A.Julius Ceaser *et al*, International Journal of Computer Science and Mobile Applications,

Vol.2 Issue. 1, January- 2014, pg. 43-49 **ISSN: 2321-8363**

RBM: Rule Based Lexical Meaning Extraction in Video Data Using Fuzzy

Mr.A.Julius Ceaser[1], Mr.S.Rajesh[2]

[1] PG Student, [2] Assistant Professor, Department of Computer Science and Engineering,

PRIST University, Trichy District, India

jbjc88@gmail.com

Abstract

Motivated by the needs of semantic search and retrieval of multimedia contents, operating directly on the video based annotations can be thought as a reasonable way for meeting these needs as video is a common standard providing a wide multimedia content description schema. Raw data and low-level features alone are not sufficient to fulfill the user's needs; that is, a deeper understanding of the content at the semantic level is required. We propose a semantic content extraction system that allows the user to query and retrieve objects, events, and concepts that are extracted automatically. In automatic extraction process, starts with object and define class for each process in video data. Here we declare a novel ontology based fuzzy video data semantic model uses spatial/temporal relation in event and concept definition. Objects extracted from consecutive representative frames are processed to extract temporal relations.

This metaontology definition provides a wide-domain applicable rule construction standard that allows the user to construct ontology for a given domain. In addition to that, we use additional rule to lower spatial relation computation cost and to be able to define some complex situations more effectively. Event extraction process uses objects, spatial relations between objects and temporal relations between events. Similarly, objects and events are used in concept extraction process.

Index Terms — **Semantic content extraction, video content modeling, fuzziness, ontology.**

I.INTRODUCTION

Video contents composed of raw video data and video metadata are the main building block elements of the infrastructure. Video metadata exist for enriching the raw video data and it is generated manually using an annotation tool instead of the automatic metadata extraction techniques such as text mining, video processing, and speech recognition.

This study proposes an automatic semantic content extraction framework. This is accomplished through the development of an ontology-based semantic content model and semantic content extraction algorithms. Our work differs from other semantic content extraction and representation studies in many ways and contributes to semantic video modeling and semantic content extraction research areas. First of all, we propose a metaontology, a rule construction standard which is domain independent, to construct domain ontologies. Domain ontologies are enriched by including additional rule definitions. The success of the automatic semantic content extraction framework is improved by handling fuzziness in class and relation definitions in the model and in rule definitions.

As a consequence of recent advances of World Wide Web, dramatic increases in the amount of multimedia data have revealed the needs for the semantic retrieval techniques of multimedia contents as the high amount of multimedia data needs high level of management facilities. Not only the amount of multimedia data but also the user desires about gaining the ability of querying the individual multimedia data semantically plays an important role on

the researches in the field. That desire basically results from the personalization needs of the users. In other words, the complexity of computer users' management needs on multimedia contents causes them to direct themselves into a way in which the multimedia contents are managed according to the personal interest areas.

Clearly, incorporating prior knowledge is a prerequisite for the retrieval as well, to allow understanding of the semantics of user search, and subsequently, aligning and matching with the content annotation semantics. Proprietary knowledge representation solutions, although effective within the predefined usage context, impose serious limitations considering reusability and interoperability. Underpinned by the emergence of the Semantic Web, the need for shareable, sufficiently rich, knowledge representation formalisms has revived interest and gave rise to advanced knowledge modelling solutions. Ontologies (Staab, 2004), promising a common and shared understanding of a domain, have turned up into key enabling technologies providing machine understandable semantics. Furthermore, due to the well-defined semantics, ontologies provide automated inference support that can further enhance retrieval by exploiting hidden conceptual associations discovery and derivation of new ones for realizing semantic-based recommendation services.

Consequently, following the ontology-based paradigm for the representation of the annotation metadata entails significant advantages for the purpose of semantic search and retrieval. More specifically, unlike keyword-based annotations, ontology-based annotations do not rely on plain word matching, and thus manage to overcome the syntactic limitations that keyword-based search and retrieval systems suffer from (Kiryakov, 1999). Synonyms and homonyms, two common reasons accounting for low recall and precision respectively in traditional keyword-based approaches do not have any implication when content descriptions are structured based on ontologies.

