

Conceptual analysis of Kashmiri music records for information storage and retrieval with special reference to Radio Kashmir, Srinagar

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An attempt has been made to understand the underlying components of Kashmiri music so as to make a conceptual analysis for designing an Information Storage and Retrieval System (IS & RS). The concepts thus analysed can act as a basis for development of an IS&RS for Kashmiri music records and can provide a broad framework for automation of library and its services in the Radio Kashmir, Srinagar. The main algorithmic steps set forth include: analysis of Kashmiri music into its entities; enlisting various attributes related to individual entities; and working out the relationships existing between various entities and between entities & attributes, putting the entities and attributes in an ordered manner to ensure individualisation; devising a data structure for storage purpose; maintain data independence; and finally devise a search mechanism to ensure fast, reliable and accurate retrieval. These steps have been supported with ER models and flow diagrams to understand the requirement clearly.

Key words: Kashmiri music, Conceptual analysis, Information storage and retrieval, Database, ER Model, Flow diagram

Introduction

The programmes of the Radio Kashmir Srinagar (RKS), in the absence of recording facilities, at its inception were broadcast live. This deprived the station to maintain records of all important events and relayed programmes and also could not preserve them for posterity, exchange across the All India Radio (AIR) network or for reference. The advent and introduction of recording facilities later on at the Radio Kashmir Srinagar changed the whole scenario. Since its inception at a very modest level, the library of audio recordings (tapes and discs) has grown into a large and precious collection of sound recordings which links present with past and future.¹ At present the library services are being provided by two libraries, one for General Service and another for Commercial Broadcasting Service. The library attached to the General Service, since its inception, has been separated on the basis of the form, nature and language of the materials. As such two library sections i.e. "Tapes Library" and "Books and Records Library" exist. The stock of Tapes Library consists of music and programme recordings in Kashmiri and other local languages viz. Gojri, Pahari, Balti, Persian and Sanskrit. The collection is purely of indigenous

nature (created and published by the station). The Tapes Library holds around 25,000 tapes. The tapes are of two types, one having the capacity of holding sound analogue of 15 minute's duration and another that of 30 minutes. These are called as "D-Tapes" and "B-Tapes", respectively.

A large number of the Kashmiri music tapes are available in Radio Kashmir Srinagar, in four musical categories viz., Classical (Sufiana Mousiqui, Ghazals); Folk (Chhakri, Rouf, Wanawun, Chalant, Nyanda Ba'th etc.); Light (Ghazals, Geet, Chorus Songs, Film Songs) and Devotional (Hamud, Na't, Du'a, Leela, Keerthan, etc.). The Tapes are of open reel to reel type, with thin poly-vinyl reel wound on a plastic spool. The loaded spools are kept in a carton (cardboard box), rectangular in shape. The dimension/s of cartons containing D-Tape is 5" × 7" and that of B-Tapes is 7" × 9". These audio magnetic tapes are kept vertically on the pigeon holes of the wooden cupboards, specially designed for the purpose. The tapes are arranged in numerical sequence as per their accession number. The audio recordings have neither been classified according to any scheme of classification nor catalogued in accordance with any cataloguing code. Entries of

music tapes are made manually on bound registers in an alphabetical order of names of singers and the names of parties in case of group songs. Although the entries for a singer are made on relevant page(s) allotted to an alphabet, prompt dictionary order of the names of singers is not maintained. The names also are not recorded in the pattern recommended by library rules i.e., entry element followed by the descriptive element or surname followed by forename. Moreover, a singer or party may have sung more than one songs, the entries of songs of a particular singer or party, happen to be in a haphazard manner. This is due to rigidity in manual system. No references or cross-references are given to guide a searcher and avoid problems of synonym or homonym. Simple accession numbers are given against each entry to retrieve a particular album from the shelves of the library. For example:

1. Songs sung by Gh. Hassan Sofi are entered under alphabet "G". Kashmiris, however, recall him as Hassan Sofi, no cross-reference is provided to lead a searcher under such situations.
2. A duet sung by Vijay Kumar Malla & Shamima Dev is entered under alphabet "V" and no cross-reference for Shamima Dev is provided.

