

The Second International Conference on
**COMPUTERS AND
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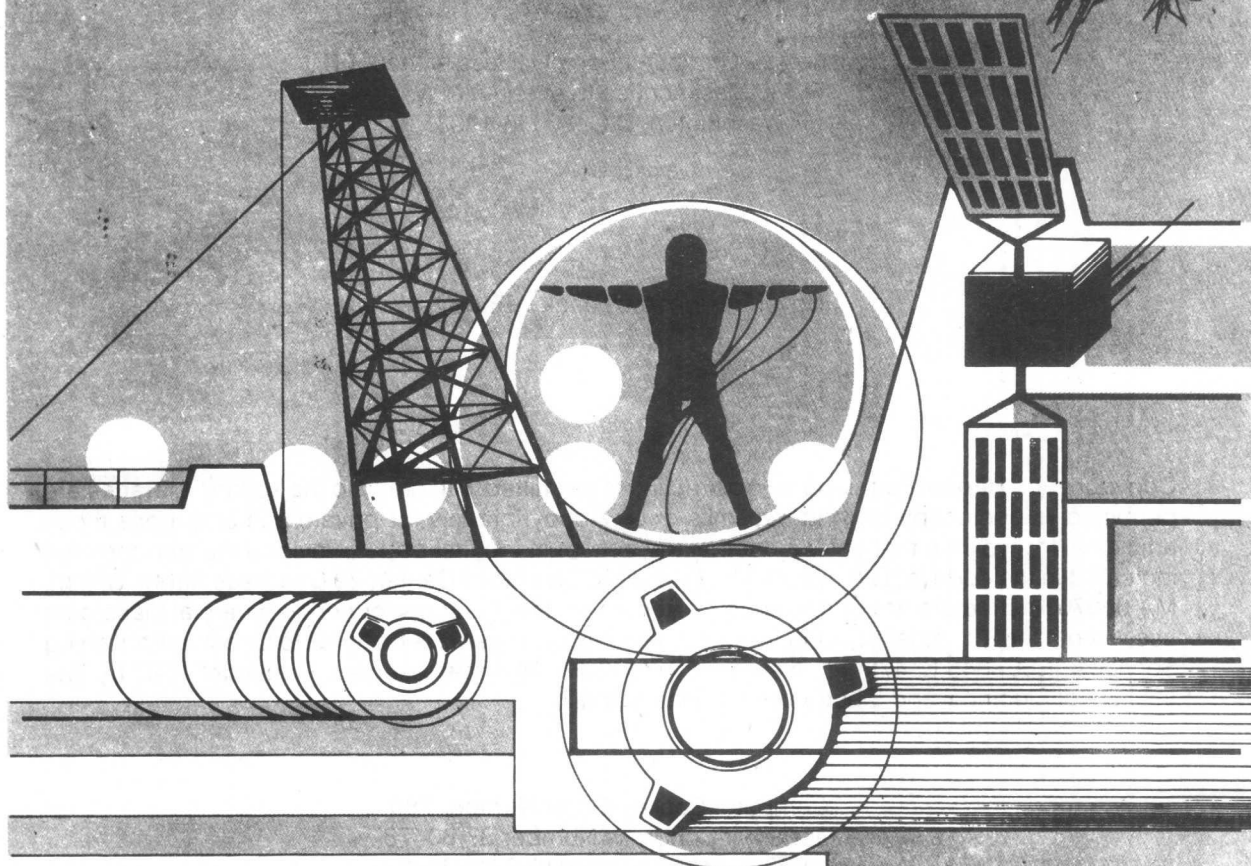
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Introduction

After the successful first joint International Conference on Computers and Applications in 1984, the leaders of the Chinese Computer Federation (previously a Society of the Chinese Institute of Electronics) and of the Computer Society of the IEEE decided to hold a second conference. It was decided to maintain the same broad scope and applications-oriented theme of the first conference. The topics covered are the result of the current interests of a wide spectrum of practicing computer professionals, rather than of any fixed prescription of the program committee. The main criterion for selection was the quality of the technical contribution. Of some 320 papers submitted from more than a dozen countries, less than half were finally accepted. Many good papers could not be accommodated in the short span of the three-day conference. We acknowledge the difficult work of the reviewers by listing their names in the following pages.

