הטכניון - מכון טכנולוגי לישראל
TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY

THE S. NEAMAN INSTITUTE
FOR ADVANCED STUDIES IN SCIENCE & TECHNOLOGY

מוסד שמואל נאמן
למחקר מתקדם במדע ובטכנולוגיה

COMPUTING and COMPUTER APPLICATIONS IN ARAB COUNTRIES

Ing. D. Granot, Dr. M. Itzkowitz and Prof. M. Yoeli

Project No. 161,
Report No. 6

December 1990

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The opinions expressed in this report are those of the author and do not necessarily reflect those of the S. Neaman Institute for Advaced Studies in Science and Technology.

Contents

Abstract

The computing and computer applications in Arab countries, especially in Egypt, Saudi Arabia and Jordan, have taken a fast development since the 1970s.

It is significant in four major fields: arabization of computer software, utilization of computing systems, science and computer engineering education, and a growing number of publications.

The fast development is to be expected in the future, mainly due to the growing awareness in the Arab States of the importance of computing.

The recent crisis in the Gulf, the war against Iraq and on the other hand, the Alliance of Egypt and Saudi Arabia with the United States and the Western countries, may have long range effects on future technological developments in these Arab countries and will affect the computer developments in these countries.

Introduction

The purpose of this research is to examine the developments taking place in the areas of computing and communications in Arab countries, with emphasis on Egypt, Iraq, Saudi Arabia, Jordan, Syria and the Gulf States.

This report summarizes part of the material collected and researched during the period January-December 1990. The report was prepared in the first half of January 1991. The report summarizes computing activities in the countries: Egypt, Iraq, Jordan and Saudi Arabia.

Professor M. Yoeli was active throughout the period, Dr. Meira Itzkowicz was active from January till June 1990, and Ing. Dan Granot from July 1990.

The information was collected from various sources, particularly:

* The DIALOG Information Retrieval System 1985-1990.
* The book [Michael Agi, *Data Processing and Telecommunications in the Arab World*, Private Edition, Koenigswinter, Germany, 1986].
* Relevant publications in scientific journals, 1985-1990.
* The World of Learning, 1990.

We acknowledge with the thanks the assistance of Mrs. Nili Tirosh, Central Library, Technion, concerning the use of the DIALOG system.

1. Overview

The development of computer technology in the Arab states started relatively late, namely in the 1970s.

The income from oil production in Saudi Arabia and Iraq (up to the Iran-Iraqi war) provided extensive funds for the advancement of computer technology, needed also for the oil industries.

The peace treaty with Israel and the expansion of oil production, allowed also Egypt to advance their computing activities.

Egypt and Saudi Arabia were also active in academic education and research in computer science and computer engineering, as well as the Arabization of computer software, to make computing accessible to a wide range of users.

The availability of funds and the friendly relations between Saudi Arabia and the USA, allowed the purchase of a supercomputer (CRAY-2) for the oil industry, but those supercomputers could, of course, be used for other scientific and/or military purposes. At the same time, the USA did not approve the acquisition of supercomputers by Israel.

The following are examples of significant utilizations of computing systems.

* The establishment of a computerized Decision Support System for the Egyptian Cabinet.
* The installation of a Computerized Information Retrieved Network in Iraq for their engineers and scientists, providing on-line access to the largest international relevant databases, e.g. DIALOG.

Noteworthy is also the fast development of computer science and computer engineering education in the Arab countries under review, where special departments of computer science were established in nearly every university. The deans of those departments are all of Arab origin.

The review of scientific publications indicates a wide range of interests with strong emphasis on applied research problems.

We expect the above fast development and expansion of computer engineering to continue in the future, due to the growing awareness in the Arab states of the importance of computing, the availability of funds and the growing cooperation of Egypt and Saudi Arabia with their Western partners in the Arab Shield Alliance.

Section 3 of this report provides a short evaluation and summarizes our specific recommendations for future research on the above topics.

2. Computing in Arab Countries

2.1 Arabization of Computing

In this Section we discuss the trend in the Arab countries to have computing facilities available for the large population who prefer to use Arabic only for all phases of their computing activities, without the necessity to use any technical terms in English.

To meet these requirements, the Arab countries established in 1976 a "Committee on Arabic in Informatics" (COARIN), in cooperation with IBI, the International Intergovernmental Bureau for Informatics, which has its headquarters in Rome.

At their meeting in Bizerte, Tunisia, COARIN decided on the following recommendations:

1. Complete Arabization of the teaching of Informatics at all levels.
2. Development of programming languages in Arabic.
3. Unified coding of Arabic characters throughout the Arab world.
4. Adopting Arabic as one of the working languages within IBI.

Judging from reports presently available, the above targets, and even much beyond them, have been achieved. Arabic computing has developed into a big, booming business. In the Gulf States alone, the computer market was estimated (Middle East Economic Digest (MEED), Jan. 12, 1990, p. 9) to exceed US $ 1.0 billion/per year and to be growing at a yearly rate of 10%.

Below are some highlights of what has been achieved so far in the field of the "Arabization of Computing".

In general, computer products are now being developed for the booming Arabic computing market including practically every type of hardware system and software package, from mainframes to PCs and their many applications.

Arabic versions of IBM-standard PCs are available, together with the following software packages:

* Arab-DOS: "Official" Arab Operating System, from Microsoft, Calif.
* ArabWord: Original Arabic word processing system developed by Gulf Star Computer Systems
* Arabkit-Plus: System-level "Arabization" toolkit from UK-based Rocketfield Computer Systems. Provides for the Arabization of e.g. Lotus-123, dBase, etc.
* Arab Mac: The Arabic version of the Apple Macintosh, together with a complete set of "Arabization" tools.

The cursive, interacting letters of the Arabic script present a particular difficulty for the Arabization of computing. Nevertheless recently developed word processing software can correctly format this type of Arabic script.

Worth mentioning in particular, is also the Arabic programming language ARABW, which has been developed by computer scientists in Saudi Arabia, together with an efficient compiler. ARABW was designed mainly for business applications and for training data processing students.

References:

M. Agi, *Data Processing and Telecommunications in the Arab World*, Koenigswinter, Germany, 1986.

D. Moralee, "*Computing in Arabic*", Computer Systems Europe, Nov. 1989, pp. 55-59.

J.D. Becker, "*Arabic Word Processing*", Commun. ACM, July 1987, pp. 600-610.

A.Y. Al-Hawaj and M. Hamed, "*Design of an Arabic Programming Language ARABW with an Efficient Compiler*", Proc. Ninth NCC, 1986.

progress during the last five years was mainly due to the following factors (cf. [2]):

* A greater awareness of the Egyptian Government as to the importance of computerizing some of their major activities, e.g. long-range planning.

* The peace treaty with Israel, which allowed the diversion of funds and Government attention to the establishment of advanced methods in administration and economic planning.

* Increased assistance from foreign sources, mainly UN and the USA.

As to the computing equipment in the universities, the Egyptian Government initiated in March 1988 a project to provide Government universities with locally manufactured equipment, to be produced by the Ministry of Military Products [3].

Arabization of Computing (see Section 2.1)

The recent trend toward the popularization and the Arabization of computing in Egypt is noteworthy. In this connection Egypt's Ministry of Education started in 1988 a rather ambitious program to introduce computer studies into about 10,000 schools throughout Egypt. For this purpose, contracts were signed with French and British companies for the supply of computer kits, to be assembled locally by the Benha Electronics Company. The computers will he programmed in Arabic. The French and British Governments are to provide training through their educational and cultural missions in Egypt [4] .

A further effort toward the Arabization of computing is the establishment of the "Pyramids Technology Valley" (Egypt's version of the US Silicon Valley), engaged in the Arabization of standard software tools, e.g., dBaseIII, and Lotus 1-2-3 (see Ref.[2]).

Academic Activities

As far as academic achievements are concerned, Egypt always had, and still keeps the lead in the Arab World. This is evident from the (partial) list of Egyptian publications in the field of theoretical computer science, applicative computer engineering, and related topics (see Appendix, Section 4.1.3), as compared with similar lists of the other Arab countries (see e.g., Appendix, Sections 4.2.3, 4.3.3, and 4.4.3). Our partial list of Egyptian publications contains 32 papers which appeared during 1977-1987, with most of them (26) produced after 1980.

Abstracts of a selection of significant papers, most of them published during the last three years, are given in the Appendix, Section 4.1.4. They illustrate the fact that the academic effort in computer science and computer engineering in Egypt is either completely application-oriented, or combines theoretical investigations with the emphasis of their applicability to major national problems. Only few of the abstracts point toward purely theoretical studies.

In view of the difficult job situation and poor salaries, many gifted Egyptian computer experts have emigrated to the USA, Europe, and other better paying Arab countries. Nevertheless, Egyptian computer scientists abroad are contributing to the development of computer engineering projects in Egypt.

Presently, the academic level of computer science in Egypt is definitely below that found in the USA, Europe, and Israel. Indeed, no Egyptian computer scientist can claim a world-wide reputation, similar to that of e.g. Israel's Michael Rabin, Zohar Manna, Amir Pnueli or Adi Shamir.

Significant Applications

The following is a partial list of significant computer applications which require advanced system and software developments.

* For computer applications to agricultural projects, see Section 4.1.2, [EGA2].

(4) Aviation

* In 1984 Egyptair installed a new automated passenger service system (OSORES), developed on the basis of a software package from British Airways. The system is run on two IBM 4341 computers, each with 8 megabytes of mainframe [1].

* A new terminal system, installed at Cairo airport in 1987, is described in Section 4.1.2, [EGA7] .

(5) Air Defense System

A contract signed in 1988 with Hughes Aircraft for the supply of a computerized air defense system is referred to in Section 4.1.2 [EGAG].

References

[1] M.Agi, *Data Processing and Telecommunications in the Arab World*, Private Edition, Germany, 1986.
[2] Management Inf. Systems Quarterly, Dec. 1988, pp.551-569.
[3] Al Ahram, March 21, 1988, p.8.
[4] Middle East Economic Digest, July 15, 1988, p.26.

2.2.2 Iraq

Development of Computing

In the early 70s the Iraqi Government already realized the importance of the new computing technology to the military, industrial and social development of the country. Consequently the government created in November 1972 the National Computer Centre (NCC) of Iraq, which was empowered with the establishment of a national strategy, to deal with short- and long-term planning for informatics. The NCC, under the directorship of Dr. H.A. Taki Al-Bayati, was

affiliated with the High Council of Planning, whose director at that time was Saddam Hussein.

The NCC operates on the basis of five-year plans, dealing with all aspects of developing and using informatics on a national scale (see Ref. [1]).

In the early 70s computer installations grew rapidly, and at the end of the 70s Iraq ranked worldwide among the 36 largest computer importing countries. At the end of 1981, Iraq had a total of 82 computer installations (37 large systems, 31 medium systems and 14 small systems). In 1982 Iraq imported hardware worth $26 million (as compared with $22 million for Egypt, and $111 million for Saudi Arabia). However, during the Iran-Iraq war the growth of computer imports and computing activities was only minor (see Ref. [2], pp. 192-194).

The NCC has a computer services and consulting department, which develops software packages and systems for government organizations and the private sector. In 1986 this department had already four large computers, and employed high-level programmers and analysts.

In 1983/84 the Iraqi Government granted funds to establish a large computer at the Iraqi Scientific Documentation Centre, which is responsible for providing information services to researchers and scientists. Connection was established with the largest international vendor of databases, DIALOG. For more details on this project, see Appendix, Section 4.2.2 [IQA1].

Academic Activities

The list of scientific papers in the area of computers and communications published by Iraqi scientists in the open literature is very limited (for a partial list of such publications see Appendix, Section 4.2.3). Nevertheless, the impression we get is that the situation is quite different. Namely, it appears that the Western principle of "publish or perish" does not apply to the scientific community in Iraq. The tendency seems to be to keep the important academic achievements hidden from the outside world. We are aware of the fact that a number of foreign countries with advanced computer and telecommunication technologies, e.g., France and Japan, have provided extensive know-how to the

Iraqi Government, military and academic establishments. However, no detailed accounts are available.

Significant Applications

The above-mentioned Iraqi tendency to keep important achievements secret, also apparently applies to significant computer applications. A few examples of some applications which have been announced, are listed in the Appendix, Section 4.2.2. Of importance is the establishment of the Computerized Information Network, mentioned earlier (see Section 4.2.2, [IQA1]).

References

[1] H.A. Taki, *The National Computer Centre of Iraq*, Agora Inf. Changing World (Italy), No. 2, 1986, pp. 40-41.

[2] M. Agi, *Data Processing and Telecommunications in the Arab World*, Private Edition, Germany, 1986.

2.2.3 Jordan

Development of Computing

Jordan is a small country without any significant industry. It lacks big companies and its geographical location does not provide special advantages for trade or transit of goods.

This situation limited the use of computers in the early stage, mostly to government functions and civil services. The introduction of computers started quite late. In 1977, there were only 10 computers in the kingdom. The computers have been introduced to government departments, universities and some private establishments. In 1981 the number of computers reached 38 and it rose to over 260 mainframes and minicomputers in 1986. The money expenditure on computer systems was about 12.5 million pounds sterling per year, 80% of which was spent on hardware, 11% on software and 9% on training (see Ref. [1]).

The Computer Systems Department (CSD), one of seven technical departments of the Royal Scientific Society (RSS) of Jordan was commissioned to promote informatics throughout the country by providing technical consultation, training Jordanian personnel, development of software, compatible with Jordan's needs and applicable to its projects, development of packages to provide support services to Jordanian organizations and other Arab countries (see Ref. [2]).

The Computer Systems Department received an NCR computer (Century 251) as a gift from the government of Japan. Due to expanding tasks of the RSS the computer was later replaced by a larger system. It can be said, that in the mid-80s Jordan did not have a long-range informatics planning policy. The responsible body for applications was CSD and the supervisory body was RSS.

Other promoters of informatics in Jordan were the suppliers of computing equipment. The Jordanian market became dominated by IBM, NCR, Data General, Burroughs and to a lesser extent by UNIVAC, Wang and Hewlett Packard.

Academic Activities - (see Appendix, Section 4.3.1).
All four universities of Jordan were important promoters of computer science by establishing the computer science faculties with attached computer centers. Between 1977 and 1980 four community colleges teaching computing sciences or programming were established in Amman. Those studies take two years and the graduates receive diplomas.

It appears that the number of Jordanian publications in computer science is very low and limited to Yarmuk University and the University of Jordan. A partial list is provided in the Appendix, Section 4.3.3.

Applications (see Appendix, Section 4.3.2).

In Jordan, having no oil resources and related industries, the computers were utilized in traditional fields like accounting, inventories, management support

in business and administration. Lately the utilization of computers has been spreading to new fields of application like planning and monitoring production, modernization of banking by establishing points of sale networks.

The evaluation of Jordan's computational potential is somewhat limited due to inadequate information about expansions of computer installations in government and military sectors.

In the 1980s, the Iran-Iraqi war brought quite a prosperity to Jordan, who became one of the main suppliers of goods to Iraq, through Aqaba, being the only available port. It can be assumed that during this period some of the financial resources were used for the expansion of computing facilities.

The known directions of computer application expansions went toward the aid in planning the production and distribution of electric power, implementation of computerized libraries and information centers. Another application planned for the near future, are the advanced police command and control systems, based on computer information systems which will allow police activities to be monitored and controlled from headquarters in Amman.

Evaluation

Since the end of the Iran-Iraqi war the economic situation of Jordan worsened. A great number of Jordanians connected with the supply of goods to Iraq lost their jobs. Due to the decreasing flow of foreign currency, the Jordanian Dinar lost a part of its value. Jordan's sympathetic attitude towards Iraq from the beginning of the Gulf crisis deteriorated its financial situation even more. Jordan lost the supply of its cheap oil from Saudi Arabia and financial aid from the Gulf States.

Due to these developments it seems that Jordan is not in a position to continue the development and enlargement of computing sciences and applications for the following reasons:

1. Lack of funds.
2. Resistance of foreign countries to send advanced computer hardware to Jordan due to its friendly relations with Iraq.