So information about the music can be retrieved through a single approach i.e., singer approach and no arrangement is in existence to meet varied approaches of users. The most significant access points or approaches of users of Kashmiri music, which need to be addressed, are as follows:

1. Subject or Situation approach;
2. Song line: First or Second line;
3. Lyrics: Poet of the song;
4. Composer: Music composer;
5. Category: Classical, Folk, Devotional etc.;
6. National Structure: Maqam, Raag, Taal etc.;
7. Title: Title of album or musical score or programme;
8. Actor/Actress;
9. Instrumentalist;
10. Instrument, and like.

Another problem which requires to be addressed is that the audio magnetic tapes of Kashmiri music are lacking a standard source of bibliographic information. Information about a few bibliographic entities is given on a flap of paper called as Que Sheet, usually lying loose in the carton/jacket or pasted on inner/outer side of one of the carton/jacket flanks.

Intermingling of various categories of music on same tape or music of various languages on the same tape is another problem, e.g., a light Ghazal tape may contain a classical *Sufiana* song or a Kashmiri music tape may contain a couple of Urdu or Hindi songs. Even some of the music tapes have been found to contain one or two talks or speeches of archival value. This needs to be addressed without making the storage and retrieval mechanism cumbersome and bulky.

Thus the analysis of Kashmir music, its components and record mechanism is a unique problem so far as its organization on shelves of library and subsequent retrieval is concerned. Therefore the investigator has made an attempt to understand the underlying components of Kashmiri music so as to develop an algorithm for designing an Information Storage and Retrieval System (IS&RS). The algorithm thus developed will act as a basis for development of an IS&RS for Kashmiri music records and will provide a broad framework for automation of library and its services in Radio Kashmir, Srinagar.

Review of literature

The databases and data banks prove to be less expensive and less time consuming as compared to printed indexes and magnetic tape systems.² Digitising the audio/video signals, contained in the musical scores, makes it possible for instant and multiple access in a single slot of time.³ There are possibilities to store the audio/video files on computers and ensure their online retrieval, transport and exchange.⁴ Since storage is not a problem in databases we must keep provision to store data for as many bibliographic entities as possible to meet varied/multiple approaches of users and address complex queries.⁵ It has been found that computer aided online catalogue proves to be more effective than the traditional cards, microfiche or print type of catalogue. The full text retrieval proves most suitable and efficient mode of retrieval.⁶

World Wide Web can act as virtual library for music and there is a need to facilitate browsing and mutual exchange of music through networks.⁷ The storage and retrieval procedures in audio/video libraries of India are still in infancy and rely mostly on manual methods like that of printed indexes and catalogues. Joshi⁸ revealed that storage and retrieval modes adopted by Indian audio/video libraries face certain limitations and suggested that networking and communication facilities be capitalized to eradicate

such problem. Raju and Rao⁹ have made an attempt to develop a music indexing and retrieval system based on melody or tune of songs. In the envisaged system, the “query”, a song fragment whistled or sung by the user into a microphone, is used to search a database of soundtracks to find the entry that is best matched to it in tune. A signal processing algorithm suitable for melody detection namely “time domain algorithm” was used to determine the pitch counter and rhythm of the acoustic signal.

The study of the published literature explored by the investigator reveals that a substantial amount of work has been done on the information storage and retrieval of music scores (documents containing music). Research is going on to attain deeper insight into the problem and workout new techniques to meet the complex demands and varied approaches of the music lovers and other users. Some researchers have dealt with the problem manually, while others have put the extensive storage potential and dynamic processing capability of micro-computers into use. Till date majority of investigators have worked on devising the storage and retrieval mechanism based on bibliographical information about the content of musical scores. However, a trend has been observed to think in terms of audio sensation or sound recognizing retrieval mechanism. Application of computers to carry out the job of storage and retrieval involves the creation & maintenance of databases and development of software programmes or pseudo codes to process the data contained in them. The operation as well as application software manage the storage of data, its processing and retrieval. Many software languages have been observed to be made use of for this purpose. The noteworthy among them are PASCAL, FORTRAN, APPLE, BASIC, DBASE, MS Access, C etc. The studies depict that wide range access of different music databases has been made possible at international level through WWW network and the efforts are underway to ensure smooth exchange of crystal clear effects and music.

