending out GA.   6a

This is due to the fact that the user Telnet has no control over
the packaging of a "line" of information sent to the server;
rather, this is a function of the NCP, which must observe
constraints such as allocation and buffering. Consider the
following example: 6b

A user types a line of text, which is buffered by his host's
user Telnet until he signals end-of-line. His keyboard then
becomes locked (this being the behavior of half-duplex
terminals while the computer has control of the line), and
stays locked in anticipation of the server's eventual response
and subsequent GA command.   6b1

The user Telnet transmits this text line over the connection;
however, due to insufficient allocation or other conditions,
the text actually gets packaged up and sent as two or more
separate messages, which arrive at the server host in the
correct order but separated by some amount of time.   6b2

The server Telnet passes the contents of the first message to
the appropriate process, which reads this partial text line and
immediately blocks for further input. At this moment (assuming
the second message hasn't arrived yet), the server Telnet, in
accordance with the Protocol, sends back a GA command.   6b3

The rest of the text then arrives; in response, the server
process may generate a large volume of output. Meanwhile,
however, the GA command has caused the user's keyboard to
become unlocked and computer output thereby blocked. Hence we
have a deadlock, which will be resolved only when the user
recognizes what has happened and (manually) gives control back
to the computer.   6b4

Of course, this particular problem is avoided if the Telnet
protocol is modified to specify that the server Telnet will
transmit GA only if the server process is blocked for input AND
the most recent character passed to that process was end-of-line.   6c

 I claim that this solution is bad in principle because it
 assumes too much knowledge on the part of the serving host as
 to what constitutes "end-of-line" in the using host.   6c1

 Furthermore, the Protocol explicitly (and quite rightly)
 specifies that the user Telnet should provide some means by
 which a user may signal that all buffered text should be
 transmitted immediately, without its being terminated by
 end-of-line.   6c2

One must conclude, then, that in general the server Telnet has no
precise way of knowing when it should send GA commands.   6d

IMPLEMENTATION PROBLEMS   7

The foregoing analysis illustrates the problems that arise with
the GA mechanism in communication between servers and users whose
normal mode of operation is half-duplex, line-at-a-time. When we
turn to hosts that provide full-duplex service, such as the
PDP-10s and many other hosts on the Network, the problems are much
more severe.   7a

 This is particularly true of operating system such as Tenex
 that exercise such tight control over terminal behavior that
 they prefer to operate in server echoing, character-at-a-time
 mode. This will probably become less necessary as protocols
 such as the Remote Controlled Transmission and Echoing Option
 come into general use, enabling servers to regulate echoing and
 break character classes in user Telnets.   7a1

Even in hosts such as 10/50 systems that provide reasonable
service to line-at-a-time users for most subsystems (e.g.
excluding DDT and TECO), GA is impossible to implement correctly.
This is true for several reasons.   7b

First, there are a number of subsystems that never block for
terminal input but rather poll for it or accept it on an interrupt
basis. In the absence of typein, such processes go on to do other
tasks, possibly generating terminal output.   7c

4

Processes of this sort come immediately to mind. The user
Telnet, FTP, and RJE programs are implemented in this fashion
by almost all hosts. 10/50 has a subsystem called OPSER, used
to control multiple independent subjobs from a single terminal.   7c1

Since these programs never block for input, GA commands will
never be sent by the server Telnet in such cases even though
the processes are prepared to accept terminal input at any
time.   7c2

Second, there is not necessarily a one-to-one relationship between
processes and terminals, as seems to be assumed by the Telnet
Protocol specification.   7d

For example, in Tenex one process may be blocked for terminal
input while another process is generating output to the same
terminal. (Such processes are typically parallel forks of the
same job).   7d1

Third, there is the possibility of inter-terminal links, such as
are provided in many systems.   7e

By this I do not mean special Telnet connections established
between a pair of NVTs for the express purpose of
terminal-to-terminal communication, as is suggested on page 9
of the Protocol specification. Rather, I am referring to
facilities such as the Tenex LINK facility, in which any number
and any mixture of local and Network terminals and processes
may have their input and output streams linked together in
arbitrarily complex ways. Clearly the GA mechanism will fall
flat on its face in this case.   7e1

Also, the notion that one user of an inter-terminal link should
have to "manually signal that it is time for a GA to be sent
over the Telnet connection" in order to unlock another user's
keyboard offends me to no end.   7e2

Finally, most systems provide means by which system personnel and
processes may broadcast important messages to all terminals (e.g.
SEND ALL in 10/50, NOTIFY in Tenex). Clearly such asynchronous
messages will be blocked by a half-duplex terminal that has been
irrevocably placed in the typein state by a previous GA.   7f

This strikes me as such an obvious problem that I am forced to
wonder how half-duplex hosts handle it even for their local
terminals.   7f1

Most of the above difficulties may be traced directly back to a
single cause: Whereas the Protocol states that GA should be
generated by server processes as a signal that they are prepared
to accept INPUT, the user processes making use of this signal are
construing it as a promise that the server will generate no
further OUTPUT. In most Network server systems, these two
conditions are not synonymous.   7g

A PROPOSAL   8

Now that I have elaborated sufficiently on why the
currently-specified Go-Ahead mechanism simply won't work, I must
of course address myself to the problem for which GA was
originally proposed as a solution.   8a

Implementation of the reverse break capability in those
half-duplex terminals that don't have it is of course the
desirable solution, and one which all installations should be
encouraged to pursue on a long-term basis. With reverse break,
the user Telnet is able to relinquish control to the user
immediately when there is no further output to be printed, yet get
it back again if further output subsequently arrives and the user
hasn't started to type anything.   8b

In the interim, the GA mechanism is still usable [subject to my
modification suggested in Paragraph 6c) for the cases in which a
half-duplex terminal is communicating over the network with a host
oriented toward such terminals. For this purpose, GA should be a
(normally suppressed) option that may be negotiated into effect.   8c

In all other cases involving half duplex terminals without reverse
break, the user Telnet must at all times retain control over the
line for possible further output, until the user explicitly
indicates he is about to type something (e.g. by pressing the
"Attention" key).   8d

This is the ONLY scheme that will prevent blocked typeout in all
cases, and I urge immediate consideration of it.   8e

Telecon log, Nov. 30

for your information

Telecon log, Nov. 30

Telecon received   1

    30 Nov., John Zanner, AFSC Data Automation, Andrews AFB, (301)
    981-6400 (or Lt Col Madril). He talked to John Islei, and was
    very interested in accessing the Net and ARC. He asked about
    Utility rates and how billing is determined, and ports; had a
    question about baud rates higher than 9600; Was going to try to
    get one of RADC's slots into. Utility. I discouraged this idea,
    and suggested that he consider buying a slot, to which there was a
    positive response. He seemed satisfied with the info. and
    mentioned collaboration with ESD and RADC.   1a

Telecon log, Nov. 30

(J20813) 7-DEC-73 21:05;   Title: Author(s): James H. Bair/JHB;
Distribution: /JCN DCE RWW; Sub-Collections: SRI-ARC; Clerk: JHB;

Request to NDM for personal, modified version of INMES

Dean: I would like a version of INMES (Call it 'MI' for 'Message
Input') that does the following two changed things: 1

