COMPUTERIZED PROCESSING OF MICROFICHE REPORTS IN A SPECIAL LIBRARY

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Abstract

Highlights the need for computerized processing of bibliographic data with specific reference to microfiche reports. Presents a case-study of a system designed and implemented at ISRO Satellite Centre Library. Future enhancement and extensions are also indicated.

Introduction :

With the rapid growth in the science and technology and R&D activities, there has resulted an enormous increase in the amount of scientific and technical information and its rate of accumulation. Quick and efficient access to relevant information is, therefore, necessary for researchers not only to keep abreast of the latest technical developments but also to avoid unnecessary and wasteful duplication of research efforts. Equally dramatic developments in computer technology and techniques have, naturally, spurred application of computers to the problem of bibliographic information processing. Many computer databases and software systems have been developed to cater to the needs of searching and retrieving bibliographic data. Examples include data banks like COMPENDEX, INSPEC, CHEMABS, PASCAL, NASA, NTIS etc., information retrieval systems like IRS, DIALOG, NASA-RECON etc. Other off-line processing packages include FAMULUS for bibliographic text processing and information retrieval and KWIC for generating keyword index.

1. **The Microfiche Reports Bibliographic System at ISAC Library**

At the ISRO Satellite Centre, there is available a collection of over 28,000 technical reports on microfiche and new reports are added at the rate of about 500 per month. These reports have been the most important source of information for space technologists. An efficient bibliographic information processing and dissemination system was, therefore, an imperative necessity.

Bibliographic processing of the collection involves cataloguing, generating appropriate accessions list, author, subject or category, report number, KWOC and title indices, and retrieval of relevant references and full length documents in response to adhoc queries. It was soon apparent that the manual system of processing could not cope with the large amount of information being received and the consequent processing requirements. A computerized system of processing was, therefore, designed and implemented and is described in the subsequent sections of this paper.

2. **The Computerized Processing System**

The system consists of a database on magnetic disk (or tape) containing the desired bibliographic data and software package composed of a set programs to process this data.

2.1 **Input :** The bibliographic details included in the system are tabulated in Table 1. The input data consists of records composed of card types 1 to 4 indicated in Table 2. The 'Issue' card carries the lowest accession number in any given group of input data cards. The 'Author', 'Title' and 'Report No.' cards together constitute one (logical) bibliographic record. If the report title cannot be accomodated on one 'Title' card a second title card can be used.

2.2 **Output :** The system generates the following outputs :

1. Microfiche Reports Accession Register.
2. NTIS Category Index (A subject-wise list suitable for current awareness and dissemination services)
3. Author index
4. Title index
5. Report No. index
6. KWOC index

Extracts of print outs are shown in the Appendix-1.

2.3 **Data & File Structures** The data structuring consists of defining appropriate groups of data fields into records. Table 3 lists the different data records. These records are stored in the following system files :

1. **Card Image File** is the ASC11 sequential file of input card images.
2. **Index Files are ASC11 sequential** files (five in number) corresponding to Author, Title, Report No., NTIS category and KWOC indices to be generated.
3. **NTIS Category Directory** is an ASC11 sequential file of NTIS Category codes and corresponding descriptions arranged in ascending order of NTIS category codes.
4. **Stopword list file** containing alphabetically sorted list of stopwords to be used for generating the KWOC index.

2.4 **Processing Scheme and Algorithms** The processing scheme, essentially, involves keypunching the bibliographic data onto punch cards (in the format indicated in Table 2), transferring this data into disc files and further processing by using the customdesigned software package.

The following processing steps are involved :

(S1) Sort the card image file by microfiche report accession number.
(S2) Generate the Accession Register and Index files.
(S3) Generate the keyword file from the tile file. This involves scanning each title and for each word in the title checking if it occurs in a predefined list of stopwords. If the word is not found in the stopword list it is taken to be a keyword and is entered into keyword file.
(S4) Sort the Index and Keyword files.
(S5) Generate Author, Title, Report No., NTIS Category and KWOC index reports and print.