Objectives of the study

- To understand basic features of the Kashmiri music;
- To study present mechanism of storage and retrieval of music record collection of library of the Radio Kashmir, Srinagar; and
- To develop an algorithm for storage and retrieval of Kashmiri music records available at Radio Kashmir Music/Archival Library.

Scope

Out of six radio stations existing in the state of Jammu and Kashmir, the study has been confined to the station library of Radio Kashmir, Srinagar only. The library of the Radio Kashmir, Srinagar has a total collection of about 15,000 audio magnetic tapes. Out of which about 9,000 are musical tapes and about 6,000 contain different non-musical programmes. The musical tapes contain songs of four tentative categories of Kashmiri music viz., classical, folk, light and devotional music. The non-musical programme tapes contain dramas, humor, talks, speeches, interviews and informative programmes (information related to sports, health, science, humanities, arts, social sciences etc.). Keeping in view the varied nature regarding their constitution, thought and content, the study has been confined to the first type of documents only i.e., the music tapes. The second type of documents i.e. programme tapes are of different nature and demand a separate treatment and have been excluded from the study.

Methodology

A combination of methods or techniques, including that of case study has been adopted to achieve the stated objectives. In order to realize the first objective a study of the related primary as well as a secondary material was conducted. A case study of Radio Kashmir Srinagar Library was conducted to achieve the second objective. Experimental and descriptive methods, including observation and analysis of the problem in hand and arriving to a logical solution, was followed to realize the third and final objective. An algorithm thus has been developed, which involved the following steps:-

1. Analysis of subject matter into its entities;
2. Enlisting various attributes related to individual entities;
3. Working out the relationships existing between various entities and between entities and attributes.

Analysis

The analysis of the data collected about the Kashmiri music, indicates that we have to design a database capable to store the diversified data about this subject and capable to ensure its fast, reliable and accurate retrieval. Charting down algorithmic steps is the most significant thing to lay a foundation for subsequent development of the proposed database.

Following are the logical steps required to be taken towards development of a storage mechanism and retrieval procedure of information about Kashmiri music at conceptual level.

1. Identify basic entities related to Kashmiri music;
2. Identify various attributes associated with selected entities;
3. Depict the relations among entities and between entities and attributes;
4. Put the entities and attributes in an ordered manner and ensure individualisation;
5. Devise a data structure for storage purpose and maintain data independence;
6. Devise a search mechanism to ensure fast, reliable and accurate retrieval.

An effort has been made at conceptual level to devise a series of steps required to delineate a road map for designing a database about the Kashmir music record collection at Radio Kashmir Srinagar in order to ensure reliable, fast and accurate storage and retrieval of the content. The first effort comprises of 17 logical steps to be followed sequentially for designing and developing a information storage and retrieval system. The steps are given in Fig. 1.

At step no. 4 an effort has been made to categorise the concepts related to Kashmiri music into appropriate categories, so that the underlying data structure is capable of storing the data in an organised manner and ensure fast and accurate retrieval. Decision boxes along with possible decisions have been incorporated to leave an opportunity for designer/developer to choose appropriate track to accomplish the goal. In the sub-steps 4B to 4E alphanumeric codes have been suggested to identify the worked out concepts and sub-concepts under respective categories. These alphanumeric codes may be used as record IDs in their respective tables and will serve in setting the relation between different tables of the proposed database and link them for meeting the complex queries of end user. Persian script is used mostly and accepted as recognised script for writing Kashmiri, however for sake of convenience the database designer/developer may choose among Roman and Devanagari scripts as English and Hindi are the other two most common languages spoken by Kashmiris. The flow diagram at its step no. 12 emphasizes the database

designer/developer to adopt a relational model to ensure data independence, spelling uniformity, and relational articulation to meet complex queries. Care has also been taken to ensure user statistics and security of database through steps 16 and 17.