The papers included reflect timely subjects in modern computing:

- Networks and Distributed Processing;
- Artificial Intelligence, Image Processing, and Pattern Recognition;
- Database, Algorithms, and Data Structures;
- Systems, Software, Tools, Applications, and Office Automation;
- Testing, Fault-Tolerance, and Reliability;
- VLSI, Computer, and Subsystem Design;
- Computer-Aided Engineering and Computer Graphics; and
- Parallel Processing and Performance Evaluation.

In addition, four tutorial sessions offered before and after the conference enhance the value of participating in this event.

The Cochairmen of the Program Committee want to sincerely thank the committee members and the reviewers for their prompt and thorough work. In particular, the untimely death of Dr. Taylor Booth, is recognized with sadness. Dr. Booth, a Program Committee member, contributed significantly to this and to the previous conference.

Finally, we express our appreciation to the General Conference Cochairmen for their assistance, to the leaders and staff of the two sponsoring organizations for their support, and to the National Natural Science Foundation of China for its collaboration.

We look forward to a technically and culturally enlightening experience in Beijing as an example of international cooperation and friendship.

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Table of Contents

ORIGINAL PAGE IS
OF POOR QUALITY

Introduction.....	iii
Conference Committee.....	iv
Reviewers.....	v
 Session 1A: Networks and Distributed Processing I	
JDCS: A Heterogeneous Distributed Computer System Based on Cambridge Ring	1
<i>J. Ju and H. Yang</i>	
ZGL2: A Distributed Data Processing System Based on Different LANs.....	6
<i>Z. Sun, L. Xie, P. Yang, X. Xue, and J. Zhou</i>	
Distributed Hotel System Based on PC and LAN	9
<i>Y. Wang, X. Tu, and J. Zhang</i>	
The Techniques for Development of Application Softwares in Local Microcomputer Network.....	16
<i>M. Dai</i>	
A Consideration on an End User Interface of Computer Network Systems.....	23
<i>K. Sugawara, T. Kinoshita, M. Ukigai, Y. Miida, W. Gao, W. Liu, and M. Hu</i>	
 Session 1B: Artificial Intelligence I	
A Natural Paradigm for Artificial Intelligence: Collective Learning Systems Theory	30
<i>P. Bock</i>	
Knowledge Acquisition by Simple Learning in a Quiz Programmer's Apprentice.....	38
<i>S. Matwin and C. Quéant</i>	
Reasoning Based on Dynamic Knowledge	44
<i>J. Guan and K. Huang</i>	
A Chinese Question-Answer Experimental System Based on the Sense Coherence among the SNEs	49
<i>Y. Feng and K. Wang</i>	
*A Reasoning System Which Can Deal with Uncertainties in Human Knowledge	50
<i>Z. Xu</i>	
 Session 1C: Database I	
A Highly Reliable DBMS for the 5ESS™ Switching System	51
<i>J.A. Kukla and F.K. Ng</i>	
Architecture of Integrated Information System for Intellectual Information Retrieval and Effectual Database Management	57
<i>T. Watanabe and Y. Ozawa</i>	
Text Searching Using an Inversion Database Consisting of Trigrams.....	65
<i>A.C. Meltzer and G. Kowalski</i>	
Developing Object-Oriented Database Applications on Microcomputers	70
<i>D.M. Kroenke</i>	
Optimal K-Ary Sequential Joins in Acyclic Database Schemes.....	78
<i>Y.Y. Sung</i>	

*Not received in time for publication

Session 2A: Systems I

Memory Management Algorithms for Buffer Pool Systems	83
<i>D.D. Smith and W.G. Bulgren</i>	
A Probabilistic Model of Deadlock.	90
<i>K. Koh and W. Yoo</i>	
Virtual Resource System: Analysis for Resource Management in Fault-Tolerant Distributed Computer Systems.	97
<i>L. Jin, X. Liao, C. Zhang, and S. Qiu</i>	
Support for Distributed Data Structures in the Homogeneous Multiprocessor.	104
<i>K.F. Li, N.J. Dimopoulos, and J.W. Atwood</i>	
Flamingo: Window Management for Distributed Systems.	111
<i>E.T. Smith and D.B. Anderson</i>	