Appendix-2 shows the processing sequence block diagrammatically.

2.5 **Program Modules** The software package for processing the data consists of the following modules :

(1) QSORT — for sorting the system (ASC11) files into desired order.
(2) MICFIC — for generating the index files.
(3) KWOC — for generating the keyword file.
(4) INDEX — for generating the Author, Title, Report No., and NTIS Category Index reports.

2.6 **System Implementation & Operation**

The programs in the software package are written in FORTRAN-IV-PLUS and implemented on PDP-11/44 system running under RSX-11M-PLUS operating system (OS). All file operations are performed through the FCS (File Control Services) utility provided by the OS. Program execution is initiated and controlled from a user terminal. The system runs in a time-sharing mode and the program execution is interactive requiring user response at the terminal.

The average logical record length for each microfiche report is about 180 characters. (i.e. 3 cards). Therefore, one months' data occupies about 500 blocks (256 bytes each) of disc storage space. The category directory and stopword list files occupy about 30 blocks. The other files are temporary and are deleted after processing.

The card image file is backed up each month onto a magnetic tape. The backed up files are merged and cumulative indices generated once a year.

3. **Conclusion**

Presently, information retrieval software is yet to be implemented. This involves scanning through the card image file and retrieving those records satisfying the conditions specified in the query. The system, as it is presently designed, is an

APPENDIX - 1

EXTRACTS FROM COMPUTER OUTPUTS

ISRO SATELLITE CENTRE
LIBRARY

MICROFORM DOCUMENTS ACCESSION REGISTER
DECEMBER 1981

PAGE: 1

DATE:28-DEC-81

CAT	ACCN NO	AUTHORS	TITLE	PUBLIS	AGENT	ISSUE DATE	REP NOS	PRICE	COLLAT ION	CNA ISSUE
63C	MF23436	STACHIW J.D.	HIGH - PRESSURE VIEWPORTS FOR INFRARED SYSTEMS, PHASE-1 GERMANIU--ETC	NTIS	CC	SEP 80	AD-A097-089 NOSC/TR-565	$1.70	122	81-16
49A	MF23437	BURNSIDE W.D. WANG N.	RESEARCH ON NEAR FIELD PATTERN EFFECTS.	NTIS	CC	JAN 81	AD-A097-102 ESL-712527-4 N00019-80-C-0050	$1.70	30	81-16
[illegible]										

AUTHOR INDEX TO MICROFORM DOCUMENTS

AUTHOR	TITLE	ACCESSION NUMBER
ABBISS J.B.	EXPERIMENTS USING A THREE - COMPONENT LASER - ANEMOMETRY SYSTEM ON--ETC.	
ADAMS W.A.	SOME TOPICS IN APPLIED ELECTROCHEMICAL KINETICS.	MF23532
ALEXANDER K.	EVALUATION OF TRANSIENT VOLTAGE SUPPRESSORS FOR SAVING ELECTRIC ENERGY.	MF23408
AMIEUX J.C.	REPORT-0002/D180 STRAPDOWN INERTIAL OPTICAL SYSTEM.	MF23565
ANDERSON R.E.	POSITION SURVEILLANCE USING ONE ACTIVE RANGING SATELLITE AND TIME-OF-ARRIVAL OF SIGNAL.	MF23599
[illegible]	[illegible]	MF23596

TITLE INDEX TO MICROFORM DOCUMENTS

TITLE	ACCESSION NUMBER
15kW GENERAL PURPOSE POWER CONDITIONER (FREQUENCY CHANGER), INV--ETC.	
314 GHZ PARAMETRIC AMPLIFIER FINAL REPORT.	MF23444
403 MHZ SAW OSCILLATOR.	MF23639
ABRASION AND HYDROSTATIC HEAD OF WEATHERED RUBBER - COATED FABRIC--ETC.	MF23929
ACCEPTANCE CRITERIA FOR THICK FILM RESISTORS.	MF23834
ACCESS PROTOCOL FOR A PARALLEL WIDEBAND LOCAL DIGITAL COMMUNICA--ETC.	MF23609
ACCURACY OF GRAVITATIONAL PHYSICS TES USING RANGES TO THE INNER PLANETS. SEMIANNUAL REPORT	MF23470
	MF23686