1) It clears the DNLS, tty message area When done.   2

    I want a better DNLS indication of when the process is done.
Currently the "Message input in process," or whatever, stays up
after the process is done. (If clearing the tty display doesn't
help enough, perhaps explicit DNLS feedback, "Message input done"
might be nice.   2a

2) It brings in a file named "mif.txt;*", for "message input file",
rather than message.txt.   3

    I can't help always feeling that between the time I read in the
message.txt file and the time I could get to the exec and delete
it, there might be another message delivered into it that I would
thus lose. So, in spite of the low odds on this, I always read
the file at exec level after the INMES ingestion, and then quickly
delete it if it doesn't have new material appended.   3a

    In the net-mail input approach that I want to try, there is only
one, initial operation at the exec level: RENAME FILE message.txt
to MIF.txt;1;t. That operation (according to my understanding) in
one swoop ensures that: 3b

    I capture all that has arrived in message.txt,   3b1

    a message arriving immediately thereafter will neatly go into
    a new version of message.txt for later attention,   3b2

    the MIF.txt file will stay around in case of need during that
    working session, but will automatically be deleted when I next
    log off (which saves my being concerned about cleaning it out).   3b3

    Then, for second and final subsequent operation [no hurry], in
NLS, do G P G 'mi' CA,   G P E 'mi' CA.   3c

    Then I want the execution, without further ado, to input the
    mif.txt file, to follow statement .JOURNAL and down one level.   3c1

    Then, before (Recreating display and) RETURNing, I would like
    for it to do the equivalent of,   3c2

        if in DNLS, J I (journal:gebtry),   3c2a

        or if in TNLS, a re-position for A: (journal d:gwynI)   3c2b

    NOTE: It would be even nicer to have the Message Innput program

Request to NDM for personal, modified version of INMES

do the RENAME FILE message.txt TO mif.txt;#;t for me, and for it
to tell me if there isn't a message.txt file (i.e no network mail
in my in basket).   3d

This is an explicit request; if it can be done within an hour's work
at modifying INMES, please fix me up with a trial process named "MI".
    Thanks,   Dou   4

Request to NDM for personal, modified version of INMES

(J20814) 8-DEC-73 14:14;   Title: Author(s): Douglas C. Engelbart/DCE
; Distribution: /ndm jcn rww chi (fyi) dvn (fyi) ji (fyi, John) ;
Sub-Collections: SRI-ARC; Clerk: DCE ;

20814 Distribution   1
    N. Dean Meyer, James C. Norton, Richard W. Watson, Charles H. Irby,
    Dirk H. Van Nouhuys, Jean Iseli,   1a

missing rfc

tell me more about the missing rfc that was assigned to me, eg title, date, and could you repeat the number ? i try to help track it down. --jon.   1

missing rfc

(J20815)   8-DEC-73 14:39;   Title: Author(s): Jonathan B. Postel/JBP;
Distribution: /MLK; Sub-Collections: NIC; Clerk: JBP;

new fbctl functions

I've added the following 2 functions to fbdtl: 1

    typenulllit   1a

        clears the screen and types a null literal (litdpy($"")) in
        anticipation of succesive calls on fbctl of type fbaddlit   1a1

    addcalit   1b

        appends the string   "TYPE CA TO CONTINUE"   to the lit area
        (similar to typecalit except appends only the above string
        instead of replacing any existing strings and then displaying
        the passed string with the above appened)   1b1

new fbctl functions

(J20816) 8-DEC-73 18:35;   Title: Author(s): Kenneth E. (Ken)
Victor/KEV; Distribution: /NPG; Sub-Collections: SRI-ARC NPG; Clerk:
KEV;

consideration for your fellow programmers (and a good practice in any case)

It is EXTREMELY inconsiderate of some people to place undebugged code in tasks such that if someone (in this case me) runs tasks and brings up a new system the system no longer works. 1

All code should FIRST be debugged in private files [using load program, etc.) before being moved into the system sources. 2

consideration for your fellow programmers (and a good practice in any
case)

(J20817) 9-DEC-73 09:51;   Title: Author(s): Kenneth E. (Ken)
Victor/KEV; Distribution: /NPG; Sub-Collections: SRI-ARC NPG; Clerk:
KEV;

Bell Canada Initial Idents: Request for Mike Bedford to Review

   Mike: I have set up some new idents for Inez, Phil, Jim et al. I
just used the data I got from Larry on the phone and filled in the
addresses as yours--also the phones. Can you look at the following
data and see what needs changing? The Utility will probably be ready
to use about the day Jim Bair and I get to Montreal Dec 17th. We look
forward to a good training session Monday and Tuesday...less planning
than the last visit. Mostly TRAINING so you will be able to do some
good work during the weeks before Inez gets rolling and before we
change to the new command language Feb 1 or so.   1

   Bell Canada Idents: 9-DEC-73 10:19 by JCN   1a

      (DMA) BELL-CANADA
      Atkinson, Donald M.
      Room 1105
      620 Belmont Street
      Montreal, Quebec

      Phone: (514) 870-5915;
      Delivery: Online Hardcopy;
      User: bell;
                                                                         1a1

      (IMM) BELL-CANADA
      Mattiuz, Inez M.
      Room 1105
      620 Belmont Street
      Montreal, Quebec

      Unverified
      User: bell;
      Delivery: Online;
      Phone: (514) 870-5902;
      Function: Bell Workshop Architect;
                                                                         1a2

      (JHK2) BELL-CANADA
      Kollem, Jim H.
      Room 1105
      620 Belmont Street
      Montreal, Quebec

      Unverified
      Phone: (514) 870-5902;
      User: bell;
      Delivery: Online;
                                                                         1a3

(LHD) BELL-CANADA
Day, Lawrence H.
Room 1105
620 Belmont Street
Montreal, Quebec

Delivery: Online;
User: bell;
Phone: work (514) 870-3223 home (514) 684-7207;

1a4

(MIKE) BELL-CANADA
Bedford, Michael T.
Bell Canada
 H.O. Planning
 Room 1105 .
 620 Belmont Street
 Montreal, Quebec
 Canada
 Phone:
Office (514) 870-5902
     Home   (514) 264-4317

1a5

(PIW) BELL-CANADA
Weintraub, Phil I.
Room 1105
620 Belmont Street
Montreal, Quebec

Unverified
User: bell;
Phone: (514) 870-5902;
Delivery: Online;

1a6

(RLT) BELL-CANADA
Treleaven, Ric L.
Room 1105
620 Belmont
Montreal, Quebec
Canada

Unverified
Phone: (514) 870-5917;
Delivery: Hardcopy Online;
User: bell;
Host: sri-arc;

1a7

Bell Canada Initial Idents: Request for Mike Bedford to Review

(J20818) 9-DEC-73 10:21;   Title: Author(s): James C. Norton/JCN;
Distribution: /MIKE LHD JHB JCN; Sub-Collections: SRI-ARC; Clerk: JCN;