In the second step an effort has been made to analyse the main concept Kashmiri music into underlying entities and attributes. The analysed facts have been represented in Fig. 2. After a thorough survey of the library records and analysis of user approaches, during service period of the investigator as Information Assistant at Radio Kashmir music library, the “*Manufacturer of Musical Score*”; “*Song*”; “*Librarian*” and the “*Listener*” have been observed and accordingly displayed through rectangles as the main entities related to Kashmiri music records. Among them focus has been laid on the entities “*Manufacturer of Musical Score*” and “*Song*”, the list of the sub-entities associated with them have been separately displayed as smaller rectangles labeled with appropriate names. Special attributes associated directly with the entity “*Manufacturer of Musical Score*” have been represented through smaller rectangles with curved edges. Star shape has been used to highlight and lay emphasis on the entity “*Song*” as the main entity among all. The diagram represents a layout about the course of action starting from song and radiating to manufacturer at one end and the user at another.

The flow diagram shown in Fig. 3 represents attributes associated with each entity or their sub-entities. Ellipses have been used to represent each attribute.

The lower portion of the both diagrams i.e., Figs. 1 & 2 depict the mechanism involved to retrieve the stored information through end user interaction.

The musical score contains the musical items called as the songs, which acts as the main content of the resource under investigation. These E-R diagrams provides the schema, which represents various entities and attributes involved and the relationships existing among them, thus presents a conceptual model for the storage and retrieval of the Kashmiri music. Attempts have been made to meet possible/common approaches of users, who are mainly the listeners and the programme staff.

