

# A Computer-based Framework for the Analysis of Narrative and Multimodality

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## The idea is...

to use a computer to identify unusually frequent forms in corpora of multimodal narratives, then:

- (i) develop theory to account for the occurrence of these forms in terms of their functions;
- (ii) automatically generate databases of these forms / functions for further analysis.

## Motivation: two sets of reasons...

- ◆ The potential for a new perspective on narrative and multimodal phenomena
- ◆ The challenges and opportunities presented by the need for effective access to multimedia archives

# The big question...

Do interesting narrative and multimodal phenomena manifest in regular ways in the surface forms of texts?

- ◆ CASE STUDY 1: Narrative in Film
- ◆ CASE STUDY 2: Multimodality in webpages

# Narrative in Film

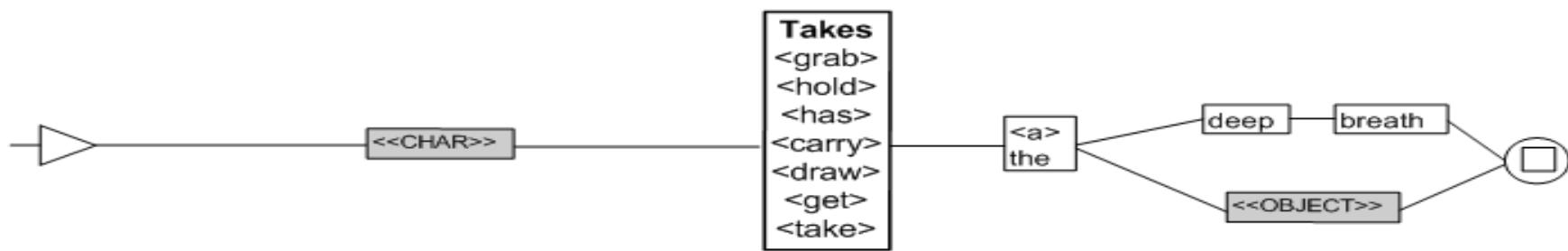
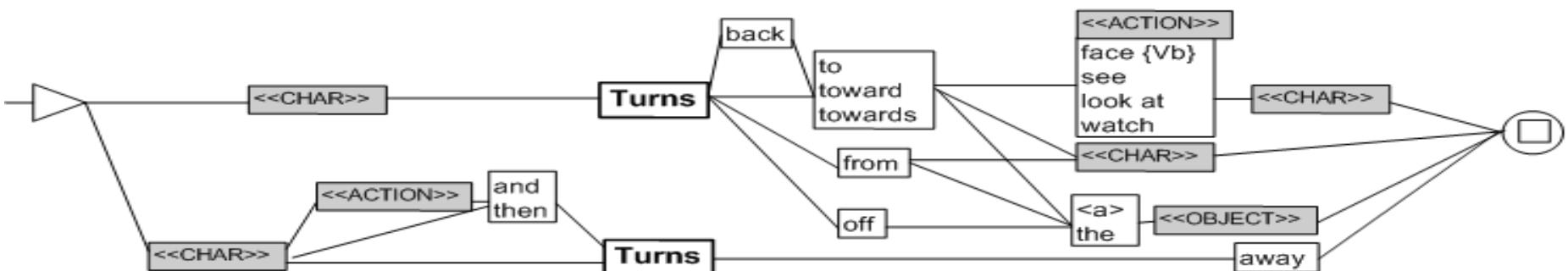
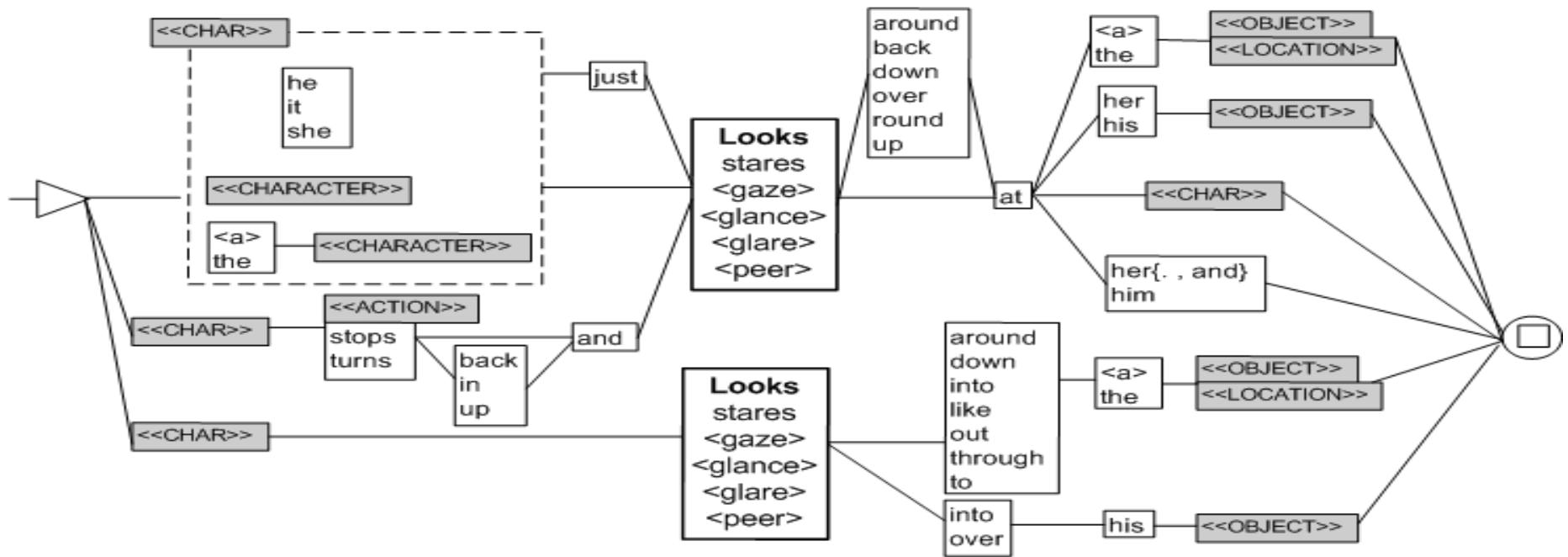
- ◆ Using written texts as surrogates for films
- ◆ Corpora
  - ◆ 75 film scripts (1,900,000 words)
  - ◆ 73 audio description scripts (713,000 words)
  - ◆ 60 subtitle files (516,000 words)
- ◆ Method: a fully-automatic method to identify unusually frequent words, and word sequences that are characteristic of the corpora --> local grammars

