

Narrative Smoothing:

Dynamic Conversational Network for the Analysis of TV Series Plots

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San Francisco, CA, USA
August 18, 2016

The “Serial Paradox”

Social Network Analysis for plot modeling

Narrative smoothing illustrated

Conclusion and perspectives

The “Serial Paradox”

TV Series: brief typology

TV Serials: continuous story / discontinuous viewing

Social Network Analysis for plot modeling

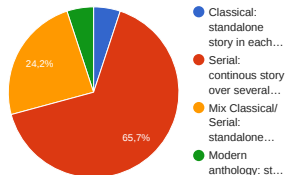
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TV Series: brief typology

1. **Classical** – **self-contained** episodes, **recurring** characters.
(*The Avengers, Columbo, Mission: Impossible*)
2. **Serial** – Single **continuous** story from one episode to the other.
(*Breaking bad, Game of Thrones, House of Cards*)
3. **Mix** Classical/Serial.
(*House MD, Person of Interest*)
4. **Anthology** – **self-contained** "units", **no recurring** characters.
(*Twilight Zone* (unit → episode), *True Detective* (unit → season))

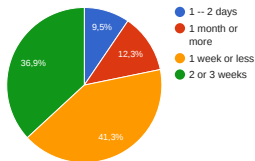
Favorite TV series genre



(187 participants, mostly students)

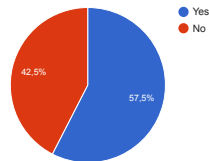
TV Series: continuous story / discontinuous viewing

Season viewing time



(a)

Need for remembering the plot before a new season



(b)

- ▶ Need for **effective recaps** of the previous season(s) plot.
- ▶ **Social Network Analysis for plot modeling?**
- ▶ 3 TV Series considered: *Breaking bad*, *Game of Thrones*, *House of Cards*.

The "Serial Paradox"

Social Network Analysis for plot modeling

Static approach based on complete aggregation

Dynamic approach: time-slices

Dynamic approach: narrative smoothing

Narrative smoothing illustrated

Conclusion and perspectives

Static approach based on complete aggregation

- ▶ Many recent attempts to apply SNA to **fictional** works.
- ▶ Most frequent approach:
 - ▶ **Static** network **agglomerating** every past interaction between the characters.
- ▶ Application to:
 - ▶ Plays (*Hamlet*):
Moretti, *Network theory, plot analysis*, 2011.
 - ▶ Novels (19th century British novels)
Elson et al., *Extracting social networks from literary fiction*, 2010.
 - ▶ Comics (*Marvel Universe*)
Gleiser, *How to become a superhero*, 2007.
 - ▶ Full-length movies/**single** TV series **episodes**:
Weng et al., *RoleNet: movie analysis from the perspective of social networks*, 2009.
- ▶ Limited to **short** stories that only **unveil** a **fixed** social network but do not **impact** it.
- ▶ **Dynamic** perspective more appropriate for **long-term stories** as in TV serials.

Dynamic approach: time-slices

- ▶ Main issue: **parallel** interactions **shown sequentially** onscreen.

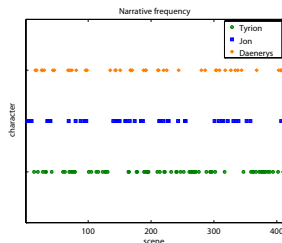


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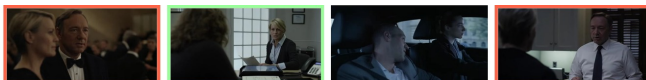


- ▶ Basic method: **agglomerate** interactions over fixed-length **time-slices**.
- ▶ **Ideal** "snapshot rate" tricky to set:
Clauset et al., Persistence and periodicity in a dynamic proximity network, 2012.
- ▶ Frequency of 3 **narrative arcs** in *Game of Thrones*, first two seasons:



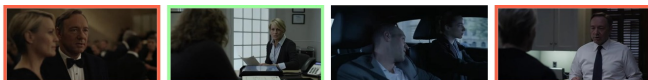
Dynamic approach: narrative smoothing

- ▶ Objective: dissociate **dynamic network** / **narrative temporalness**.
- ▶ **Weighting scheme** of a relationship:



Dynamic approach: narrative smoothing

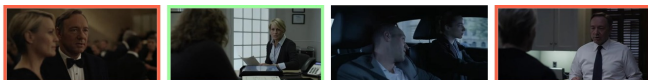
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- ▶ $w_{ij}^{(t)} = h_{ij}^{(t)} \rightarrow w_{12}^{(1)} = 30, w_{12}^{(4)} = 20$