We can assume therefore that the stagnation in the Jordanian computing will remain as long as the present situation continues.

References

[1] Jousef Nussair, *A report on the policy of users of computers in Jordan,* Amman, 1986.

[2] M. Agi, *Data Processing and Telecommunication in the Arab World.* Private edition, Germany 1986, p. 195.

2.2.4 Saudi Arabia

Development of Computing

In 1968 the General Assembly of the UN stressed the importance of informatics for the economic and social development and called on the developing countries to utilize data processing systems in order to enlarge their productivity and reduce the technological and economic gap between them and the industrial countries. Saudi Arabia had to wait until the end of the 1970s when the petrol discovery and exploitation started the ambitious industrialization program, which in its continuation allowed Saudi Arabia to become the most extensive user of computers and data processing in the Arab region.

The institutions that played essential roles in promoting the utilization of data processing in Saudi Arabia were:

1. Saudi Arabian National Center of Science and Technology (SANCST)
2. The National Computer Center (NCC)
3. The large universities in Riyadh, Jeddah and Dhahran.

SANCST is involved in promoting and encouraging applied scientific research and coordinating activities of research institutions in SA including all technical fields. Within SANCST the Directorate of Information Systems and Technical Services (ISTS) is engaged in the field of information technology and documentation.

NCC is a division of the Department of Statistics in the Ministry of Finance and National Economy. It provides subsidiary DP services for ministries and government agencies which do not have their own DP capacities. The center provides training to cover its own requirements and to build up technical staff for its customers. NCC utilized in 1983 a mainframe IBM 3033 with 8MB memory, including peripheral equipment of Arabic, English and bilingual terminals and printers.

Having no financial limitations, Saudi Arabia continues to import computing hardware and software, as well as qualified specialists in this field. In the mid 80s the Saudi Arabian computer market was estimated at about 25% of the total Arab computer import market. In 1982 SA imported hardware worth $ 111 million.

The popularization of personal computers became so strong in Saudi Arabia that at present there is one personal computer for every four persons.

Academic Activities (see Section 4.4.1)
The development of academic activities began quite late in the 60s together with the growing need of qualified scientists and engineers for the oil industry and the following financial and economic growth of Saudi Arabia.

The greatest achievement in the field of academic education was the huge increase of the number of students in the universities, when the number of students in engineering and in exact sciences grew between 1965 and 1986 from 440 to 24,750. Most of the academic activities were and still are concentrated around the 3 main universities:
King Abdulaziz University (KAU)
King Fahad University of Petroleum and Minerals (UPM)
King Saud University (KSU)

The departments of science and engineering of those universities in cooperation with SANCST and with other national institutions and companies carry out research and development projects to advance the field of informatics in the kingdom.

Those universities can afford to utilize an up-to-date technology, including powerful mainframes, mini and microcomputers, bilingual peripherals and specialized laboratory systems.

Computers became gradually an essential part of the infrastructure of universities and research institutes of the kingdom. The three main universities KAU, UPM and KSU are offering informatics as main subjects, they carry out also R&D projects in informatics. For a partial list of publications see Appendix, Section 4.4.3, and for a list of selected abstracts see Section 4.4.4. For example Dr. R.S. Al-Thiga from UPM developed an Arabic computer system for educational purposes, he also together with Saudi engineers and businessmen, established a national company, Saudi Computer Industries for the production of Arab computers.

Economy and Significant Applications

For typical examples of significant applications of computers in SA, see Appendix, section 4.4.2. The present economic situation of Saudi Arabia (SA) in the beginning of the 90s seems to be quite good. The annual growth of 3.2% with the inflation rate of less than 1% (one of the lowest in the world), provide a solid basis for future expansion. SA makes also great effort to replace foreign professionals with Saudi nationals. Thanks to the expanded education, 26,225 Saudis were appointed in the military sector and 20,000 in the civilian sector (see Ref. [1]).

The expansion of data communication is planned to increase from 33.0M $ in 1986 to 123.9 M $ in 1995, and 238.0 M $ in 2000 [2].

The agreement between SA and the Republic of China (ROC), signed in 1989, includes the studies of the feasibility of joint ventures in crude oil transportation, computers, ship building and TV production in SA, when ROC provides the personnel and the know-how. In January 1990 SA installed a Cray-2 supercomputer. According to the Saudis, its purpose is to facilitate the search for oil deposits [3].

Prospects of Future Expansion

The prospects of future expansion of future expansion of computing in SA is hard to predict, especially now, a few days before the 15th of January, 1991, the final date of the UN ultimatum for Iraq's army to evacuate Kuwait. Some information on expected development can be found in the Appendix, Section 4.4.5. The continuous occupation of Kuwait created a threat to SA which, together with the American presence with its sophisticated technology, will create a proper atmosphere for the Saudis to improve and modernize its computing and communication facilities.

The peaceful solution of this conflict or a short and successful American military intervention will perhaps only slow-down this technological build-up for some time. Although a part of SA's oil royalties are spent to cover the expenses of the "Desert Shield", the continuous high prices of oil will allow SA to continue the purchase of sophisticated technology.

Only a very serious damage of Saudi oil fields and its industry, as the result of the Gulf crisis, may diminish for some time the future continuous modernization and expansion of the computerization process.

References:

[1] Al Riyadh, Jan. 1, 1990, p. 1.

[2] Middle East Economic Digest, Nov. 10, 1989, p. 11.

[3] Computergram International, Jan. 26, 1990.

3. Summary and Suggested Future Research

Summary

The present report indicates a fast-growing development of computing activities in the Arab countries under review, particularly in Saudi Arabia and Egypt.

The major areas of computer applications are: military, industrial and scientific.

The popularization and Arabization of computing activities assist in providing additional know-how and manpower required for this purpose.

Egypt's improved relations with the USA, as consequence of its participation in the Gulf Crisis, may allow this country to acquire advanced hardware and thus to develop further its activities in the computing field.

On the other hand, Jordan does not seem able to improve its economic situation in the near future, and will, therefore, not be able to advance its computing activities.

At the time of writing of this report, the development of Iraq's future activities is not predictable.

The availability of huge financial resources in Saudi Arabia allows this country to acquire advanced equipment and the expertise of leading foreign companies. The further development in Saudi Arabia will be influenced by the outcome of the present Gulf crisis (see Section 2.2.4).

Also noteworthy is the strong effort of the Arab countries to educate its own experts in the computer and telecommunication fields. In this effort they are assisted by the many Arab scientists studying or living abroad (USA and Europe).

Suggested Future Research

The first stage of our research presented an overview some of the major activities of the four Arab countries under review in the fields of computer technology.

The next stage should deal with the other Arab countries of interest, namely, the Gulf States and Syria, as well as with the telecommunication activities in the Arab countries.

For this purpose we intend to enlarge the available sources of information to include the following:

* frequent updating from the DIALOG information retrieval system

* relevant scientific and industrial periodicals, e.g. Computer World, Middle East Economic Digest, Computer Economics, Communications Engineering International etc.

* The Abu Dhabi Arabic Information Center.

* Academic connections with foreign scientists active in Arab studies.

To be able to provide comprehensive and updated information and suitable evaluations of the activities of the Arab countries in the areas of computing and communications, we intend to establish a suitable user-friendly computerized information retrieval system. Such a system will provide easy and user-friendly access to the following subjects:

* Universities with computer science and/or telecommunications teaching and research activities
* Computing centers
* Computer and telecommunications scientists
* Computer applications in the military, industrial and scientific fields.
* Progress of the telecommunication networks.

The establishment of such an information retrieval system will open the possibility for interested organizations and scientists to obtain updated and suitably sorted information for their specific purposes.

APPENDIX

4.1 Egypt

4.1.1 Universities and Research Institutes - Computer Science

Cairo University, Giza
Founded 1908, Number of teachers 4,494
Number of students 76,794
Incorporates: Dept. of Computer Science

Ein Shams University, Cairo
Founded in 1950, Number of teachers 4,703
Number of Students 100,179
Incorporates: Department of Electronics and Computers,
Computer Center - Director - Dr. Abdel Badie Salem.
Information Systems Center, Head - Mohamed Reda El-Karaksy.

Alexandria University, Alexandria
Founded in 1942, Number of teachers 3,610
Number of students 92,000
Incorporates: Computer Center, Director - Dr. Khalil Mohamed Ahmed
Dept. of Comp. Sci. and Autom. Control

Al-Azhar University, Cairo
Founded in 970, Number of teachers 228
Number of students 3,604
Incorporates: Department of Computers and Systems

Assiut University, Assiut, Central Egypt
Founded in 1957, Number of teachers 2,110
Number of students 42,520
Incorporates: Computer Center

Menia University. Menia, Central Egypt

Founded in 1976, Number of teachers 770

Number of students 16,120

Incorporates: Dept. of Computer Eng.

Menoufur University - Shebeen El-Koam, North Egypt

Founded in 1976, Number of teachers 863

Number of students 18,366

Incorporates: Department of Computers

Zagazig University - Zagazig, North Egypt

Founded in 1974, Number of teachers 3,080

Number of students 70,800

Incorporates: Department of Computer Sciences

Computer Center, Head - Amal El-Kerdawy

Remote Sensing Research Center, Cairo

Founded in 1972, by Academy of Scientific Research in cooperation with the USA. Incorporates advanced digital processing facility for satellite and aircraft data.

Number of scientists - 65.

Director - Dr. Muhamed Abdel Hady.

Ref.: World of Learning, 1990

4.1.2 Examples of Computer Applications

[EGA1]: A Decision Support System for the Egyptian Cabinet

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After Egypt's peace agreement with Israel, the Cabinet of Egypt embarked on a program of economic revival, facing formidable socio-economic development challenges in the early 1980's. The program had to cope with rapid changes in the regional and international economy. The complexity of the situation created a heightened awareness of the need for computer-based assistance. Consequently, in 1985, as part of a broader plan for administrative development, an information systems project was initiated, which has evolved into what is now known as the Information and DecisionSupport Center (IDSC) for the Cabinet.

IDSC, starting with a staff of three persons and a few personal computers, grew into an organization of over 150 people by mid-1988, with an extensive network of mainframe and minicomputers. The IDSC found ways of putting into computer-based practices advanced theories of decision-making support systems, socio- economic systems modelling, consensus building, etc. (see bibliography below).

IDSC completely reorganized and suitably computerized the methods of collecting and processing data, to meet the requirements of the decision making process at the Cabinet. This decision-making process before and after IDSC is illustrated in Fig.1 and Fig.2, respectively.

The following project is an example of the way IDSC assisted in the Cabinet decision-making process. The project in question was to completely reorganize the existing Customs Tariff System, which suffered from too many inconsistent regulations. Due to different goals of the various ministries, no agreement could be reached in preliminary inter-ministerial debates.

The IDSC entered the picture with a "crisis" team. They started by setting up a computer model. The team shuttled daily to the six most impacted ministries, to collect additional data, formulate reform policy proposals, and derive quantitative evaluations of the various proposals.

As the model became more explicit, the issues became more articulated, assumptions were uncovered, and the impacts of various "what-if" scenarios were demonstrated with numbers rather than abstract opinions.

Gradually consensus was reached and after one month of intense efforts a new custom tariffs policy was established. At some point the old-timers estimated that the new policy would bring in an additional $250M. The computer boys used their model and came up with an increase in income of a total of $25M. After one year of the new policy in action the actual increase in income amounted to $28M.

The initiator and co-founder of the IDSC is Hisham El Sherif. He holds a Ph.D. from the Massachusetts Institute of Technology (MIT) in decision support systems. Since 1984 he has taught information systems at the American University in Cairo.
The IDSC was also assisted by Omar El Sawy, who is assistant professor of decision systems at the Graduate School of Business Administration at the University of Southern California, Los Angeles. His activities at the IDSC were supported by the United Nations Development Program.

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J.L.Bennett (ed.), Building Decision Support Systems, Addison-Wesley Publ. Co., 1983.

R.H.Sprague and H.J.Watson (eds.), Decision Support Systems: Putting Theory into Practice, Prentice-Hall Publ. Co., 1986.

E.R.McLean and H.G.Sol (eds.), Decision Support Systems: A Decade in Perspective, Elsevier Science Publ., 1986.

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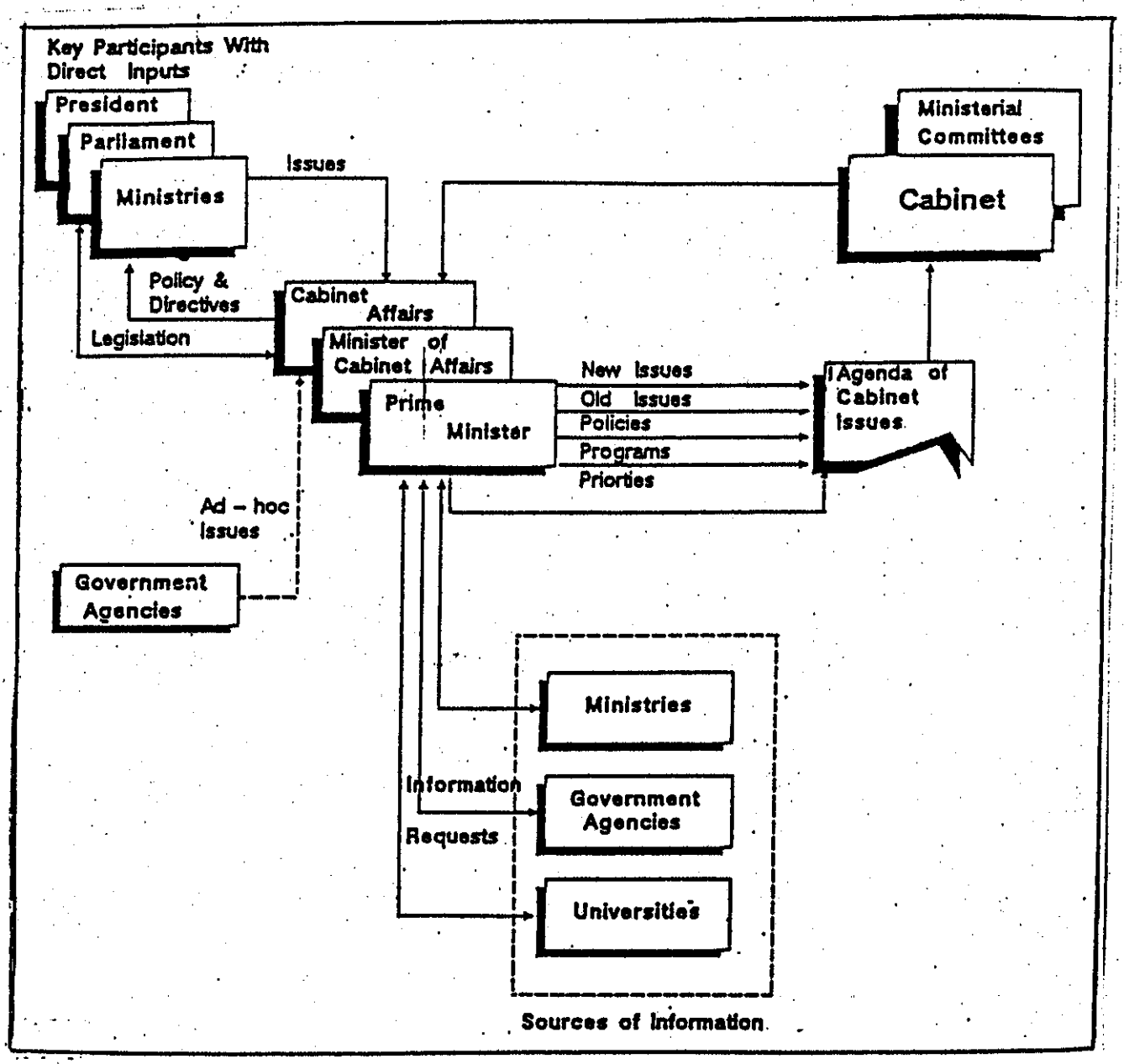