REPORT NUMBER INDEX TO MICROFORM DOCUMENTS

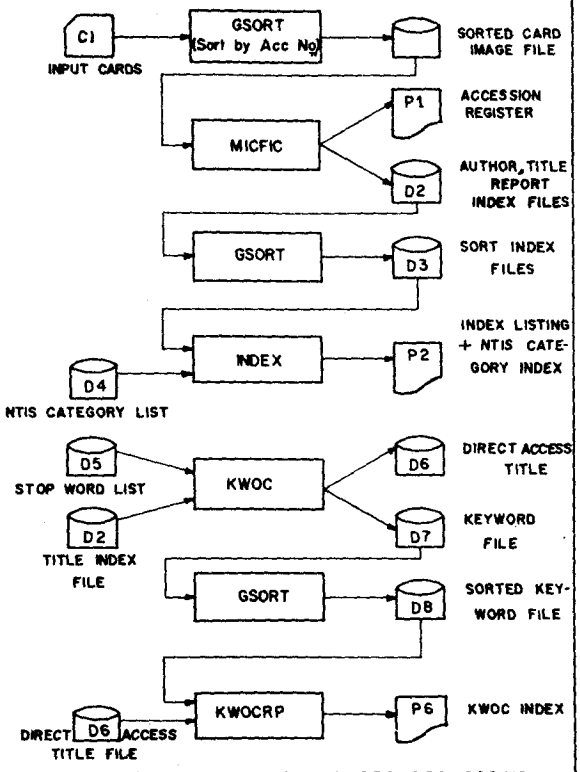
REPORT NUMBER	TITLE	ACCESSION NUMBER
A33615-75-C5218	DIGITAL AVIONICS INFORMATION SYSTEMS VOLUME I,IMPACT OF--ETC .	MF23474
AD-A/97-590	REQUIREMENTS DEFINITION WITHIN ACQUISITION AND ITS RELATIONSHIP--ETC.	MF23522
AD-A/97-620	CHANNEL MEASUREMENT DECODING FOR TROPOSCATTER COMMUNICATIONS.	MF23526
AD-A097-089	HIGH - PRESSURE VIEWPORTS FOR INFRARED SYSTEMS, PHASE-1 GERMANIU--ETC	MF23436
AD-A097-102	RESEARCH ON NEAR FIELD PATTERN EFFECTS.	MF23437
AD-A097-121	NOTE ON COMPUTER GRAPHICS FOR MAXIMUM ENTROPY SPECTRAL ANALYSIS-ETC.	MF23439

CATEGORY NUMBER INDEX TO MICROFORM DOCUMENTS (DEC 81)

