International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 11 | Nov 2018 www.irjet.net p-ISSN: 2395-0072

Multimedia Summarization and Retrieval of News Broadcast

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Abstract - *This project proposes to build system to summarize and retrieve the broadcast news at multimedia level. This project combines anchor person based story boundary detection and text summarization system to build multimedia news summary and news extraction system. Broadcast news are captured both in video/audio with accompanying transcript in text format. Summarized individual news story video clip according to textual summary can be retrieved by user query. Lexical chain text summarization technique is used to summarize individual news story transcript. The summary is in multimedia format including video, audio, and text.*

Key Words: **Multimedia Summarization, Retrieval System, Story Boundary Detection, Text Summarization, Lexical Chain, News Broadcast**.

1. INTRODUCTION

The recent development in networking and multimedia has led to an explosive growth of multimedia data. Broadcast news video is primary multimedia resource; it is accessed all over the world by people regularly. It is very difficult and time consuming to find videos of particular person's interest for several reasons. First, People find it difficult to locate news video from huge news broadcast archives and thus lost in TV program space. Second, News broadcasted daily at fixed time, people may be busy doing some other important task and miss to watch news broadcast. Third, People always don't watch whole news broadcast instead they are interested to watch particular news segment. Segmenting news broadcast into meaningful news stories we can efficiently manage and manipulate increasing broadcast news videos. Intensive research has been made to summarize the news broadcast. Visual, textual, audio feature, combined with Natural language processing, speech recognition, video analysis technique are used to segment and summarize news broadcast. And to date, these approaches as well as the segmented story units are serving as the essential infrastructure for a variety of user-oriented functions, including video browsing, summarization, recommendation, topic tracking, content indexing and retrieval.

The broadcast news video has several distinct characteristics that are quite different with other types of videos. For instance, a story unit always accompanies with one to several descriptive caption texts. Anchor persons usually appear at the beginning of a story unit. Thus, the broadcast news video can be regarded as a kind of semi-structured multimedia data that contains informative clues for parsing itself into semantic story units.

By studying few Rajyasabha TV news bulletin it is found that anchor person appear at the beginning of every news story. We are detecting story boundary in the news broadcast using anchor person. Natural language processing and video analysis technique are used to form multimedia summary. By using Keyword based search technique user can get multimedia summary of desired news story.

2. LITERATURE RIVIEW

Mark T. Maybury and Andrew E. Merlino has implemented and extracted "Summaries for Broadcast News". They have used algorithm for summarization, key phrase extraction and story segmentation, and key frame extraction generate the summarized video.

Marcus J. Pickering, Stefan M. Rüger has focused "video search engine using dual-media segmentation". They implemented an algorithm which uses the audio track for identifying meaningful scene breaks. This work is related to web-based video search engine that is implemented using broadcast news, and the main part of implementation is story boundary detection.

Kuan-Yu Chen, Shih-Hung Liu has implemented "Extractive Broadcast News Summarization Leveraging Recurrent Neural Network Language Modeling Techniques" their work in this paper mainly focused on use of recurrent neural network language modeling (RNNLM) framework for extraction as well as summarization of broadcast news.

Mark T. Maybury mainly focused on "Discourse Cues for Broadcast News Segmentation" they describe analysis of a broadcast News corpus, and focused on information extraction techniques, and finally its computational implementation and evaluation in the Broadcast News Navigator (BNN) for achieving browsing, retrieval, and summarization of news video.

Warren Greiff, Alex Morgan, Randall Fish, Marc Richards, Amlan Kundu presented "Fine-Grained Hidden Markov Modeling for Broadcast-News Story Segmentation". The News broadcasts are divided into story segments by using Hidden Markov Model. Model topology and the textual features used together with the non-parametric estimation techniques for obtaining estimates for both transition and observation probabilities. Visualization methods developed for the analysis of system performance.

Kathleen McKeown and Dragomir R. Radev have developed a model for "Generating Summaries of Multiple News Articles".

They have presented Natural Language system for summarization of a series of News articles on the same event. Hemant Misra, Frank Hopfgartner, Anuj Goyal, P. Punitha, and Joemon M. Jose are focused on "TV News Story Segmentation based on Semantic Coherence and Content Similarity". They have evaluated two approaches, one using video stream and the other using close-caption text stream, for segmenting TV news into stories. The segmentation of the video stream into stories is achieved by detecting anchor person shots and the text stream is segmented into stories using a Latent Dirichlet Allocation (LDA) based approach.

Regina Barzilay, Michael Elhadad have investigated one technique to summarize original text by using the model of the topic progression in the text derived from lexical chain. They presented new algorithm to compute lexical chain in the text.

