

Song lyrics display (English text to Hindi text)

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ABSTRACT

A system to be developed recognizes song and displays its lyrics in Hindi or English depending upon the user preference. Audio Recognition which is a part of NLP (Natural Language Processing) is done to convert song vocals into text. After audio recognition, the English text can be converted into Hindi text using transliteration. Transliteration is the conversion of a text from one script to another. Also, along with the lyrics, the song information is to be displayed like movie name, singer or artist, composer and lyricist.

Keyword : - Transliteration, Supervised Learning, Natural Language Processing, Information Extraction, .

1. INTRODUCTION

Most of the Bollywood songs are written and sung in Hindi (Devanagari) language. These Bollywood song lyrics when displayed in English creates pronunciation errors, so many of the difficult words may sound different when spelled in English than in Hindi. To improve upon this, the song lyrics need to be displayed in Hindi to get the right pronunciation. This paper aims to solve Music recognition and lyrics display as NLP task which makes use of text classification, information extraction techniques. The proposed exercise of transliteration is executed by mapping word by word from one system to another manually. Input to the system is initialised using voice recognition and lyrics of the song are taken in account to get equivalent spelling to its pronunciation using the unique codes of the language. While transliterating a word from the language of its origin to a foreign language than it is called Forward Transliteration, whereas transliterating a word written in a foreign language back to the language of its origin is called Backward Transliteration. Transliteration is totally different from translation like English word sleeping would be transliterated to the Hindi word. This is different from translation in which the word sleeping would map. Machine transliteration is important in many cross-lingual natural language process applications such as information retrieval, machine transliteration. Out of vocabulary (OOV)[10] words are problematic in cross-lingual information retrieval.

There exists many research works in the field of machine transliteration in the name entity recognition or translation.

2. RELATED WORK

Several techniques are used in conversion of text scripts from one language to another in order such as SMT (Statistical Based Translation) approach, FST (Finite State Transducers) approach, Hybrid approach, etc.

Hybrid Approach -

Hybrid Approach was used to develop a Name Entity Transliteration system for English-Hindi language pair by [1] using Stanford NER tool. The system was based on a hybrid model where English name entities were processed using a set of rules and the conversion of English-Hindi was done statistically.

Error-driven Learning -

Another approach for transliteration was introduced by [2] based Direct Orthographical mapping (DOM) approach. This approach can be successfully applied in machine transliteration by segmenting a word according to syllables and then mapping them directly into target language without considering its pronunciation. The performance of two-stage machine transliteration was studied based on Conditional Random Fields.

Applying Finite Rules to Data -

In English-Hindi transliteration by applying finite rules by [3] to the data before training, remarkably increased the transliteration result. The rules are applied to bilingual corpus of Indian Name Entities with source in English and target in Hindi (Devanagari) script. This concept has been incorporated in our system.

Buckwalter's Transliteration System -

This system is a Syntax Directed Translator for English to Hindi proposed by [4] which is used nation-wide for translation. It focuses on the automatic translation of text using compilation technique through syntax generator translator. The system is trained by using specific words from encyclopaedia and dictionary maintained exclusively for meaningful Hindi words.

Cross Language Plagiarism Detection -

This is an application programming interface presented by [5] for measuring semantic similarity/distance between multilingual words and concepts. Cross Language Plagiarism Detection (CLPD) is used for the English-French and English-Arabic multilingual plagiarism cases.

Machine Transliteration of English to Hindi: A Literature Survey –

This paper [6] focuses on various existing approaches for machine transliteration tools available for Indian languages. These transliterations are based on statistical and phoneme-based approach.

3. RELATED WORK

Dataset for the system is available provided by many existing services like musiXmatch[7], EchoNest, Shazam[8] which contains a record of about 10 to 15 million songs along with their information like album or movie name, lyricist, singer, composer etc. The second dataset is created by us for the transliteration module which contains key-value pairs of English-Hindi phonemes.

4. METHODS

The proposed system contains two modules: speech recognition module and transliteration module. In the first module of speech recognition, each audio file is “fingerprinted,” a process in which reproducible hash tokens are extracted. Both “database” and “sample” audio files are subjected to the same analysis. The fingerprints from the unknown sample are matched against a large set of fingerprints derived from the music database. The candidate matches get displayed in English.