49 ELECTRO TECHNOLOGY

ACCESSION NUMBER	TITLE		REPORT NUMBER
	49C ELECTRO MECHANICAL DEVICES		
[illegible]	MANUFACTURING METHODS AND TECHNOLOGY FOR ELECTROMAGNETIC COM PN--ETC.	DAAK40-78-C-0071 AD-A098-167	PR-80-76-1294R-V-1
[illegible]	FEASIBILITY ASSESSMENT OF A MAGNETICALLY SUSPENDED	ESA-CR(P)-1370	N81-21848
[illegible]	ELECTRIC VEHICLE MOTORS AND CONTROLLERS	N81-21801	NASA-TM-81760
	49E OPTOELECTRONIC DEVICES AND SYSTEMS		
[illegible]	PERFORMANCE OF LIGHT-EMITTING DIODES UNDER HYDROSTATIC PRESS URE--ETC	AD-A097-782	NOSC-TR-651
[illegible]	HIGH CONTRAST CRT MODULE	DELET-TR-79-0270-1	AD-A097-727
[illegible]	HIGH CONTRAST CRT FACEPLATE	LMSC-D767730 DELET-TR-79-0080-2	AD-A098-091
[illegible]	ACOUSTICALLY SCANNED OPTICAL IMAGING DEVICES.	ONR-24-034-11 GL-3219	AD-A098-168
[illegible]	LIQUID CRYSTAL MATERIALS FOR MATRIX DISPLAY	TR-1 AD-A098-307	N00014-79-C-0984
[illegible]	PERFORMANCE OF PHOTOMULTIPLIER TUBES AND SODIUM IODIDE SCINT ILLATION DETECTOR SYSTEM.	N81-21280	NASA-TM-82406
	49G RESISTIVE, CAPACITIVE & INDUCTIVE COMPONENTS		
[illegible]	MANUFACTURING METHODS AND TECHNOLOGY FOR ELECTROMAGNETIC COM PON-ETC.	DAAK40-78-C-0071 AD-A098-168	PR-80-76-1294R-V-2
[illegible]	HANDBOOK OF ELECTRICAL INSULATION MTLS FOR DEEP--ETC	AD-B012-737	PAD-76-8
	49H SEMICONDUCTOR DEVICES		
[illegible]	SEMICONDUCTOR TECHNOLOGY PROGRAM-PROGRESS BRIEFS.	AD-A098-089	NBSIR-81-2230
[illegible]	MICROWAVE SEMICONDUCTOR MATERIALS AND DEVICES.	AD-A098-112	AFOSR-TR-81-0464
[illegible]	VERY LARGE SCALE INTEGRATED CIRCUITS FOR MILITARY SYSTEMS.	AD-A098-176 IDA-P-1538	IDA-HQ-80-22941
[illegible]	TEST OF CHARGE INJECTION DEVICE.	N81-21164	NASA-CR-161701
MF23917	SEMICONDUCTOR MEASUREMENT TECHNOLOGY TEST PATTERNS NB-88 AND .NB-28A.	NBS-SP-400-63	PB81-181901

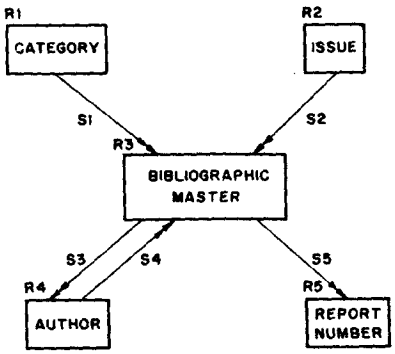
APPENDIX - 2.



COMPUTERIZED MICROFICHE REPORTS PROCESSING SCHEME.

APPENDIX - 3

NETWORK MODEL FOR A DATABASE FOR MICROFICHE REPORTS PROCESSING SYSTEM



R1-R5 : RECORD TYPE DEFINITIONS

R1 : CATEGORY (CATEGORY CODE, CATEGORY DESCRIPTION)
R2 : ISSUE (RECORD No., PUBLISHER, AGENT, PRICE, GRA ISSUE No.)
R3 : BIBLIOGRAPHIC MASTER (ACCESSION No., TITLE, COLLATION)
R4 : AUTHOR (AUTHOR)
R5 : REPORT No. (REPORT No.)

S1-S5 : LINKAGE SETS

About the Author

Dr. M. S. Sridhar is a post graduate in mathematics and business management and a doctorate in library and information science. He is in the profession for last 35 years. Since 1978 he is heading the Library and Documentation Division of ISRO Satellite Centre, Bangalore. Earlier he has worked in the libraries of National Aeronautical Laboratory (Bangalore), Indian Institute of Management (Bangalore) and University of Mysore. Dr. Sridhar has published four books ('User research: a review of information-behaviour studies in science and technology', 'Problems of collection development in special libraries', 'Information behaviour of scientists and engineers' and 'Use and user research with twenty case studies') and 74 research papers, written 19 course material for BLIS and MLIS, presented over 22 papers in conferences and seminars, and contributed 5 chapters to books. **E-mail:** sridharmirle@yahoo.com, mirlesridhar@gmail.com, sridhar@isac.gov.in ; **Phone:** 91-80-25084451; **Fax:** 91-80-25084475.