Ontology provides many advantages and capabilities for content modeling. Yet, a great majority of the ontologybased video content modeling studies propose domain specific ontology models limiting its use to a specific domain. Besides, generic ontology models provide solutions for multimedia structure representations. In this study, we propose a wide-domain applicable video content model in order to model the semantic content in videos. Therefore, using semantic entities in the annotations helps us as an improvement for the data model. "Objects" and "Events" are the primitives used to structure the annotations for semantics. Objects are the entities describing the concepts while events are used to model the relations between the concepts and describing the actions in the video segments.

Therefore, the querying actions searching the videos are processed using the reasoning procedures working on the ontology instances of each video represented by SWRL. In other words, the answers for the queries on the video contents are extracted by reasoning on the logical representation. The infrastructure proposed in this thesis uses a video data model based on annotation layering. But, an object-based approach is also used in the annotations in order to hybridize this data model with the object-based models for structuring the video annotations.

II. RELATED WORK

2.1 Project overview

To extract semantic video data extraction through fuzzy based Viscom algorithm and to automate the event and concept extraction process, objects, events, domain ontologies, and rule definitions

2.1.1 Scope of project

- Manual techniques, which are inefficient, subjective and costly in time and limit the querying capabilities and bridge the gap between low-level representative features and high-level semantic content Storage space per peer must necessarily grow unboundedly.
- Here we proposed a novel scheme for extract content like object, event and concept automatically.
- For that we use ontology based fuzzy semantic model that uses spatial and temporal relation in definition.
- This metaontology definition provides a wide-domain applicable rule construction standard that allows the user to construct an ontology for a given domain.
- we use additional rule definitions to lower spatial relation computation cost and to be able to define some complex situations more effectively.

2.2 Existing system

It is very difficult to extract semantic content directly from raw video data. Spatial relations are partially or fully used to model and extract the semantic content. No matter which type of data set is used, the process of extracting semantic content is complex and requires domain knowledge or user interaction. We expect to get more meaningful regions in terms of human visual perception, corresponding to semantic objects (e.g., a human, a car). However, this is still not achievable with the current state-of-the-art in computer vision; final segmentation does not usually correspond to semantic objects. Both ontologies are expressed in RDF(S), and their integration takes place using the conceptually common classes between the two ontologies as attachment points, thus resulting in a unified ontology-based framework for handling visual content at a semantic level. Manual extraction approaches are tedious, subjective, and time consuming, which limit querying capabilities. The model is extended with a rule-based approach that supports spatiotemporal formalization of high-level concepts, and then with a stochastic approach.

Simple periodic events are recognized where the success of event extraction is highly dependent on robustness of tracking.

2.2.1 Disadvantages

- Manual techniques, which are inefficient.
- It is very difficult to extract semantic.
- Time consuming.

2.2 Proposed system

Our work differs from other semantic content extraction and representation studies in many ways and contributes to semantic video modeling and semantic content extraction research areas. Therefore, such domain knowledge needs to include prototypical descriptions of the important domain concepts, i.e. objects and events, in terms of their visual properties and spatial context of appearance, so as to allow for their identification. Detection can then be roughly described as a process based on appropriately defined matching criteria between the low-level features that are automatically extracted from the content and the predefined models, which comprise the domain knowledge, plus possibly some additional decision making support. In order to address the modeling need for objects, events and concepts during the extraction process, a wide-domain applicable ontology-based fuzzy Video

Semantic Content Model (VISCOM) that uses objects and spatial/temporal relations in event and concept definitions is developed.

VISCOM is a metaontology for domain ontologies and provides a domain-independent rule construction standard. It is also possible to give additional rule definitions (without using ontology) for defining some special situations and for speeding up the extraction process. Ontology based video content modeling studies propose domain specific ontology models limiting its use to a specific domain. Constructing rules for extraction is a tedious task and is not scalable. Without any standard on rule construction, different domains can have different rules with different syntax.

2.3.1 Advantages

- It eases the rule construction process.
- Makes its use on larger video data possible.

III. MODULES

- Object/Event Extraction.
- Domain Ontology construction.
- Event Extraction
- Concept Evacuation.