Session 2B: Applications I

Computer Assisted Apprenticeship to Communication Protocol	118
<i>Fe. Bendedouch, Fa. Bendedouch, and J.P. Cabanel</i>	
A Temporal Logic for Specification and Verification of Protocol.	124
<i>K. Wang, J. Chen, and J. Li</i>	
Designing a System for Customer Control of Telecommunication Services	130
<i>E.J. Pasternak and S.A. Schulman</i>	
STARBASE: An Applied Database Management System for Education and Research in Astronomy	137
<i>S.C. Bachus</i>	
Computer Assisted School and Careers Guidance System.	143
<i>D.S. Tung</i>	

Session 2C: Parallel Processing I

RSM (Receiver Selectable Multicast): A Communication Mechanism for Multiprocessors	149
<i>H. Amano</i>	
A Multiple Computer System Architecture for Non-Numeric Parallel Processing	157
<i>T. Fu</i>	
Comparison of Concurrent Error-Correcting Techniques for Multistage Interconnection Networks	163
<i>M. Malek, A.M. Johnson, Jr., and B.D. Rath</i>	
Techniques for Enhancing Performance of Interconnection Networks	169
<i>Z-y. Liu, X-n. Tan, Q-s. Gao, and X. Zhang</i>	
Bitonic Selection Algorithm on SIMD Machines	176
<i>K.L. Chen and S. Hong</i>	

Session 3A: Networks and Distributed Processing II

An Intelligent Support System for Developing Communication Software in Computer Networks	183
<i>N. Shiratori, K. Takahashi, K. Sugawara, S. Noguchi, and J. Oizumi</i>	
Research for Design Methods of Communication Software of Local Microcomputer Network.	191
<i>J. Shi</i>	

A Design Methodology for Distributed Microprocessors in Real-Time Control Applications	199
<i>J.H. Herzog and T. Zhang</i>	
The Design and Study of the Kernel Executive for DRIPS, A Distributed Real-Time Information Processing System	208
<i>J. Wang</i>	
A Distributed Network Operating System for IBM PCs	215
<i>X. Xia</i>	

Session 3B: Algorithms and Data Structures

An Automatic Partition Algorithm for AND-Parallel Execution in the Framework of OR-Forest.	223
<i>C. Sun and Y. Tzu</i>	
Concurrent Garbage Collection with Associative Tag	230
<i>H. Shin, M. Malek, and S. Lee</i>	
*Proof Rules for Communicating Sequential Processes	237
<i>G. Song</i>	
*Formalization of Operations and Function Definitions in a Functional Programming Language for Data Structures	238
<i>R.S. Mehrizy and J.C. Thompson</i>	
Automatic Implementation of Abstract Data Type in Prolog	239
<i>G. Zhu, W. Miao, and X. Gan</i>	

Session 3C: Fault Tolerance and Reliability I

Eliminating Domino Effect in Backward Error Recovery in Distributed Systems	243
<i>D. Zhou</i>	
Increasing Software Reliability of Distributed Systems with OCCAM	249
<i>A.M. Tyrrell</i>	
New Techniques for Intelligent Syntactic and Lexical Error Repair	255
<i>Q. Lu and J. Qian</i>	
Architecture and Implementation of a Fault-Tolerant Computer	261
<i>D. Shan, D. Qian, and Z. Gu</i>	
Multi-Functional Fault-Tolerant Modular Network Architecture	266
<i>L. Wang and Y. Tohma</i>	

Session 4A: Networks and Distributed Processing III

Congestion Control in Packet-Switched Computer Networks	273
<i>L. Zhang</i>	
A Packet Mode Used in Information Flow Networks of Hierarchical Processors	281
<i>B. Fang and M. Hu</i>	
The Approach of Control of Packet Driving System Based on Hierarchical Processors and the Research of Its Model	288
<i>M. Hu and B. Fang</i>	
*Communication Overlap of Networks	295
<i>J. Hong</i>	
Building Protocols for Transfer of Data in Distributed Environments: A Generalized Conceptual Methodology	296
<i>R.F. Calvo</i>	

Session 4B: Performance Evaluation I

Use of Performance to Guide Software Designs	305
<i>T.L. Booth and B. Qin</i>	
Synthesizing Benchmarks with Appropriate Instruction Mix and Locality	312
<i>W.S. Wong and R.J.T. Morris</i>	
A Methodology for Studying Performance of WE® 32100-Based Single Board Computer Systems	320
<i>W.S. Wong, M. Isenman, and J. Mao</i>	
Performance Evaluation of Multiprocessor Systems with Heterogeneous Common Resources	329
<i>Y. Zhao, H. Okada, and S. Maekawa</i>	