Figure 1. The Cabinet Decision-Making Process Before IDSC

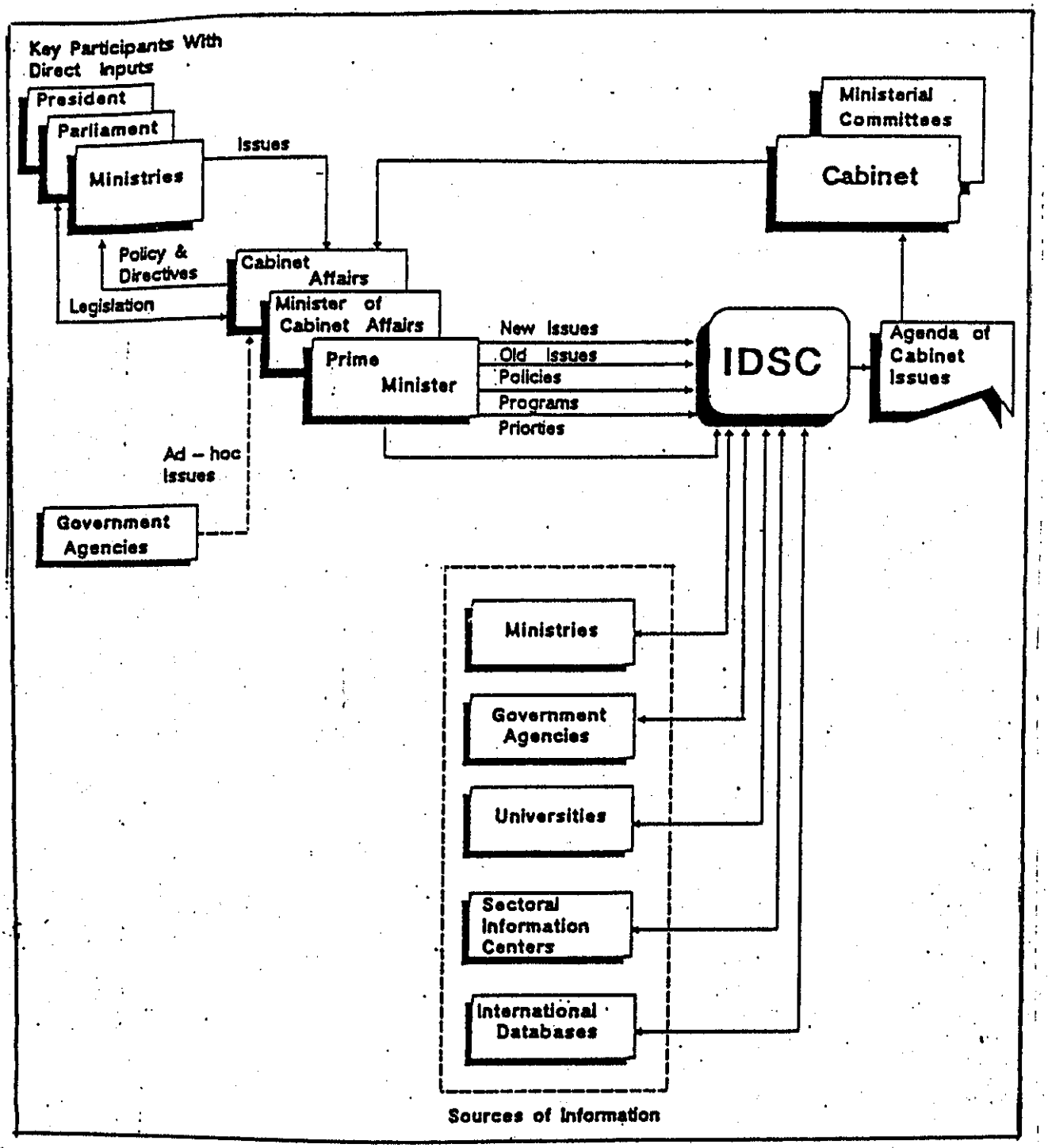

Figure 2. The Cabinet Decision-Making process After IDSC

[EGA2] Computer Applications to Agricultural Projects

++

According to an agreement between the UN Development Programme (UNDP) and the Egyptian Ministry of Agriculture, UNDP invested $1.6 million into a project for the application of computers in administrating agricultural crops production projects.
Ref.: Al Ahram, June 27,1989, p.9.

[EGA3] Computerized Control System for Cairo's Water Supply

++

The Italian company Nuovo Pignone installed a computerized control system for Cairo's water supply system in 1988 at a total cost of $10 million.
Ref.: Middle East Economic Digest, May 23,1987, p.10.

[EGA4] Computerized Mapping of Nile River Delta

++

The US Agency for International Development awarded a $30 mil contract to Geonex, Florida, to take aerial photographs of the Nile River delta and to transfer the information to a computer.
Ref.: St.Petersburg Times, Florida, Dec. 19,1989, p.E1.

[EGA5] Decision Support System for a Textile Company

++

A computerized decision support system (DSS) was developed and installed for the ESCO Textile Company, which possesses more than ten factories in the vicinity of Cairo. The DSS is based on a computerized information system, together with optimal operation models.
Ref.: Proc. Internat. Symp. Comp. Appl. Industry, 1988, pp.32-36.

[EGA6] Air Defense System

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In 1988 Hughes Aircraft has received a $159 million contract to expand the air defense system of Egypt. The contract calls for Hughes to supply operational software, computers, aircraft control displays, large screen displays, and other electronics gear.
Ref.: Signal, Sept. 1988, Vol.43, Issue 1, p.17.

[EGA7] Airport Terminal System

++

In 1987 Cairo Airport has installed a Common User Terminal System (CUTE) to improve passenger handling facilities. The system, designed by International Telecommunications Aeronautiques, consists of workstations installed at check-in counters, transit halls and boarding gates. It enables agents of different airlines to share one set of standardized equipment.

Ref.: Interavia Air Letter, August 26, 1987, pp.4,5.

4.1.3 List of Publications - Egypt, 1977 - 1987

AR000821, B ENVIR CON, Vol. 36, Page 242, Source-Year 86
A COMPUTER-PROGRAM IN BASIC FOR DETERMINING PROBIT AND LOG-PROBIT OR LOGIT COR RELATION FOR TOXICOLOGY AND BIOLOGY/
ABOUSETTA MM, SORRELL RW, CHILDERS CC
UNIV FLORIDA, CTR AGR RES & EDUC, LAKE ALFRE, FL
AGR RES CTR, PLANT PROTECT RES IN, GIZA, EGYPT

AR002449, INT J CONTR, Vol. 28, Page 681, Source-Year 78
COMPUTATION OF OPTIMAL SINGULAR CONTROL/
ALY GM
AIN SHAMS UNIV, FAC ENGN, DEPT ELECT, CAIRO, EGYPT

AR002456, INT J CONTR, Vol. 29, Page 829, Source-Year 79
MULTILEVEL TECHNIQUE FOR THE COMPUTATION OF OPTIMAL SINGULAR CONTROL/
ALY G, ABDELMEG.AH
AIN SHAMS UNIV, FAC ENGN, DEPT ELECT, CAIRO, EGYPT

AR003242, IEEE VEH T, Vol. 30, Page 121, Source-Year 81
DIRECTION DIVERSITY IN MOBILE COMMUNICATIONS/
AWADALLA KH
MENOUFIA UNIV, FAC ELECTR ENGN, CAIRO, EGYPT

AR004497, RADIO SCI, Vol. 22, Page 781, Source-Year 87
COMMUNICATION IN A ROUGH 3-LAYERED CONDUCTING MEDIUM/
BISHAY ST
AIN SHAMS UNIV, FAC SCI, DEPT MATH, CAIRO, EGYPT

AR005699, COMPUTER J, Vol. 20, Page 374, Source-Year 77
FAST GALERKIN ALGORITHM FOR SOLUTION OF LINEAR FREDHOLM EQUATIONS/
DELVES LM, ELAL LFA
UNIV LIVERPOOL, DEPT COMP & STAT SCI, LIVERPOOL, ENGLAND
UNIV CAIRO, CAIRO, EGYPT

AR006414, THEOR CHIM, Vol. 65, Page 199, Source-Year 84
FIBONACCI RELATIONS - ON THE COMPUTATION OF SOME COUNTING POLYNOMIALS OF VERY
LARGE GRAPHS/
ELBASIL S
FAC PHARM, KASR EL AINI ST, CAIRO, EGYPT

AR006627, COMPUT PHYS, Vol. 23, Page 27, Source-Year 81
ON THE PHOENICAL LAX-WENDROFF METHOD/
ELFAYOUMI MKK, ELSEBAII WA
UNIV QATAR, DEPT MATH, DOHA, QATAR
AL AZHAR UNIV, DEPT MATH, CAIRO, EGYPT

AR006679, BR J UROL, Vol. 60, Page 381, Source-Year 87
A COMPUTER-BASED SYSTEM FOR UROLOGY AND NEPHROLOGY/
ELGAMAL SS, GHALY AM, DEHEAULM.M, GHONEIM MA
MANSOURA UNIV, CTR UROL & NEPHROL, MANSOURA, EGYPT
INSERM, U88, F PARIS, FRANCE

AR007017, INT J ELECT, Vol. 50, Page 299, Source-Year 81
IDENTIFICATION OF DISPERSIVE COMMUNICATION CHANNELS USING BARKER CODES/
ELKHAMY SE
UNIV ALEXANDRIA, FAC ENGN, DEPT ELECT, ALEXANDRIA, EGYPT

AR007027, WHO CHRON, Vol. 37, Page 163, Source-Year 83
MICROCOMPUTERS AND HEALTH IMPROVEMENT IN DEVELOPING-COUNTRIES/
ELKHOLY A, MANDIL SH
MINIST HLTH, BOARD HLTH, CAIRO, EGYPT
WHO, DIV INFORMAT SYST SU, CH GENEVA, SWITZERLAN

AR007243, IEEE COMMUN, Vol. 28, Page 1197, Source-Year 80
DIGITAL PCM BIT SYNCHRONIZER AND DETECTOR/
ELMOGHAZY A, MARAL G, BLANCHARD A
MIL TECH COLL, CAIRO, EGYPT
ECOLE NATL SUPER AERON & ESPAC, DEPT ELECTR, F TOULOUS, FRANCE

AR007449, INT J HYD E, Vol. 8, Page 191, Source-Year 83
THEORY OF THE COMPUTER CODE RET-1 FOR THE CALCULATION OF SPACE-TIME DEPENDENT
TEMPERATURE AND COMPOSITION PROPERTIES OF METAL HYDRIDE HYDROGEN STORAGE BEDS/
ELOSERY IA
INSHAS NUCL RES CTR, DEPT REACTORS, ATOM ENERG, CAIRO, EGYPT

AR007451, INT J HYD E, Vol. 9, Page 421, Source-Year 84
A COMPARATIVE-STUDY OF IN OUT AND OUT IN HYDROGEN REACTION ALTERNATIVES FOR ME
TAL HYDRIDE BEDS USING RET-1 COMPUTER CODE/
ELOSERY IA
NUCL POWER PLANTS AUTHOR, NUCL STUDIES & FUEL, POB 8191 M, NASR, EGYPT

AR007920, MECH MACH T, Vol. 19, Page 235, Source-Year 84
A COMPUTER-AIDED METHOD FOR OPTIMUM DESIGN OF PLATE CAM-SIZE AVOIDING UNDERCUT
TING AND SEPARATION PHENOMENA .2. DESIGN NOMOGRAMS/
ELSHAKERY SA, TERAUCHI Y
MINUFIYA UNIV, FAC ENGN & TECHNOL, DEPT MECH, SHIBEEN EL, EGYPT
HIROSHIMA UNIV, FAC ENGN, DEPT MECH, HIROSHIMA, JAPAN

AR007938, OPT COMMUN, Vol. 54, Page 195, Source-Year 85
SPECIAL-ANGLE-OF-INCIDENCE ELLIPSOMETRY FOR UNIAXIAL CRYSTALS .1. NEGATIVE CRY
STALS/
ELSHAZLYZAGHLOU.M
UNIV CAIRO, FAC ENGN, DEPT ELECT, CAIRO, EGYPT

AR008036, NUCL INST B, Vol. 13, Page 443, Source-Year 86
COMPUTER CALCULATIONS OF SECONDARY PARTICLE-EMISSION NEAR THE CURIE-POINT OF N
ICKEL/
ELTEKOV VA, SAMOYLOV VN, YURASOVA VE, MOTAWEH HA
MV LOMONOSOV STATE UNIV, DEPT PHYS, MOSCOW, USSR
TANTA UNIV, FAC SCI, DEPT PHYS, TANTA, EGYPT

AR008923, COMPUTER J, Vol. 24, Page 347, Source-Year 81
VALIDATION OF AN ANALYTIC MODEL OF COMPUTER-PERFORMANCE/
FOXLEY E, SALMAN O
UNIV NOTTINGHAM, DEPT MATH, NOTTINGHAM, ENGLAND
UNIV CAIRO, ISSR, DEPT COMP, CAIRO, EGYPT

AR009312, CLIN ELECTR, Vol. 9, Page 159, Source-Year 78
ELECTROENCEPHALOGRAPHY AND COMPUTERIZED TRANSAXIAL TOMOGRAPHY IN EPILEPSY DIAG
NOSIS/
GHAZY A, SLETTNES O, LUNDERVO.A
UNIV OSLO HOSP, RIKSHOSP & DOSENT, CLIN NEURO, N OSLO, NORWAY
UNIV OSLO HOSP, RIKSHOSP, CLIN NEURO, N OSLO, NORWAY
TANTA UNIV, FAC MED, TANTA, EGYPT

AR010538, IEEE SYST M, Vol. 8, Page 575, Source-Year 78
HIERARCHICAL STRUCTURE FOR COMPUTING NEAR OPTIMAL DECENTRALIZED CONTROL/
HASSAN MF, SINGH MG
CNRS, AUTOMAT & ANAL SYST, F TOULOUS, FRANCE
UNIV CAIRO, FAC ENGN, DEPT ELECT, CAIRO, EGYPT

AR013762, IEEE PATT A, Vol. 3, Page 540, Source-Year 81
A MODULAR COMPUTER VISION SYSTEM FOR PICTURE SEGMENTATION AND INTERPRETATION/
LEVINE MD, SHAHEEN SI
MCGILL UNIV, DEPT ELECT ENGN, MONTREAL H, CANADA
UNIV CAIRO, DEPT ELECTR & COMMUN, GIZA, EGYPT

AR013767, COMPUT VIS, Vol. 32, Page 104, Source-Year 85
RULE-BASED IMAGE SEGMENTATION - A DYNAMIC CONTROL STRATEGY APPROACH/
LEVINE MD, NAZIF AM
MCGILL UNIV, DEPT ELECT ENGN, COMP VIS &, MONTREAL H, CANADA
UNIV CAIRO, DEPT ELECT ENGN, CAIRO, EGYPT

AR013768, IEEE PATT A, Vol. 7, Page 155, Source-Year 85
DYNAMIC MEASUREMENT OF COMPUTER GENERATED IMAGE SEGMENTATIONS/
LEVINE MD, NAZIF AM
MCGILL UNIV, DEPT ELECT ENGN, COMP VISIO, MONTREAL H, CANADA
UNIV CAIRO, DEPT ELECT ENGN, CAIRO, EGYPT

AR014144, INT J SYST, Vol. 18, Page 527, Source-Year 87
COMPUTATIONAL EXPERIENCE WITH ADAPTIVE MODEL-REFERENCE IDENTIFICATION SCHEMES/
MAHMOUD MS
UNIV CAIRO, FAC ENGN, DEPT ELECT, GIZA, EGYPT

AR014190, IEEE COMMUN, Vol. 30, Page 2277, Source-Year 82
NOISE AND FALSE-LOCK PERFORMANCE OF THE PSK-TANLOCK LOOP/
MAKARIOS AH, FARRELL PG
MIL TECH COLL, DEPT RADAR & GUIDANC, CAIRO, EGYPT
UNIV MANCHESTER, DEPT ELECT ENGN, MANCHESTER, ENGLAND

AR017829, COMPUT STRU, Vol. 21, Page 1313, Source-Year 85
DYNAMIC OPTIMIZATION OF FRAMED STRUCTURES/
SADEK EA
UNIV CAIRO, FAC ENGN, CAIRO, EGYPT