3.1 OBJECT / EVENT EXTRACTION

The linguistic part of VISCOM contains classes and relations between these classes. Some of the classes represent semantic content types such as Object and Event while others are used in the automatic semantic content extraction process. VISCOM is developed on an ontology-based structure where semantic content types and relations between these types are collected under VISCOM Classes, VISCOM Data Properties which associate classes with constants and VISCOM Object Properties which are used to define relations between classes. In addition, there are some domain independent class individuals. The VISCOM properties consist of four additional relation like temporal relation, object relation, movement individuals and spatial relation. These relation are split out by class, because these relation are defined by classes itself. where the predicate individuals is used to mean “an entity is defined as an individual of a class” in the formal representation of classes.

It is sub-classed to the different types of domain concepts that need to be supported by the analysis.Consequently, in the current implementation, class Object reduces to the subclasses of the domain ontology Photograph Element class that can be automatically detected, i.e. the concepts Sky, Vegetation, Sunset and Body of Water, as detailed in the experimental results section. All object instances comprise models (prototypes) for the corresponding semantic concepts.

3.2 DOMAIN ONTOLOGY CONSTRUCTION

Domain ontology was developed to capture the examined domain semantics and provide the conceptualization and vocabulary for the annotation. Furthermore, analysis ontology was designed to model the semantics extraction process and the required qualitative and quantitative low-level information definitions. While

through concept-based browsing, query formulation is significantly facilitated. Seen from the analysis perspective, domain concepts detection is assisted by the knowledge provided in the domain ontology definitions, while extensibility and interoperability is advanced as all analysis aspects are treated as ontological concepts. In that we extract the event definition, Spatial concept, Spatial relations etc., in count. For all event in process, do whether each event has another event within it or not. If it has an event then define event in terms of event definition. Also check weather event define with other event temporal relation, then define event in terms of event temporal relation. Then finally construct relation with c that can place in its meaning.

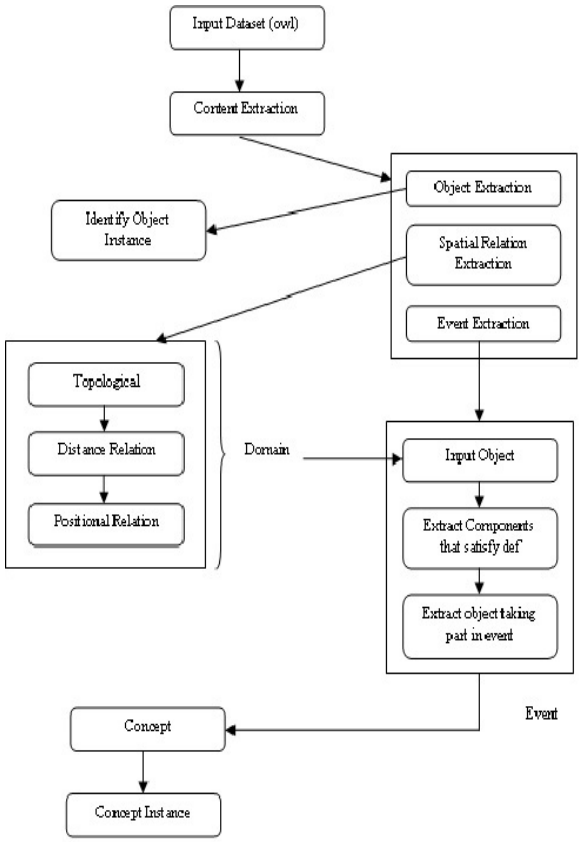
3.3 EVENT EXTRACTION

Event instances are extracted after a sequence of automatic extraction processes. Each extraction process outputs instances of a semantic content type defined as an individual in the domain ontology. In event extraction process we extract related relation process for making the event or happening in event. In this we also extract properties of spatial relation component. Every spatial relation extraction is stored as a Spatial Relation Component instance which contains the frame number, object instances, type of the spatial relation, and a fuzzy membership value of the relation. Event extraction process uses objects, spatial relations between objects and temporal relations between events. Similarly, objects and events are used in concept extraction process. In this process extract spatial relation component, spatial movement component, spatial change etc. For all above components extract SRC, SMC, SC, TSC, ED, instance and individuals.

