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Hindustani Film Music Information Storage and Retrieval: Using MS Access Database Management System.

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Abstract:

A large number of government, semi government and private Radio/TV stations or channels exist in India. All of these stations/channels have got small or big libraries with audio/video collection. The collection comprises of around 22 official languages ranging from Asami to Urdu. The collection also comprises of a variety of recording media ranging from earlier gramophone records to present day digital versatile discs (DVDs). Radio talks, interviews, discussions, situation and subject based programmes, musical concerts, songs (folk, classical, geet, ghazals), dramas, sports, humorous programmes, and so on depict the diversity of collection. Radio/TV Libraries in India need a reliable software ensuring safe & secure storage and reliable, fast and accurate retrieval of desired audio/video content. Moreover, there should be a mechanism to play the content, simultaneous upon its retrieval without losing any time. So the software should envisage instant and live linkage to such digital files from the database itself. A database was created using the MS Access 2007 Database Management System. Tables, queries, forms, macros, methods and procedures have been designed and developed to ensure reliable storage and fast/accurate retrieval of information. Digital files of songs have been stored outside the database linked to corresponding records in the database so that upon retrieval the particular song can be played instantly. The database can easily be operated in a networked atmosphere on client server mode of communication. The software will act as a reliable solution for development of an audio visual digital library of Hindustani film music.

Key words: *1. Hindustani Film Music 2. MS Access 3. Information Storage and Retrieval 4. Audio/Video Libraries*

Introduction

Since the very beginning of sound film production in India by 1931, virtually all Indian commercial films have had a musical format, nowadays including about six or seven songs per film. In 1934, the first gramophone records of film songs were produced and played on the radio **(Joshi 1988: 150)**, thus launching film song as a mass mediated, popular music in India. For over five decades, these film songs, also known as 'film music', almost exclusively constituted what was popular music in South Asia, and despite the expansion in the music world, that has taken place from the 1980s following the advent of cassettes in India **(Manuel, 1993)**, film songs are still the dominant form of popular music in this part of the world. It is said that 'Indians love music', that songs and music mark the most important aspects of Indian life - life

cycle rituals such as birth and marriage, and also festivals and worship - and hence Hindi films are full of songs. Whilst most Indians undoubtedly love music and music is a part of traditional (and also modern) life in India. Since around 1940, songs in Hindi films began to be sung by 'playback' singers rather than the actors themselves, and this soon became the norm. **(Poe, Marshall T., 2011).** Despite relatively little criticism, film songs have become a ubiquitous part of modern India. They have become the music of public space in India, being heard from open windows in peoples' homes, on buses, work places and in bazaars. They are sung and danced to by millions of people in a range of formal and informal contexts, and have been appropriated in many folk genres **(Manuel 1993; Marcus 1992/3 & 1994/5; Booth 1990 & 1991/2; Larkin 1997)**.

Problem

The survey of the sources available in print and digital format reveals that a couple of efforts have been made to develop information storage and retrieval system for Hindi film music. The noteworthy among them are Library Management and Information System (LMIS) of IT Division earlier known as EDP Cell of the then Directorate of All India Radio, New Delhi. LMIS is a standalone software about which no documentation was traceable. The investigator while working in library of Radio Kashmir Srinagar used the software and found that it is capable of storing bibliographical level information about Hindi Film Music that too covering limited number of entities and attributes. Besides it, need is felt to define some additional parameters in the base tables. Moreover, being a standalone software, it could not be used in advanced network atmosphere on shared basis. The investigator found that the software could neither be upgraded nor operated over Windows 2007 Operating System and MS Access 2007. Besides LMIS, some online portals have been developed by different commercial and voluntary agencies, which provide links to audio/video files of Hindi Film Music. A large number of such portals are visible across the web, however, the Libraries cannot rely on these portals and need a reliable software ensuring legal, safe & secure storage and reliable, fast and accurate retrieval of desired audio/video content. Moreover, there should be a mechanism to play the content simultaneous upon their retrieval without losing any time. The time is not far when the Radio/TV Libraries will have their entire audio/video collection in digital form. So the software should envisage instant linking system to such digital files from the database itself.

In order to solve these problems and find a reliable and lasting solution, need was felt to design and develop a system capable of storing the information and retrieving same through all possible approaches of users (library staff, listeners and programme producers). Need is felt to devise a sustainable/lasting soft solution to facilitate prompt and quick retrieval of audio/video content. The prime demand of the time is to lay a foundation stone for development of a digital library with scope to share it over local, national or wide area networks.

Objectives

The study was carried with following objective in view:-

1. To make a comprehensive record of audio/video content contained by Hindi motion picture musical scores and ensure regular and prompt updation of such bibliographical record;

2. To facilitate quick & accurate retrieval of bibliographical information and meet different searching approaches of programme producers and listeners;
3. To ensure storage of actual audio/video files in digital format and provide a mechanism to play the individual files instant upon their search & retrieval.

Scope

A large number of government, semi government and private Radio/TV stations or channels exist in India. All of these stations/channels have got small or big libraries of audio/video documents. These collections comprises of around 22 official languages ranging from Asami to Urdu. The collection also comprises of a variety of recording media ranging from audio recordings in shape of gramophone records, audio-magnetic tapes (open reel to reel wound on a spool, cassettes, cartridges, rolls), compact discs (CDs), digital versatile discs (DVDs). Further these collections comprise of radio talks, interviews, discussions, situation/subject based programmes, musical concerts, songs (folk, classical, ghazals), dramas, sports programmes, joke programmes and so on. The present study has been confined to "Hindustani film music" only. Thousands of motion pictures have been produced from 1930s. At an average each motion picture contains 5-7 songs. Moreover, a large number of musical albums, of both light and classical nature, have been produced in the country. Songs of 10 motion pictures have been taken as a sample and entered into the database for investigation purpose. These have been selected on random basis and will serve as a specimen for further work.