AR018628, LARGE SCALE, Vol. 4, Page 309, Source-Year 83
AN ITERATIVE ALGORITHM FOR COMPUTING THE INVARIANT-ZEROS OF LARGE-SCALE SYSTEM
S AS EIGENVALUES/
SEBAKHY OA, ELSINGABY M, ELARABAWY IF
UNIV ALEXANDRIA, DEPT ELECT ENGN, ALEXANDRIA, EGYPT

AR019002, INT J BIO-M, Vol. 14, Page 451, Source-Year 83
ESMIS - A COMPUTER-BASED EMERGENCY MEDICAL-SERVICES MANAGEMENT-INFORMATION-SYS
TEM .1. DESIGN PROCEDURE/
SHAHEIN HIH, ZAKY MM
KING ABDULAZIZ UNIV, COLL ENGN, DEPT ELECT, JEDDAH, SAUDI ARAB
AIN SHAMS UNIV, FAC ENGN, DEPT ELECT, CAIRO, EGYPT

AR019184, ASTRO SP SC, Vol. 84, Page 53, Source-Year 82
EXPANSION THEORY FOR THE ELLIPTIC MOTION OF ARBITRARY ECCENTRICITY AND SEMI-MA
JOR AXIS .3. ANALYTICAL AND COMPUTATIONAL DEVELOPMENTS OF THE FUNCTIONS/
SHARAF MA
UNIV CAIRO, DEPT ASTRON, CAIRO, EGYPT

AR019565, J COMPUT CH, Vol. 8, Page 575, Source-Year 87
AN OBJECTIVE COMPUTER-ORIENTED METHOD FOR THE CALCULATION OF FORMATION-CONSTAN
TS FROM THE FORMATION FUNCTION - A WEIGHTED LEAST-SQUARES CURVE FITTING/
SIDRAK YL, ABOULSEO.A
PURDUE UNIV, AA POTTER ENGN CTR, PURDUE LAB, W LAFAYETT, IN
UNIV ALEXANDRIA, FAC ENGN, DEPT CHEM, ALEXANDRIA, EGYPT

AR019690, ELEC POW SY, Vol. 5, Page 97, Source-Year 82
A COMPUTER FEASIBILITY STUDY FOR A LONG, SERIES-COMPENSATED EHV TRANSMISSION-S
YSTEM/
SMITH JR, CLEOBURY E, ABDALLAH HM
UNIV ABERDEEN, MARISCHAL COLL, DEPT ENGN, ABERDEEN A, SCOTLAND
UNIV ASSIUT, DEPT ELECT ENGN, ASSIUT, EGYPT
PREECE CARDEW & RIDER CONSULTI, BRIGHTON, ENGLAND

4.1.4 Selected Abstracts - Egypt, 1978-1989

[EG1]
Development of models for computer based decision support systems
Ahmed, S.H.; Darwish, M.G.
Author Affil: Dept. of Comput. Sci., Cairo Univ., Giza, Egypt
Source: Adv. Model. Simul. (France) vol.12, no.2, pp.: 25-34
Publication Year: 1988
CODEN: AMSIEY ISSN: 0761-2494
Treatment: THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(13 Refs)
Abstract: The decision modelling process as a base for decision support systems is briefly discussed identifying its components and their relationships. Then a decision model based on multiattributes decision making is developed to provide decision makers with decision values aiding in the decision process. Implementation of the developed model on microcomputer based system is investigated. Finally the developed model is illustrated through case study and the results are reported and discussed.

[EG2]
Design of decentralized reliable controllers for large-scale systems
Darwish, M.G.; Soliman, H.M.
Author Affil: Fac. of Eng., Cairo Univ., Giza, Egypt
Source: Int. J. Syst. Sci. (UK) vol.19, no.8, pp.: 1529-38
Publication Year: Aug. 1988
CODEN: IJSYA9 ISSN: 0020-7721
Treatment: THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(14 Refs)
Abstract: A methodology is developed in this paper for the design of decentralized reliable controllers for large-scale systems. The overall system is decomposed into a group of interconnected subsystems for which local decentralized controllers are designed to ensure the reliability of the overall system, taking into consideration the effect of changes in the system components characteristics and the system structure. The design procedure allows one to find a lower limit for the degree of stability of the subsystems under a wide range of environmental conditions. Finally, the developed methodology is illustrated through a case study.

[EG3]
A new decentralized controller for the interconnected Egyptian power network

Bahnasawi, A.A.; Hassan, M.F.; Eid, S.Z.
Author Affil: Dept. of Electron. & Commun., Cairo Univ., Giza, Egypt
Source: Large Scale Syst. - Theory Appl. (Netherlands) vol.11, no.3, pp.: 217-32
Publication Year: 1986
CODEN: LSSAD2 ISSN: 0167-420X
U. S. Copyright Clearance Center Code: 0167-420X/86/$3.50
Treatment: APPLIC; THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(9 Refs)
Abstract: Concerns the enhancement of the Egyptian power network against the destabilizing effects of some nonlinear components present in power systems. The speed governor backlash nonlinearity is considered and a linearized model is derived using the describing function approach. As a result, a new dynamical model for the megawatt-frequency control problem of a multi-area power system is obtained. Then, a new decentralized control approach for interconnected dynamical systems is applied to control the behaviour of the system. The proposed decentralized control structure is based on the concept of the overlapping decomposition technique which leads to a set of decentralized controllers for the overlapped subsystems. It is shown that the adopted control policy guarantees the closed loop asymptotic stability and control structure reliability. Moreover, the new strategy will retain the area control concept, while offering a possibility to improve system transients and stability margins for the overall interconnected system.

[EG4]
Design of an on-line controller for microcomputer implementation

Mahmoud, M.S.; Rahouma, K.H.; Eid, S.Z.
Author Affil: Dept. of Electron. & Commun. Eng., Cairo Univ., Giza, Egypt
Source: Int. J. Syst. Sci. (UK) vol.19, no.11, pp.: 2195-209
Publication Year: Nov. 1988
CODEN: IJSYA9 ISSN: 0020-7721
Treatment: THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(8 Refs)
Abstract: An on-line controller is developed for the regulation of DC compound motors using microcomputer capability. The controller has a PID configuration, the parameters of which are computed using linear-quadratic theory. Procedures for selecting the sampling period, software design, and hardware specification are presented.

[EG5]
Adaptive alternate-routing in telephone networks: optimal and equilibrium solutions
Elsayed, H.M.; Mahmoud, M.S.; Bilal, A.Y.; Bernussou, J.
Author Affil: Dept. of Electron. & Commun., Cairo Univ., Egypt
Source: Inf. Decis. Technol. (Netherlands) vol.14, no.1, pp.: 65-74
Publication Year: 1988
ISSN: 0167-420X
U. S. Copyright Clearance Center Code: 0167-420X/88/$3.50
Treatment: THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(18 Refs)
Abstract: Considers the problem of adapting the alternate routing tables in telephone networks to the varying traffic conditions. Two types of solutions of this problem, which is treated under quasi-static conditions, are discussed. First, the authors consider optimal solutions in the sense of minimum traffic losses. This problem of optimal routing is shown to be NP-complete in the strong sense, which is an indication of computational intractability even for near-optimal solutions. Then, equilibrium solutions are proposed as a natural and more tractable alternative. A relaxation type algorithm is suggested and shown to obtain the equilibrium strategies for networks having multiple sources directing traffic to a common destination. The decentralization of the algorithm in large scale networks is also discussed.

[EG6]
Optimization of freeway traffic control problems
Mahmoud, M.S.; Eid, S.Z.
Author Affil: Dept. of Electron. & Commun. Eng., Cairo Univ., Giza, Egypt
Source: Optim. Control Appl. Methods (UK) vol.9, no.1, pp.: 37-49
Publication Year: Jan.-March 1988
CODEN: OCAMD5 ISSN: 0143-2087
U. S. Copyright Clearance Center Code: 0143-2087/88/010037-13$06.50
Treatment: THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(15 Refs)
Abstract: The problem of optimal freeways traffic control is described by a detailed non-linear discrete-time model. A four-level hierarchical algorithm is developed to compute the optimal control strategies. Simulation results indicate the efficiency of the developed algorithm in bringing congested traffic flow back to normal operation.

[EG7]
Generalized multinomial detectors for data communication signals
Al-Hussaini, E.K.
Author Affil: Dept. of Electron. & Commun., Cairo Univ., Giza, Egypt
Source: IEEE Trans. Commun. (USA) vol.37, no.10, pp.: 1099-102
Publication Year: Oct. 1989
CODEN: IECMBT ISSN: 0090-6778
U. S. Copyright Clearance Center Code: 0090-6778/89/1000-1099$01.00
Treatment: THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(7 Refs)
Abstract: A detector with multinomial input (MN) previously derived for on-off communication systems is generalized to include binary antipodal signals with arbitrary shapes. The proposed detector is distinguished by its simpler implementation. No multiplications are needed and it has a relatively good performance. Results of numerical examples are obtained under Gaussian and non-Gaussian noise environments for different numbers of quantization levels. Solutions for M-ary signaling are also discussed.

[EG8]
Parallel quadrature receivers for M-ary NCFSK signals through multipath fading channels
Al-Hussaini, E.K.
Author Affil: Dept. of Electron. & Commun., Cairo Univ., Giza, Egypt
Source: Arab. J. Sci. Eng. (Saudi Arabia) vol.14, no.4, pp.: 617-21
Publication Year: Oct. 1989
CODEN: AJSEDY ISSN: 0377-9211
Treatment: THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(5 Refs)
Abstract: For an M-ary NCFSK signaling system, expressions for the error probability are derived for single and parallel quadrature receivers. During the bit duration T, the signal is assumed to be divided into two coherent parts which may results from multipath propagation. Two cases are assumed, when the two parts are completely correlated and when they are uncorrelated. Depicted results show that the parallel receiver dominates the single quadrature receiver as rho approaches zero; that is, when the signal coherence diminishes. The hardware complexity of the parallel receiver increases with increasing number of incoherent parts of the signal. However, the branches are similar except for the integration period. Therefore it can be easily implemented in current technology. Results can be extended to the case when the background noise is colored.

[EG9]
DECOMPOSITION AND COORDINATION FOR FEEDBACK PROCESS CONTROL
MAHMOUD, M.S.; EID, S.Z.
Author Affil: ELECTRONICS AND COMMUNICATIONS DEPT., CAIRO UNIV., GIZA,
UAR
TZAFESTAS, S.G. (Editors)
Sponsor: IMACS
Source: SIMULATION OF DISTRIBUTED-PARAMETER AND LARGE-SCALE SYSTEMS.
PROCEEDINGS OF THE IMACS EUROPEAN SIMULATION MEETING ON SIMULATION OF
DISTRIBUTED-PARAMETER AND LARGE-SCALE SYSTEMS pp.: 155-60
Publication Year: 1980
Conference Information :
Date: 2-4 OCT. 1979 Location: PATRAS, GREECE
Publ: NORTH-HOLLAND, AMSTERDAM, NETHERLANDS. IX+380 pp.
ISBN 0 444 85447 9
Treatment: THEORETICAL;
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(5 Refs)
Abstract: FEEDBACK DESIGN OF LINEAR PROCESS CONTROL SYSTEMS SUBJECT TO CONSTANT BUT UNKNOWN DISTURBANCES IS APPROACHED USING MULTILEVEL DECOMPOSITION AND COORDINATION TECHNIQUES. THE BASIC IDEA BEHIND THIS APPROACH IS TO AUGMENT THE DISTURBANCE VECTOR WITH THE STATE VECTOR BEFORE EMPLOYING DECOMPOSITION PROCEDURE. ASSOCIATED WITH THIS APPROACH IS THE PENALIZATION OF THE RATE OF CONTROL EFFORT IN THE PERFORMANCE MEASURE TO ACCOMMODATE THE STRENGTH OF DISTURBANCE.

[EG10]
Synthesis of mixed mode sequential machines on the scope of asynchronous sequential circuits
El-Derini, M.N.; Abou-Of, M.A.
Author Affil: Dept. of Comput. Sci. & Autom. Control, Alexandria Univ., Egypt
Hamza, M.H. (Editors)
Source: Proceedings of the IASTED International Symposium Applied Informatics - AI '88 pp.: 198-203
Publication Year: 1988
Conference Information :
Date: 16-18 Feb. 1988 Location: Grindelwald, Switzerland
Publ: ACTA Press, Anaheim, CA, USA. 219 pp.
ISBN 0 88986 097 1
Treatment: PRACTICAL; THEORETICAL;
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(8 Refs)

Abstract: A method is presented for realizing any mixed mode sequential machine flow table where transition conditions between internal states are either input state level or edging transitions of digital asynchronous input signals. This method provides two successive procedures to design this type of sequential machine. The first procedure reduces the mixed mode machine to an asynchronous one, where a new circuit structure is given to recognize between input levels and types of input transitions (either positive or negative input edge) and transforms them to a set of input state levels. The second procedure implements this machine by using the 'input stability model', based on the self-synchronization concept. This is suggested for asynchronous machines with unrestricted input changes where no constraints are imposed on the row assignment and the number of state variables can be made absolutely minimum. This realization overcomes racing and hazard problems, regards multiple input change and allows maximization of the operating speed of the circuit. It is applicable to completely or incompletely specified sequential machines described by normal mode flow tables where unstable state leads directly to a stable internal state.

[EG11]
A procedure to connect the Egyptian government through a computer network
El-Derini, M.N.; Guirguis, S.K.
Author Affil: Alexandria Univ., Egypt
Luque, A.; Figueiras Vidal, A.R.; Delgado, J.M.R. (Editors)
Sponsor: IEEE; Madrid's Mayor; Minist. Ind. & Energy; Spanish Nat. Telephone Co.; et al
Source: Proceedings of MELECON '85. Mediterranean Electrotechnical Conference (Cat. No.85CH2185-7) pp.: 591-4 vol.2
Publication Year: 1985
Conference Information :
Date: 8-10 Oct. 1985 Location: Madrid, Spain
Publ: IEEE, New York, USA. 4 vol. (xiii+260+xviii+637+xiv+292+xii+227)
U. S. Copyright Clearance Center Code: CH2185-7/85/0000-0591$01.00
Treatment: THEORETICAL;
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(10 Refs)
Abstract: The communication network design problem is investigated and an algorithm which introduces precise techniques for the analysis and design procedures is presented. The algorithm makes use of the physical parameters which control the design, and therefore no assumptions or restrictions are imposed on the network design philosophy. Instead, the design choice can reflect the realistic demand and the actual objectives of the network. Starting with a fully connected network, the objective of the design is to minimize the cost of communication channels between the computer sites by disconnecting the nonrequired ones. The cost is directly proportional to the number of interfaces used in the network as well as the physical lengths of the channels. The constraints which govern the solution are the maximum allowable delays time for a message and the minimum reliability to be achieved.

[EG12]
Self-synchronized asynchronous circuits with unrestricted input changes
Abou-Of, M.A.; El-Derini, M.N.
Author Affil: Dept. of Comput. Sci. & Autom. Control., Alexandria Univ., Egypt
Luque, A.; Figueiras Vidal, A.R.; Delgado, J.M.R. (Editors)
Sponsor: IEEE; Madrid's Mayor; Minist. Ind. & Energy; Spanish Nat. Telephone Co.; et al
Source: Proceedings of MELECON '85. Mediterranean Electrotechnical Conference (Cat. No.85CH2185-7) pp.: 35-40 vol.2
Publication Year: 1985
Conference Information :
Date: 8-10 Oct. 1985 Location: Madrid, Spain
Publ: IEEE, New York, USA. 4 vol. (xiii+260+xviii+637+xiv+292+xii+227) pp.
U. S. Copyright Clearance Center Code: CH2185-7/85/0000-0035$01.00
Treatment: PRACTICAL; THEORETICAL; EXPERIMENTAL;
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(7 Refs)
Abstract: The authors consider the design of asynchronous circuits that process high-frequency asynchronous binary-valued input signals, taking into account racing and hazards problems. The previous solution, based on the self-synchronization concept (SSC), needs a certain type of delay to prevent clock pulses with unpredictable interspacing (I), and this is true only for a specific I amount. S.H. Unger (1971) and also imposed constraints on delays to ensure satisfactory operation when input changes (INC) are unrestricted with a reasonable assumption on individual INC. These constraints will not be met all the time. A new model, the input stability model, based on SSC under the Unger assumption, reserves the inputs until response completion. Its general clock is a function of the inputs and does not depend on the flow table. It eliminates critical races and hazards without changing the automation form and it regards multiple INC with faster speed.

