

ANSWER: Documentation, Formal Conceptualisation and Annotation of New Media

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ABSTRACT

Within the scope of ANSWER, an EC-supported research project, a new artistic notation system, called DirectorNotation, is being developed for describing media content, much like notes are used to document a music composition. Our current research focuses on developing “notation-enabled” offline authoring tools, but interactive applications are an anticipated extension. Here, we summarise the key aspects of DirectorNotation and the ANSWER project, from the point of view of a multimedia-technology audience interested in content-based manipulation of media.

Categories and Subject Descriptors

I.2.4 [Artificial Intelligence]: Knowledge Representation Formalisms and Methods – *Representations (procedural and rule-based), Semantic networks*

J.5 [Arts and Humanities]: *Arts, fine and performing, Performing arts (e.g., dance, music)*

General Terms

Design, Experimentation, Human Factors, Languages

Keywords

Artistic Notation, Film Directing, Knowledge Representation, Ontologies, Multimedia Annotation, DirectorNotation, Cinematography

1. INTRODUCTION

While technological support for the artistic activity of creating media is powerful, useful and ever improving, the available tools remain technical, and their interfaces continue to be shaped by implementation technicalities rather than a deeper artistic affinity with creative perceptions, concepts, needs and processes.

The EC-supported ANSWER project¹ [1] is a new approach to the creative process of film production. It will create a notation system [2], DirectorNotation [3], for describing the creation of multimedia content. The notation is a logical symbolic structure allowing directors to document their creative intentions, in a way similar to music notation and dance notation already used by composers and choreographers.

2. DIRECTORNOTATION - ARTISTIC AND TECHNICAL VALUE

DirectorNotation is interesting from a technological point of view. It is a system that simultaneously allows an artistic and a technical formalisation of the domain of film directing. Its main purpose is to analyse and represent media content during its production phase, rather than capturing knowledge about already existing media. The artistic notation is used by the film director to formally record his ideas and conceptualisation regarding the creation of a film (as opposed to using natural language or some kind of technical formal language similar to an animation script) – but it is also fully computer-processable. This leads to various applications – such as automatic synthesis of animated storyboards (a focus of ANSWER) or the automatic cost-estimation of a production from the earliest phases of pre-production (a topic of future research). All applications are based on the fact that DirectorNotation is transformed into metadata that accurately describes film content: we retain a machine-processable annotation of what the director was doing in order to produce the film. The description in notation is *formal* – the language’s semantics are strictly defined – so the automatically derived technical annotation corresponds exactly to the user’s input.

3. ANNOTATION OF NEW MEDIA

DirectorNotation has the potential to be exploited by any application that requires media content to be annotated. However,

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it can not produce annotations for every “thematic” point-of-view from which content could be described, so it is could not single-handedly allow e.g. for general-purpose consumer-oriented content-based media search [4][10]. The notation will describe a scene in terms of camera and actor motions, lighting and set configurations, spatial relations on-screen and in-set, dynamic qualities of movements, and more – this can be imagined as detailed, accurate *instructions* that the Director gives to his crew. Simple “interpretative” annotations of content as e.g. “happy”, “suspenseful” are not within its scope. However, annotations derived from notation have a very important advantage: they have been derived from the content-creator’s own description of the content (and ANSWER is developing a tool to match notation to produced footage so that the final annotation describes the final content exactly). This process is guaranteed to result in annotations that are detailed, accurate, and very extensive within the scope of the notation’s descriptive concerns – in clear contrast to the annotation of pre-existing footage, either manually or automatically by software.

DirectorNotation will be valuable for many new media and entertainment applications. For instance, the customisation of content that a system could perform when the content is delivered over an interactive medium will require a representation of how the content needs to be presented in different possible delivery scenaria. DirectorNotation allows both the artistic representation of a director’s ideas, and automatic processing of these ideas, so it can provide many new solutions in this area. For instance, [5] is based on “adaptive media templates” which allow amateur-produced content to be automatically edited according to predetermined professional designs, but it does not provide an artistically articulate way to define these templates, a gap that could readily be filled with our notation (and the corresponding ontology). We should stress that DirectorNotation will provide such applications with (formalised, well-defined) annotation *only*, not with processing algorithms. However, *combined* with content recognition algorithms, DirectorNotation would allow e.g. the “adaptive media templates” above to be applied to real-time interactive applications such as TV mediated communication.

4. A FILM DIRECTING ONTOLOGY

Our vision for the generalisation of the ANSWER project’s outputs is the creation of an “upper ontology for film directing” ([6]-[10]) that will offer developers a general-purpose, actionable knowledge model of the specific domain described above. When describing the architectural structure of content, based on decisions for the states and actions of camera, actors, lights and set elements, and decisions about film editing, the necessary vocabulary and semantics will be formalised in the generalised ANSWER knowledge model.

This model is intended to be put to uses that go beyond the scope of the ANSWER project. For instance, in our project, 3D graphics output is automatically generated, but this is always for the purpose of pre-visualisation, and thus not at “production quality”; also, the director always exactly describes his intentions, and the system never makes any decisions for the director. A future application, however, could aim to generate production quality graphics, or to provide automated decision making for the production of content, by adding the necessary modelling and reasoning components for issues such as narrative, aesthetics,

rendering, etc, over ANSWER’s formalisation of the domain of the film directing activity itself.

5. CONCLUSION

There is no space here to go into the technical details of how our vision will be achieved. The project website [1] is the entry point for additional information. A working software demo is intended to be released on the site by summer 2009. We should, however, note some important points in conclusion: all software developed by the project will be released as open source (and some legacy systems being brought on board all use open interfaces and open formats, e.g. a graphics engine based on X3D); our investigation of the director’s need for efficient description, as well as our application of film directing notation to creating video content in games, are leading towards the formalisation of idioms and rules, constructs which allow very efficient content description, and will be of special utility to further “reasoning” in applications that automate more of the content creation process; and, finally, we should close by crediting the system that inspired our project – Labanotation, the choreography notation [11][12].

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