Review of Literature:

Computer has got a pioneering role in organization; storage/retrieval of music. Keywords truncation marks and Boolean logic have got a scope for carrying out the search effectively. **(Catlin, Amy and Jairazbhoy, N. A., 1983). Drummond, Phillip J. (1984)** advocates the development of standards for the storage of data and is of the opinion that framing of query segments to arrive at efficient retrieval results is the utmost need. The databases and data banks prove to be less expensive and less time consuming as compare to printed indexes and magnetic tape systems **(Gharnase, Helene, 1984)**. Although music is amenable to alpha numeric encoding and application of existing indexing languages, the natural language comparatively shows superior retrieval performance. Intensive research requires to be undertaken before artificial language can surpass the natural language, in its performance. **(McLane, A., 1996)**. A need is felt to evolve an online digital storage and retrieval mechanism of audio/video media. Digitising the audio/video signals, contained in the musical scores, makes possible the instant and multiple access in a single slot of time. **(Amthor, G. A., 1995)**. There are possibilities to store the audio/video files on computers and ensure their online retrieval, transport and exchange. **(Bearman, D., 1993)**. Extensive efforts need to be undertaken before the process of putting music online. **(Ellen, Richard, 1988)**. Need is felt to standardise the publication of music at international level, on the analogy of books and serial publications the musical scores be assigned International Standard Music Numbers (ISMNs). The ISMNs helps in achieving prompt indexing and have proved in efficient retrieval. **(Lerch, D., 1995)**. 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. **(Myers, J. A., 1995)**. 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. **(Grotosphorst, Clyde W., 1986)**. 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. **(Witten, I. H. and McNab, R. 1997)**. Scientists are exploring opportunities for organizing the music according to resonance, frequency and other attributes of sound waves, rather than word content. **Fieten, B. and Gunzel, S. (1994)** suggested the application of Artificial Intelligence techniques to solve the problem. They put forth a new concept of "Auditory Sensation" to ensure specific retrieval procedure and revealed that similarities of sound can be evaluated mathematically. These techniques have been found successful on conceptual level and more intensive research requires to be conducted before it could be made practical.

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. **Joshi, H. M. (1992)** revealed that storage and retrieval modes adopted by Indian audio/video libraries face certain limitations and suggested that networking and communication facilities be captilised to eradicate such problem. **Raju, M. Anand and Rao, Preeti (2002)** 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. A similar effort has been made by **Raju, M. Anand, Sundaram, Bharat and Rao, Preeti (2003)** while taking the songs sung by famous singer Tansen. However, despite passage of a decade no such audio/visual music storage and retrieval system has come to existence and people still rely on the textual storage and retrieval systems.

Methodology

The author has previously made an effort to develop storage and retrieval system for the music library of Radio Kashmir Srinagar while using Database Management System "Dbase III+". Dbase is a flat type of database management system, capable of storing data in the shape of text files. The advent of Relational Database Management System (RDBMS) concept, has set forth some better utilities than the flat type of file systems. Owing to the familiarity of Investigator, easy availability and popularity, the *RDBMS* **Microsoft Access** has been used to store the bibliographical details and design the necessary retrieval system. A Database named *"HFMISRS.Accdb"* was created in **MS Access**.

Constituent Items of the Database: Following are the constituent parts of the Database:
1. Tables: Fifteen tables have been used to store the most important data elements related to Hindustani Film Music. Some of these tables act as base table to ensure uniformity and standardization of vocabulary terms so as to avoid any controversy in spelling and rendering of terms.

Table 1: Detail of tables and constituent fields created in the *"HFMISRS.Accdb"*

S. No.	Table Name	Field Name(s)	Data Type	Field Length (in characters)	Description
1	Actor Actress	Actor Actress (Primary Key)	Text	20	Name of Actor Actress on whom the song has been filmised.
2	Banners	Banner (Primary Key)	Text	30	Banner under which the film has been produced and released.
3	Composer	Composer (Primary Key)	Text	20	Name of Music Director who has Composed the song
4	Director	DirectorsName (Primary Key)	Text	20	Name of Director who has Directed the film
5	FilmDetail	FilmTitle	Text	30	Name of the film
		AccNo	Number	Integer	Stock entry number
		YOP	Number	Integer	Year of publication/release of the disc
		DiscTpe	Text	08	Gramophone (78, 45, 33 rpm) or CD
		DiscIN	Text	08	Identification number of the disc used for arranging it on shelve of library
		Director	Text	20	Director of film
		Producer	Text	20	Producer of film
		Banner	Text	20	Banner under which film is prepared
6	Lyrics	LyricsID (Primary Key)	Auto Number	Long Integer	Unique ID
		LyricsLine1	Text	80	First line of the song
		LyricsLine2	Text	80	Second line of the song
		DiscIN	Text	05	Disc identification number as foreign key
		Singer Type	Text	08	Solo, Duet, Chorus etc. as foreign key
		SongType	Text	08	Film Song, Ghazal, Geet, Bhajan, Hamud, Na't etc. as foreign key
7	Media	Media	Text	12	Recording media: Audio Magnetic Tape; Poly Vinyl