[EG13]
Development of the Egyptian iron and steel industry using process computer control
Sakr, M.F.; Dorrah, H.T.
Author Affil: Dept. of Electr. Eng., Cairo Univ., Egypt
Gertler, J.; Keviczky, L. (Editors)
Sponsor: IFAC; IMACS; IFIP; IFORS; IMEKO; UNESCO; UNIDO
Source: Bridge Between Control Science and Technology. Proceedings of the Ninth Triennial World Congress of IFAC pp.: 3321-6 vol.6
Publication Year: 1985
Conference Information :
Date: 2-6 July 1984 Location: Budapest, Hungary
Publ: Pergamon Press, Oxford, England. 6 vol.
ISBN 0 08 031666 2
Treatment: PRACTICAL;
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(9 Refs)

Abstract: This paper addresses the problem of modernizing the Egyptian iron and steel factory at Helwan, using process computer control. The problem of priorities within different sections of the factory to first apply the process computer control is encountered. It is shown that, for the Helwan factory, computerization procedure should commence first in the oxygen steel converter shop, then followed by the hot boiling mill process. For the steel converter shop, statistical data analysis are carried out as a pre-requisite for developing the necessary mathematical model for the on-line computer control application. It is demonstrated that, with the random trend appearing in the steel making data, statistical components in modeling are mandatory. Finally, the future steps to be followed for model building, economical justification of computerization and real life model implementation are elucidated.

[EG14]
A STOCHASTIC MODEL FOR THE RIVER NILE
MOBAREK, I.E.; SALEM, M.H.; DORRAH, H.T.
Author Affil: DEPT. OF IRRIGATION AND HYDRAULICS, CAIRO UNIV., CAIRO,
U A R
Sponsor: IEEE
Source: PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON CYBERNETICS AND SOCIETY pp.: 607-14
Publication Year: 1978
Conference Information :
Date: 3-7 NOV. 1978 Location: TOKYO-KYOTO, JAPAN
Publ: IEEE, NEW YORK, USA. 800 pp.
Treatment: APPLIC; THEORETICAL;
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(13 Refs)
Abstract: THIS PAPER PRESENTS A COMPUTER-BASED STOCHASTIC MODEL FOR GENERATING MONTHLY SYNTHETIC STREAMFLOWS FOR THE RIVER NILE. THE MODEL IS OF THE MULTIVARIATE AUTOREGRESSIVE MARKOVIAN TYPE. FOUR SITES ON THE RIVER WERE SELECTED IN MODELING AND THEIR CHOICE WAS MADE ON A STATISTICAL GROUND. PRACTICAL CONSIDERATION, WHILE IMPLEMENTING THE MODEL AS WELL AS ITS MERITS AND LIMITATIONS, ARE DISCUSSED. IT IS SHOWN THAT THE DEVELOPED MODEL CORRESPONDS TO AN OPTIMAL WIENER FILTERING PROCEDURE. THE TESTED MODEL CAN PROVIDE INNUMERABLE DIFFERENT STREAMFLOW SCENARIOS WHICH PERMIT AN EFFECTIVE TOOL FOR DETERMINING RESERVOIR OPERATIONS AND IS HELPFUL IN EVALUATING FUTURE PROJECTS ON THE RIVER. FINALLY, AN ON-LINE STREAMFLOW FORECASTING MODEL AT VARIOUS POINTS ON THE NILE IS SUGGESTED USING KALMAN FILTERING TECHNIQUE.

[EG15]
General computer program for choices of optical fiber link components-application to Cairo interoffice communication
Mitkees, A.A.; Elmoghazy, A.; Abdel-Halim, M.; Taha, A.S.A.
Author Affil: Mil. Tech. Coll., Cairo, Egypt
Source: Third National Radio Science Symposium 1985 pp.: 212-21
Publication Year: 1985
Conference Information :
Date: 23-25 Feb. 1985 Location: Cairo, Egypt

Treatment: APPLIC; PRACTICAL;
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(3 Refs)
Abstract: Concerns the development of a general computer program allowing the optimum choice of the fiber optical link components and parameters. Namely the operating wavelength, the source type and its power, the photodetector type and its sensitivity as well as fiber type. The parameters taken into consideration are the operating bit rate, the required error rate, the distance between the source and destination, and the available relative economical aspects. The program is examined for a variable range of link lengths and data rates. As a practical application of the program, the interconnection between the main central offices, and the satellite Earth station in Cairo is considered.

[EG16]
Microcomputer based image processing system
Shaheen, S.I.; Darwish, A.M.
Author Affil: Fac. of Eng., Cairo Univ., Giza, Egypt
Luque, A.; Figueiras Vidal, A.R.; Delgado, J.M.R. (Editors)
Sponsor: IEEE; Madrid's Mayor; Minist. Ind. & Energy; Spanish Nat. Telephone Co.; et al
Source: Proceedings of MELECON '85. Mediterranean Electrotechnical Conference (Cat. No.85CH2185-7) pp.: 311-16 vol.2
Publication Year: 1985
Conference Information :
Date: 8-10 Oct. 1985 Location: Madrid, Spain
Publ: IEEE, New York, USA. 4 vol. (xiii+260+xviii+637+xiv+292+xii+227) pp.
U. S. Copyright Clearance Center Code: CH2185-7/85/0000-0311$01.00
Treatment: GENERAL,REVIEW; EXPERIMENTAL;
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(23 Refs)
Abstract: The authors present an interactive microcomputer-based digital image processing system. The system, directed towards a wide spectrum of image-processing applications, is a modular, menu-driven system. It provides its users with a powerful experimental tool and allows future extensions. Several image processing modules have been implemented and successfully tested. Sample of the results obtained from different applications are presented. The significance of this system lies in the fact that though it is an integrated system with a variety of modules that are rarely found together, it is microcomputer based.

4.2 Iraq

4.2.1 Universities and Research Institutes

University of Baghdad, Baghdad
Founded in 1957, Number of teachers 1,500
Number of students 19,300
Incorporates: Department of Computer Engineering
Department of Electronical Computers, Center of Automatic Computers

University of Technology, Baghdad
Founded in 1975, Number of teachers 269
Number of students 7,384
Postgraduates 200
Incorporates: Department of Control and Systems, including Computer Science, Head - Dr. M.A. Shallal, and Center of Electronic Computers

University of Basrah, Basrah
Founded in 1964, Number of teachers 616
Number of students 13,600
Incorporates: Department of Computer Sciences and Computer Center - Director of the Center - Dr. H.A. Ali

University of Mossul
Founded in 1967, Number of teachers 1,400
Number of students 13,600
Incorporates: Department of Computer Sciences and Computer Center.
Director of the Center - Mahdi Al-Obaidi

Saddam University for Engineering and Science, Baghdad
Founded in 1988, Number of teachers 70
Number of students 200
Incorporates: Faculty of Computer Sciences, Head - Dr.Mohamed Ali S. Shallal, and Computer Center

University of Salahaddin, Arbil (North Iraq)

Founded in 1968, Number of teachers 560

Number of students 7,000

Incorporates: Computer Center.

Scientific Research Council, Baghdad

Has attached Electronic and Computer Center in Jadiriya. Director - Dr. M.N. Bekir

Nuclear Research Center, Tuwaitha, Baghdad

Incorporates computer system and services.

Ref: The World of Learning, 1990.

4.2.2 Examples of Applications - Iraq

[IQA1] Computerized Information Services in Iraq
++
Ref.: Information Development, Vol.2, No.2, 1986, pp.85 - 92.

The Scientific Research Council (SRC) of Iraq was established in 1963, to be responsible for activating and coordinating basic and applied scientific research in such fields as industry, health, agriculture, and energy. There are seven research centres within the Council, dealing with research in respect of astronomy and space, agriculture and water resources, the life sciences, building, electronics and computers, petroleum, and solar energy.

In 1972 the SRC created a Scientific Documentation Centre (SDC), to serve the needs of individual researchers and research institutes. In 1983/84 it was decided to establish a computerized national scientific and technical information network. The information storage and retrieval program CDS/ISIS developed at UNESCO was selected as the basic applications software. This is a powerful package used by many libraries and information centres throughout the world to automate library and information services. As underlying hardware a large IBM 4341 system was installed in early 1984. To obtain assistance in the design and implementation of the system, the SRC made a contract (via UNESCO) with the Hungarian Computer Applications and Service Company SzAMALK, which had already implemented several CDS/ISIS-based systems.

An outline of the SDC Information Network is shown in Fig.1. As for the applied sciences and technology, the well-known data base INSPEC was selected. This data base provides a very good coverage for physics, electronic and control engineering, computer and information science and technology. This data base, acquired on tape, is made available on-line to the individual users of the network via a suitable software package (SDCINSP). To cover the life sciences, the very large data base BIOSIS is similarly acquired on tape and made available on-line (see Fig.1). To complement the above services, connection was established with the largest international vendor of databases, DIALOG, which offers access to more than 200 up-to-date databases.

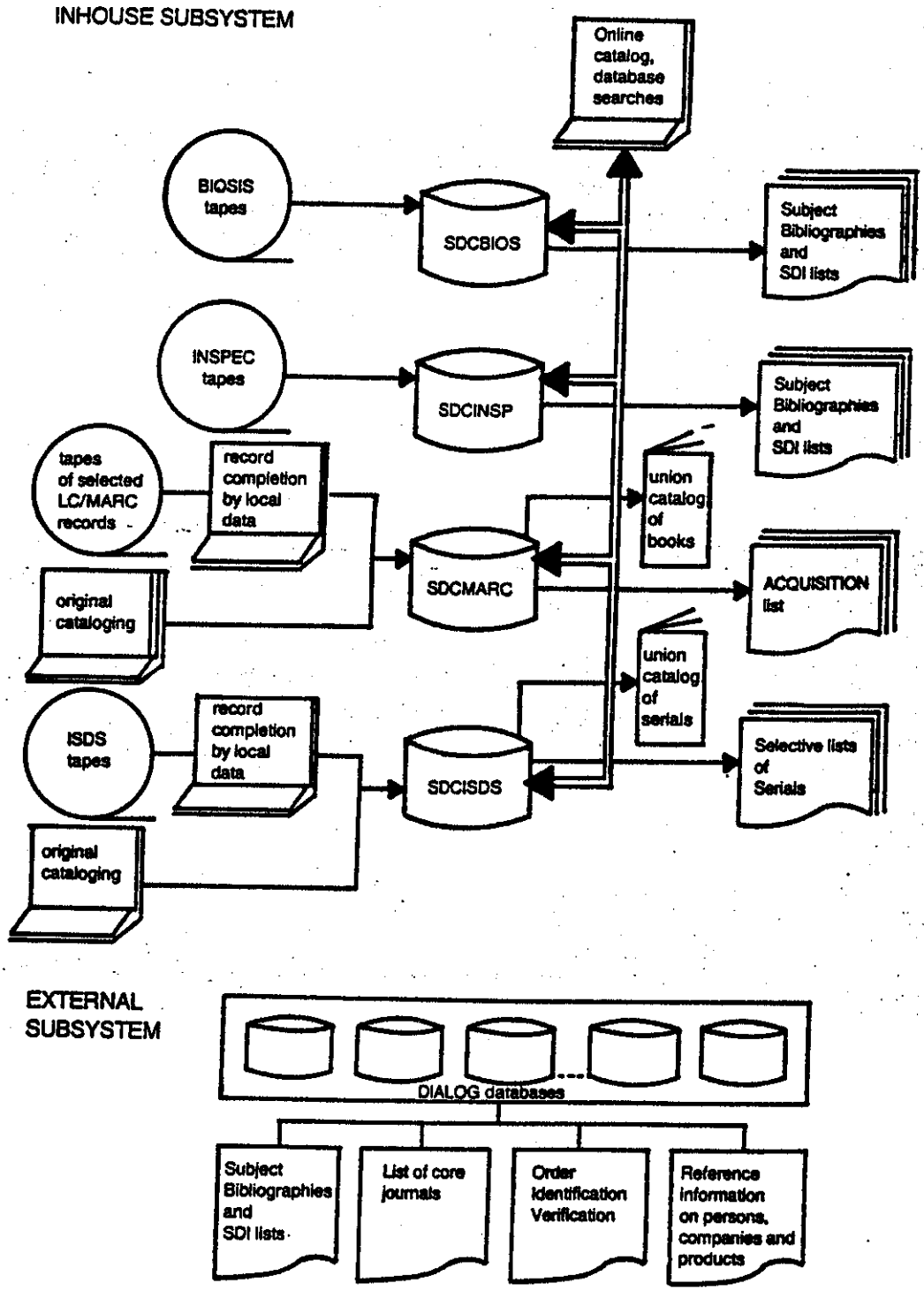

Figure 1. The computerized library and information system of SDC (Databases, inputs and outputs)

[IQA2] Computer Center for Oil Ministry

++

In 1989 a computer center was opened in Baghdad, to serve the Iraqi Oil Ministry. This center is part of a $128 million oil sector complex, built by a group of Yugoslav companies led by Ingra.

Ref.: Middle East Economic Digest, July 14, 1989, p.15.

[IQA3] Computer System for Transport Ministry

++

In 1987 the Iraqi Ministry of Transport and Communications signed a $3.2 million contract with ICL (UK) for a system consisting of mainframe computers and a distribution system. The terminals were to be installed at border control posts.

Ref.: ME Economic Digest, Sept.12, 1987, p.11.

[IQA4] Computer System for Agricultural Planning

++

According to an agreement between the Iraqi Planning Ministry and the UN Development Programme (UNDP) signed Feb. 1988, a computerized system was to be installed, to help improve the efficiency of state enterprises engaged in agricultural planning and data analysis.

Ref.: ME Economic Digest, Feb.20, 1988, p.22.

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4.2.3 Partial List of Publications - Iraq

AR000565, IEEE COMMUN, Vol. 31, Page 1204, Source-Year 83
SELF-NOISE SPECTRAL MEASUREMENTS IN CLOCK SYNCHRONIZERS/
ABDULSATAR AM, MARAL G
MIL TECH COLL, BAGHDAD, IRAQ
ECOLE NATL SUPER AERONAUT & ES, DEPT ELECTR & COMMUN, F TOULOUS, FRANCE

AR001140, IEEE COMPUT, Vol. 27, Page 266, Source-Year 78
NOVEL TECHNIQUE FOR COMPUTING MEGABINARY SQUARES/
AGRAWAL DP
UNIV TECNOL BAGHDAD, BAGHDAD, IRAQ

AR002065, IEEE COMPUT, Vol. 27, Page 951, Source-Year 78
SEQUENTIAL MACHINE IMPLEMENTATIONS USING UNIVERSAL LOGIC MODULES/
ALMAINI AEA
SCI RES FDN, BAGHDAD, IRAQ

AR005338, MATH COMPUT, Vol. 33, Page 541, Source-Year 79
SEMI-EXPLICIT A-STABLE RUNGE-KUTTA METHODS/
COOPER GJ, SAYFY A
UNIV SUSSEX, SCH MATH & PHYS SCI, BRIGHTON B, ENGLAND
UNIV BAGHDAD, COLL SCI, DEPT MATH, BAGHDAD, IRAQ

AR005340, MATH COMPUT, Vol. 35, Page 1159, Source-Year 80
ADDITIVE METHODS FOR THE NUMERICAL-SOLUTION OF ORDINARY DIFFERENTIAL-EQUATIONS/
COOPER GJ, SAYFY A
UNIV SUSSEX, SCH MATH & PHYS SCI, BRIGHTON B, ENGLAND
UNIV BAGHDAD, COLL SCI, DEPT MATH, BAGHDAD, IRAQ

AR011754, CLIN RADIOL, Vol. 31, Page 287, Source-Year 80
THE USE OF COMPUTERIZED AXIAL-TOMOGRAPHY %CAT< IN THE DIAGNOSIS OF HYDATID CYS
TS/
ISMAIL MA, ALDABAGH MA, ALJANABI TA, ALMOSLIH MI, ALANI MS, RASSAM S, FAWZI AH
UNIV BAGHDAD, COLL MED, DEPT MICRO, BAGHDAD, IRAQ
UNIV BAGHDAD, COLL MED, DEPT RADIO, BAGHDAD, IRAQ

4.2.4 Selected Abstracts - Iraq

[IQ1]
Computer-aided optimisation of simplified discrete models for control systems
Al-Assadi, A.K.; Marouf, A.
Author Affil: Dept. of Electr. Eng., Coll. of Eng., Baghdad Univ., Iraq
Source: Trans. Inst. Meas. Control (UK) vol.11, no.3, pp.: 138-44
Publication Year: July-Sept. 1989
CODEN: TICODG ISSN: 0142-3312
Treatment: PRACTICAL; THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(20 Refs)
Abstract: A computer-aided method for the computation of optimal discrete models with reduced orders for control systems is presented. The method used for simplification utilises a time-domain-optimisation technique to search for optimum values for the parameters of prespecified reduced-order discrete-time models for control systems. The measure of success of simplification is taken to be the minimum integral squared error between the step responses of the simplified discrete-time models and that of the actual system at sampling instants. Two examples are considered to illustrated the usefulness of the method in simplifying control systems given in various forms.

