Entertainment Computing 1 (2010) 105–117

Contents lists available at ScienceDirect

Entertainment Computing

journal homepage: ees.elsevier.com/entcom

From tradition to emerging practice: A hybrid computational production model for Interactive Documentary

Insook Choi *

Emerging Media Program, Department of Entertainment Technology, New York City College of Technology of the City University of New York, 300 Jay Street V411, Brooklyn, NY 11201, USA

ARTICLE INFO

Article history:
Received 11 June 2009
Revised 15 February 2010
Accepted 15 March 2010

Keywords:
Documentary production model
Interactive Documentary
Ontology
Multimedia authoring
Narrative structure
GUI
Enactive authoring
Interaction design

ABSTRACT

This paper introduces Interactive Documentary as a new production paradigm. Research objectives are (1) to engage documentary practice with emerging media technologies in an open data space; (2) to prototype tools to facilitate cyclical authoring among a contributors' community. Interactive Documentary is here defined as a media production model with interactive author functions for constructing a narrative voice as a document of reality itself. The proposed system is envisioned for applications beyond motion picture genres, supporting the creation of living documents used in educational and collaborative project settings. Three types of users are anticipated: Authors, Contributors, and Observers. A formalization of traditional documentary production provides workflow analysis and modeling. The process of authoring is discussed in detail as well as system requirements and design specifications. A computational architecture hosts an author function; documentary authoring is implemented as query-display-edit facilitated by an inference engine. The system supports real-time *enactive query* across heterogeneous media resources, parallel media signal processing, and multi screen presentation and display formats. A use case takes upon a regional architectural history as an example of data design with domain sensitive ontology engineering. Ontology supports heterogeneous cross-referential capacity; its structure is reflected in a GUI designed to facilitate concept-based navigation across 2D graphics, 3D models, video, and audio resources. A dual-root-node data design links ontological reasoning with metadata, which provides a method for defining hybrid semantic–quantitative relationships.

1. Introduction

Documentary in film practice is an established genre. Yet its definition often undertakes a discursive path. Two factors play consistently in various definitions: (1) reality is captured in some forms of documents and (2) the documents are subjected to assemblage to serve a larger context. This paper introduces a production model of documentary practice with computational processes to support interactive authoring. For the definition of documentary we adopt the simplest task definition, that of Vertov: "to capture fragments of reality and combine them meaningfully" [1, p. 55]. Grierson's "the creative treatment of actuality" [1, p. 287], is at the heart of documentary practice for both spectators and authors. The Interactive Documentary system model presented here is designed to be used for novice as well as expert authoring. In this spirit we implement *enactive query* to reduce the gap of traditional polarities between production and reproduction, between media producers and consumers, and between authoring and acts of inquiry.

The construction of the documentary subject utilizes narrative devices accompanied by information sources such as first-person accounts to anchor the devices in factual circumstances. A documentary synthesizes a narrative about factual objects and events including original documents and reconstructed representations. More significantly the narrative resides in the rules of play engaging human memories in observations and experiences. The rules of play provide a set of criteria how to frame subject matter with camerawork, sound recording, and editing, and are a part of an *author function* [2] for constructing a vehicle to carry narrative voices.

1.1. User-centered definition

Interactive Documentary is here defined as a documentary production model with interactive author functions for constructing a narrative voice as a document of reality itself. The proposed methodology is envisioned for applications beyond motion picture genres, supporting the creation of living documents used in educational and collaborative project settings. It anticipates scalable dissemination and participation through diverse user communities and media devices in an open data space. Its narrative structure

* Tel.: +1 718 260 5588; fax: +1 718 260 5591.
E-mail address: ichoi@CityTech.CUNY.edu

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doi:10.1016/j.entcom.2010.03.001

