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Ontology- based annotation for semantic multimedia retrieval

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Abstract

Numerous educational video lectures, CCTV surveillance, transport and other types have upgraded the impact of multimedia video content. In order to make large video databases realistic, video data has to be automatically indexed in order to search and retrieve relevant material. An annotation is a markup reference made to data in video in order to improve the video accessibility. Video annotation is used to examine the massive quantity of multimedia data in the repositories. Video annotation refers to the taking out of significant data present in video and placing this data to the video can benefit in "retrieval, browsing, analysis, searching comparison and categorization". Video annotation implies taking out of data and to attach such metadata to the video which will "accelerate the retrieval speed, ease of access, analysis and categorization". It permits fast and better understanding of video content and improves the performance of retrieval and decreases human time & efforts for better study of videos. Video annotation is imperative technique that assists in video access. Proposed system provides effortless access to the data of the video and decrease the time necessary to access and evaluate the video. Ontology-based video annotation helps the user to get the semantic information from video, which is essential to search the needful data from a video.

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1. Introduction

In the recent years, most of people depend on internet as it offers us multimedia contents such as textual data, audio data, animation data, video content, and image content. Such multimedia contents are change with respect to time. These contents need huge database for storing and retrieving the information, which can be used by people for accessing. There is a need of more effective and robust approach for retrieval of required information from internet. The information retrieval is such an approach that allow user to store and retrieval of needed information. The main goal of information retrieval system is to determine which documents are most related with respect to the user queries from list of data source. User requirement may not only include text but also requires multimedia contents. The information retrieval approach provides only retrieval of text information but not multimedia content. Therefore, there exists a need of multimedia information retrieval method.

2. Problem Statement, Motivation and Objectives

MIR is a research region of computer science that supports to extract semantic data from multimedia data sources. Data sources contains directly observable source such as “audio, image, video” and indirectly observable source such as “text, bio signals”.

Proposed system provides effortless access to the data of the video and decrease the time necessary to access and evaluate the video. Ontology-based video annotation helps the user to get the semantic information from video, which is essential to search the needful data from a video.

Searching of required video information from large multimedia database is complex task. Video consists of collection frames, analyzing each frame is tedious and erroneous. So, analyzing only essential information from video make user to understand entire content of video without analyzing entire video. Ontology based video annotation is such technique which permit user to easily get information present in video.

The Objectives are:

- To reduce the time required to analyze video.
- To improves the performance of retrieval of video systems.
- Ontology-based annotation eases the semantic retrieval of video data from huge database.

3. System Architecture

System Architecture is described in Fig.1

- Ontology-based video annotation system consists of two phases:
- Training Phase
- Testing Phase

3.1 Training Phase

- In Training phase, image with any format, which is collected from internet is given as input to system.
- SIFT features are extracted from given input image using VL Fleat toolbox.
- After extracting SIFT features, next step is feature extraction by using HoG method.
- HoG features along with RGB histogram also extracted as training classifier and to identify the objects and store in a database.

3.2 Testing Phase

- In Testing Phase, video with .AVI format is given as input to system.
- Video consists of large collection of frames. User does not require all frames so the frame which consists of useful information and which are non-redundant in video are considered as key frames. Such key frames are extracted using entropy method.
- SIFT features are extracted from each key frame.
- After extracting SIFT features, next step is feature extraction by using HoG method.