(Salway, Vassilou and Ahmad 2005; Vassilou 2006)

# Frequently depicted events

- ◆ Some unusually frequent phrases in audio description and film scripts...
  - ◆ “X looks at Y”
  - ◆ “X goes to the Y”
  - ◆ “X opens the door and leaves”
  - ◆ “X nods her head”

## FOCUS OF ATTENTION



# Characters' emotions

- ◆ Some patterns, especially in audio description scripts, give information about characters' emotional states

CHARACTER looking \b\w\*(ed|ly)\b

CHARACTER (smiles|stares|looks|walks|frowns|grins)  
\b\w\*\ly\b

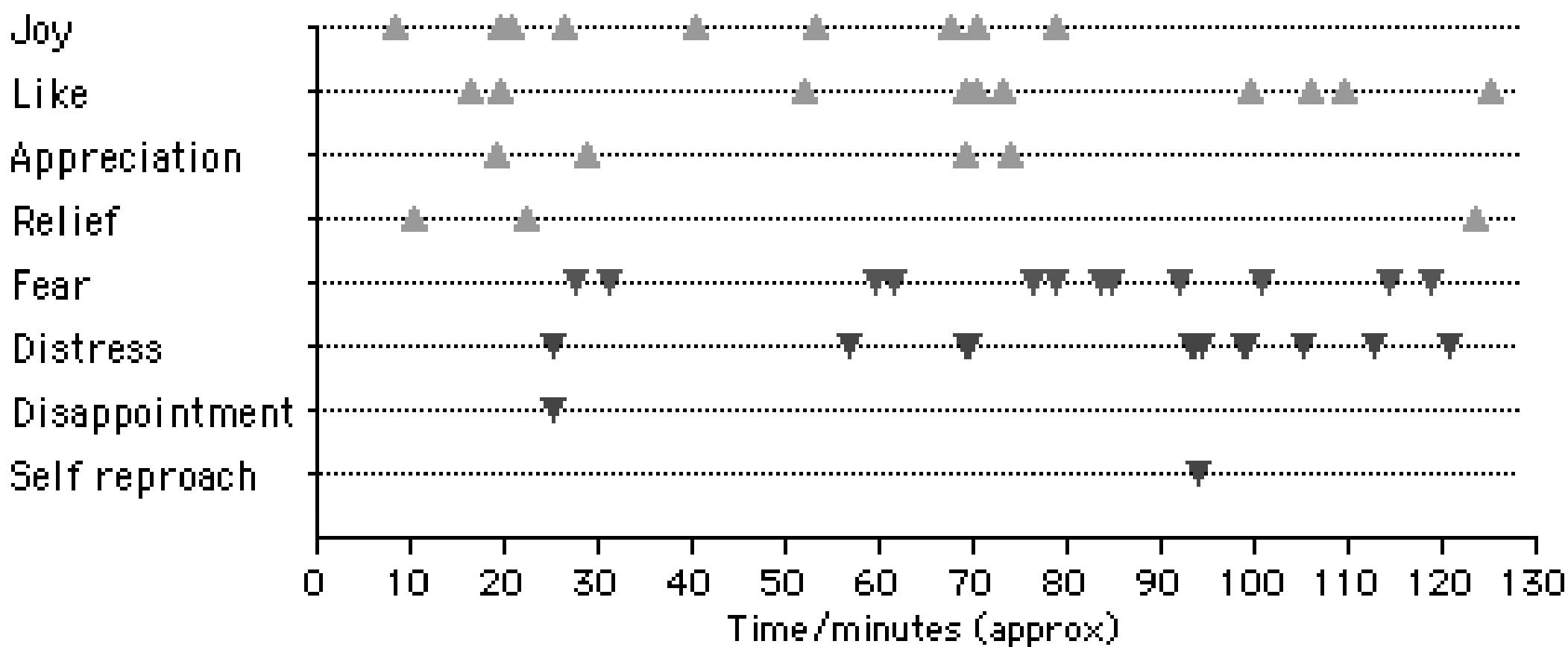
# Emotions in *Captain Correlli's Mandolin* (Salway and Graham 2003)

15-20 minutes: Pelagria's betrothal to Madras

20-30 minutes: invasion of the island

68-74 minutes: Pelagria and Correlli's growing relationship

92-95 minutes: German soldiers disarm Italians



# What do people say in films? (Lingabavan and Salway 2006)

Some unusually frequent phrases in subtitles...

- ◆ “I don't know”
- ◆ “I'm gonna X”; “I am going to X”
- ◆ “I wanna X”; “I want to X”
- ◆ “I gotta X”; “I am going to X”

# CASE STUDY 1: Discussion

- ◆ An automated corpus analysis can highlight some kinds of information that must be conveyed for successful storytelling in film, along with associated word patterns
  - ◆ Use information extraction techniques to populate databases of common film events
  - ◆ Analyse the database to compare functions between genres
- ◆ Ongoing work
  - ◆ A more in-depth analysis of each corpus
  - ◆ Corpus Narratology Initiative – with David Herman
  - ◆ Analysis of how audio description conveys information about characters' minds – with Alan Palmer

# Image-Text Relations

- ◆ Motivating Questions
  - ◆ How do images and text function together in multimodal documents?
  - ◆ How are image-text relations 'realised' in the forms of multimodal documents?
- ◆ We proposed a system of image-text relations (Martinec and Salway 2005); drawing on Barthes and on Halliday
  - ◆ Not a computer-based analysis, but we were considered the limits of computational analysis when specifying realisations of image-text relations