Note to RADC Users: Transfer of AKW Online Services to OFFICE-1

Table of Contents

TRANSFER OF AKW SERVICES TO A NEW FACILITY   2

   During the past year or so, SRI-ARC has provided online
   access for RADC users to services such as NLS, Journal,
   Sndmsg, and the NIC Query through the SRI-ARC
   PDP-10/TENEX--host 2.   2a

   In order that we may provide increased reliability and
   quality of service to our users, we are now about to provide
   these services through a new PDP-10/TENEX computer facility to
   be operated for SRI-ARC by Tymshare, Inc in Cupertino,
   California.   2b

FACILITY NAME: OFFICE-1   3

   The new facility will be known as "OFFICE-1" and will be host
   43 decimal (for tip users) connected to the ARPANET through a
   TIP at Tymshare.   3a

      This is also host 53 (octal, for telnet users)   3a1

PRESENT RADC DIRECTORIES WILL MOVE IN MID-DECEMBER 1973   4

   Present RADC user directories (there are over 20) will be
   moved to the Utility computer shortly after December 12, 1973.
   The exact timing will depend upon final checkout operations
   now in progress.   4a

   We will keep RADC users informed of the date of transfer as
   it approaches.   4b

   At the time of the transfer there will be a message for RADC
   users at the SRI-ARC machine directing them to OFFICE-1, host
   43, where online AKW services and their user directories will
   be available.   4c

   We plan to keep the present RADC directories active at ARC
   for backup use for at least a week after the transfer. All
   RADC users' files will be moved to their Utility directories
   when service from that facility is made available to them in

order to minimize confusion as to changes in duplicate copies.
Moved files will be protected by disk dumps to help out with
any difficulties users may have.   4d

GROUP ALLOCATIONS   5

  We intend to continue to use the group allocation scheme
currently in effect to ensure appropriate allocation of
resources to RADC users in line with funding provided by RADC.
We will soon be working on changes to improve the
effectiveness of this feature.   5a

  This will provide access to an estimated minimun of 5 RADC
users at all times during the Utility's 16 hour (5am to 9pm
PST), 6 day service periods (Monday through Saturday).   5b

  The extension of the RADC allocation to 16 hours each day
should ease the access situation considerably at RADC.
Offquota access will still be available and may at first
prove quite beneficial to those RADC users who are already
initially trained and running on the system now. Other
using organizations may have a slower start, although we
will be working hard at getting them on and using the
system as fast as possible.   5b1

  Other users of the Utility computer will be allocated
portions of the system according to the funding provided for
those activities. Some such user organizations are: selected
ARPA offices, discipline- and mission-oriented communities
performing ARPA-related work (Computer-Based Instruction,
Energy, etc), and Network Information Center users.   5c

Note to RADC Users: Transfer of AKW Online Services to OFFICE-1

(J20819) 9-DEC-73 15:21;   Title: Author(s): James C. Norton/JCN ;
Distribution: /RADC   SRI-ARC ; Sub-Collections: SRI-ARC RADC; Clerk:
JCN ;
Origin: <NORTON>RADCTRANSFER.NLS;1, 9-DEC-73 15:17 JCN ;

Name for the Workshop Utility Computer Facility: OFFICE-1

There has been considerable disussion of the name for the Workshop
Utility Computer Facility around ARC. When I issued Journal document
(20663,1) indicating that KWCS1 would be the name for the facility, I
got many replies that suggested other names, criticized the absence
of an explanation of who "we" was--as in "we have chosen"--and
suggested that in any case KWCS1 just would not be appropriate.

1

The "we" whom I should have specified was Jim Norton, Doug
Engelbart, and Dick Watson. I am coordinating this task as
ARC/Utility Operations Manager.

1a

After further discussions with ARC people and with some outside of
ARC, we (the above we) have settled on OFFICE-1 as being the name we
will use. This should be easier to remember and pronounce, less
cryptic, and probably more in line with the expectations of many of
the first users of the Utility.

2

Future facilities would be named: OFFICE-2, OFFICE-3 and so on.

2a

I thank those who took the time to suggest and discuss alternative
names and those who pointed out the shortcomings of my earlier
Journal item.

3

I'll have to admit that I still like the idea of getting the term
"knowledge workshop" exercised a little through devices such as the
facility name, but will readily admit that KWCS1 would not have made
it, particularly in light of the responses that were so negative,
even from within.

4

Name for the Workshop Utility Computer Facility: OFFICE-1

(J20820) 9-DEC-73 12:58; Title: Author(s): James C. Norton/JCN;
Distribution: /SRI-ARC JSP LHD DLS JAKE(for action) MLM JIMB;
Sub-Collections: SRI-ARC; Clerk: JCN;

Another Bell Ident

Mike: oops Here's good old Phil's ident too: 1

   (PF) BELL-CANADA
  Feldman, Phil
  Room 1105
  620 Belmont Street
  Montreal, Quebec

  Unverified
  Phone: (514) 870-5902;
  User: bell;
  Delivery: Online;

                                                                                 1a

Another Bell Ident

(J20821) 9-DEC-73 14:00;   Title: Author(s): James C. Norton/JCN;
Distribution: /MIKE JHB LHD; Sub-Collections: SRI-ARC; Clerk: JCN;

CA Program and DEX/Data Prep Format

Dean:

   As you may have noticed I have not been using the NIC system in
the last couple of weeks. Now that I am back using it I discover
that the CA program I wrote some weeks ago does not work on my 'live'
data. It does not work in so far that it does not get any matches on
searching for EOL. The only difference that I can think of is that
the test data was read in from the keyboard, whilst the live data
comes in and is processed by DEX. Our data prep equipment puts out
the sequence CR LF DEL at the end of line, and I think it may be the
DEL which is throwing either DEX or the scan process. Any ideas?

   In NLS one cannot search for DEL (or can you?) and editing my
original tape when it first gets in the system (using say, Teco) is
similarly not possible.

   I hope you can think of a way round it. By the way, thanks for the
comments, and the circulated reply to someone elses query. I'd
better finish now before I get NET Trouble again

   Cheers .. Steve   1

CA Program and DEX/Data Prep Format

(J20822)   10-DEC-73 00:14;   Title: Author(s): Stephen R. Wilbur/SRW;
Distribution: /NDM; Sub-Collections: NIC; Clerk: SRW;

INFO ON TENEX

DEAR DAVE
I HAVE A COLLEAGUE WHO IS INTERESRED IN OPERATING SYSTEMS
AND IS TRYING TO OBTAIN INFORMATION ON TENEX.
CAN YOU SUGGEST ANY LITERATURE OR REFERANCES ON TENEX.   1

INFO ON TENEX

(J20823)   10-DEC-73 04:03;   Title: Author(s): Keith N. Sandum/KNS;
Distribution: /DCW3; Sub-Collections: NIC; Clerk: KNS;

Possible ANTS use of the Utility

Jim,   1

I got your note. After this please direct mail for me either to
DAY@isi or thru the Journal (my ident is DAY). We have a lot of
people using this usercode and so I might not get it for a while.   2

About your note, we don't consider 400 pages of documentation very
much. In fact that 400 pages includes very very little ANTS
documentation, so our needs could easily double or triple. In what
follows I would like to try to rough out 1) how we presently pay for
our storage requirements at UCSD, 2) and what kinds of things we will
have, need, or want to do.   3