Dynamic approach: narrative smoothing

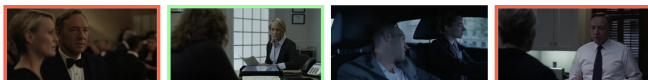
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- ▶ **Narrative persistence**: $\Delta_{ij}^{(l)}(t) = h_{ij}^{(l)} - \sum_{t'=l+1}^t \sum_{k \neq i,j} (h_{ik}^{(t')} + h_{jk}^{(t')})$
 $\rightarrow \Delta_{12}^{(1)}(2) = 30 - 40 = -10$
- ▶ **Narrative anticipation**: $\Delta_{ij}^{(n)}(t) = h_{ij}^{(n)} - \sum_{t'=t}^{n-1} \sum_{k \neq i,j} (h_{ik}^{(t')} + h_{jk}^{(t')})$
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- ▶ $w_{12}^{(2)} = \max\{-10, -20\} = -10$
- ▶ $w_{12}^{(3)} = \max\{-10, 20\} = 20$
- ▶ **Weight normalization**: sigmoid function.

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The protagonists

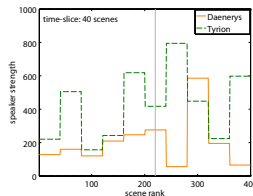
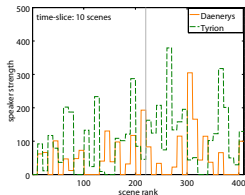
The relationships

Conclusion and perspectives

The protagonists

Dynamic **strength** of two major characters of *Game of Thrones*:

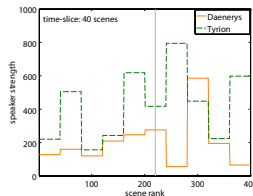
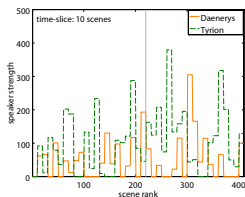
- ▶ Time-slices: **10** scenes (left), **40** scenes (right):



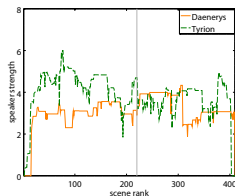
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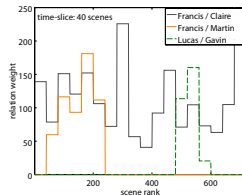
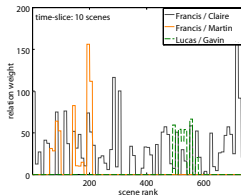
- ▶ **Narrative smoothing:**



The relationships

Dynamic **weight** of 3 relationships between 5 characters of *House of Cards*:

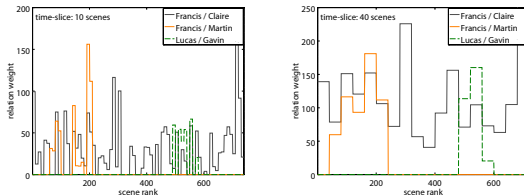
- ▶ Time-slices: **10** scenes (left), **40** scenes (right):



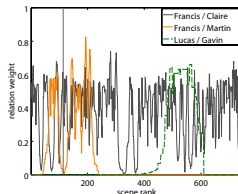
The relationships

Dynamic **weight** of 3 relationships between 5 characters of *House of Cards*:

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- ▶ **Narrative smoothing:**



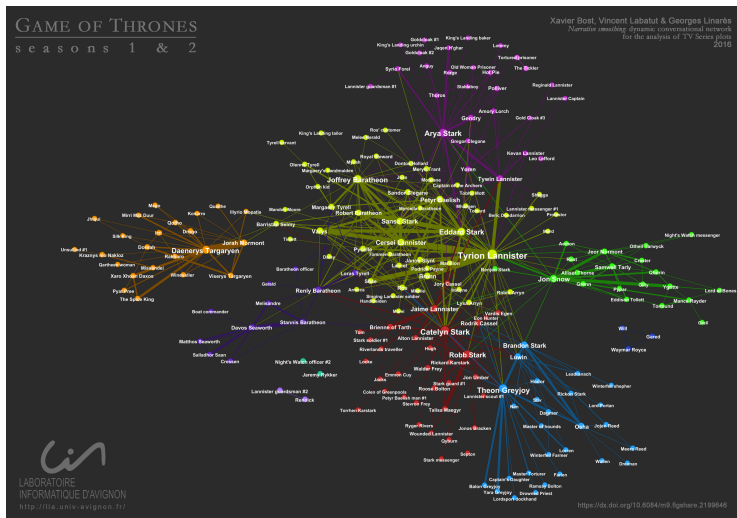
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- ▶ **Qualitative** evaluation, but:
- ▶ **Summarization framework** of TV Serials based on narrative smoothing (Submitted).
- ▶ The method should **generalize** well to:
 - ▶ Any **other narrative**: parallel interactions are shown sequentially.
 - ▶ Cases where the whole set of interactions is **not fully monitored** at any moment.
- ▶ **All data available** on *Figshare* (see paper or personal website).

Complete aggregation over *Game of Thrones*, first two seasons.

Dynamic social network of *Game of Thrones*, first two seasons.