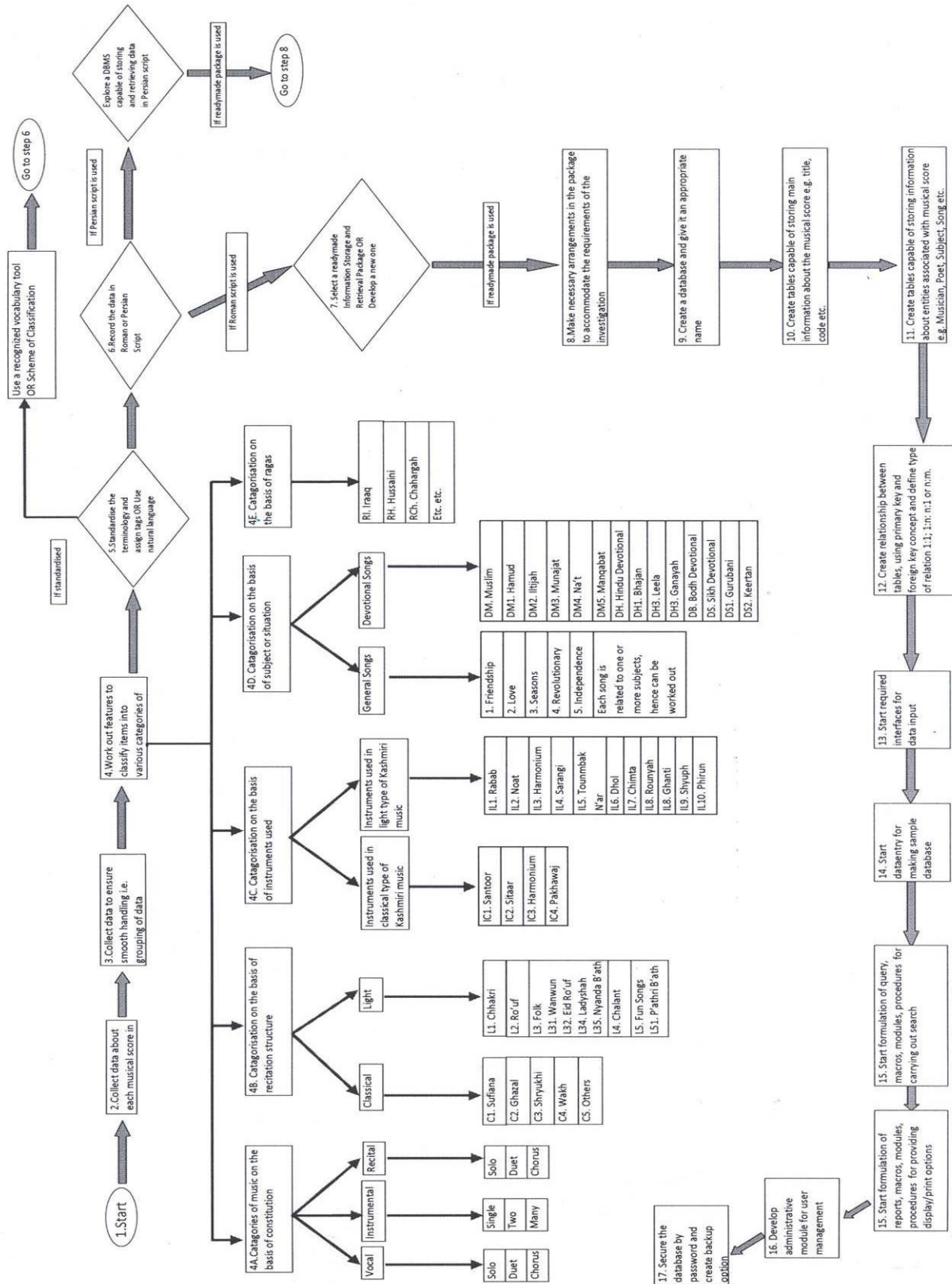


Fig. 1—Analysis of Kashmiri music into corresponding entities and attributes and different steps of algorithm