                                                                        4
Paying for things at UCSD

   At UCSD, we pay a staggered rate on CPU and IO time ranging from
   \$6.25 /sec for CPU and \$2.92 for IO to \$.83 for CPU and \$.58 for
   IO. These rates go down according to 5 queues in which jobs are
   placed based on what kind of turn-around time you desire. The
   most expensive is for interactive and the least for overnight
   batch. For example, Queue 3 will usually give you about 15-30
   minute turnaround on large compiles at \$2.78 / sec (for CPU time).   4a

   More important to this discussion though is disk charges. At
   UCSD, one can have two sorts of disk 1) contract and 2)
   non-contract.   4b

      Most people have non-contract disk. This is like what most
      systems support. A user creates his files and the local site
      looks every once and while totals it up and makes a charge. At
      UCSD, this charge is \$.0055 per 1000 bytes per day.   4b1

      However, if you can guarantee the Comp Center that you will pay
      for so much disk (I believe there is a threshold but don't know
      what it is), they (the Comp Center) will give you a special
      rate. This rate is \$.0032 per 1000 bytes per day. This is the
      mode in which we pay for most of our disk space at UCSD.   4b2

   This contract method may be useful to the utility. I think that
   as these networks get going, there are going to more and more
   sites like our selves who will not have many local resources and
   will want to rely on the network for them. We are going to have
   these mini-sites developing software at other sites and wanting to
   document for access by the rest of the net. This seems like what
   part of the utilities function is to provide the means for doing
   this. However, I dont think many sites will have enough to do
   continuously to warrant buying a slot. (If you like I can comment
   on this further.)   4c

Possible ANTS use of the Utility

Possible uses of the utility by the ANTS group   5

    Equipment   5a

        We have at Illinois an Imlac with mouse and keyset. So I (and
        some others here) would like to be able to use IMNLS. Further,
        I would be very interested in hooking a Line-processor to one
        of our Hazeltines (if possible) and trying that. This could
        have several benefits to both of us depending on each others
        plans (Your experimenting with use over the net and its use on
        an ANTS system and any attendent games therein.)   5a1

Documentation and other stuff   6

    We will need to have nls taught to our secretaries for the obvious
    reasons.   (this is fairly easy, right Jim).   6a

    I think the ANTS newsletter should most definitly be done at NIC
    and the attendent distribution. Is the utility planning on
    handling this kind of a service?   6b

    The Peespol manual presently exists on-line at UCSD and could be
    moved to NIC and placed in an NLS form. (I'm contemplating
    software to perform this function.)   6c

    The ANTS Command Language Manual should, of course, also be
    available.   6d

    A narrative description of the ANTS system will also be written
    and made available. It can be batted around whether this would
    need to be on-line or merely recallable from an archive.   6e

    Also, the definitive ANTS System Documentation detailing the in
    and outs of the whole system. This could also be archived
    probably.   6f

    Since ANTS is a system that people can get there hands into and
    write their own device drivers, commands, and data transforms, etc
    there are two other manuals not as detailed as the definitive
    system documentation. They will be the System-writers Reference
    Manual and the System-writers Guide. One is a "how to" and the
    other is "a place to find it if you think you know what you want".   6g

So as you can see we have a lot of stuff to put on-line. It would be
possible to do any part of this stuff with the utility or all
depending on what you and we think. I will be glad to comment
further if I can, or we can talk while I'm out there. Jim, I will
get you that document on our editor as soon as we can get some made

Possible ANTS use of the Utility

up.   I haven't forgotten you.(See Jim, I really don't mind using
TNLS, actually it keeps getting easier)

7

As always,
John Day

8

Possible ANTS use of the Utility

(J20824) 9-DEC-73 20:31;   Title: Author(s): John D. Day/DAY;
Distribution: /JHB; Sub-Collections: NIC; Clerk: DAY;
Origin: <ILLINOIS>NOTETOBAIR.NLS;1, 9-DEC-73 18:44 DAY ;

Tickler for week of 10 December

(dm3) 10 December — Monday   1

    0830 hrs. Branch Chief's Meeting   1a

    ISIS/D. Nelson — Advanced Development Candidates   1b

    Dr. Cragg Visit — 0845 — 0945 — ISOverview — Mr. Barnum
        1000 — 1100 Software First — Maj Patterson
        1100 — 1200 — Higher Order Languages — Mr. DiNitto
        1300 — 1400 — Software Reliability & Validation — Mr. Nelson
        1400 — 1700 — Discussion
        One hour is scheduled for each, but it is suggested that a 30
    minute briefing be prepared to allow for questions.   1c

    ISIM/ISIS — Completion of Info Sci Div Questionnaire — All SSE
    personnel   1d

(dt3) 11 December — Tuesday   2

    Col Thayer — TDY   2a

    ISIM/R. Iuorno — Negative Interim Report on Inventions on Contract
    F30602-73-C-0001 w/Univ of Michigan — Completed   2b

(dw3) 12 December — Wednesday   3

    Col Thayer — TDY   3a

    ISF Confessions — 0830 hrs.   3b

    Due Date — ISIM/ISIS — Awards for Technical Achievement   3c

    1445 hrs. Presentation on Software — ISI/Col Thayer   3d

(dth3) 13 December — Thursday   4

    Col Thayer — TDY   4a

    Laboratory Activity Reports due today: Bucciero must have then by
    1000, ISM must have them by 1100, and DOT must have then by 1600.   4b

    0830 hrs. Branch Chief's Meeting   4c

(df3) 14 December — Friday   5

    Col Thayer — TDY   5a

    Bobbie: Travel figures due by noon.   5b

Tickler for week of 10 December

Due Date - ISIM/R. Iuorno - Interim Report - Contract
F30602-73-C-0001 for Technical Review   5c

Due Date - ISIM/Ray Liuzzi -Technial Evaluation PR-B-4-3245   5d

20825 Distribution

Larry M. Lombardo, Anna A. Cafarelli, Roberta J. Carrier, Donna R. Robilotta, David L. Daughtry, Richard H. Thayer, Frank J. Tomaini, Mike A. Wingfield, Edmund J. Kennedy, Ray A. Liuzzi, John W. Johnson, Donald Van Alstine, Dean F. Bergstrom, William P. Bethke, Frank S. LaMonica, William E. Rzepka, Rocco F. Iuorno, Frank P. Sliwa, Thomas J. Bucciero, Robert E. Doane, David A. Luther, Roger B. Panara, John L. McNamara, Joe P. Cavano, Duane L. Stone, Marcelle D. Petell, Josephine R. Stellato, Robert K. Walker, Thomas F. Lawrence, James H. Bair,

Tickler for week of 10 December

(J20825) 10-DEC-73 06:07;   Title: Author(s): Roberta J. Carrier/RJC;
Distribution: /RADC; Sub-Collections: NIC RADC; Clerk: RJC;