Session 4C: Computer Graphics I

High Performance Display System for Dynamic Image Generation	336
<i>J. Staudhammer, J. Huang, and L. Liu</i>	
A Command-Based User Interface Management System	344
<i>D.R. Olsen, Jr. and R.P. Burton</i>	
A Proposal for a Graphic-Oriented Logic Database System	350
<i>P. Asirelli, P. Castorina, and G. Dettori</i>	
Continuous Tone Display for Geometric Modeling	352
<i>N. Zhang, J. Dong, and Z. He</i>	

Session 5A: Systems II

An Extendable Simulator for Multiprocessor Machines	359
<i>S.C. Hsieh</i>	
A New Functional Language and Its Application to Operating Systems	367
<i>Y.Q. Sun and L. Yang</i>	
Experiments with Systems Programming in FP Style	375
<i>L. Jin, H. Zhu, and J. Xu</i>	
*An Interactive System SDI on Microcomputer	382
<i>R. Yuan</i>	

Session 5B: Artificial Intelligence II

The Computational Formulae of Evidence Combination Scheme in a Hierarchical Hypothesis Space	383
<i>J. Guan and V.R. Lesser</i>	
Analysis of the Unit Element in Inexact Reasoning in Expert Systems	391
<i>J. Guan and C. Zhang</i>	
The Connection Method for Automated Theorem Proving and Its Implementation	395
<i>H. Miao</i>	
A Massively Parallel Network-Based Natural Language Parsing System	401
<i>T. Li and H.W. Chun</i>	
*Parallel Execution of Negative Goals in the Extended PSOF Model	409
<i>P. Wang</i>	

Session 5C: Database II

Integrated Solutions to Concurrency Control and Buffer Invalidation in Database Sharing Systems	410
<i>E. Rahm</i>	
Automatic Relational Data Base Designs by Transformation of the Entity-Relationship Model	418
<i>M-J. Kim, W-U. Lee, and J-C. Derniame</i>	

Picture Description Using Entity Relationship Diagrams	426
<i>E.T. Lee</i>	
Design and Implementation of a Tree-Structured Database Machine	432
<i>X. Xu, H. Chang, L. Meng, G. Chen, M. Hu, and S. Li</i>	
A Unifying Multi-Processor Allocating Approach on Database Machine Systems	440
<i>H. Chang, X. Xu, and L. Meng</i>	

Session 6A: Networks and Distributed Processing IV

Formal Specification and Automated Implementation of Communication Protocols Based on ISO's FDT	447
<i>W. Jing and Y. Xu</i>	
A New Technique for Protocol Description and Verification	454
<i>Q. Zhang and J. Zhou</i>	
How to Build a Gateway—C-Gateway: An Example	461
<i>L. Zhang</i>	
A TCP/IP Communication Subsystem in Micros	469
<i>L.D. Wittie and F. Ma</i>	
A Multiprocessor System with Shared Memory for Distributed Processing	475
<i>D. Zhang and C. Zhao</i>	

Session 6B: Algorithms and Data Structures II

A Tagging Scheme to Prevent Infinite Recursion in First-Order Databases	480
<i>W.-c. Wong and L. Bic</i>	
*Improvements to Shell's Diminishing Increment Sort	482
<i>C.T. Zhan</i>	
The Design of a Parallel Sorter SOP	483
<i>F.-Y. Peng and S.-R. Hu</i>	
Multi-Selection and Distributed Sorting	490
<i>X. Zhou and Z. Jin</i>	
CNNEIM-A and Its Mean Complexity	494
<i>L. Xu, P. Yan, and T. Chang</i>	

Session 6C: Image Processing and Pattern Recognition I

A Functionally Distributed Multiple-Array Architecture for Parallel Vision Processing	500
<i>Q. Guo and Z. Li</i>	
*IGKS: Integrated Image Processing and Graphics	507
<i>G. Grinstein</i>	
MORPHEE: A Multi-Access Memory Unit for On-the-Fly Image Processing Applications	508
<i>Ph. Kajfasz and B. Zavidovique</i>	
A Microcomputer Controlled Speech/Data Interpolation System	515
<i>S.-M. Sun, X.-Y. Liu, and K.-J. Li</i>	