					Discs; Compact Discs etc
8	Poets	PoetsName	Text	20	Poet of the song
9	Producers	ProducerName	Text	20	Producer of film
10	Publishing Companies	PublishersName	Text	25	Publishing company of the disc
		DiscIN	Text	08	ID of film title as foreign key
11	Singers	Singer	Text	20	Singer of the song
12	SingerType	SingerType	Text	20	Solo, Duet, Chorus etc.
13	SongDetail	SongDetID	AutoNumber	Long Integer	UniqueID
		DiscIN	Text	08	Disc Identification number as foreign key
		LyricsID	Number	Long Integer	ID of song line as foreign key
		Singer1	Text	20	Singer of the song
		Singer2	Text	20	Singer of the song
		Singer3	Text	20	Singer of the song
		Lyricist	Text	20	Poet of the song
		Composer	Text	20	Music Director of the song
		Theme1	Text	20	Subject of the song
		Theme2	Text	20	Subject of the song
		Theme3	Text	20	Subject of the song
		ActorActress1	Text	20	Actor or Actress on whom the song has been filmised
		ActorActress2	Text	20	Actor or Actress on whom the song has been filmised
		ActorActress3	Text	20	Actor or Actress on whom the song has been filmised
14	SongType	SongType	Text	08	Film Song, Ghazal, Geet, Bhajan, Hamud, Na't etc.
15	Themes	Theme	Text	20	Subject of the song

The bibliographical detail is found printed on the disc or on the jacket containing the tape or disc. The poetic content being Hindi/Urdu stands transliterated into the Roman script, e.g. “Aadmi Musafir Hai”. This is quite popular and people are very much familiar with the script and readout the content quite comfortably. As it is evident from the detail about the 15 tables given above, the bibliographical information about 15 main constituent entities of the Hindustani Film Music (HFM), were taken into consideration. Field(s) in each table were created to store bibliographic information about the attributes associated with each entity e.g. for main entity *music album* a table named *FilmDetail* has been created and eight fields shown above have been kept in this table to accommodate the bibliographical information about its attributes.

2. Relationships: Tables contain information in the shape of columns and rows. A row comprising of a set of fields associated to its main subject is called record. The record gives complete information of a single subject e.g. A line of film song, with further relevant information like that of who has sung it, who has composed it etc. etc. is example of one

complete record. One field in each table is set as primary key, a field containing unique values. The table is indexed around this primary field. The tables are linked with each other and a relation is designed and created among each related table. This relation is created by setting a primary_key <> foreign_key joint between the associated tables. Graphic representation/ diagram of the relationship working behind the screen to ensure desirable search, retrieval and report generation options is given below as *fig.1*.

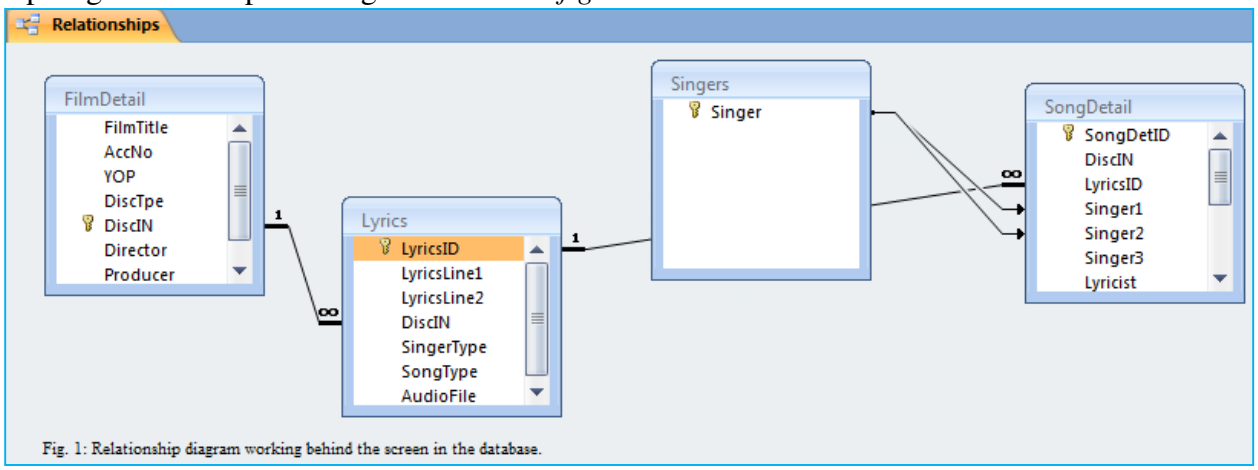


Fig. 1: Relationship diagram working behind the screen in the database.

Three types of relationships 1:1 (one to one), 1:m (one to many), and m:m (many to many) have been used to achieve appropriate actions. The relationships are indispensible for: designing dataentry forms used to make dataentry into the underlying tables through a user friendly interface; designing queries to retrieve information specific to desired keywords & meet different approaches of the users and designing reports to generate different views & printouts.

3. Data Entry Forms: Form is a dynamic option which provides a user interface to carryout dataentry into the underlying tables. Form is also used to act as a default interface, which opens on operating/starting the database. This acts as a platform to start dataentry, carryout search or activate reports to view or print the information. The interface bears command buttons, live labels or hyperlinks to carry out these operations. A glimpse of starting interface use in this database is as under:

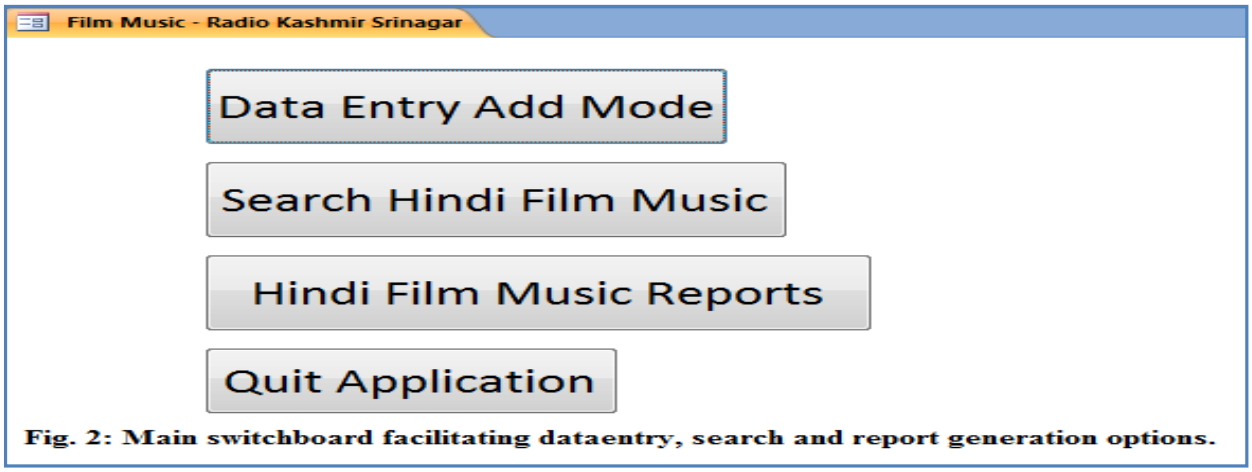


Fig. 2: Main switchboard facilitating dataentry, search and report generation options.

On clicking the command button “Data Entry Add Mode” the dataentry form gets activated in shape of a user interface to enter data into a number of underlying tables.

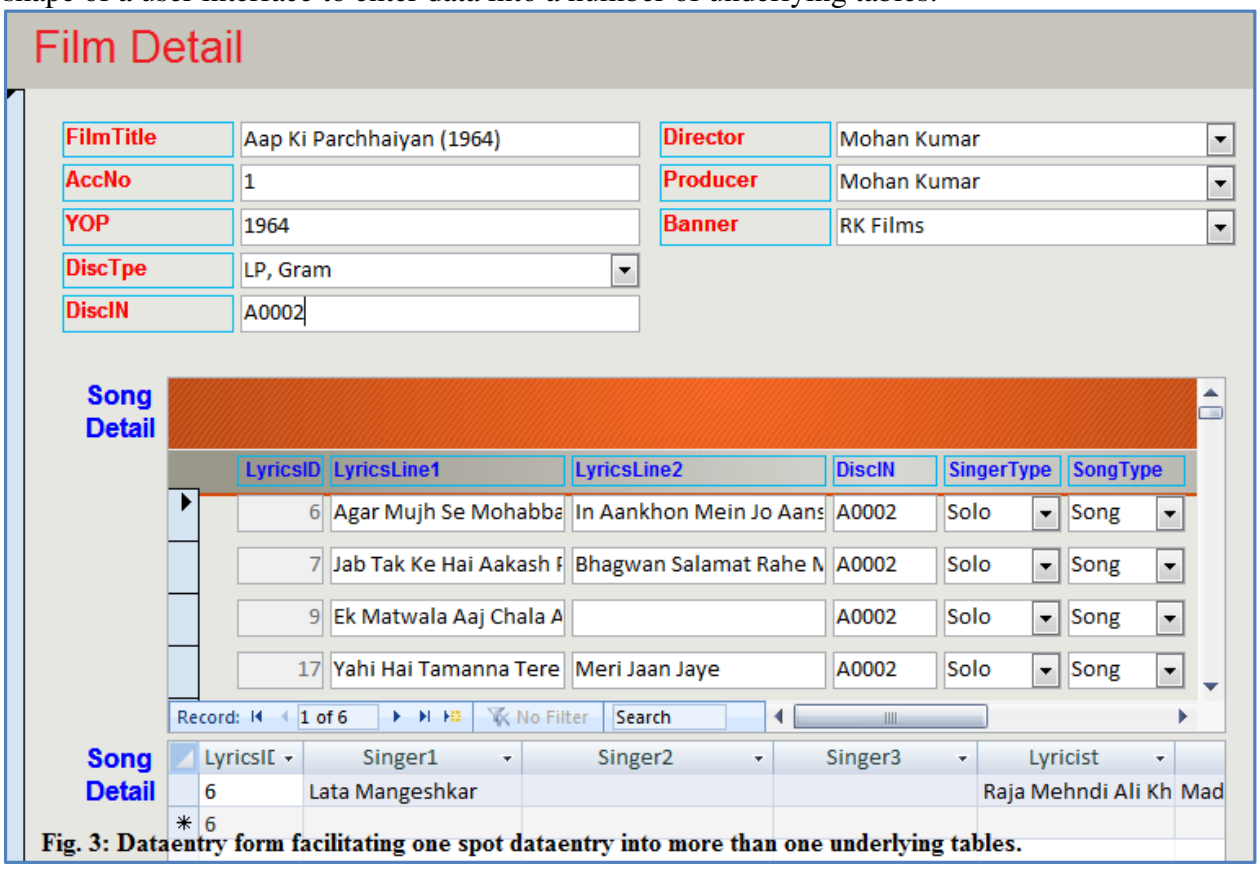


Fig. 3: Dataentry form facilitating one spot dataentry into more than one underlying tables.

In order to ensure uniform and standard terminology and avoid any spelling mistakes combo boxes have been kept on this user interface. Data entry options/elements in these combo boxes come from the underlying hub tables which contain unique values. This option also saves time of dataentry operator.