BIOGRAPHICAL SKETCH - Richard Nelson   1

Mr. Richard Nelson is currently serving as Chief of the Software
Sciences Section of the Rome Air Development Center, USAF. Except
for a two-year assignment as staff scientist with the SHAPE Technical
Center (NATO) in the Hague, Netherlands, Mr. Nelson has been employed
by RADC since 1950, and prior to that by its predecessor the Watson
Laboratories, USAF, from 1947. Prior to that he served 2 1/2 years
with the U.S. Navy, and for a short time with the Western Electric
Company.   2

In addition to duties involved with the RADC program on software
reliability and High-Order programming language control, since 1971
Mr. Nelson has been the Chairman of the USAF Industry Committee
modernizing the JOVIAL programming language (and authors of the
recent JOVIAL J/73 version). He is also serving as a member on the
ANSI X3/SPARC/BASIC Committee for the standardization of the BASIC
timesharing language, and is a member of the Planning Committee for
the 1975 National Software Reliability Symposium. Mr. Nelson is a
past member of the IEEE, a present member of the ACM, and holds a BA
in Physics with graduate work in Computer Sciences from Syracuse
University.   3

20827 Distribution
    Frank J. Tomaini,

Biographical Sketch - Mr. Richard Nelson

(J20827) 10-DEC-73 06:45;   Title: Author(s): Roberta J. Carrier/RJC;
Distribution: /FJT; Sub-Collections: NIC; Clerk: RJC;
Origin: <CARRIER>BIO.NLS;1, 10-DEC-73 06:43 RJC ;

Coparison of AABNCP and NPS studies

10 december 1973   1

Mr Tomaini   2

This note is written in response to your request to compare the
aabncp TRS study with the NPS study effort by Walker, Kesselnan, et
al.   3

I have concluded that there is no direct overlap in the two proposed
efforts; however, it appears that the two jobs would involve the same
offices and possibly some of the same people (ESD, MITRE, and RADC).
Additionally, the Remote Terminal Emulator may be the device proposed
by ESD/YSE to access the RADC computer for the AABNCP RTS study (see
YSE letter undated, subject "RADC FY-74 Support for the 481b
Program").   4

The purpose of the NPS study is to ascertain the capabilities of the
Network Processing System. This will involve the use of the TPE to
generate transactions within the GCOS software. Some overlap in the
two studies may be manifested here in that some GCOS performance
statistics can be compiled as they relate to the generated
transactions.   5

Note that the main purpose of the AABNCP RTS study is to determine
how well GCOS functions when using the Priority Dispatcher and a
Transaction Processor. Hopefully, the study can be made using the
WWMCCS software as well if ever we are able to run it in Time sharing
and batch mode. Additionally, we are to make the RTS study with
different loadings of GCOS or WWMCCS.   6

Note that while we have been trying to generate a pvoposal of work
acceptable to IS, ISC has gone on and set up their study plan and
have assumed available resources without clear approval for the work.
I think we can basically do the same thing realizing that we do have
the people capable of the study. The only problem may be in our
requiremment to have a generalized Transaction Processor available,
and even so, some limited study could be made without the TPE.   7

In conclusion, I think the two studies are more complementary than
overlapping. We could proceed by reviewing and cooperating with the
ISC effort.   8

                                                                    9

DAVID L DAUGHTRY   10

1

20828 Distribution
   Frank J. Tomaini, Roberta J. Carrier, Ray A. Liuzzi, Rocco F. Iuorno,
   David L. Daughtry,

Coparison of AABNCP and NPS studies

I have written a short letter to Mr. Tomaini about the AABNCP and NPS
proposals and how I think they relate. The letter is available by
journal mail...Dave Daughtry   1

20829 Distribution
   Frank J. Tomaini, Roberta J. Carrier, Ray A. Liuzzi, Rocco F. Iuorno,
   David L. Daughtry,

(J20829) 10-DEC-73 08:00; Title: Author(s): David L. Daughtry/DLD2;
Distribution: /FJT RJC RAL RFI DLD2; Sub-Collections: NIC; Clerk: DLD2;

That Old RFC

Jon,
It's RFC 517 NIC 16712 -- the number was taken from the system in May
of this year. That's all I know about it, except that it was taken
out by you. Let me know what you find out.
Marcia   1

20830 Distribution
    Jonathan B. Postel,

That Old RFC

(J20830) 10-DEC-73 08:28;   Title: Author(s): Marcia Lynn Keeney/MLK;
Distribution: /JBP; Sub-Collections: SRI-ARC; Clerk: MLK;

this is the much talked abot toronto talk how does it look

(ott) NOTES FOR OTTAWA TALK   1

During all of this talk, i am assuming that someone else, either
yo or Don has explained the background of BPG, including: 1a

location in company structure   1a1

objectives   1a2

mthods of operation   1a3

etc.   1a4

home ta   1b

background   1b1

initial delphi study on the home services... what services
looked most probable   1b1a

purpose   1b2

to determine what direction the technological emphasis was
taking are there some real problems that must be
overcome....what will the side-effects of some of these
services be ?   1b2a

methods (methodology = SPRITE   1b3

what is sprite ?   1b3a

sequential polling and review of interacting teams of
experts   1b3a1

identify groups or disciplines with a stake in the future
of the these services (that is, their future development)
and get them to compare note re their assumption,
expectations, and fears re the development of the
services.   1b3a2

asking the groups to pool their knowledge and develop
some forecasts abot the future of a particular technology
(traditioally) or process   1b3a3

How is sprite different from Delphi ?   1b3b

who are the experts ? Sprite recognizes that definitions
vary.   1b3b1

this is the much talked abot toronto talk how does it look

accent on identifying differences rather than   on coming
to a conclusion   1b3b2

reliance on comments for developing subsequent round,
rather than on the statistical data   1b3b3

areas covered   1b4

privacy (with respect to other people)   1b4a

securtiy (with respect to data)   1b4b

interpersonal relations (expected changes in how we relate
to people)   1b4c

time (how much more free time, how will we spend it ?)   1b4d

trvl- comm'ns   1c

purpose   1c1

to develop a better understanding of what factors motivate
businessmen to travel rather than use comunications media,
and to understand what aspects of their travel could be
substituted for by these same media, or pedia that are bing
developed.   1c1a

methods   1c2

survey of some 40,000 business travelers, traveling between
Montreal and (Toronto, Ottawa, and Quebec City), and Toronto
and (Ottawa). 9000 replys expected.   1c2a

cooperation between many different groups, each with a
vested interest in the results was necessary. Some of
cooperating groups included: 1c2b

Air Canada, CP Air, CN Rail, Voyageur Bus, Gov't. of
Quebec,   1c2b1

parameters around which the questionnaire was based   1c3

corridor being traveled (even the idea of a corridor is
crucial)   1c3a

type of company or institution sponsori he trip, and h
travelers situation in that company   1c3b

principle reason or purpose for making the trip   1c3c

this is the much talked abot toronto talk how does it look

this is the much talked abot toronto talk how does it look

some specifice examples of how it can improve communiScations 1e2

able to hold conferences "out of time", "oit of place" 1e2a

the fact that it is a formal conference tends o keep
everyone on the right subject....not much jumping
around.....chairman can control direction of he conference. 1e2b

it's democratic...everyone gets a voice 1e2c

even though everyone is speaking, you do't have to listen to
you can be selective 1e2d

saves listeners' time 1e2d1

encorages speakers to be concise 1e2d2

continus.ally updated written record of proceedings is
available 1e2e

to go back in the conference to confirm anything without
disrupting proceedngs 1e2f

some examples of conf'g. systems we're using 1e3

BNR — used mainly as a message service ad project
documentation aid. Very little interactive, simulataneous
communication. very easy to retrieve past messages.....by
number, by date, by author, or by content 1e3a