# Status Relations

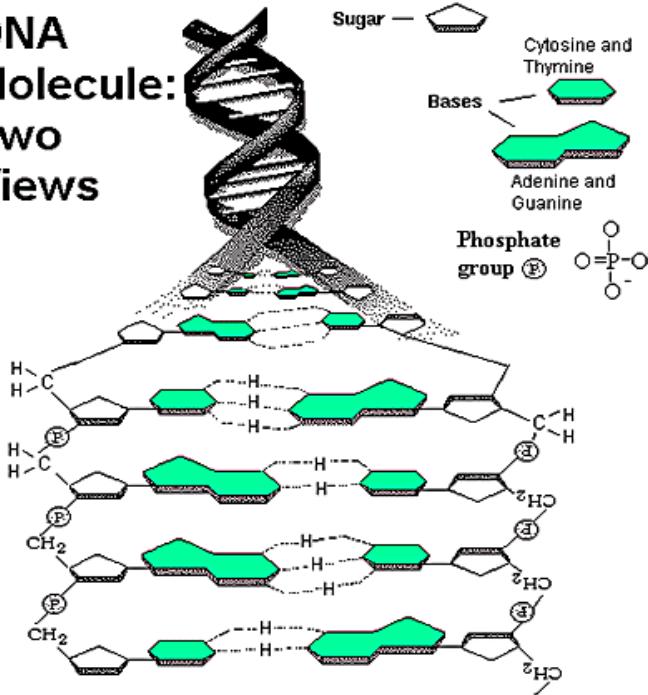
- ◆ The relation between an image and a text is **equal** if:
  - ◆ both the image and the text are required for successful communication, in which case they are **equal-complementary**; OR
  - ◆ both the image and the text can be understood individually, in which case they are **equal-independent**.
- ◆ The relation is **unequal** if:
  - ◆ either the image or the text can be understood individually;
  - ◆ that which cannot be understood individually is **subordinate**.



## DNA Molecule - Two Views

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### DNA Molecule: Two Views



## DNA Molecule - Two Views

### Legend:

The double helix of the DNA is shown along with details of how the bases, sugars and phosphates connect to form the [structure of the molecule](#).

DNA is a double-stranded molecule twisted into a helix (think of a spiral staircase). Each spiraling strand, comprised of a sugar-phosphate backbone and attached bases, is connected to a complementary strand by non-covalent hydrogen bonding between paired bases. The bases are adenine (A), thymine (T), cytosine (C) and guanine (G).

A and T are connected by two hydrogen bonds. G and C are connected by three hydrogen bonds.

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## Queen in Liverpool for ceremony

The Queen is visiting Liverpool for the ancient Maundy Thursday ceremony.

During the service at the city's Anglican cathedral the Queen will hand out money to 78 men and 78 women.

Maundy Thursday marks the washing of the disciple's feet by Jesus. British monarchs used to wash subjects' feet, but James II ended the practice.

The Queen has only missed four Maundy Thursday ceremonies

It is the first time the ceremony has been performed at the cathedral. The locals were selected for their contributions to their communities.

The ceremony is due to take place at 1100 BST.

Organisers have selected 78 men and women as a way of marking the Queen's 78th birthday celebrations which take place on 21 April.

The Queen and the Duke of Edinburgh, will arrive at Liverpool's Lime Street station before being taken the short distance to the cathedral where they will receive the traditional nosegays - posies of strong-smelling flowers.

After the service they will attend a civic reception at Liverpool Hope University.

Lord Mayor of Liverpool, Councillor Ron Gould, said: "It is a wonderful honour that the Queen has chosen to visit Liverpool this year for the Maundy Thursday celebrations.

"I am delighted that some of the people who make such a great contribution to our city are receiving this prestigious award from Her Majesty."

The Queen has only missed four Maundy Thursday ceremonies since coming to the throne in 1952.