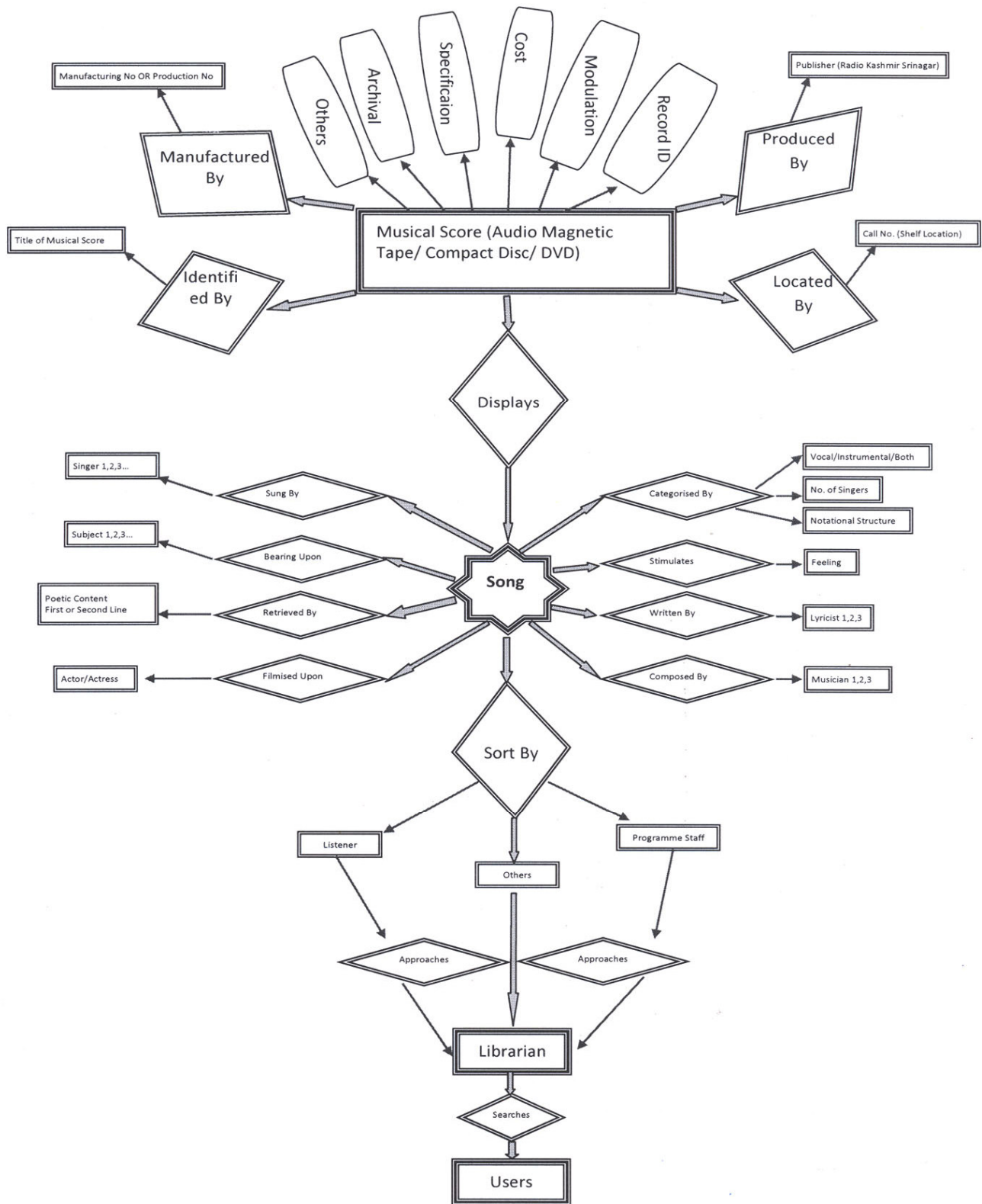


Fig. 2—E – R Model showing relationship among entities