Session 7A: Computer Aided Engineering

Computer Aided Testing (CAT)—Aircraft Engine Development	520
<i>C. Schiano</i>	
Putting Computer Aided Software Engineering to Work	528
<i>N.J. Kubilus</i>	
Automatic Large-Scale Software Integration	532
<i>M.E. Yip</i>	
*Computer Aided Programming for Robots	536
<i>K.W. Nielsen</i>	

Distributed Systems Architecture and Decision Support Systems in Computer Integrated Manufacturing	537
<i>J.D. Palmer and Q.L. Yi</i>	
Session 7B: Artificial Intelligence III	
Structure Theory of Many-Valued Logic Functions	544
<i>C.K. Lo</i>	
Towards an Algebraic Manipulation System (AMS) Using PROLOG	554
<i>H. Shen and Z. Xie</i>	
*MTSP: Micro-Tale Spin Using PROLOG	563
<i>L.A. Chen</i>	
A PROLOG-Based Rule Compiler for Building Expert Systems	564
<i>L. Zhou and X. Li</i>	
Session 7C: Office Automation I	
CWPR, A Chinese/Japanese Word-Processing System for Use with the UNIX™ Device-Independent TROFF System	570
<i>C.H. Ip, D.M. Berry, and K.P. Chow</i>	
*A Chinese-English Automated Translation Aid for Use on Personal Computers	578
<i>G.D.A. Cable</i>	
A Multi-Language Characters Operating System on IBM PC/XT Microcomputer	579
<i>Z. Wu, W. Islam, J. Jin, S. Janbolatov, and J. Song</i>	
Designing Multinational Applications	586
<i>K.E. Chez and R.T. Nicholson</i>	
Panel Sessions	
The Role of Education in Technology Transfer	
The Fifth Generation: Is It Dead or Alive	
Software Engineering: The Endless Frontier	
Session 8A: Applications II	
The Interpretation of Seismic Facies Expert System: SFAES	592
<i>S. Wang and Y. Xu</i>	
A Discovery-Oriented Logic Model	598
<i>P. Wang and C-C. Hsu</i>	
Blackboard Model Implementation in a Knowledge-Based Job-Shop Scheduling System	605
<i>J.U. Choi and T.A. Byrd</i>	
Some Innovative Application Design Approaches of GDC 7220	612
<i>J. She, M. Chen, L. Shi, and C. Chen</i>	
Computer Networking in and with the People's Republic of China: Possibilities and Probabilities	619
<i>J.H. Maier</i>	
The Design of HOE Using Equivalent Lens Method	625
<i>H.M. Chen</i>	
Session 8B: Artificial Intelligence IV	
Concurrency Control for Object Oriented Programming Environments	630
<i>H. Tirri</i>	
The Sixth Generation Computer—Fuzzy Intelligent Computer	638
<i>Y. Zhang</i>	