Institute for the F — used mainly as a project development
and coordination aid 1e3b

Englebart's ARC — not as useful for cofeencing as the above
two, but it has a host of information management rotines
that let yo get right into another planner's work and
observe what he is doing, how he operates, wat his style is,
what his priorities are, etc. 1e3c

more detail on the Englebart system. 1e4

Initial reactions to a lot of the people we talk to are
skeptical.....they wonder how anybody could work in that
sort of environment, ie, with someone peering over their
shoulder all the tme 1e4a

actually the reverse is true. the wrker becomes more
productive, rather than less productive... the increased
productivity stems, we believe, from the inproved

this is the much talked abot toronto talk how does it look

communications within his community of related planners or
researchers. He has access to the ideas, thoughts,
schedules, procedures, etc. of the community.   1e4b

how to give credit for work done   1e4b1

synergy at work   1e4b2

comunity's structuring of heir own infornato must be of
key importance.

1e4b3

20831 Distribution
    Lawrence H. Day,

this is the much talked abot toronto talk how does it look

(J20831) 10-DEC-73 09:13; Title: Author(s): Micaael T. Bedford/MIKE;
Distribution: /LHD; Sub-Collections: NIC; Clerk: MIKE;

htis is he tiltelelelel

this is the txt of message test one...hi larrry

20832 Distribution
   Lawrence H. Day,

htis is he tiltelelel

(J20832) 10-DEC-73 09:16;   Title: Author(s): Michael T. Bedford/MIKE;
Distribution: /LHD; Sub-Collections: NIC; Clerk: MIKE;

Visit Log: Per L. Hoving, Per Overnas -- University of Uppsala

VISIT LOG: Per L. Hoving, Per Overnas (UMLAUT on O and a), and wife   1

   From   1a

      Department of Computer Sciences,   1a1

      University of Uppsala,   1a2

      sturegatan 4 B,   1a3

      S-752 23 Uppsala, Sweden.   1a4

   Interest: Display work stations   1b

Demoed the system to them and sent them away with several
documents, including AKW paper and last couple of reports.   1c

They were very interested in our system and used it to do some
play editing. Most intruiged by split screen stuff. Very nice
people.   1d

Visit Log: Per L. Hoving, Per Overnas -- University of Uppsala

(J20834) 10-DEC-73 16:48;   Title: Author(s): Charles H. Irby/CHI;
Sub-Collections: SRI-ARC; Clerk: CHI;

Hark ARC

Please read this important announcement

Hark   ARC

There will be an ARC Christmas party at the Englebart's this Friday
December 14 starting at 3 PM. All ARC staff and their friends,
spouses, children, etc. (no dogs) are invited.   1

Please bring something for all to eat or drink as it's a potluck so
to speak. Sign up is at the ARC office window.   2

One dollar will help buy beer and other Christmas cheer -- payable to
Judy, Marcia, or Carol by Thursday. No Scrooges allowed.   3

Please come   4

20835 Distribution

Donald C. (Smokey) Wallace, Richard W. Watson, Don I. Andrews,
James H. Bair, A. Jim Blum, Meredith(Reddy) E. Dively, Jeanne M.
Leavitt, Rodney A. Bondurant, Jeanne M. Beck, Mark Alexander Beach,
Judy D. Cooke, Marcia Lynn Keeney, Carol B. Guilbault, Susan R. Lee,
Elizabeth K. Michael, Charles F. Dornbush, Elizabeth J. (Jake)
Feinler, Kirk E. Kelley, N. Dean Meyer, James E. [Jim) White, Diane
S. Kaye, Paul Rech, Michael D. Kudlick, Ferg R. Ferguson, Douglas C.
Engelbart, Beauregard A. Hardeman, Martin E. Hardy, J. D. Hopper,
Charles H. Irby, Mil E. Jernigan, Harvey G. Lehtman, Jeanne B. North,
James C. Norton, Jeffrey C. Peters, Jake Ratliff, Edwin K. Van De
Riet, Dirk H. Van Nouhuys, Kenneth E. (Ken) Victor

1

Hark ARC

(J20835) 10-DEC-73 16:52; Title: Author(s): Marcia Lynn Keeney/MLK;
Distribution: /SRI-ARC; Sub-Collections: SRI-ARC; Clerk: MLK;
Origin: <KEENEY>XMAS.NLS;3, 10-DEC-73 16:50 MLK ;

Yes let us bury the GA

Hic Jacet

Yes let us bury the GA

I liked your rfc on GA. We have always agreed on the issue.
I hope that your very persuasive arguments and impeccable
wording will open the eyes of the renegades at 360/91
and generate such sentiment that GA as required initial
mode will die. I have already voiced my opinion in an
earlier RFC though in much milder terms. But I will voice it
again in stronger (even profane) words. I missed the new
TELNET protocol meeting as my wife was having a baby and I
was the midwife. That is the only meeting I regret having
missed as much damage was done by Braden, Padlipsky and
McKenzie in letting the GA be born and survive. Though
Padlipsky relented and offered to withdraw his suggestion
when told of precisely the arguments mentioned in your rfc.
We need only to convince Braden, and Mckenzie says he will
be happy to agree to a change in specs. Added dividend
is that old user TELNETS will "work" with new servers without
the GA...... after a fashion atleast.
So let us move on and start the pressure on ccn renegades.

1

Yes let us bury the GA

(J20836) 10-DEC-73 20:51;   Title: Author(s): Abhay K. Bhushan/AKB;
Distribution: /EAT3; Sub-Collections: NIC; Clerk: AKB;

20836 Distribution
    Edward A. Taft,

Re: Programs and site write-up

Dear Yngvar,   1

     Sorry, I have fallen a bit behind in my correspondence. I have
two messages from you to which I have not responded.   2

     With regard to the write-up we discussed while you were here:
yes, I will be glad to use the information from the ARPAnet news.   I
will wait until it comes out and look it over; then if I need more
information I will get in touch with you. Meanwhile, if you receive
word that other hosts are definitely going to be added to your IMP
please let me know so that I can get a more complete write-up.   3

     In response to your request for programs available for optical
ray tracing: I have looked through the information I have but see
nothing along those lines, therefore, I would suggest that you send a
brief message to all the Liaison around the network asking them if
they know of such a program or programs. You can do this through the
Journal (at SRI-ARC) by using the ident NLG when asked for
'distribution'. If you are not familiar with this send me a sndmsg
telling me where you want your mail delivered and I will do it for
you.   4

     Unfortunately we have not gathered as much information as we
would like concerning programs available around the network - I hope
to spend some time on this after the first of the year.   5