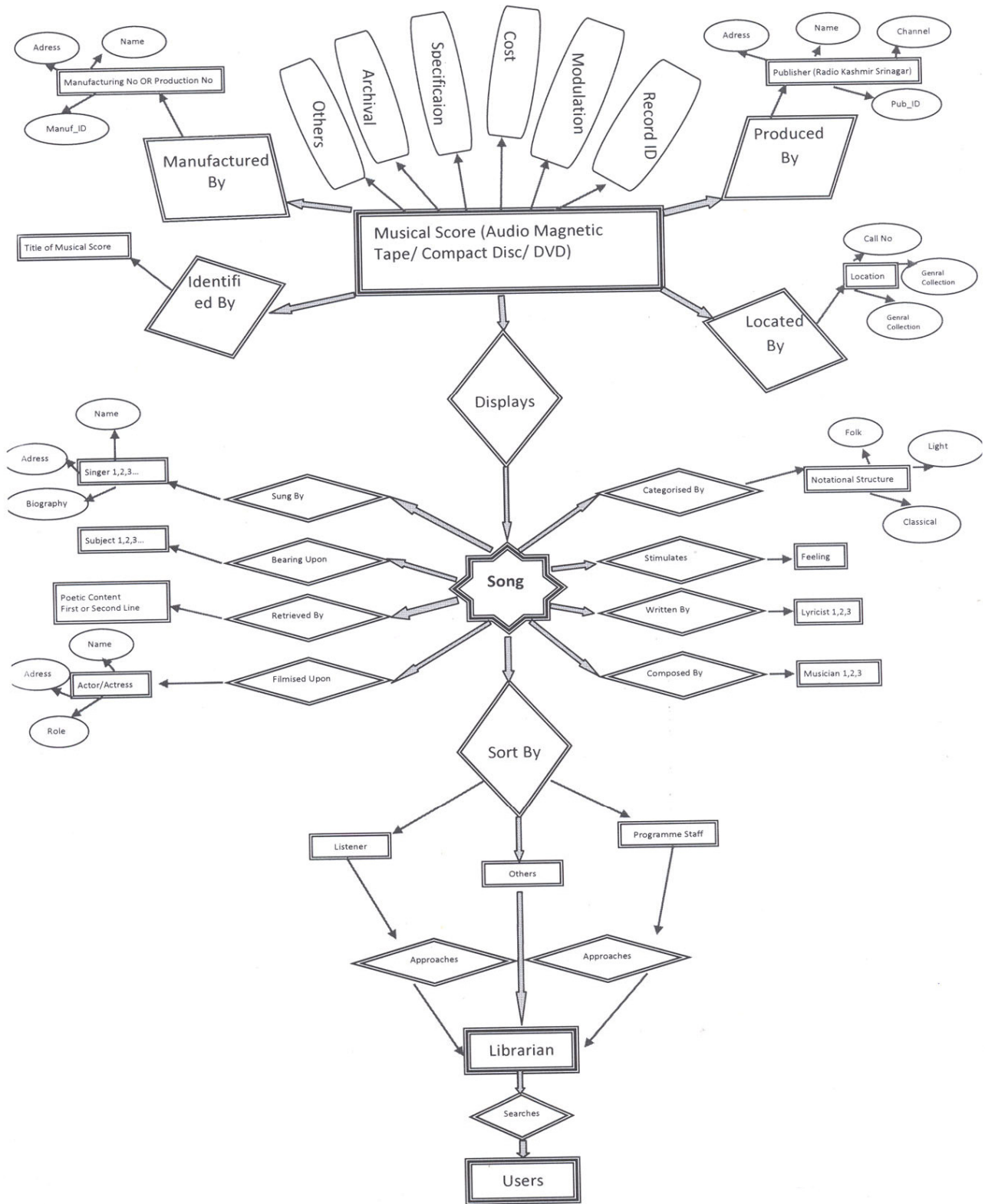


Fig. 3— E – R Model showing relationship among entities and between entities and attributes