A Compact Symbolic Processor for Artificial Intelligence Applications	641
<i>J.C. Heudin, C. Metivier, P. Kajfasz, B. Zavidovique, and F. Devos</i>	
Intelligent Scheduling Architecture in KSS	646
<i>Z. Shi</i>	
Session 8C: Fault Tolerance and Reliability II	
CODAR: An Expert System Design Tool for Engineering Diagnostics	650
<i>L. Christensen, T. Li, B. Nelson, L. Fang, G. Stokes, and B. Hayes</i>	
General Purpose System to Generate Detection Program for Microprocessors	656
<i>S. Feng, S. Xu, and C-w. He</i>	
Distributed Diagnosis Algorithms for Large Scale Regular Interconnected Structures	661
<i>A.K. Somani</i>	
*A Built-in Test Pattern Generator	667
<i>Y. Min</i>	
A Design of Totally Self-Checking Checkers.	668
<i>J. Li and Y. Min</i>	
Session 9A: Networks and Distributed Processing V	
Static Evaluation of Concurrency Degree in Multitask Environments	674
<i>V. Piuri</i>	
An Efficient and Flexible Heuristic Task Assignment Method for Distributed Computing Systems	682
<i>X. Huang and X-y. Cai</i>	
A General Heuristic Algorithm of Task Allocation in Distributed Systems.	689
<i>X-L. Yang and X-D. Zhang</i>	
The Potential Speedup in the Optimistic Time Warp Mechanism for Distributed Simulation	694
<i>O. Berry and G. Lomow</i>	
Optimistic Algorithms in Distributed Systems	699
<i>R.W. Lee and L. Lilien</i>	
Session 9B: Algorithms and Data Structures III	
Can Algorithm SA Beat 'Exponential Explosion'?	706
<i>L. Xu</i>	
A New Algorithm for the Isolation of Real Roots of Polynomial Equations	714
<i>J. Chen</i>	
The Gap on Distance of Zeros of Polynomial and Others	720
<i>C. Lin and J-w. Hong</i>	
The Meta-Level Control in MES1	724
<i>J. Guan and A. Zhang</i>	
An Algorithm on Generating the Case Frame	729
<i>Y. Feng and K. Wang</i>	
An Implementation Algorithm for Integrity Enforcement	733
<i>K.K. Chan and B. Srinivasan</i>	
Session 9C: Computer Graphics II	
Determination of Parallelism and Intersection of Chained-Coded Lines	742
<i>P. Son</i>	
A Non-Parametric Hough Transform for Lines and Ellipses	752
<i>C.K. Chan, J.G.N. Lee, and H.T. Tsui</i>	
Display of 3D Objects with Realistic Images Using Movie System	757
<i>Z. Zhao</i>	

An Expert System for Pseudo-3D Art Pattern Creating	764
<i>F. Lin, Z-J. He, Y-H. Pan, and S-Q. Guo</i>	
Session 10A: Artificial Intelligence V	
Knowledge Representation and Acquisition Methods for Oriental-Medicine Liver	
Diagnosis System: OLDS	770
<i>Y. Lim, D. Shin, S. Kim, K. Kim, S. Park, G. Oh, and W. Lee</i>	
The Automatic Generation of Mode Declarations (AGMD) of Predicates Used in the Data	
Dependency Analysis (DDA) of Logic Programs	778
<i>S. Yan</i>	
A Parallel Execution Model of Logic Programs—TIDE	784
<i>Z-y. Liu and Q-s. Gao</i>	
Motion Estimation of Rigid Objects in Blocks World	790
<i>T.X. Wei and B. Dubuisson</i>	
Session 10B: Designing Computers and Subsystems	
A Pipelined Array System for Relational Database Operations	795
<i>G. He</i>	
Associative Query at the Microlevel Using Interconnection	802
<i>A. Săfir, Ph. Kajfasz, F. Devos, and B. Zavidovique</i>	
Design Considerations of a Distributed Parallel Reduction Architecture	809
<i>Y.K. Guo, X.L. Du, J.G. Fang, D.X. Wang, and W.M. Zheng</i>	
A Requirement-Driven System Design Environment	817
<i>K-W.E. Lor and D.M. Berry</i>	
Survey of CAE Workstation and Accelerator Developments	823
<i>C.J. Tan</i>	
Session 10C: Design and Test of VLSI I	
Time-Space Optimal Systolic Array Divider Using Redundant Binary Representation	833
<i>D.Y.Y. Yun and C-n. Zhang</i>	
*Top-Down Design of Systolic Processors with a Systolic Simulator	838
<i>T. Li and B. Nelson</i>	
Structured Design of the Control Parts of Self-Timed VLSI Systems	839
<i>M. Yoeli</i>	
An Automatic Placer for Arbitrary Sized Rectangular Blocks Based on a Cellular	
Model	842
<i>D.L. Jarmon</i>	
Session 11A: Design and Test of VLSI II	
Score Function Channel Router	847
<i>K.P. Tan and T.S. Tan</i>	
Design for Testability in LSI/VLSI Systems	855
<i>F.F. Tsui</i>	
A Unified Approach to Via Minimization with Movable Terminals in VLSI Routing	863
<i>J.S. Deogun and B.B. Bhattacharya</i>	
Segmented Microprogramming in the Design of High Performance Microprocessor	870
<i>X. Meng and M. Kriger</i>	