Zechao Li, Jinhui Tang, Xueming Wang, Jing Liu , Hanqing Lu have developed new approach of multimedia news summarization for searching results on the Internet, which uncovers the underlying topics among query-related news information and threads the news events within each topic to generate a query-related brief overview. They used hLDA to topic structure from query related news document. And time biased maximum spanning tree algorithm is proposed to form compact summary of parent topic.

Peter Bell, Catherine Lai, Clare Llewellyn, Alexandra Birch, Mark Sinclair in their paper described an end-to-end system for processing and browsing audio news data. Their fully automated system brings together recent research on audio scene analysis, speech recognition, and summarisation, named entity detection, geolocation, and machine translation.

3. METHODOLOGY

Multimedia summary of news broadcast comprises the act of taking multimedia stream (news broadcast) comprising video, audio, and text. The news broadcast video is divided into individual news stories segment. By using anchor person news story boundaries are identified. And start and end time of each individual news story is recorded. By using individual story boundaries identified using anchor person corresponding news transcript is segmented into individual news stories. News transcript consisting of individual news stories is passed to natural language processor to identify important keywords and store it in database. Then individual news story is summarized using lexical chain text summarization method. And summarized story is stored in database. As per the textual summary generated for individual news story, individual news video/audio is also summarized as per text summary. Keyword based search is implemented to get the summary comprising text, audio/video of news story desired by user.

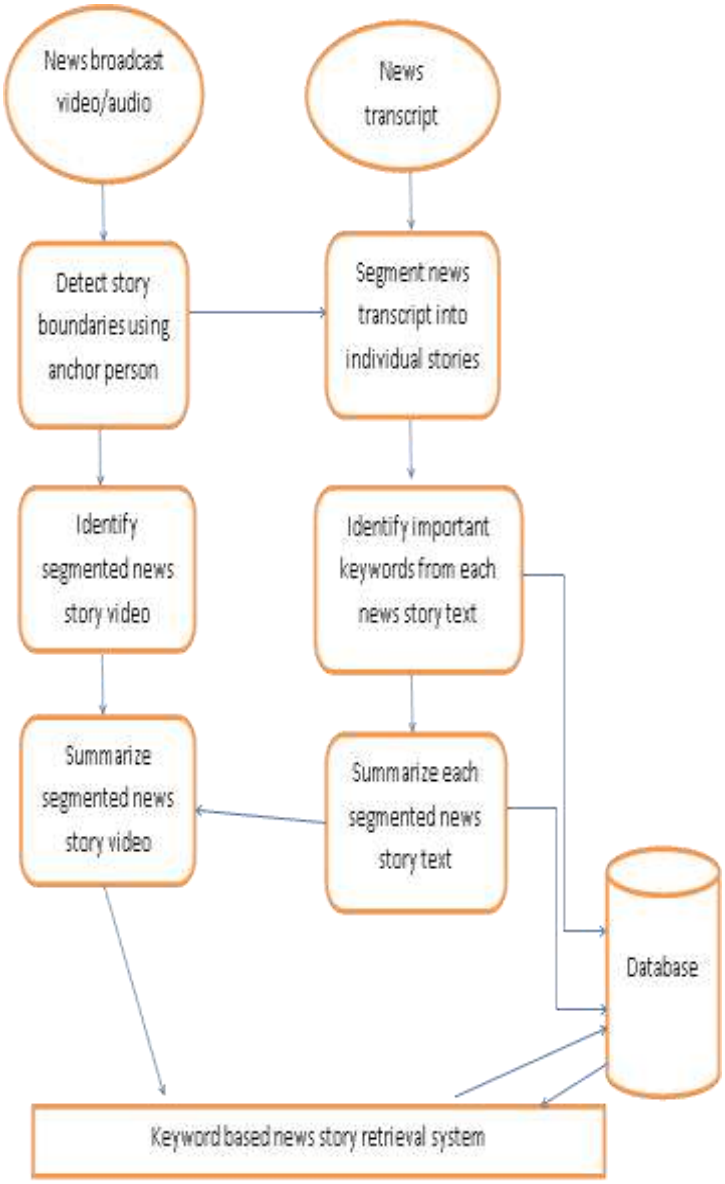

Fig -1: System Overview

4. CONCLUSION

The most of the people give primary preference to broadcast news videos and the videos are regularly seen by millions of people in the world. Developing a system which generates extraction as well as summarization for such News video and display multimedia summary comprising video/audio and texts as per user's choice and interest is more efficient and less time consuming. In our Paper, we proposed to implement Multimedia summarization of news broadcast using anchor person based story identification and Lexical chain algorithm. Using this system one can generate multimedia summary of one or more input news broadcast and allow user to search and retrieve desired news story using keyword based search and retrieval system.

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