4. Queries for Search: In order to meet individual approaches of users and retrieve data relevant to their varied demands, a bunch of queries have been designed. Two types of queries have been designed. Type one queries meet a single approach of user say through a particular song, singer, musician and the like. Second type of queries provide an opportunity to retrieve data based on complex search technique e.g. gay songs sung by a particular singer or patriotic songs composed by a particular musician. A glimpse of these queries is given below:

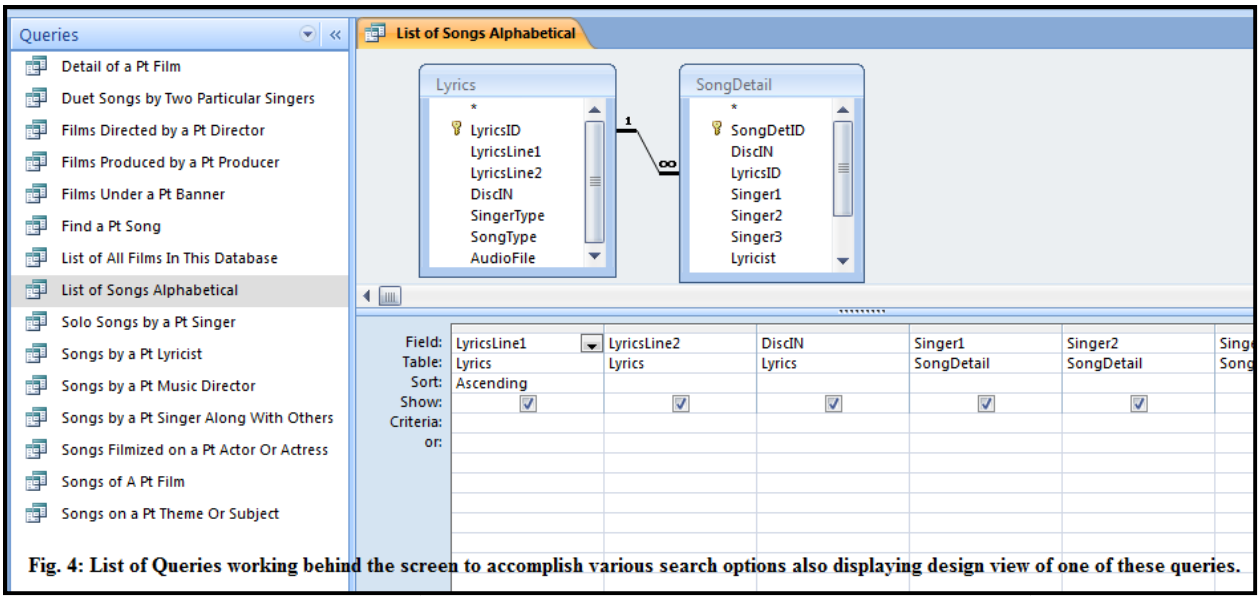


Fig. 4: List of Queries working behind the screen to accomplish various search options also displaying design view of one of these queries.

Upon activating the query named "Detail of Particular Film", a dialog box appears asking for the name of a film whose detail the user wants to see.

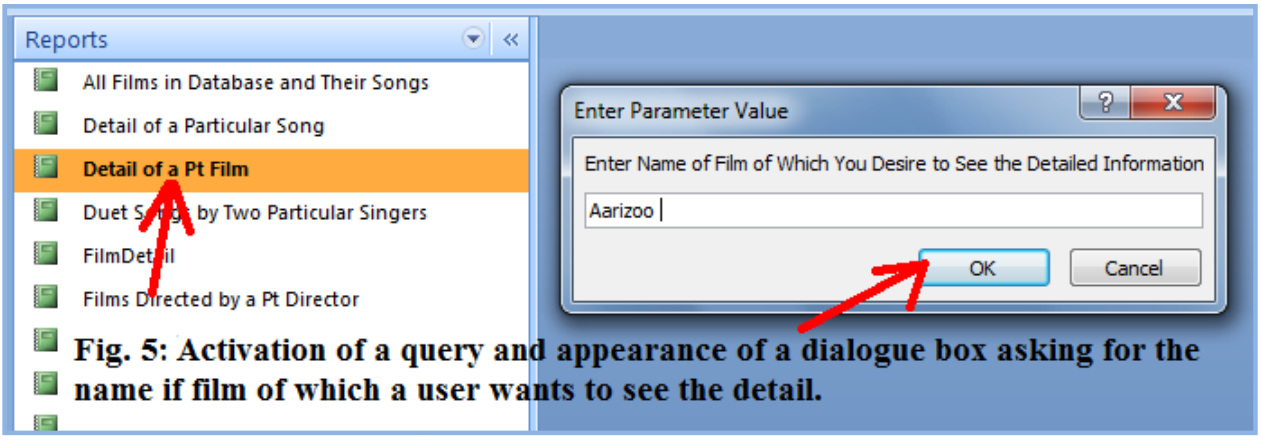
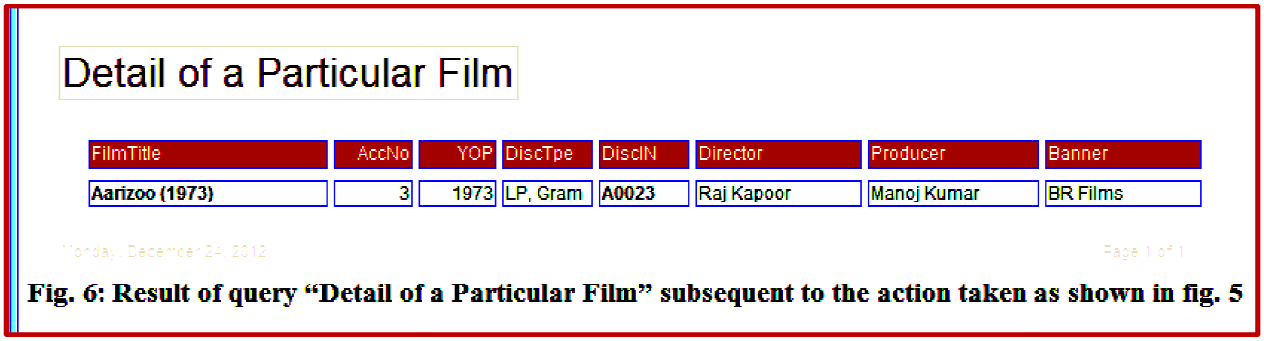


Fig. 5: Activation of a query and appearance of a dialogue box asking for the name if film of which a user wants to see the detail.