Session 11B: Software and Tools I

Automatic Program Bug Location by Program Slicing	877
<i>J.R. Lyle and M. Weiser</i>	
Incremental Nonlocal Attribute Evaluation in Language-Based Interactive Programming Environment.	884
<i>Y. Zheng and J. Qian</i>	
Semireusable Software in a System	890
<i>C.B. Quan</i>	
PROSPECT: Prototype Software Performance Evaluation and Coalescence Tool	896
<i>H.A. Sholl and V. Iyer</i>	
A Pre-Processor for Schematic Pseudocode.	904
<i>P.N. Robillard, J.B. Trouve, and A. Grenier</i>	

Session 11C: Image Processing and Pattern Recognition II

*New Approach to Improve Spectral Representation for Voice, Unvoice, and Silence of Speech Signal.	912
<i>B.J. Adzman and V.J. Phillips</i>	
*TRES—A Knowledge-Based System for Understanding Trademarks	913
<i>F. Kong and J.T. Tou</i>	
The Optimal Characteristics of Mahalanobis Distance Feature Selection	914
<i>G. Xuan</i>	
2D Recognition of Partially Occluded Machine Parts	920
<i>H-T. Tsui and M-H. Chan</i>	
Author Index.	935

JDCS: A HETEROGENEOUS DISTRIBUTED COMPUTER SYSTEM BASED ON CAMBRIDGE RING

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Abstract

A heterogeneous personal microcomputer distributed system developed at the University of Jilin during the period of 1983-1986 is described in this paper. The system is based on a Cambridge Ring which we ourselves built. The Ring contains 10 nodes connecting 13 computers of 9 models and is 1100-metre long (3 slots runnable) using twisted cables with error rates of 10^{-4} . The system is a typical client/server distributed system, providing services of file, name, print/spooling, asynchronous communication, error logger, boot, plot, mail, UNIX and mainframe.

Introduction

Since July 1983 we have started a project -- developing the Jilin Distributed Computer System (JDCS), a heterogeneous personal microcomputer distributed computing system using a Cambridge Ring. The objectives of the project are:

- a) building a Cambridge Ring by ourselves, obtaining detailed, hand-on experience with it, designing suitable access boxes to allow more types of computer in China to be attached to the Ring.
- b) to seek a method of setting up a DCS promoting applications of microcomputers in China.
- c) to set up a working distributed system, stimulating atmosphere for pursuing research.

It should be noted that in China most computers are low cost personal microcomputers, and quite different from each other. These need to be connected together via a Ring for application such as office automation and the access boxes must be cheap and simple.

The remainder of this paper presents the status of the Ring built at Jilin, architecture, functions and implementation of the JDCS. The reader is referred to the

references for great detail of designing and implementation of the Cambridge Ring¹ and general principles of distributed computing system based on the Cambridge Ring^{4,5,6}

The Ring of Jilin

The Ring of Jilin built at the University of Jilin is based on information offered by the University of Cambridge Computing Laboratory. The Ring system is shown in figure 1.

The present status of the system is as following:

repeaters	10
monitor	1
station units	10
access boxes interrogating type	7
access boxes interrupting type	3
ring size in length (metres)	1100
slots runnable	3
maximum distance between repeaters (in metres)	150
data rate (MBPS)	10
error rates	10^{-4}
protocols	BBP, ESP ^{2,3}

At the time of writing 13 computers of 9 models have been connected to the Ring. Configurations of the computers are shown in table 1.

The Ring system has three features:

- a) It is a heterogeneous system.
- b) It has three types of connecting computers to the Ring (interrogating, interrupting and using asynchronous lines).
- c) It has three kind of nodes:
 - .server nodes:
 - only providing some services to client nodes or other server nodes.
 - .client nodes:
 - do not provide any services, only access server nodes.
 - .server/client nodes:
 - have both server and client roles.