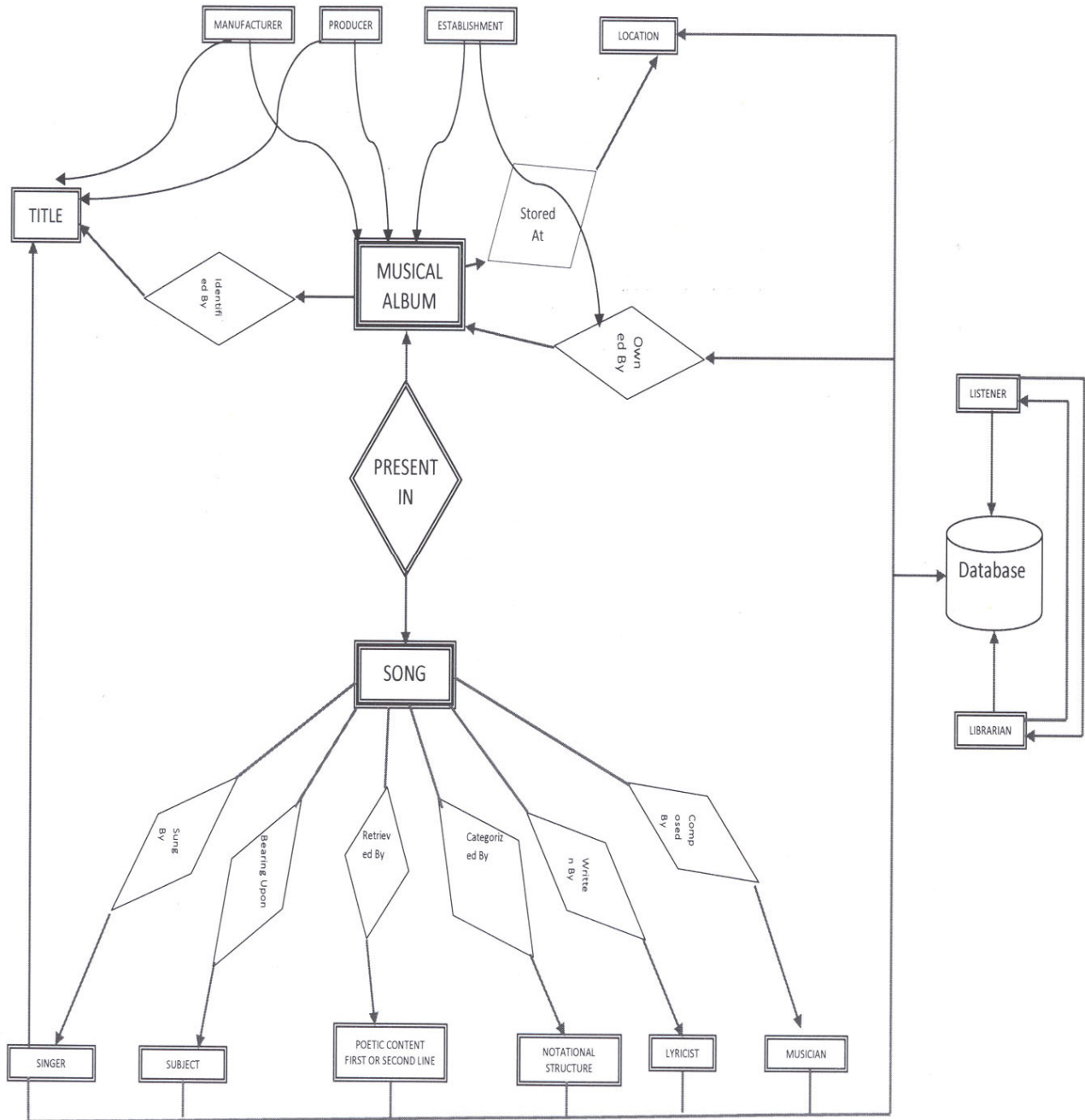


Fig. 4—Flow diagram depicting the interlinking of various fields in the database

In the diagrams, rectangles represent entities; ellipses the attributes, diamonds the relationship, attributes with underscore represent primary key and 1, n, m represent types of relationship.

Finally, Fig. 4 is a diagrammatic presentation of how main entities, attributes and sub-attributes should

be interlinked among and between each other while framing the relationship diagram likely to work behind the screen for the proposed database. While the left portion of the diagram represents the constitution of the internal data structure and interlinking mechanism, the right portion shows the

actual interaction between all the three stake holders i.e., the database, the users and the librarian. Once the database is in place, the user may directly use the database or approach the librarian to retrieve the relevant item under search or he may approach a librarian for the same. The librarian may in turn address his/her query directly based on his memory or use the database to retrieval the information and provide it to user.

Conclusion

The audio collection of Kashmiri music at radio Kashmir Srinagar is quite diversified and rare. No other library in the country possesses a replica to substitute the same in case of any accidental damage or loss through routine wear-tear or theft. The collection still lies haphazardly on shelves without following any classified arrangement. The musical scores in the form of audio magnetic tapes lie vertically in sequence of tape number (a number randomly assigned to a tape at the time of its recording). Moreover, the bibliographical detail available on the so called Que Sheets, lying inside the tape cartons, has not been indexed through any professional means. A simple alphabetical index stands maintained on a register, which, due to lack of flexibility poised with the register type of indexing, does not possess an exact alphabetical sequence. Hence an automated arrangement for storage and retrieval of the actual content i.e., songs in the shape of sound (audio) files and the associated bibliographical detail needs to be made at an earliest. The retrieval procedure also needs to be strengthened as the present manual/indexed system is quite cumbersome and fails to meet the user requirements. At the most it may help to address a simple query and does not have any arrangement to meet the queries of complex nature. Thus both librarian and the programming staff of Radio Kashmir Srinagar face a lot of problem in searching the relevant items in short notice of time. Adoption of an existing or development of a new dynamic information storage and retrieval system (IS&RS) for the purpose is a prime need of the time. Almost all existing IS & RS are not suitable to serve the storage & retrieval of

musical scores as their content and bibliographical details are quite different. So there are two options to cater to the storage & retrieval needs of musical libraries i.e. either customize an existing IS&RS or design and develop a new one. An attempt has been made to analyse the subject of Kashmiri music at conceptual level into corresponding entities and the attributes associated to these entities. An effort has also been made to work out the relations among entities and relations between entities & the associated attributes. A road map, in the shape of flow diagrams, has been laid down which will act as a guide for designer/developer to make such customization or design or develop a new database.

The proposed IS & RS needs also to keep a provision for monitoring/maintaining the user statistics & ensure security of the system and preservation of this valuable treasure. This way the Kashmiri music collection may be transformed into a dynamic digital library which a prime need of time to cater to the online information searching strategies and remote accessing behaviour of concurrent users.

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