[IQ2]
Computer-aided discretization and simplification of continuous control systems
Al-Assadi, S.A.K.
Author Affil: Dept. of Electr. Eng., Coll. of Eng., Baghdad Univ., Iraq
Source: Comput. Aided Des. (UK) vol.21, no.4, pp.: 239-47
Publication Year: May 1989
CODEN: CAIDA5 ISSN: 0010-4485
U. S. Copyright Clearance Center Code: 0010-4485/89/040239-09$03.00
Treatment: PRACTICAL; THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(24 Refs)
Abstract: An iterative method for discretization and model reduction of continuous control systems is presented. The proposed method utilizes a frequency-domain optimization technique to find the optimal simplified z-transfer functions for a given higher order s-transfer function. The optimum values for the parameters of the prespecified reduced order discrete model are obtained as a result of minimizing the sum of magnitude-squared error function. Examples are considered to illustrate the application of this method, compared to other methods, in system identification, discretization, and model reduction, for both small and large sampling rates.

[IQ3]
Engineering industry applications of microcomputers and personal computers in Iraq
Sadiq-Hussain, S.
Author Affil: Dept. of Electr. Eng., Univ. of Technol., Baghdad, Iraq
Source: Comput. Ind. (Netherlands) vol.11, no.4, pp.; 341-7
Publication Year: Feb. 1989
CODEN: CINUD4 ISSN: 0166-3615
U. S. Copyright Clearance Center Code: 0166-3615/89/$3.50
Treatment: APPLIC;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(8 Refs)
Abstract: Engineering industry applications of microcomputers and personal computers are presented. These applications range from in-production testing of colour TV sets to the preprocessing of Arabic texts for a printing press, and from in-circuit testing of telephone sets to the measurement of the electrical parameters of ceiling fans.

[IQ4]
SEQUENTIAL MACHINE IMPLEMENTATIONS USING UNIVERSAL LOGIC MODULES
ALMAINI, A.E.A.
Author Affil: SCI. RES. FOUND., BAGHDAD, IRAQ
Source: IEEE TRANS. COMPUT. (USA) VOL.C-27, NO.10, pp.: 951-60
Publication Year: OCT. 1978
CODEN: ITCOB4
Treatment: THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(19 Refs)
Abstract: THE PAPER DISCUSSES THE PROPERTIES OF UNIVERSAL LOGIC MODULES AND INTRODUCES THEIR USE FOR SEQUENTIAL MACHINE IMPLEMENTATION. EXPRESSIONS FOR THE MAXIMUM NUMBER OF MODULES REQUIRED TO REALIZE A GIVEN FUNCTION ARE GIVEN. THE DECOMPOSITION TECHNIQUE IS SHOWN TO BE RELEVANT TO A MODULAR REALIZATION AND IS A POWERFUL TOOL IN REDUCING THE TOTAL NUMBER OF MODULES REQUIRED. LIMITS ON THE STATE SPLITTING TECHNIQUE USED IN THE SEARCH FOR A DECOMPOSABLE SYSTEM ARE DISCUSSED. LAGRANGE'S METHOD OF UNDETERMINED MULTIPLIERS WAS USED TO FIND A MINIMIZED IMPLEMENTATION BASED ON THE DISTRIBUTION OF THE STATE VARIABLES AMONG THE COMPONENTS IN SERIAL AND PARALLEL DECOMPOSITIONS. THE RESULTS ARE ILLUSTRATED BY MEANS OF EXAMPLES.

4.3 Jordan

4.3.1 Universities and Research Institutes

University of Jordan, Amman

Founded - 1962

Number of teachers - 778

Number of students - 12,659

Incorporates faculty of Computer Sciences - Staff - 111

Dean - Dr. Rashed al-Natour

Computer Center - staff - 15

Director - Yahia el-Halabi

Teachers of computing science in the Department of Mathematics -

A/Prof. Dr. Ibrahim Kara'eem, A/Prof. Dr. Gnassan al-Miflih, Dr. Riad Yebri

Jordan University of Science and Technology (JUST), Irbid

Founded - 1986

Number of teachers - 175

Number of students - 2,556

Incorporates Faculty of Science -

Dean - Prof. Shaker Mikbel

Computer Center - Director - Dr. Abdulrahman Jaradat

Mutah University - Mut'ahal Karak

Founded - 1981

Number of teachers - 70

Number of students - 3,000

Incorporates Faculty of Engineering, Dean - Prof. J. Galabsa,

Faculty of Military Sciences - Lieut. Col. Nofan M. Omar

Department of Computer Sciences and Computer Center

Yarmouk University, Irbid

Founded - 1976

Number of teachers - 470

Number of students - 11,500

Incorporates faculty of Sciences, Staff - 122, part-time - 8

Dean - Dr. Mohammed Abu Salem

Department of Computer Sciences

Computer and Information Center, Director Dr. Saadat Hassouneh

Royal Scientific Society (RSS) - Amman

Founded - 1970, Independent non-profit industrial research and development center, electronic services and training center, commissioned to promote informatics.

Computer Systems Dept. of RSS a supervisory body of Informatics

Scientific and Technical Information Center - Amman

Founded 1986, core collection includes computer science, economics, electronics, on-line services from Dialog, BRS, Infoline.

Director - Dr. Yousef Nusseir

Arab Community College - Amman

Founded - 1980

Number of teachers - N/A

Number of students - 3,532

Incorporates faculty of Computer Sciences - Staff - 8, Part-time - 4

Dean - Dr. Talal al-Sadi

Diploma after 2 years.

Ibn Khaldoun Community College - Amman

Founded - 1979

Number of teachers - N/A

Number of students - 726

Incorporates faculty of Computer Sciences - Staff - 2, part-time - 3

Dean - Dr. Moh'd Abu-Nour

Diploma after 2 years

Al-Quds Community College - Amman

Founded - 1980

Number of teachers - 31

Number of students - 1,200

Incorporates faculty of Computer Sciences - Staff - 2, part-time - 2

Dean - Dr. Zuhdi Wawi

Diploma after 2 years

Princess Sumaya College - Amman

Founded - 1977

Staff - 10

Number of students - 77

Incorporates faculty of Programming and Analysis.

Ref: The World of Learning, 1990.

4.3.2 Examples of Applications

[JOA1]
UK provides Jordan with advanced police command and control systems
++
The UK's Marconi Defence Systems has won a contract to provide the Jordanian Gov't with advanced police command and control systems, centering on a computer-based information system to allow police activities to be monitored and controlled from Amman. It includes a data bank for quick access to criminal, immigration and other records, and an automatic vehicle locating system (AVLS), which will be able to monitor hundreds of police vehicles in the entire central region. Intl suppliers to the project include General Electric and Harris Corp. both of the USA, and Canada's Northern Telecom.
Ref: ME Economic Digest, Jan. 20, 1989, p. 16

[JOA2]
Jordan, South Korea sign cooperation agreement
++
The Jordan Electricity Authority has signed a cooperation agreement with South Korea for the exchange of expertize and information about the use of computers in producing and distributing electricity. Korea is also to provide the authority with help in making electrical equipment.
Ref: ME Economic Digest, Jan. 23, 1988, p. 16.

[JOA3]
The Use of Computers in Libraries and Information Centres
++
Libraries and information centres in Jordan have realised the value and importance of automation in order to improve their services to users. Therefore, a basic survey was initiated to study the extent of computer applications and use in libraries and information centres in Jordan. The main objectives of the study were to look at the extent of computer use in library functions and services, problems and solutions, and future plans.
Ref: Program (UK), Vol. 22, No. 3, July 1988, pp. 268-74.

[JOA4]
Computer aided distribution planning for the Jordanian Electric Power Co. Ltd.
++
The reference below describes the requirements of the Jordanian Electric Power Co. Ltd. (JEPCO) and some of the problems encountered in selecting the appropriate facilities and outlines the computer aided distribution planning package now being implemented. It also illustrates the application of the programs by describing preliminary studies carried out on the JEPCO 33 kV system as well as the results from a planning study carried out elsewhere.
Ref: Proc. 8th International Conf. on Electricity Distribution (IEE, Conf. Publ. No. 250), 1985, pp. 439-44.

4.3.3 Partial List of Publications

AR000969, IEEE COMPUT, Vol. 30, Page 341, Source-Year 81
ON THE PERFORMANCE ENHANCEMENT OF PAGING SYSTEMS THROUGH PROGRAM ANALYSIS AND
TRANSFORMATIONS/
ABUSUFAH W, KUCK DJ, LAWRIE DH
YARMOUK UNIV, DEPT ELECT ENGN, IRBID, JORDAN
UNIV ILLINOIS, DEPT COMP SCI, URBANA, IL

AR001529, IEEE COMPUT, Vol. 26, Page 1009, Source-Year 77
NEW WEIGHTED GENERALIZED INVERSE ALGORITHM FOR PATTERN-RECOGNITION/
ALALAOUI MA
ROYAL SCI SOC, DEPT ELECT ENGN, AMMAN, JORDAN

AR011902, NUCL INST B, Vol. 18, Page 194, Source-Year 87
INK - A COMPUTER-PROGRAM FOR ACCURATE ANALYSIS OF PARTICLE-INDUCED X-RAY-EMISS
ION SPECTRA/
JABR IJ, SALEH NS, HALLAK AB
UNIV JORDAN, DEPT PHYS, AMMAN, JORDAN

AR014367, IEEE COMMUN, Vol. 35, Page 568, Source-Year 87
ANALYSIS AND MODELING OF INTERMODULATION DISTORTION IN WIDEBAND CABLE TV CHANN
ELS/
MAQUSI M
UNIV JORDAN, DEPT ELECT ENGN, AMMAN, JORDAN

AR019058, OPT COMMUN, Vol. 41, Page 231, Source-Year 82
ON OPTICAL PULSE-PROPAGATION/
SHAKIR SA
YARMOUK UNIV, DEPT PHYS, IRBID, JORDAN

AR019061, OPT COMMUN, Vol. 45, Page 317, Source-Year 83
REFLECTION OF ULTRASHORT PULSES FROM LAYERED MEDIA/
SHAKIR SA, YUSUF NA, MIRZAA MC
YARMOUK UNIV, DEPT PHYS, IRBID, JORDAN

4.3.3 Partial List of Publications

AR000969, IEEE COMPUT, Vol. 30, Page 341, Source-Year 81
ON THE PERFORMANCE ENHANCEMENT OF PAGING SYSTEMS THROUGH PROGRAM ANALYSIS AND TRANSFORMATIONS/
ABUSUFAH W, KUCK DJ, LAWRIE DH
YARMOUK UNIV, DEPT ELECT ENGN, IRBID, JORDAN
UNIV ILLINOIS, DEPT COMP SCI, URBANA, IL

AR001529, IEEE COMPUT, Vol. 26, Page 1009, Source-Year 77
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ALALAOUI MA
ROYAL SCI SOC, DEPT ELECT ENGN, AMMAN, JORDAN

AR011902, NUCL INST B, Vol. 18, Page 194, Source-Year 87
INK - A COMPUTER-PROGRAM FOR ACCURATE ANALYSIS OF PARTICLE-INDUCED X-RAY-EMISS
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AR014367, IEEE COMMUN, Vol. 35, Page 568, Source-Year 87
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ELS/
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AR019058, OPT COMMUN, Vol. 41, Page 231, Source-Year 82
ON OPTICAL PULSE-PROPAGATION/
SHAKIR SA
YARMOUK UNIV, DEPT PHYS, IRBID, JORDAN

AR019061, OPT COMMUN, Vol. 45, Page 317, Source-Year 83
REFLECTION OF ULTRASHORT PULSES FROM LAYERED MEDIA/
SHAKIR SA, YUSUF NA, MIRZAA MC
YARMOUK UNIV, DEPT PHYS, IRBID, JORDAN

4.4 Saudi Arabia

4.4.1 Universities and Research Institutes

King Abdulaziz University (KAU) Jeddah

Founded - 1967

Number of teachers - 1147

Number of students - 20,077

Faculty of Science, Dean - Dr. Nabeeh Baashn, incorporates Department of Computer Science with Center of Statistics and Data

Department of Systems, Head - Dr. Saeed Ali Yahia

Informatics studies given also within the Department of Engineering

King Fahad University of Petroleum and Minerals (UPM) Dhahran

Founded - 1963

Number of teachers - 780

Number of students - 4,500

Began to utilize computers: IBM 370/158 and IBM 3033 with 8 MB of main storage in 1982.

Incorporates: Faculty of Engineering and Computer Science - Dean - Dr. Mohamed J. Al-Suwaiyel;

College of Engineering and Computer Science incorporates:

Computer Engineering - Dr. Mohammad Y. Osman

Information and Computer Science - Dr.Muhammad A. Al-Tayyeb

College of Industrial Management has an MBA program - Dr. Abdulrahim al Meer

King Saud University (KSU) Riyadh

Founded - 1957 as Riyadh Univerity, name changed in 1982

Number of teachers - 2730

Number of students - 32,000

Incorporates: Faculty of Management Sciences an Department of Computer Sciences. First Department of Informatics was established in 1984.

The main computing center has two computers:

1. IBM 3081 with internal memory of 16MB 9 MIPS
2. AMDAHL 5240 with internal memory of 16MB 6,7 MIPS

Department of Computer Sciences has 2 VAX 780 computers, each has internal memory of 4 MB

Incorporated also Graduate Studies and Research - Dean Ahmed Mohammad al-Dhobaib.

Incorporated Colleges:

College of Science, Dean - Dr. Salih Hamad Al-Sidrani

College of Engineering, Dean - Dr. Nasser Al-Mahous

College of Computer and Information Science, Dean - Dr. Mohammad M. Mandora

Ummal-Qura University - Mecca

Founded - 1979. Taif Campus founded - 1981.

Number of teachers - c. 100 in Taif Campus.

Number of students - c. 3,000 in Taif Campus.

Incorporates Faculty of Applied Science and Engineering - Dean - Dr. Abdul Aziz Mustafa Uqqab.

King Abdulaziz Military Academy - Riyadh

Founded - 1955, No. of students - 1,300

Incorporates Faculty of Applied Science and Engineering,

Department of Computer Engineering

Courses include modern languages including Hebrew.

Arab Technical Institute, Riyadh

Founded - 1964, Students - 1,000.

King Abdulaziz City for Science and Technology - Riyadh

Founded - 1977.

Its purpose: To formulate the national policy for science and technology development and to draw up the strategy and plan for its implementation.

Staff - 242

342,000 technical reports on microfiche. On-line search facilities of international and some national databases.

President - Dr. Salem Abdulrahman Al-Athel.