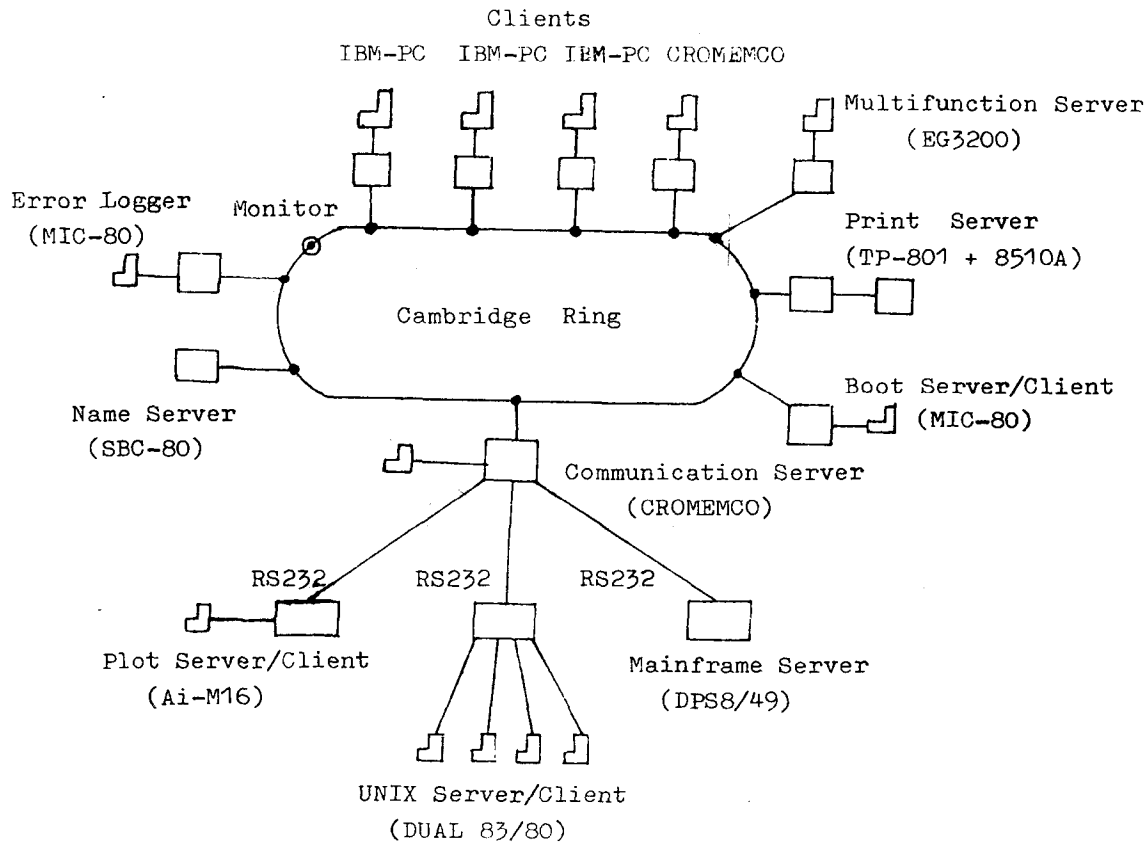


Figure 1. Functional diagram of JDCS

Functions of JDCS

The system may provide many services, such as:

.File service: A user at a client node may access the file system of the File Server. Operation includes renaming, fetching, sending, deleting a file and reading the directory of the file system.

.Print service: A local file or a file on the File Server may be sent to the Print Server for printing out immediately, or queuing up (spooling).

.Asynchronous Communication service: The multicomunication controller connects computers with RS232 asynchronous serial lines to the Ring.

.Mail service: Users who have been signed with appropriate passwords given by the operator of the system may send or read letters each other at any client nodes. Chinese characters may be used on IBM-PCs.

.Time service: A user may read the year, month, day, date, hour, minute from the Time Server at any client nodes. The Mail Server reads the time from the Time Server when writing a letter and appends it

to the letter. The Error Logger reads the time from the Time Server when receiving an error report and writes it down to the error record.

.UNIX service: A user at an IBM-PC or a CROMEMCO computer may use the facilities on Dual 83/80 computer. Most of the UNIX utilities are available.

.Mainframe service: Users on the Ring may use a client node computer as a remote terminal of the mainframe computer Honeywell DPS8/49, being located in the Computing Centre of the University.

.Plot service: Users of client node computers may use the Plotter, graphic terminal or graphic printer of the Ai-M16 computer.

.Name service: The Name Server maps names of servers, computers and processes to physical addresses and vice versa, making resources of the system transparent to the users.

.Boot service: Low cost micros without floppy discs such as TP-801 and SBC-80 single boards computer are loaded by tape recorders usually and not convenient, impossible in some cases. When such a computer on the Ring requests the Boot