     How are you coming with NLS? That was an unfortunate situation
we got into with partial copies. The partial copy is the copy one is
currently working on, but is not the permanent copy. In order to
transfer currrent work onto the permanent copy, one must update the
file. This gets rid of the partial copy and overwrites all the new
material onto the permanent file. Our problem arose when both of us
were logged in as you. This is a rare instance that under ordinary
circumstances should not happen. Let me know if you are having
problems as you go along.   6

               Best regards, Jake   7

20837 Distribution
   Yngvar Lundh,

Re: Programs and site write-up

(J20837)   10-DEC-73 23:07;   Title: Author(s): Elizabeth J. (Jake)
Feinler/JAKE; Distribution: /YL; Sub-Collections: SRI-ARC; Clerk: JAKE;
Origin: <FEINLER>LUNDH.NLS;2, 10-DEC-73 23:05 JAKE ;

Article Coming Your Way

Jean:
    I am sending the Arpanet News article under separate cover   As I
remarked before, I am not quite sure what format you would like it
in, but at present it is plain NLS, I have not even included the
Author, although I'm sure you know who it was written by.. , I hope
it meets with your approval in its final form, and any time I can be
of any other help either on the Arpanet News front or any other
aspect, please do not hesitate to contact me. By the way, some
Saturday we must get together for that interview   I saw you on over
the weekend, but you were busy, at least I think it was you.. HELP?

    Anyway, cheers for now .. Steve

1

20838 Distribution
   Jean Iseli,

Article Coming Your Way

(J20838) 10-DEC-73 23:29;   Title: Author(s): Stephen R. Wilbur/SRW;
Distribution: /JI; Sub-Collections: NIC; Clerk: SRW;

ARPANET - A British Way of Life?

ARPANET -- A British Way of Life?   1

Introduction   2

Apart from being at the receiving end of puns about 'very remote
hosts', what does it feel like to be on the British spur of the
ARPANET? Well, as for most other Tip users it varies between the
bleak 'NET TROUBLE' to the warm 'LINK FROM ..' responses on a
terminal. Obviously though, we have other rewards than friendly
chit-chat, including access to computer systems which would
otherwise be unavailable, and off-peak use of these machines.   2a

Why did I therefore single out the 'NET TROUBLE' and 'LINK FROM
..' messages? Largely because I feel that these are very
significant as far as we, at present, in Britain are concerned.
The reason is that we are on a spur from Washington, via Norway,
and net trouble usually means the spur is down, thus isolating us
from all American machines.   2b

Linking and mail facilities are very vital, since these in fact
represent to us the only effective means of communication If we
had the same computer systems in the UK as we have access to over
the net we could obviously rely on telephone or postal services
for queries etc.. However, over the net we have to rely on the
mailing services within the network, and in fact we probably have
very good response to our mail, since they get into your systems
at the beginning of the day, resulting in our getting replies the
same or next day.   2c

We have been actively on the network, both via terminals and
front-ending the RHEL 360/195, for about three weeks now. My own
feelings on logging in to a strange host are ones of wondering
where it is, what its surroundings are and such like, so in part
of the remainder of this article I shall try to give an informal
look at our installation. I shall also try to present some of my
experience so far, but as a user rather than a computer network
specialist. Perhaps one of our system implementers will write a
more technical item in the future.   2d

The UK Scene   3

The research group working on ARPA related topics, and engaged in
looking after the Tip are part of the Dept. of Statistics and
Computer Science, at University College, London. We are sited in
a set of Georgian houses overlooking Gordon Square, in the heart
of Bloomsbury. The houses have their facade preserved and still
appear much as they must have done to their former inhabitants,
the so-called 'Bloomsbury Set' of the early part of this century.
Those inhabitants included Virginia Woolf and Lytton Strachey.   3a

ARPANET - A British Way of Life?

On the ground floor of 47 Gordon Square can be found our
installation. In one room we have a Tip, two PDP-9s, two
telephone switchboards, four terminals and a very noisy air
conditioning plant! From the ARPA point of view all US linking
comes via the Tip into either, one of the switchboards and thence
to the dialled up users, or to PDP-9A and via the other
switchboard to the RHEL 360/195 about sixty miles away in
Berkshire. PDP-9A is becoming used more and more to front end the
360, and PDP-9B is at present being used largely in the
development of further software. In the future, it is hoped that
this machine, too, may be connected to the Tip and front end the
Computer Aided Design Centre machines in Cambridge, again about
sixty miles away.   3b

Geographically, we are somewhat unique. Apart from being the
first Tip outside the USA, the majority of our Tip users use the
network via dialled up connections. Although by American
standards the distance between them and the Tip is not large,
distances of between 60 and 200 miles can pose problems,
especially with regard to capturing of printers and related
topics.   3c

On a recent count, there are some 15 groups in this country who
expect to become active participants on the net within the next
month. They range from groups collaborating on AI work, through
some intending to do graphics work to others involved in
information retrieval excercises. A document will be issued
shortly giving the names and means of contacting these active
users.   3d

My Activities   4

My personal activities on the net over the past few weeks have
been aimed at three broad areas: 4a

   Getting familiar with the NIC,   4a1

   Setting up procedures for dealing with local documentation, 4a2

   Providing some personalised mail facilities within the normal
   SNDMSG facilities.   4a3

Obviously, the first two activities have involved a reasonable
amount of work at the NIC. What we intend to do as far as British
copies of Network documentation is concerned, is to keep reference
manuals at the British Library in Yorkshire. Documents sent there
will then be put on to microfiche and a copy sent to all
participants. The original documents are then available for loan,
or prints. The microfiche will be free to users, but they will

have to pay for prints. Since the documentation concerning the
360/195 will also be kept this way, we hope to be able to extend
this service to American users in the future.   4b

The catalogue of this collection will shortly be kept on-line at
the NIC, in (uk-ics,uk-docs,bl). If any US users find any of our
360/195 documentation in there of interest, please contact me via
ident SRW at the NIC, or by SNDMSG to KIRSTEIN at ISI. In the
latter case, include the characters SRW: in the message or title,
(see next paragraph).   4c

The other of my recent activities concerned a mail problem which
we have, and I suspect, many other sites have. Many of our users
are interested first in getting a feel for the network, and then
later in persuing some more specific activity. Until they are
engaged in such activities we are unwilling to have separate
accounts set up for each user, so we feel that it should be
possible to fit them all under the umbrella of one account. This
has now been done, and any of the active groups can be contacted
via the UK account at ISI. In order to filter the mail, the
sender has to include a short mnemonic followed by colon, in the
message. When UK users call POST, (our mail subsystem,) they give
their identifier and see only mail destined for them. Obviously,
means are provided for getting at unaddressed mail.   4d

Experiences   5

  Time Difference   5a

      The one factor which affects us more than any other users is
      the time difference between the UK and USA. We are normally
      eight hours ahead of the west coast, and five hours ahead of
      the east coast. This means that our best response on
      Californian machines is between 8 am and 12 noon, by which time
      the east coast users start getting active. This access period
      immediately gives us a number of advantages, but at the same
      time a number of sociological disadvantages.   5a1