In the second module, English lyrics are transliterated to Hindi text using phoneme based mapping. The key-value pairs are checked for each English phoneme in the offline database. The task of song identification and displaying its lyrics requires high level of knowledge into the Artificial Intelligence (AI), mainly in Natural Language Processing (NLP). A significant amount of music audio has lyrics. Lyrics encode an important part of the semantics of a song, therefore their analysis complements that of acoustic and cultural metadata and is fundamental for the development of complete music information retrieval systems. The proposed system analyzes the captured sound and seeking a match based on an acoustic fingerprint in a database. This is done based on an audio fingerprint based on a time-frequency graph called a spectrogram. A catalogue of audio fingerprints is stored in a database. The user tags a song for a couple of seconds and the system creates an audio fingerprint. Once it creates the fingerprint of the audio, it starts the search for matches in the database. If there is a match, it returns the information to the user; otherwise it returns a “song not known” dialogue. The system can identify pre-recorded music being broadcast from any source,

such as a radio, television, cinema or music in a club, provided that the background noise level is not high enough to prevent an acoustic fingerprint being taken, and that the song is present in the software’s database. The system to be developed recognizes song and displays its lyrics in Hindi or English depending upon the user preference. Audio Recognition which is a part of NLP (Natural Language Processing) is done to convert song vocals into text. After audio recognition, the English text can be converted into Hindi text using transliteration. Also, along with the lyrics, the song information is to be displayed like movie name, singer or artist, composer and lyricist. Most of the Bollywood songs are written and sung in Hindi (Devanagari) language. These Bollywood song lyrics when displayed in English create pronunciation errors, so many of the difficult words may sound different when spelled in English than in Hindi. To improve upon this, the song lyrics need to be displayed in Hindi to get the right pronunciation.

5.ALGORITHM

Following explain the basic algorithm of the proposed system:

1. Accept user audio input
2. Convert audio to English text lyrics using Music Recognition API.
3. Sending English text to transliteration process
4. Tokenizing, Part of audio tagging and filtering using NLTK
5. Retrieving phoneme from Knowledge Base
6. Match input to the retrieved phoneme and applying Step 3 and Step 4.
7. Combining the phonemes (transliterated text) .
8. Display the lyrics according to user language selection (English/Hindi)
9. Display Song information.

6. SYSTEM ARCHITECTURE

The system consists of speech recognition module and transliteration module. The first module is implemented using MusiXmatch and the later is implemented using the algorithm mentioned in the above section.

Main components of the system are :

1. Music recognition API which includes :
 - 1.1 Song database
 - 1.2 Song recognition
2. Knowledge Base for transliteration.
3. Acoustic model.

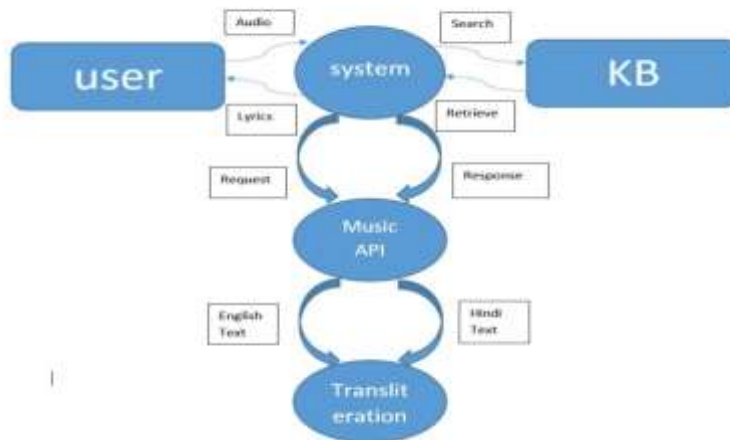


Fig -1: System Architecture

7.RESULT

We obtained a set of transliterations (using the TMs) for each Hindi word in the collected sample data. For each similarity metric the task was to identify correct transliteration pairs and avoid recognizing incorrect pairs by giving them a very low similarity score.

DC	precision	recall	F-measure
>= 95	0.967	0.263	0.414
>= 90	0.932	0.454	0.611
>= 85	0.901	0.585	0.710
>= 80	0.822	0.732	0.775
>= 75	0.772	0.732	0.752
>= 70	0.732	0.732	0.732

Chart -1 : Transliteration Score

7.RESULT

The following procedure was repeated for each similarity metric. For each Hindi word in these test pairs we obtained a transliteration with highest score. The system can be used by artists for learning songs perfectly without misspelling any word. This can be further extended to various other Indian languages. Further the same idea can be used for transliterating any live audio contents into text in various languages.

8. CONCLUSIONS

A simple phoneme based approach to transliterate the English text to Hindi text has been presented in this paper. This approach recognizes the problem type, identifies the sentence function and generates the corresponding match to eventually solve the problem. The system gives song lyrics in English or Hindi as output along with song information.

9. REFERENCES

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[8]. Shazam Application is a magical mobile app that recognises music, TV and media. It's the best way to discover, explore and share music and TV