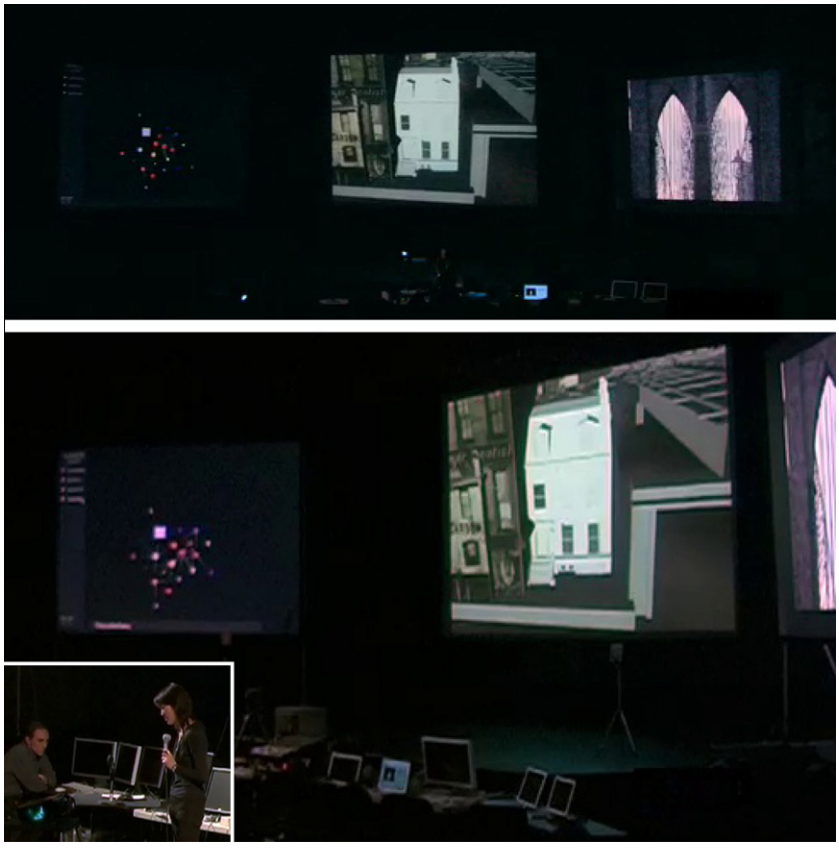

Fig. 1. Front view (top) and side view (below) of the idBrooklyn [REF] Interactive Documentary presentation, and presenter (inset). The center screen displays a 3D scene; the right screen displays video and still images. The GUI on the left screen is also displayed on the presenter's kiosk.

involves real-time performance of structured database query, an extensible range of heterogeneous media resources, parallel signal processing of media that use diverse display subsystems, and interactive experiences for novice users. Current development is at the phase of prototyping and alpha testing a working system. User tests with novice participants are forthcoming. Current design criteria are based upon practitioners' perspectives, developed through consultations with an Oscar[1]-nominated producer–director [3], and incorporating the author's insights gained as a composer of virtual reality performances and installations [4].

The present Interactive Documentary system anticipates three types of users: (1) an Author who creates an original Interactive Documentary path, and may provide semantic classifications and related media resources; (2) an Observer who interacts with a given documentary path within a pre-determined range of exploration, choosing the degree and timing of exploration when traversing a given path; (3) a Contributor who can modify a given path to create variations or enter new regions. Media resources are displayed in multiple 2D and 3D image frames (see Fig. 1), not unlike the display used in Soft Cinema [5] but with extended types of media resources such as real-time generated graphics and spatially-modeled sounds.

Interactive Documentary facilitates the general practice of documentary as described above with designs to establish an author function with computational practice. This relationship is explicated in Section 3. For grounding perspectives in computation, an author of Interactive Documentary prepares a structured vocabulary to serve a semantic network compatible with media resources. The semantic network can be adopted as a literal representation of the network of media perspectives serving narrative possibilities. Ontology design to support this is discussed in Section 6.

This paper presents ontology applied as an organizing tool for concept based documents storage, retrieval, and assemblage, to assist authoring interactive experience and narrative voice. Ontology processing not only provides an extensible use and cross-referential organization of documents of multiple type as media resources (the term "documents" and "media resources" are interchangeable hereafter), it also facilitates a partnership among author functions, some carried out by an author, some by a computer, and some by a community of respondents. This extensibility facilitated by ontology is rather promising for developing a new production paradigm. For exploring the new paradigm the paper reviews groundwork and related research.

1.2. Order of this paper

In Section 2 the relevant previous works will be discussed. Section 3 introduces authoring processes applied in an interactive presentation system in an installation setting, for testing the case studies. The configuration incorporates multiple visual displays, synthesized audio, and a mouse-based interface. The media resources in the prototype include 3D graphic models and scenes, simulations, and data-driven and procedural auditory and visual processing of resources. A graphical user interface (GUI) design for concept-based navigation enables queries across heterogeneous media resources. A methodology is introduced as path-planning using the GUI for semantic query-based authoring. A use case is presented focusing on the design of ontological data and the use of interactive reasoning to retrieve media resources in real-time.

[1] Annual award ceremony of the Academy of Motion Picture Arts and Sciences.