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Information and features on the BBC's Liverpool website

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Joseph Mallord William Turner 1775-1851

**The Goddess of Discord Choosing the Apple of Contention in the Garden of the Hesperides** exhibited 1806

Oil on canvas  
support: 1553 x 2184 mm  
painting

Bequeathed by the artist 1856

N00477

The Hesperides were the three daughters of Hesperus, the evening star. They kept watch over a tree of golden apples in a garden on the slopes of Mount Atlas. Here, the goddess Discord chooses the apple that will eventually lead to the Trojan war. Paris offered the apple to the goddess Aphrodite who, in return, offered him the most beautiful woman in the world: the Greek Queen, Helen.

The classical grandeur of this landscape is based on the work of the seventeenth-century French artist, Nicolas Poussin. Its background reflects Turner's experience of the Alps in 1802  
(From the display caption February 2004)

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# Logico-Semantic Relations

- ◆ A text **elaborates** the meaning of an image, and vice versa, by further specifying or describing it
- ◆ A text **extends** the meaning of an image, and vice versa, by adding new information
- ◆ A text **enhances** the meaning of an image, and vice versa, by qualifying it with reference to time, place and/or cause-effect

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## Baghdad stunned by hotel attack

Rescuers in Baghdad have given up the search for survivors in the rubble left by a massive blast which killed at least 17 people, most of them Iraqis.

The explosion on Wednesday night wrecked the small Mount Lebanon hotel and nearby houses in the city centre.

The US military says a 450kg car bomb packed with artillery ordnance killed at least 17 people and injured 45.

On Thursday, three people also died in an attack on staff at a US-funded TV station in Baquba, north of Baghdad.

US officials say the hotel attack, in the busy Karrada district, was intended to cause maximum casualties and bore the hallmarks of an al-Qaeda-related group.

One Briton was killed, and another injured, the UK government said.

US officials initially put the death toll as high as 27, but later revised it downwards. Iraqi officials said the toll was as low as six.

Hours after the blast, a mortar attack on a US logistics base north of Baghdad killed two soldiers and injured six.

### 'Friendly' hotel

Most of the victims of the hotel bombing were Iraqis living

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The BBC's Paul Wood "People were killed as they were sitting down to dinner"

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# Computable Realisations of Relations?

**Page Layout and Formatting Features:** relative size and position of image and text; font; use of borders

==> many algorithms available to analyse page and webpage structure

**Linguistic Features:** references – 'this picture shows...', 'see Figure 1'; grammatical characteristics of the text – tense; quantification; full/partial sentences

==> these can be captured with quite shallow language processing

**Image Features:** modality of images – realistic/abstract, photographic/graphic; framing of images

==> ???

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- US held talks with Iraq militants
- Dozens die in fresh Iraq attacks
- Iraq deputy PM injured in blast
- UN chief shaken by Baghdad blast
- Freed Sadr aide meets Iraq's PM

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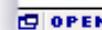
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# Automatic analysis of image modality

- ◆ It seems news images can be classified as 'specific person' or 'general person' by humans reliably, and by computers automatically on the basis of low-level image features
  - ◆ Image brightness, sharpness and colour variation
  - ◆ Face detection / size
- ◆ Ongoing work with Mark Hughes, Noel O'Connor and Gareth Jones (Centre for Digital Video Processing, Dublin City University)

## CASE STUDY 2: Discussion

- ◆ Our system of image-text relations captures some of our intuitions about how images and texts combine in print and on webpages. We have suggested 'realisations' for the relations but these have yet to be tested experimentally.
- ◆ Ongoing work
  - ◆ A bottom-up induction of image-text relations based on low-level text, image and page layout features
  - ◆ Applying relations to the moving image and dialogue in film: using audio description as a surrogate for the moving image, subtitles as a surrogate for the dialogue, and automatic video analysis to detect cinematic features

# Closing Remarks

- ◆ To what extent do interesting narrative and multimodal phenomena manifest as patterns of media features that can be detected by a computer-based analysis?
- ◆ How can a computer-based analysis feed into the development of theories about narrative and multimodality?
- ◆ What new applications will be enabled by giving computers some 'understanding' of narrative and multimodality?