Once the name of desired film is entered and "OK" button is clicked following results are displayed:



Detail of a Particular Film

FilmTitle	AccNo	YOP	DiscTpe	DiscIN	Director	Producer	Banner
Aarizoo (1973)	3	1973	LP, Gram	A0023	Raj Kapoor	Manoj Kumar	BR Films

Fig. 6: Result of query "Detail of a Particular Film" subsequent to the action taken as shown in fig. 5

The user can take the **DiscIN** and easily locate the musical score on the shelf of the Library. The frequent most approaches of users of audio and video libraries i.e. listeners and producers of

musical programmes, happen to be (i). First, first two or second line of the song; (ii). Name of Singer; (iii). Name of Composer/Music Director; (iv). Name of Lyricist; (v). Name of Director/Producer; (vi). Keyword/Key Term relevant to a Subject/Situation and the like. Query named "Detail of a Particular Song" has been designed to retrieve detail of a particular song through transliterated words of a song. On activating the query a dialogue box appears asking to enter first few words of the song to see its detail.

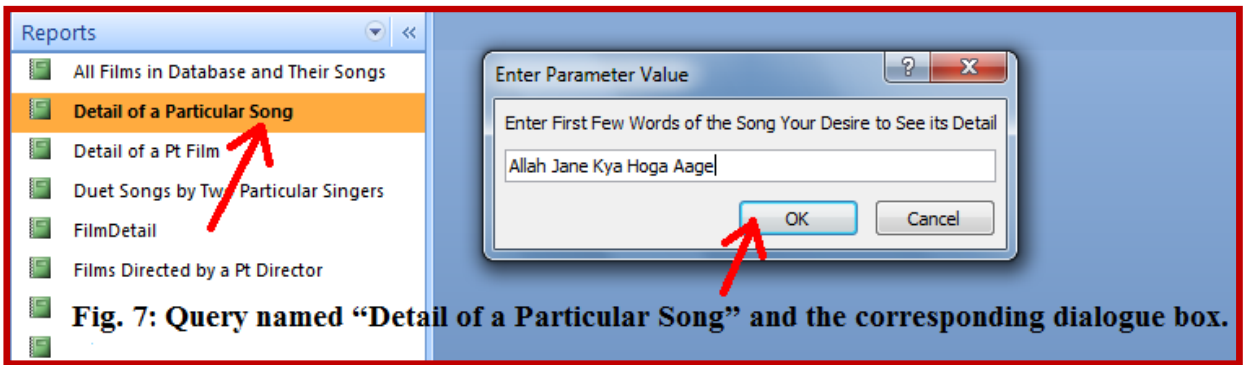


Fig. 7: Query named "Detail of a Particular Song" and the corresponding dialogue box.

Once the line(s) of song is/are entered and "OK" button is clicked following results are displayed:

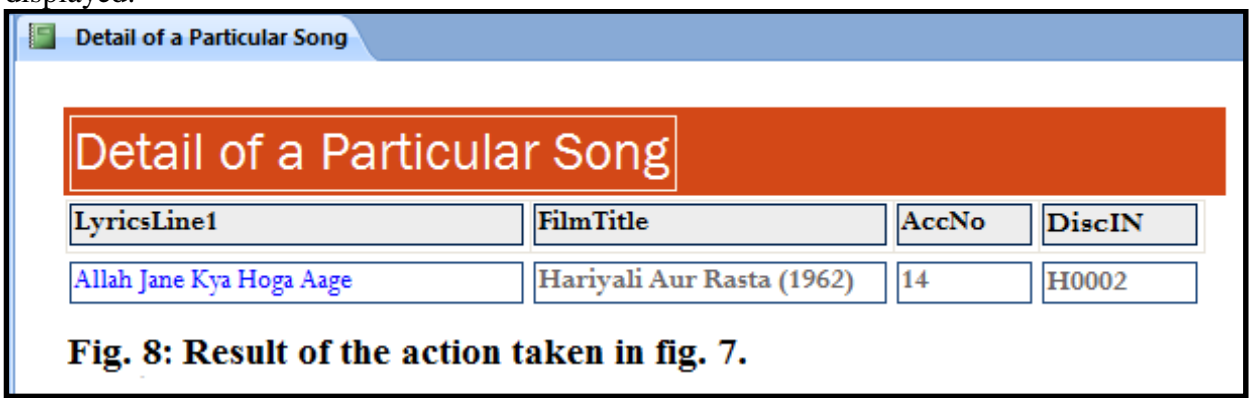


Fig. 8: Result of the action taken in fig. 7.

5. Reports: In addition to the queries, a number of report generation options have been designed and created to display readily available views and take time to time print outs. These reports can also be used to generate print form of indexes and catalogues. **Fig. 9** highlights the report generation options to meet requirements of users.