Vice President -Dr. Abdullah Al-Kadhi

Ref: The World of Learning, 1990.

4.4.2 Examples of Computer Applications

[SAA1]
Computerized fingerprint identification system

NEC has completed the sale of a Y1.2bil computerized fingerprint identification system to the Saudi Arabian Ministry of Internal Affairs. The Japanese company will also handle software and maintenance support services for the system. It will establish a system support and software development center in Saudi Arabia to facilitate the arrangement.
Ref: EDP Japan Report, May 15, 1987, p. 42

[SAA2]
Cray Research reports lease of Cray-2 to Saudi Arabia

Cray Research Inc. reports that Saudi Arabian Oil Co. has installed a leased Cray-2 in Dhahran on undisclosed terms: the oil company is using the machine primarily to simulate underground oil reservoirs.
Ref: Computergram Internationa, January 26, 1990, p. N/A, ISSN: 0268-716X

[SAA3]
Valmet automates in Saudi Arabia

Ibn Zahr (Saudi Arabia) will start up a 500,000 metric tons per year methyl tert-butyl ether plant at Al-Jubail, Saudi Arabia. Methyl tert-butyl ether (Metal tert-butyl-ether) is an additive used for producing or eliminating the lead content of gasoline. Valmet Process Automation (Finland) will supply a Damatic microcomputer process control system, while contractor for the overall plant construction is Snamprogetti (Italy).
Ref: Finnish Trade Review 1, 1987, p.3.

[SAA4]
Saudi Arabia - a pioneer in bilingual telecommunications

In order to upgrade its telex network the PTT of Saudi Arabia ordered 1659 bylingual teleprinters from Siemens. The T1200 AL machines use a new word processing program which enables text to be created, corrected, edited, copied and deleted in both latin and Arabic script. The same text editor allows the user to switch between Arabic and Latin script at any time; Latin characters can be inserted in Arabic text and vice versa.
Ref: Telcom Rep. (West Germany), vol. 10, No. 6, pp. 344-7 Nov.-Dec. 1987

[SAA5]
Contingency planning and computer center disaster recovery capabilities in Saudi Arabia facilities

---

Most of the advanced activities in the Kingdom are either dependent upon, or supported by, complex data processing and information manipulation facilities. Management's traditional argument against security costs (especially the cost of contingency planning and disaster recovery) has been that the risk probabilities are only low to moderate. While it is arguable that a given disaster will not cripple a given facility, it is not valid to argue that NO disaster will seriously affect the facility.

Disaster becomes a matter of timing of inevitability. Disaster recovery is considered in terms of security shells, prevention, remove back-up, contingency planning, site options, and a formal disaster recovery plan (DRP). Emphasis is laid on investment value, strategic imperatives and military defence. Commercial and civil resources are also vulnerable.
Ref: Ninth National Computer Conference and Exhibition, 1986, Conference Proceedings, pp. 11-4/1-38, Vol. 2, Riyadh, Saudi Arabia.

[SAA6]
Energy management and software maintenance system in Saudi Electric Company

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The Saudi Consolidted Electric Company, Eastern Provice, has signed a $13.3 million contract with General Signal Corporation's Leeds and Northrup (L&N) unit for the installation of an energy management and software maintenance system in its new power control center in Damman, Kingdom of Saudi Arabia. The master station of L&N's powerful LN6000 energy management system, initially designed to gather data from 95 large remote terminal units, will be able to handle data from more than twice that many units. In addition, two data links to external computers - each utilizing the popular X.25 communications protocol - will operate from "front-end" processors housed in the master station. Nine operator and training consoles, each housing three 19-inch color CRTs and operator's panels, will provide the man-machine interface for the new system. A tenth control console with five 19-inch color CRTs and the necessary man-machine interface will function as a programmer's console.
Ref: News Release October 22, 1987, p. 1.

[SAA7]
Computerized log analysis system

Saudi Arabian Well Log Analysis System (SARLOG) is a computerized open hope well log interpretation system developed locally for the Ministry of Petroleum and Minerals. This system consists of a total of forty subprograms which will digitize and prepare data, perform chartbook environmental corrections and do level by level main calculations. Cross plotting subprograms are included for verification of log calibration, identification of lithology, differentiation of gas and oil and determination of all formation parameters. As the equations and methods used in well logging depend on lithology type, shaliness and available log combination, optional methods have been included in SARLOG to allow the log analysts to put his own judgement when it becomes required. Six shale indicators are used to approach a more precise shale value, and seven water saturation methods are optional for shaly sandstones and complex carbonate lithologies. (Edited author abstract) 2 refs.
Ref: SPE Publ. by Society of Petroleum Engineers of AIME, USA SPE 13736, 1985, pp. 443-53.

4.4.3 List of Publications - Saudi Arabia, 1979-1987

AR001244, IEEE RELIAB, Vol. 31, Page 41, Source-Year 82
A SIMPLE TECHNIQUE FOR COMPUTING NETWORK RELIABILITY/
AHMAD SH
KING ABDULAZIZ UNIV, DEPT IND ENGN, JEDDAH, SAUDI ARAB

AR004643, IEEE IND E, Vol. 31, Page 61, Source-Year 84
A MICROCOMPUTER-BASED PROPULSION CONTROL-SYSTEM OF A HYBRID ELECTRIC VEHICLE/
BOSE BK, SOMUAH CB, SUTHERLAND HA
GE, CTR RES & DEV, SCHENECTAD, NY
UNIV PETR & MINERALS, DHAHRAN, SAUDI ARAB

AR005024, CLIN NUTR, Vol. 3, Page 67, Source-Year 84
NUTRITIONAL ASSESSMENT USING A MICROCOMPUTER .1. PROGRAM DESIGN/
CHANG RWS
RIYADH ARMED FORCES HOSP, DEPT SURG, NUTR SUPPO, POB 7897, RIYADH, SAUDI ARAB

AR010231, CANCER, Vol. 54, Page 172, Source-Year 84
PREDICTIVE VALUE OF EXCRETORY UROGRAPHY, ULTRASONOGRAPHY, COMPUTERIZED-TOMOGRA
PHY, AND LIVER AND BONE-SCAN IN THE STAGING OF BILHARZIAL BLADDER-CANCER IN SA
UDI-ARABIA/
HANASH KA, BISSADA NK, ABLA A, ESMAIL D, DOWLING A
KING FAISAL SPECIALIST HOSP &, DEPT SURG, RIYADH, SAUDI ARAB
KING FAISAL SPECIALIST HOSP &, DEPT DIAGNOST RADIOL, RIYADH, SAUDI ARAB

AR012097, NEURORADIOL, Vol. 29, Page 317, Source-Year 87
COMPUTED-TOMOGRAPHY OF THE CRANIO-CERVICAL LYMPHATIC-SYSTEM - ANATOMICAL AND F
UNCTIONAL CONSIDERATIONS/
JINKINS JR
KING FAISAL SPECIALIST HOSP &, DEPT RADIOL, NEURORADIO, RIYADH, SAUDI ARAB

AR013363, IEEE COMPUT, Vol. 28, Page 586, Source-Year 79
EXAMINATION OF THE COST FUNCTION FOR PROGRAMMABLE LOGIC-ARRAYS/
KOBYLARZ T, ALNAJJAR A
UNIV PETR & MINERALS, DEPT ELECT ENGN, DHAHRAN, SAUDI ARAB

AR016220, COMPUT METH, Vol. 36, Page 147, Source-Year 83
A SEARCH ALGORITHM FOR THE MINIMUM COST COVERING OF 0-1 INTEGER SETS/
NOUH A, ULA N
UNIV RIYADH, FAC ENGN, RIYADH, SAUDI ARAB

AR016783, J CHEM EDUC, Vol. 62, Page 413, Source-Year 85
CHEMICAL ARITHMETIC ON A POCKET COMPUTER/
POLLET PL
UNIV PETR & MINERALS, DHAHRAN, SAUDI ARAB

AR017040, IEEE RELIAB, Vol. 31, Page 410, Source-Year 82
RELIABILITY OF DIGITAL-COMMUNICATION SYSTEM WITH CHANNEL REDUNDANCY/
RAHMAN M
UNIV PETR & MINERALS, DHAHRAN, SAUDI ARAB

AR017622, MICROEL REL, Vol. 26, Page 973, Source-Year 86
UTILIZATION OF SYMMETRIC SWITCHING-FUNCTIONS IN THE COMPUTATION OF K-OUT-OF-N
SYSTEM RELIABILITY/
RUSHDI AM
KING ABDULAZIZ UNIV, DEPT ELECT ENGN, JEDDAH, SAUDI ARAB

AR017623, COMPUT ELEC, Vol. 13, Page 41, Source-Year 87
IMPROVED VARIABLE-ENTERED KARNAUGH MAP PROCEDURES/
RUSHDI AM
KING ABDULAZIZ UNIV, DEPT ELECT ENGN, JEDDAH, SAUDI ARAB

AR017624, MICROEL REL, Vol. 27, Page 875, Source-Year 87
OPTIMAL COMPUTATION O K-TO-1-OUT-OF-N SYSTEM RELIABILITY/
RUSHDI AM, DEHLAWI FMA
KING ABDULAZIZ UNIV, DEPT ELECT & COMP EN, POB 9027, JEDDAH, SAUDI ARAB

AR017625, RELIAB ENG, Vol. 17, Page 157, Source-Year 87
EFFICIENT COMPUTATION OF K-TO-L-OUT-OF-N SYSTEM RELIABILITY/
RUSHDI AM
KING ABDULAZIZ UNIV, DEPT ELECT ENGN, POB 9027, JEDDAH, SAUDI ARAB

4.4.4 Selected Abstracts - Saudi Arabia, 1980-1989

[SA1]

Simulation tools for the investigation of ALOHA packet switching protocols

Arabi, J.M.; Bakry, S.H.; Al-Kadi, I.

Author Affil: Dept. of Electr. Eng., Coll. of Eng., King Saud Univ., Riyadh, Saudi Arabia

Source: J. Eng. Sci. King Saud Univ. (Saudi Arabia) vol.14, no.1, pp.: 27-42

Publication Year: 1988

CODEN: JESCDO ISSN: 0377-9254

Treatment: THEORETICAL; EXPERIMENTAL;

Document Type: JOURNAL PAPER

Languages: ENGLISH

(15 Refs)

Abstract: The ALOHA packet switching protocols represent a solution of great importance to the channel management problem in a multi-access environment. Digital computer simulation is one important method for the investigations of such protocols. This paper describes simulation programs that can help students and researchers to study ALOHA protocols in a practical manner, and to test new ideas to improve them further. The model considered by the simulation programs includes the basic ALOHA activities. The programs have been developed in a top-down programming approach, which resulted in programs having a modular construction with each module simulating a specific activity. To demonstrate the use of the programs, two problems have been considered. The first, is simpler and is based on the principle of collided packets lost, while the second is more realistic and is based on collided packets delayed and retransmitted until transmission is successful. For both cases the slotted-ALOHA rules have been used. The simulation programs can be used for many other cases.

[SA2]
Mathematical models for the investigations of telephone access demands with applications to the Kingdom of Saudi Arabia
Bakry, S.H.
Author Affil: King Saud Univ., Riyadh, Saudi Arabia
Source: Int. J. Policy Inf. (Taiwan) vol.12, no.2, pp.: 121-37
Publication Year: 15 Dec. 1988
CODEN: IJPIDH ISSN: 0251-1266
Treatment: THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(14 Refs)
Abstract: Deals with the development of mathematical telephone access demand models, that enable the inter-relation of the different factors involved, and ease the investigation of various telephone access problems. The factors considered include: human factors such as population, households, business offices, and so on; and telephone access service factors, such as working lines, required lines, telephone density, interest level, and so on. The models can be used for the investigation of various telephone access problems; examples of such problems have been analyzed, and the solution produced using the mathematical models applied to the Kingdom of Saudi Arabia, for the whole country, and for the urban,semi-urban, and rural areas of the country is presented.

[SA3]
A proposed planning methodology for the ARABSAT telephone network
Bakry, S.H.
Author Affil: Coll. of Eng., King Saud Univ., Riyadh, Saudi Arabia
Source: Space Commun. Broadcast. (Netherlands) vol.5, no.6, pp.: 453-60
Publication Year: Nov. 1987
CODEN: SCBRDZ ISSN: 0167-9368
U. S. Copyright Clearance Center Code: 0167-9368/88/$3.50
Treatment: PRACTICAL; THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(12 Refs)
Abstract: Concerns the development of a methodology for the future planning of the ARABSAT telephone network, The methodology considers various forecasting factors including: population, GNP, level of development of the countries concerned, human, political, and trade relations, past experience, alternative media, different future development scenarios and so on. The methodology also considers balancing the expected busy-hour traffic with the network capacity requirements, and relating forecasted overall traffic with the network income. The methodology recommends the development of mathematical models, and the author suggests the use of computer spreadsheet software and computer programming facilities, for the manipulation of the models and the investigation of various practical planning problems.

[SA4]
Simulation tools for the investigation of the operational behaviour of telephone links
Shatila, M.M.; Bakry, S.H.
Author Affil: Coll. of Eng., King Saud Univ., Riyadh, Saudi Arabia
Source: J. Eng. Sci. King Saud Univ. (Saudi Arabia) vol.12, no.2, pp.: 169-84
Publication Year: 1986
CODEN: JESCDO ISSN: 0377-9254
Treatment: PRACTICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(9 Refs)
Abstract: Describes simulation tools that can be used for the investigation of telephone links, as if they are parts of a real network. The tools enable researchers to describe telephone links, their identity, state, and so on in computer codes. In addition, the operational activities of these links are simulated in a set of modules with each module concerned with one special activity. The computer programming language used is FORTRAN. Two timing methods have been used for the execution of the various activities: the time-true method and the roulette method. The results obtained by the programs have been tested in order to prove their reliability, using three different applications as examples.

[SA5]
An analysis of the capacity of international telephone links of the Gulf States using teletraffic theory algorithms
Al-Gamdi, A.M.; Bakry, S.H.
Author Affil: Dept. of Electr. Eng., Coll. of Eng., King Saud Univ., Riyadh, Saudi Arabia
Source: J. Eng. Sci. King Saud Univ. (Saudi Arabia) vol.12, no.1, pp.: 69-81
Publication Year: 1986
CODEN: JESCDO ISSN: 0377-9254
Treatment: THEORETICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(5 Refs)

Abstract: Describes a computer program, written in Fortran, for the analysis of the capacity of a full-availability group of telephone links. For a given situation, where the number of links, the design grade of service, and the teletraffic offered in the busy hour are known, the program decides whether the system is underloaded or overloaded, computes the optimum number of links necessary for providing satisfactory service, and gives the number of links that could be saved, or the number of additional links that should be provided. The program also gives design tables showing the expected performance of a specific group of links for different teletraffic loads. The program is based on Erlang theory of telecommunication traffic, and can be used for groups of links of various sizes, as it avoids the occurrence of arithmetic overflow during computation. The

program is of modular construction, which enhances its readability and makes it more flexible to use. The program is applied to the international telephone links between Saudi Arabia and the surrounding Gulf Cooperation Council States.

[SA6]
COMPUTER AND ENGINEERING EDUCATION IN SAUDI ARABIA
BAKRY, S.H.
Author Affil: KING SAUD UNIV., RIYADH, SAUDI ARABIA
Source: MIDDLE EAST ELECTRON. (GB) VOL.6, NO.8, pp.: 39-42
Publication Year: SEPT. 1983
CODEN: MEAED7 ISSN: 0140-7619
Treatment: GENERAL,REVIEW;
Document Type: JOURNAL PAPER
Languages: ENGLISH
Abstract: COMPUTING AND PROGRAMMING KNOWLEDGE IS VITAL IN ENGINEERING TODAY AND IT IS ESSENTIAL THAT EDUCATIONAL ESTABLISHMENTS PROVIDE ADEQUATE COMPUTER TRAINING TO CATER FOR THE NEEDS OF INDUSTRY AND COMMERCE. THE AUTHOR EVALUATES THE IMPORTANCE OF COMPUTER EDUCATION WITHIN SAUDI ARABIA'S UNIVERSITIES AND DRAWS A COMPARISON WITH TWO AMERICAN ESTABLISHMENTS.