      The obvious advantage is that of working on underloaded
      machines, and having fantastically good response on machines
      which US users tell me they rarely use because they can never
      get in. The fairly obvious disadvantage is that all computer
      installations, out of sheer economics, do their maintenance in
      off-peak times, and via ARPANET that means we are the ones
      deprived of the machine! In fact, this is a mixed blessing as
      we shall see.   5a2

      The reason I entitled this article "A British Way of Life", is
      because of the sociological changes British network use

implies. Student lectures have to be given and telephone calls
have to be taken in the morning, (certainly if one wants
results by next day,) so that I find the period from about 10
am onward very difficult to use for network activities. Thus
my way of life has been tempered to the extent of starting
around 6.30 to 7 am and working till 9.30 uninterrupted. It
should be now obvious why routine maintenance, one day a week
is somewhat of a blessing!   5a3

Personal Communication   5b

Whilst we, at UCL, have got access to a reasonable number of
general purpose manuals I find, as one always does, that they
never quite explain just what you want to know. Over the past
few weeks, therefore, I' have found the various mail systems
invaluable. In general replies have been very prompt.
However, on the few occasions when some information was needed
desperately and no response was forthcoming, the feeling of
frustration is imeasurable due to the lack of telephone access.   5b1

Occasionally, we use the net in the afternoons, when we
specifically wish to talk to someone, but the most interesting
linking I have done has been at weekends. I suppose the
attraction of linking is that it lies somewhere between the
pioneering radio ham era and some sort of spiritualism!
Whenever problems have arisen and I have linked to someone I
thought might help, I have found that the assistance given has
been fantastic, and obviously beats the mail facilies hands
down. One particularly interesting link was after I had
requested a file from archive some days ago at SRI. When the
file was reloaded the operator came through to inform me. We
got to chatting, and he in talking about England said his Uncle
was a professor in the university. It eventually turned out
that I had been working with the same uncle for some four
years!   5b2

Technicalities   5c

Finally, a few words on the technicalities of life on a spur.
Since we only have one route into the general network from
London to Washington, any failure on this spur isolates us
completely. Furthermore, as I have said, our access is best in
the morning. Thus, if either the host we are interested in, or
the line is down we have a day in which we can do no work. An!
you say, what about off-line facilities? This is just what we
said in the circumstances. All we wanted to do was to prepare
some documents off-line, and then next time the net was up send
them to our friendly host. To a certain extent we have been
successful, but the main problem lies in the fact that the Tip

is not designed to support free running devices like a teletype
reader, and one ultimately, with any sort of realistic loading
on the net gets into trouble with buffers overflowing. I am
told this is being looked into, but I feel a strong need for
good facilities in this area. 5c1

Just as we feel we need good facilities in the Tip to allow us
to prepare off-line paper tapes, so we also need support
systems in the hosts we are using. Many of these facilities
exist at the NIC, but as yet through lack of information I have
not tried other systems' utilities such as RUNOFF which I
believe does page formatting, on other Tenexs. 5c2

ARPANET - A British Way of Life?

(J20839) 10-DEC-73 23:30;   Title: Author(s): Stephen R. Wilbur/SRW;
Distribution: /JI; Sub-Collections: NIC; Clerk: SRW;
Origin: <UK-ICS>ANART.NLS;4, 5-DEC-73 02:32 SRW ;

L10 and Journal Queries

Dean:
   A few more queries, now that I can get back on-line after the
first of the season's power cuts..   1

Outputing Sequential (?) Files from L10 Programs   2

   One program which I would like to try writing in L10 would be to
   produce circulation list labels from a list of names and addesses
   held in an NLS file. The output format would be 3 labels side by
   side, by say 6 deep, ie. 18 per page. Thus one page of labels
   would be well over the limit of size for an NLS statement. Is the
   most sensible way then, to output a sequential (SENDPRINT format?)
   file, or would it be better to put one set of 3 labels as an NLS
   statement?   2a

NLS Statement Size   3

   A strange thing happened the other day. I had some o/p from an
   on-line session, which I wanted to include as a scenario in a
   document I am writing. When this was put into an NLS statement,
   after processing by DEX, all but about the last three lines
   appeared. Repeated insertion of these lines had apparently no
   effect when I used 'ps', but using the '/' cmd the text appeared
   to be there. Splitting the statement in fact did produce the
   text, plus about 4 more copies which I had in fact successfully
   edited in. Any comments? The statement size was 1069 chars
   according to TECO which I had used to put in the primes needed for
   DEX (is there a better way?) and viewspec 'w' was used for output. 3a

Journal Mail Printing   4

   Is there any way, (apart from diverting output), of getting
   journal mail output via the likes of 'pj' to our printer, ie. is
   it possible to specify a print file? Also, is it possible to use
   a 'pj' type function on the Author branch, without moving Author
   to Journal? Producing both of these branches on our printer,
   properly paged, would be very useful, since the output is
   difficult to read when printed continuously over the fold!!   4a

Sorry to keep raising points like this, but certain areas of
documentation are bound to be lacking in any large system, and these
areas obviously call for personal contact. I hope this message
eventually reaches you, since the TIP has stopped three times during
submission, and I have continued by using ATTACH.. Oh what faith I
have!!

   Cheers and Thanks .. Steve   5

(J20840) 11-DEC-73 01:21;   Title: Author(s): Stephen R. Wilbur/SRW;
Distribution: /NDM; Sub-Collections: NIC; Clerk: SRW;
Origin: <UK-ICS>MES.NLS;1, 11-DEC-73 00:39 SRW ;

tickler - week of 3 - 7 Dec

(dm2) 3 December - Monday   1

   0830 hrs. Branch Chief's Meeting   1a

   Robert Stover - Interview w/Col Thayer -- 1330 hrs.   1b

   News Brief items due into Becky Today. Completed   1c

   Bobbie: Personnel Strength Rpt. due. Completed   1d

   Due Date - Action Items (IS) Reply to Thayer - Review status of
   DM-1   1e

(dt2) 4 December - Tuesday   2

   Due Date to ISF - For Tom B. Draft Proposal Re Equipment
   Maintenance   2a

(dw2) 5 December - Wednesday   3

   ISC Confessions - 0830 hrs.   3a

(dth2) 6 December - Thursday   4

   0830 hrs. Branch Chief's Meeting   4a

   Status of DM-1 - Bergstrom w/Col Thayer - 1330 hrs.   4b

   ISIM/Rr. Panara - Impact statements due   4c

   Laboratory Activity Reports due today: Bucciaro must have them by
   1000, ISM must have them by 1100, and DOT must have them by 1600.   4d

(df2) 7 December - Friday   5

   Timecards due today.   5a

   Bobbie: Travel figures due by noon.   5b

   Due Date - ISIM - Unsol Prop DO 85-74, "Network Info Center &
   Augmented Knowledge Workshop Development" w/SRI (1 cy) -
   Completed   5c

   Due Date - ISIM - Unsol Prop DO 82-74, "Interactive Command
   Language III" w/Honeywell (2 cys)   5d

20841 Distribution
     Frank J. Tomaini,

tickler - week of 3 - 7 Dec

(J20841) 11-DEC-73 05:45;   Title: Author(s): Roberta J. Carrier/RJC;
Distribution: /FJT; Sub-Collections: NIC; Clerk: RJC;