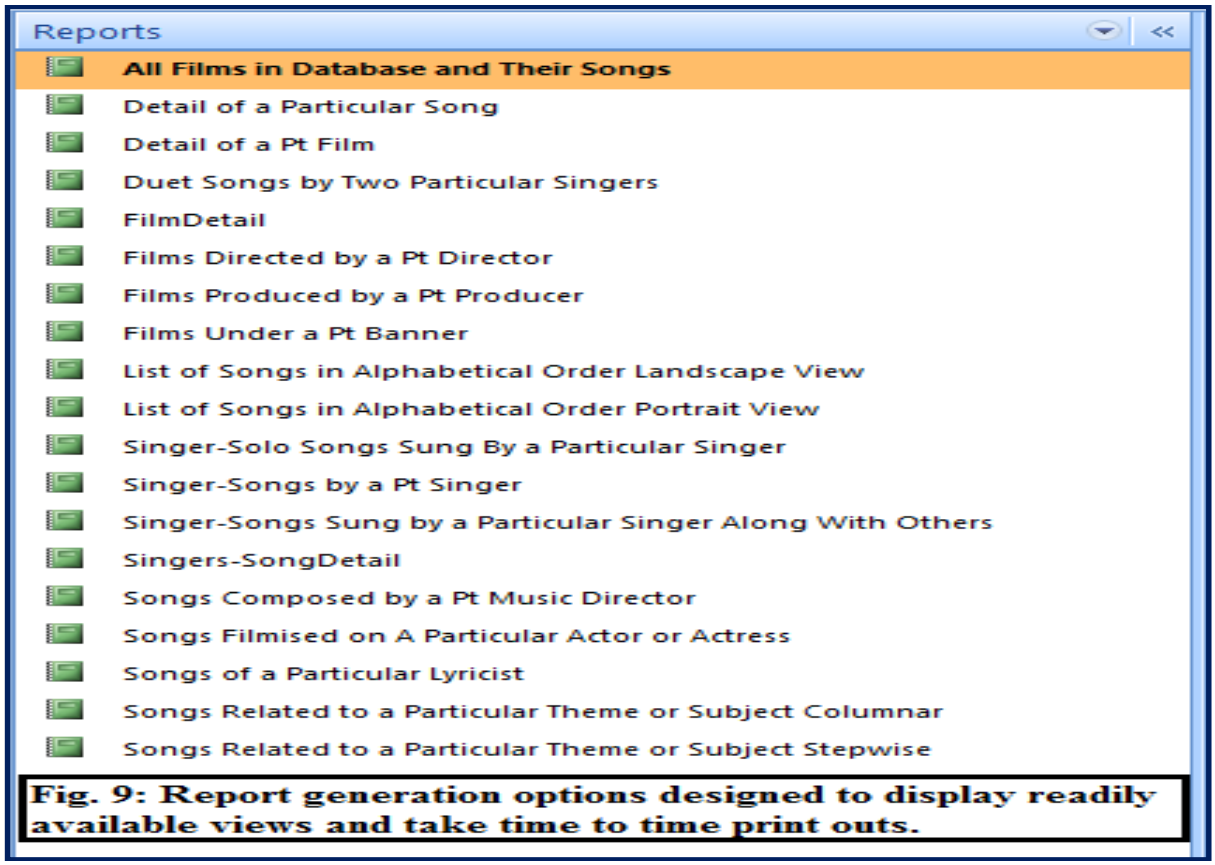
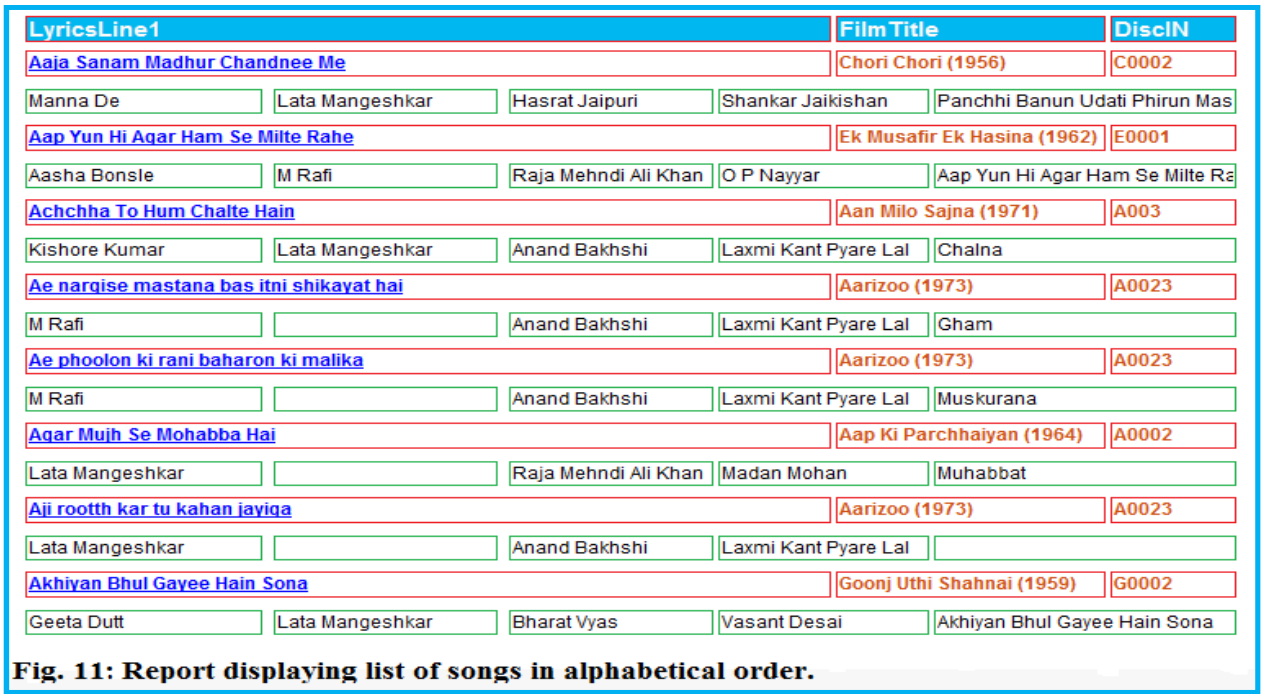


Fig. 9: Report generation options designed to display readily available views and take time to time print outs.