3.4 CONCEPT EVACUATION

Concepts detection is assisted by the knowledge provided in the domain ontology definitions, while extensibility and interoperability is advanced as all analysis aspects are treated as ontological concepts. In the concept extraction process, Concept Component individuals and extracted object, event, and concept instances are used. Concept Component individuals relate objects, events, and concepts with concepts. When an object or event that is used in the definition of a concept is extracted, the related concept instance is automatically extracted with the relevance degree given in its definition. In addition, Similarity individuals are utilized in order to extract more concepts from the extracted components. The last step in the concept extraction process is executing concept rule definitions. Similar to the event extraction, concepts are extracted with a membership value between 0 and 1. The following example explains how component membership values are used to calculate concept membership values: Event individual E and Object individual O are related components with the Concept individual C. Event E and Object O have relevance values for representing the concept C.

IV. DATA FLOW DIAGRAM



V. CONCLUSION

The semantic content extraction process is done automatically. In addition, a generic ontology-based semantic metaontology model for videos (VISCOM) is proposed. Moreover, the semantic content representation capability and extraction success are improved by adding fuzziness in class, relation, and rule definitions. An automatic Genetic Algorithm-based object extraction method is integrated to the proposed system to capture semantic content. In every component of the framework, ontology-based modeling and extraction capabilities are used. Object or event that is used in the definition of a concept is extracted, the related concept instance is automatically extracted with the relevance degree given in its definition

ACKNOWLEDGEMENT

I sincerely thanks to all authors in reference section. All papers in the reference section are very useful for my proposal. Their concepts and techniques are very useful for my research.

REFERENCES

[1]T. Yilmaz, "Object Extraction from Images/Videos Using a Genetic Algorithm Based Approach," master's thesis, Computer Eng. Dept., METU, Turkey.

[2] C. Xu, J. Wang, K. Wan, Y. Li, and L. Duan, "Live Sports Event Detection Based on Broadcast Video and Web-Casting Text," MULTIMEDIA '06: Proc. 14th Ann. ACM Int'l Conf. Multimedia, pp. 221-230

[3] Y. Zhang, C. Xu, Y. Rui, J. Wang, and H. Lu, "Semantic Event Extraction from Basketball Games Using Multi-Modal Analysis," Proc. IEEE Int'l Conf. Multimedia and Expo (ICME '07), pp. 2190- 2193

[4] D. Song, H.T. Liu, M. Cho, H. Kim, and P. Kim, "Domain Knowledge Ontology Building for Semantic Video Event Description," Proc. Int'l Conf. Image and Video Retrieval (CIVR), pp. 267-275

[5] Y. Yildirim, T. Yilmaz, and A. Yazici, "Ontology-Supported Object and Event Extraction with a Genetic Algorithms Approach for Object Classification," Proc. Sixth ACM Int'l Conf. Image and Video Retrieval (CIVR '07), pp. 202-209

[6] Y. Yildirim and A. Yazici, "Ontology-Supported Video Modeling and Retrieval," Proc. Fourth Int'l Conf. Adaptive Multimedia Retrieval: User, Context, and Feedback (AMR), pp. 28- 41

[7] Y. Yildirim,"Automatic Semantic Content Extraction in Video Using a Spatio-Temporal Ontology Model," PhD dissertation, Computer Eng. Dept., METU, Turkey.

[8] A.D. Bagdanov, M. Bertini, A. Del Bimbo, C. Torniai, and G. Serra, "Semantic Annotation and Retrieval of Video Events Using Multimedia Ontologies," Proc. IEEE Int'l Conf. Semantic Computing (ICSC)

[9] L. Bai, S.Y. Lao, G. Jones, and A.F. Smeaton, "Video Semantic Content Analysis Based on Ontology," IMVIP '07: Proc. 11th Int'l Machine Vision and Image Processing Conf.

[10] T. Sevilmis, M. Bastan, U. Gu¨du¨ kbay, and O ¨ . Ulusoy, "Automatic Detection of Salient Objects and Spatial Relations in Videos for a Video Database System," Image Vision Computing, vol. 26, no. 10, pp. 1384-1396