[SA7]
EXTENDED COMPUTER NETWORKS FOR ENGINEERS AND SCIENTISTS
BAKRY, S.H.
Author Affil: ELECTRICAL ENGNG. DEPT., KING SAUD UNIV., RIYADH, SAUDI
ARABIA
Source: J. ENG. SCI. (SAUDI ARABIA) VOL.8, NO.1, pp.: 69-78
Publication Year: 1982
CODEN: JESCDO ISSN: 0377-9254
Treatment: PRACTICAL;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(13 Refs)
Abstract: COMPUTER NETWORKS ARE BECOMING OF INCREASING IMPORTANCE. A WIDE VARIETY OF NETWORKS ARE NOW IN USE SERVING DIFFERENT FIELDS, AND SOME COUNTRIES HAVE INSTALLED COMPUTING SERVICES FOR NATIONAL USER COMMUNITIES. THE AIM OF THE REVIEW IS TO INTRODUCE THE BASIC PRINCIPLES OF COMPUTER NETWORKS TO A READER WHO IS NOT IMMEDIATELY FAMILIAR WITH THE SUBJECT, BUT WHO HAS A BACKGROUND IN ENGINEERING OR SCIENCE. SUCH A READER COULD BE A POTENTIAL USER OR BECOME INVOLVED IN THE DESIGN OF COMPUTER NETWORKS. THE PAPER PRESENTS THE VARIOUS TYPES OF NETWORK CONFIGURATIONS. IN ADDITION, THE MULTI-LEVEL ARCHITECTURE OF COMPUTER NETWORKS IS DESCRIBED AND THE NETWORK PROTOCOLS AT THE DIFFERENT LEVELS ARE PRESENTED. THE NETWORK DESIGN OBJECTIVES, VARIABLES AND DESIGN TOOLS ARE DISCUSSED. ONE OF THE NETWORK DESIGN TOOLS IS DIGITAL COMPUTER SIMULATION. AS AN EXAMPLE OF THE USE OF THIS METHOD, A NETWORK MODEL IS DESCRIBED IN TERMS OF STRUCTURE, ACTIVITIES

AND PERFORMANCE MEASUREMENTS. THE MODEL ENABLES THE INVESTIGATIONS OF VARIOUS TRAFFIC PATTERNS AND DIFFERENT ROUTING STRATEGIES. THE READER WHO WISHES TO PROCEED WITH THE STUDY OF COMPUTER NETWORKS MAY PROGRAM THE MODEL AND UNDERTAKE SOME INVESTIGATIONS.

[SA8]
Design of an Arabic programming language ARABW with an efficient compiler
Al-Hawaj, A.Y.; Hamed, M.
Author Affil: Bahrain Univ., Saudi Arabia
Source: Ninth National Computer Conference and Exhibition 1986. Conference Proceedings pp.: 9-1/1-19 vol.2
Publication Year: 1986
Conference Information :
Date: 6-13 Oct. 1986 Location: Riyadh, Saudi Arabia
Publ: Minist. Interior Nat. Inf. Center, Riyadh, Saudi Arabia. 2 vol. iv+1060 pp.
Treatment: PRACTICAL;
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(25 Refs)
Abstract: A survey of design criteria for programming languages is given. A classification of programming languages is outlined and the features of some classes are explained. An Arabic programming language ARABW suited for both business applications and training data processing students is designed. The definition of the language (ARABW) assures ease of use together with efficiency of compilation and execution. Both the compiler and executor can be implemented on any kind of machine that supports the features of the language. The efficiency of the compiler and executor are also affected by the characteristics of the language used to develop their subroutines.

[SA9]
Administrators and technologists: a study of the role and career aspirations of Saudi engineers
Ghani, J.A.; Al-Buraey, M.A.
Author Affil: Coll. of Ind. Manage., King Fahd Univ. of Pet. & Minerals, Dhahran, Saudi Arabia
Source: Eng. Manage. Int. (Netherlands) vol.5, no.1, pp.: 63-9
Publication Year: April 1988
CODEN: EMIND8 ISSN: 0167-5419
U. S. Copyright Clearance Center Code: 0167-5419/88/$03.50
Treatment: APPLIC; GENERAL,REVIEW;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(12 Refs)
Abstract: Presents a study of the job responsibilities, the career aspirations, and continuing education needs of Saudi engineers. A sample survey of 217 Saudi engineers was conducted in 1985. Results indicate that the majority switch to a management career within six years of graduation. The majority of engineers are content with their career. However, a significant number would like to make a switch in their career. A typology is suggested which categorizes 12% of Saudi engineers as 'disillusioned administrators', 22% as 'ambitious technologists', 18%

as 'contented administrators', and 33% as 'loyal technologists'. In general, Saudi engineers realize the necessity of their playing a dual role and wish to develop both their technical and managerial skills through continuing education.

[SA10]
Management education for engineers: the case of Saudi Arabia
Al-Buraey, M.A.; Ghani, J.A.
Source: Eur. J. Eng. Educ. (Netherlands) vol.11, no.4, pp.: 437-50
Publication Year: 1986
CODEN: EJEED8 ISSN: 0304-3797
Treatment: GENERAL,REVIEW;
Document Type: JOURNAL PAPER
Languages: ENGLISH
(9 Refs)
Abstract: Investigates the continuing education needs and career path development of engineers in Saudi Arabia. A survey of practising engineers in the Kingdom was conducted. This was supplemented by in-depth interviews with experts in industry. The authors focus on three issues: the changing job responsibilities as engineers move into management; the actual, recommended and required undergraduate preparation for engineers in management topics; and the specific topics in management of interest to engineers. It is recommended that universities and private/public organisations should join together in providing continuing education to the professional engineer. This is necessary for the engineer to fulfil both his technical and managerial responsibilities.

[SA11]
A systolic algorithm for VLSI design of a 1/N rate Viterbi decoder
Sait, S.M.; Damati, A.F.; Rahman, M.
Author Affil: King Fahd Univ. of Pet. & Miner., Dhahran, Saudi Arabia
Barbosa, A.M. (Editors)
Sponsor: IEEE
Source: MELECON '89: Mediterranean Electrotechnical Conference Proceedings. Integrating Research, Industry and Education in Energy and Communication Engineering (Cat. No.89CH2679-9) pp.: 307-10
Publication Year: 1989
Conference Information :
Date: 11-13 April 1989 Location: Lisbon, Portugal
Publ: IEEE, New York, NY, USA. xxxi+791 pp.
Treatment: PRACTICAL;
Document Type: CONFERENCE PAPER
Languages: ENGLISH
(16 Refs)
Abstract: A novel systolic architecture for Viterbi decoding is presented. It consists of two blocks of processors. The first contains a column of processors which perform branch metric computation and decide on the survived branches. The second consists of a matrix of simpler processors which update survived paths and provide the decoded output. The systolic algorithm is modeled in AHPL to verify functional correctness. Implementation details are discussed. It is found that the proposed systolic design compares favorably with previous implementations of Viterbi decoders in terms of speed and modularity.

[SA12]

A general real-time decoder based on AMD2900 devices

Soomro, A.A.; Rahman, M.; Sait, S.M.

Author Affil: Dept. of Electr. Eng., Univ. of Pet. & Miner., Dhahran, Saudi Arabia

Source: Microprocess. Microprogr. (Netherlands) vol.22, no.2, pp.: 97-113

Publication Year: Feb. 1988

CODEN: MMICDT ISSN: 0165-6074

Treatment: PRACTICAL; THEORETICAL;

Document Type: JOURNAL PAPER

Languages: ENGLISH

(8 Refs)

Abstract: A bit-slice microprocessor-based real-time decoder has been proposed in this paper. A microprocessor-based architecture is preferable because of its programmability, availability, low cost and simplicity of design. Two strategies are adapted to increase throughput of the decoder for real-time decoding. First, bit-slice microprocessors are used and ALU word length is chosen to be equal to that of a code word. Second, decoding operation is accomplished in two steps, namely error detection and error correction. It takes relatively much longer time to correct errors. Therefore, a buffer memory is used to store incoming blocks as more than one block may be received during a decoding cycle. The design is versatile since different decoding algorithms can be executed by changing the microprogram. Minor, apparent and simple changes have to be made in the design to decode codes of longer block length.

[SA13]

Threshold systems and their reliability

Rushdi, A.M.

Author Affil: Dept. of Electr. & Comput. Eng., King Abdulaziz Univ., Jeddah, Saudi Arabia

Source: Microelectron. Reliab. (UK) vol.30, no.2, pp.: 299-312

Publication Year: 1990

CODEN: MCRLAS ISSN: 0026-2714

U. S. Copyright Clearance Center Code: 0026-2714/90/$3.00+.00

Treatment: THEORETICAL;

Document Type: JOURNAL PAPER

Languages: ENGLISH

(21 Refs)

Abstract: A threshold system is defined as a system whose success/failure is a threshold switching function in the successes/failures of its components. Examples of such a system abound in applications involving decision mechanisms or involving supply-type components with fixed ratings for their capacity, flow, throughput, and the like. In general, a threshold system can be coherent or noncoherent. If a coherent threshold system is made to have identical component weights, then it reduces to the well known k-out-of-n or voting system. The paper lists some of the fundamental properties of a threshold system, and presents a recursive algorithm for computing the exact system reliability. Illustrative examples are given, and extension to the multi-threshold case is also discussed.

[SA14]

On computing the spectral coefficients of a switching function

Rushdi, A.M.

Author Affil: Dept. of Electr. & Comput. Eng., King Abdulaziz Univ., Jeddah, Saudi Arabia

Source: Microelectron. Reliab. (UK) vol.27, no.6, pp.: 965-79

Publication Year: 1987

CODEN: MCRLAS ISSN: 0026-2714

U. S. Copyright Clearance Center Code: 0026-2714/87/$3.00+.00

Treatment: THEORETICAL;

Document Type: JOURNAL PAPER

Languages: ENGLISH

(8 Refs)

Abstract: The spectral coefficients of a switching function are computed in terms of the real transform of the function, or equivalently, in terms of a disjoint sum-of-products representation of the function. Such a representation can be cast into an almost minimal form through some existing algorithms, and its complexity can be significantly less than that of a minterm expansion, which it includes as a special case. The real transform is also utilized as a mechanism for the inverse transform from the spectral domain to the Boolean domain.

[SA15]

On computing the syndrome of a switching function

Rushdi, A.M.

Author Affil: Dept. of Electr. & Comput. Eng., King Abdulaziz Univ., Jeddah, Saudi Arabia

Source: Microelectron. Reliab. (UK) vol.27, no.4, pp.: 703-16

Publication Year: 1987

CODEN: MCRLAS ISSN: 0026-2714

U. S. Copyright Clearance Center Code: 0026-2714/87/$3.00+.00

Treatment: THEORETICAL;

Document Type: JOURNAL PAPER

Languages: ENGLISH

(26 Refs)

Abstract: The real transform of an n-variable switching function is a multiaffine function of the same 'truth table' as the switching function. Hence, it has a finite multivariable Taylor's expansion which is completely specified by 2/sup n/ coefficients. The value of this transform when all its arguments equal 0.5 is the syndrome of the switching function. Therefore, the problem of computing the syndrome is equivalent to that of computing the numerical reliability of a system whose success is the switching function under consideration. Several efficient methods of system reliability analysis are adapted to handle syndrome computation. Several examples are given to illustrate these methods and some remarks are made about the syndrome properties of certain special types of switching functions.

4.4.5 Miscellaneous

King Fahd unveils SR 753 bil 5th Development Plan

King Fahd Bin Abdul Azeez of Saudi Arabia announced at a Cabinet meeting in Riyadh, Sun Dec 31 that the country's 5th 5-Yr Development Plan (1990-95) will be implemented at an estimated cost of SR 753 bil. King Fahd also presented the Kingdom's budget amounting to SR 143. Addressing the Council of Mins which endorsed the 5-Yr Plan and the budget, King Fahd said the Kingdom expects an annual growth rate of 3.2% during the next 5 yrs. The King expressed his happiness over stability in the oil market and praised the efforts of Gulf states and other OPEC members in this respect. He said Saudi Arabia, with an inflation rate less than 1%, is among the few countries in the world which are not suffering from the bad effects of inflation. Spelling out the country's major achievements last yr, the King said the number of students increased to 3 mil including over 120,000 in univs. Some 16,000 students will graduate this yr, he added. As many as 12,000 students graduated from vocational and training institutes last yr. He said the govt appointed more than 20,000 employees last yr. They included 8,200 univ graduates. Moreover, some 26,225 Saudis were appointed in the military sector and 20,000 in the civilian sector. Last yr the govt was able to supply electricity to 360 new villages and townships. Electricity connections were given to over 115,000 housing units and buildings. The total area of agricultural land increased by 3 mil hectares and the govt distributed 1.4 mil hectares of land among the citizens for cultivation. The country's wheat output last yr stood at 3.3 mil ton and fruit and vegetable output at 2.6 mil ton. The number of telephone lines increased to 1.5 mil and are distributed in 400 cities and townships. The Ministry of Posts Telegraphs and Telephones collected revenues of SR 4.5 bil last yr. (SPA)
Ref.: Al Riyadh, Jan.1, 1990, p.1

The changing data processing environment in Saudi Arabia

The rapid growth in microcomputer sales has affected data processing in many ways and in many countries. In order to study the effects of this growth in a Third World environment, a survey of 200 organizations was conducted. Three major user segments were identified: non-users, microcomputer users, and mainframe users. It was found that during the period 1982-1984 an important change occurred, in that the number of organizations using microcomputers surpassed those using mainframe computers. Companies using microcomputers were found to be smaller, younger and more likely to be in the trade/service sector. The majority of companies in this user segment lacked a formal data processing department. They generally did not employ computer professionals and depended on ready-made rather than in-house development of software. There were no differences in the overall portfolio of applications of the two user segments, though the number of applications was fewer among micro users. This paper discusses the growing use of microcomputers in the small business sector and the implications of these results for educators, equipment vendors, and researchers.
Ref: Inf. Management (Netherlands), Vol. 14, No. 2, Feb. 1988, pp. 61-6.

Saudi Arabia, Taiwan agree to widen cooperation

Saudi Arabia and the Republic of China (ROC - Taiwan) reached an agreement to cooperate on economic aspects, trade and science and technology at the close of the 11th session of the Sino-Saudi Joint Com on Economic and Technical Cooperation in Taipei, Sat Nov 11. ROC Economics Min Chen Lian and Muhammad Abal Kheil, Saudi Min of Finance and Natl Economy, initialed the accord on behalf of their countries. According to the agreement, the 2 countries will seriously study the feasibility of joint ventures in crude oil transportation, computers, shipbuilding and TV production in Saudi Arabia. Other highlights of the accord are:

- Both govts agreed to encourage ROC businessmen to invest in Saudi Arabia.
- ROC will continue to supply personnel and know-how for transportation, communications and power distribution projects.
- ROC experts will continue to assist in enhancing Saudi Arabian agricultural and pisciculture standards.
- Both sides will study the feasibility of a bilateral agreement exempting each other from aviation taxes.
- Both countries will jointly engage in snake poisons, hepatitis B and biological research.
- Meetings will be held to review the implementation of the current medical cooperation agreement.
- ROC will send more medical personnel to Saudi Arabia.(China News Agency, CNA)

Ref.: Arab News, Nov.12, 1989, p.3.

Saudi Arabia, USA's Boeing sign first of four high-technology projects

Saudi Arabia has signed an agreement for the 1st of 4 high-technology projects to be set up in the Kingdom under the Boeing offset investment programme. The agreement covers a $ 20 mil, computer project - Intl Systems Engineering - for which technology will be supplied by the Boeing Computer Services Co of the USA. Last Jul the Kingdom gave the green light for the first 4 projects (involving an investment of over $ 250 mil) to be set up under the $ 1.18 bil contract which was awarded in 1985 to a consortium led by Boeing for a command system for the Saudi AWACS planes.

Ref.: ME Economic Survey, Sept.21, 1987, p.A1.