This way the library staff and the users view the information from almost every possible angle and can generate printouts they desire. The results of some of these report options are displayed here as fig. 10 and 11.

AAN MILO SAJNA (1971)	**4**	**A003**	
Rang Rang Ke phool khile, mohe bhaye koi rang na			
Lata Mangeshkar	M Rafi	Anand Bakhshi	Laxmi Kant Pyare Lal
Achchha To Hum Chalte Hain			
Kishore Kumar	Lata Mangeshkar	Anand Bakhshi	Laxmi Kant Pyare Lal
Palat Meri Jaan			
Aasha Bonsle		Anand Bakhshi	Laxmi Kant Pyare Lal
Yahan Vahan Sare Jahan Mein Tera Raj Hai			
Kishore Kumar		Anand Bakhshi	Laxmi Kant Pyare Lal
Tere Karan Mere Sajan			
Lata Mangeshkar		Anand Bakhshi	Laxmi Kant Pyare Lal
Falak Se Tod Kar Dekho Sitare Tod Laya Hoon			
M Rafi		Anand Bakhshi	Laxmi Kant Pyare Lal
BAAZI (1951)	**5**	**B0001**	
Tadbir Se Bigdi Huyi Takdir Banale			
Geeta Dutt		Sahir Ludhianvi	SD Burman
Ui Dekh Ke Akeli Mohe Barkha Sataye			
Geeta Dutt		Sahir Ludhianvi	SD Burman
Suno Gajar Kya Gaye			
Geeta Dutt		Sahir Ludhianvi	SD Burman
Laakh Zamaane Waale Daalen Dilon Pe Taale			
Geeta Dutt		Sahir Ludhianvi	SD Burman
Sharamaaye Kaahe Ghabaraaye Kaahe Sun More Raajaa			

Fig. 10: Comprehensive list of films along with their song detail.



LyricsLine1				FilmTitle	DiscIN
Aaja Sanam Madhur Chandnee Me				Chori Chori (1956)	C0002
Manna De	Lata Mangeshkar	Hasrat Jaipuri	Shankar Jaikishan	Panchhi Banun Udati Phirun Mas	
Aap Yun Hi Agar Ham Se Milte Rahe				Ek Musafir Ek Hasina (1962)	E0001
Aasha Bonsle	M Rafi	Raja Mehndi Ali Khan	O P Nayyar	Aap Yun Hi Agar Ham Se Milte Ra	
Achchha To Hum Chalte Hain				Aan Milo Sajna (1971)	A003
Kishore Kumar	Lata Mangeshkar	Anand Bakhshi	Laxmi Kant Pyare Lal	Chalna	
Ae nargise mastana bas itni shikayat hai				Aarizoo (1973)	A0023
M Rafi		Anand Bakhshi	Laxmi Kant Pyare Lal	Gham	
Ae phoolon ki rani baharon ki malika				Aarizoo (1973)	A0023
M Rafi		Anand Bakhshi	Laxmi Kant Pyare Lal	Muskurana	
Agar Mujh Se Mohabba Hai				Aap Ki Parchhaiyan (1964)	A0002
Lata Mangeshkar		Raja Mehndi Ali Khan	Madan Mohan	Muhabbat	
Aji rootth kar tu kahan jayiga				Aarizoo (1973)	A0023
Lata Mangeshkar		Anand Bakhshi	Laxmi Kant Pyare Lal		
Akhiyan Bhul Gayee Hain Sona				Goonj Uthi Shahnai (1959)	G0002
Geeta Dutt	Lata Mangeshkar	Bharat Vyas	Vasant Desai	Akhiyan Bhul Gayee Hain Sona	

Fig. 11: Report displaying list of songs in alphabetical order.

On observing fig. 10 & 11 above it is quite clear that each lyrics line is a hyperlink. Once the cursor is taken near the song line it turns into hyperlink symbol and if clicked activates/plays the audio/video song file stored in the concerned directory created for the purpose.

Findings

The user interface developed for dataentry and making day to day updation has demonstrated efficient results. The dataentry operator has not to wander from table to table, but can key in the data into more than one underlying tables from a single user interface. The database has eradicated the problems faced in manually recording the information about the Hindustani Film Music, especially, that of rigidity faced while maintaining sequential printed inventories. The record can be kept uptodate without any difficulty. Moreover, the database has revolutionized the storage of musical scores by providing a hyperlink mechanism. This mechanism has paved a way to store the digital audio/video files on hard discs of computer and activate and play the same well with the help of retrieval system. This data independence between the database and the actual audio/video files has made the system fast, accurate and secure. The problems faced due to manual handling of hand written indexing registers, such as demolition through wear tear, smearing, effacement/erasing, loss of legibility and the like has been solved. There is no need to generate newer and newer printouts, however, if needed the printing is quite economical.

The queries, reports and macros developed to retrieve information from different angles and meet different approaches of library users, has come up with efficient solution to the problems faced in searching the information from hand written record through manual means. Main findings are:

1. Search is unbelievably fast, problems like that of cumbersomeness and loss of time in searching have been eradicated.
2. Retrieval is possible through as many angles as the number of data fields kept in the database, so it is possible to meet more than one, approaches of users.
3. More than one user can browse the record simultaneously, subject to availability of computers.
4. The software will prove as a viable solution for development of a digital library of audio / visual material existing in electronic media libraries.
5. The mechanism to play the records simultaneous upon their retrieval has proved to save the time both of library staff and users and has made it possible to meet the queries of music lovers during live phone-in programmes.
6. The software can easily be used to make the Hindustani film accessible through network and allow the users to share the music online through Internet.

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