

CYBEREMOTIONS - Collective Emotions in Cyberspace
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Motivation

Emotions are an important part of most societal dynamics. As with face to face meetings, Internet exchanges may not only include factual information but also emotional information; how participants feel about the subject discussed or other group members. The development of automatic sentiment analysis has made large scale emotion detection and analysis possible using text messages collected from the web.

We present results of two years studies performed in the frame of CYBEREMOTIONS Project (Collective emotions in cyber-space). It is an EU Large Scale Integrating Project within the 7th Frame Programme in FET ICT domain Theme 3: "Science of complex systems for socially intelligent ICT and it associates nearly 40 scientists from Austria, Germany, Great Britain, Poland, Slovenia and Switzerland.

Achievements

Among the most significant CYBEREMOTIONS achievements are:

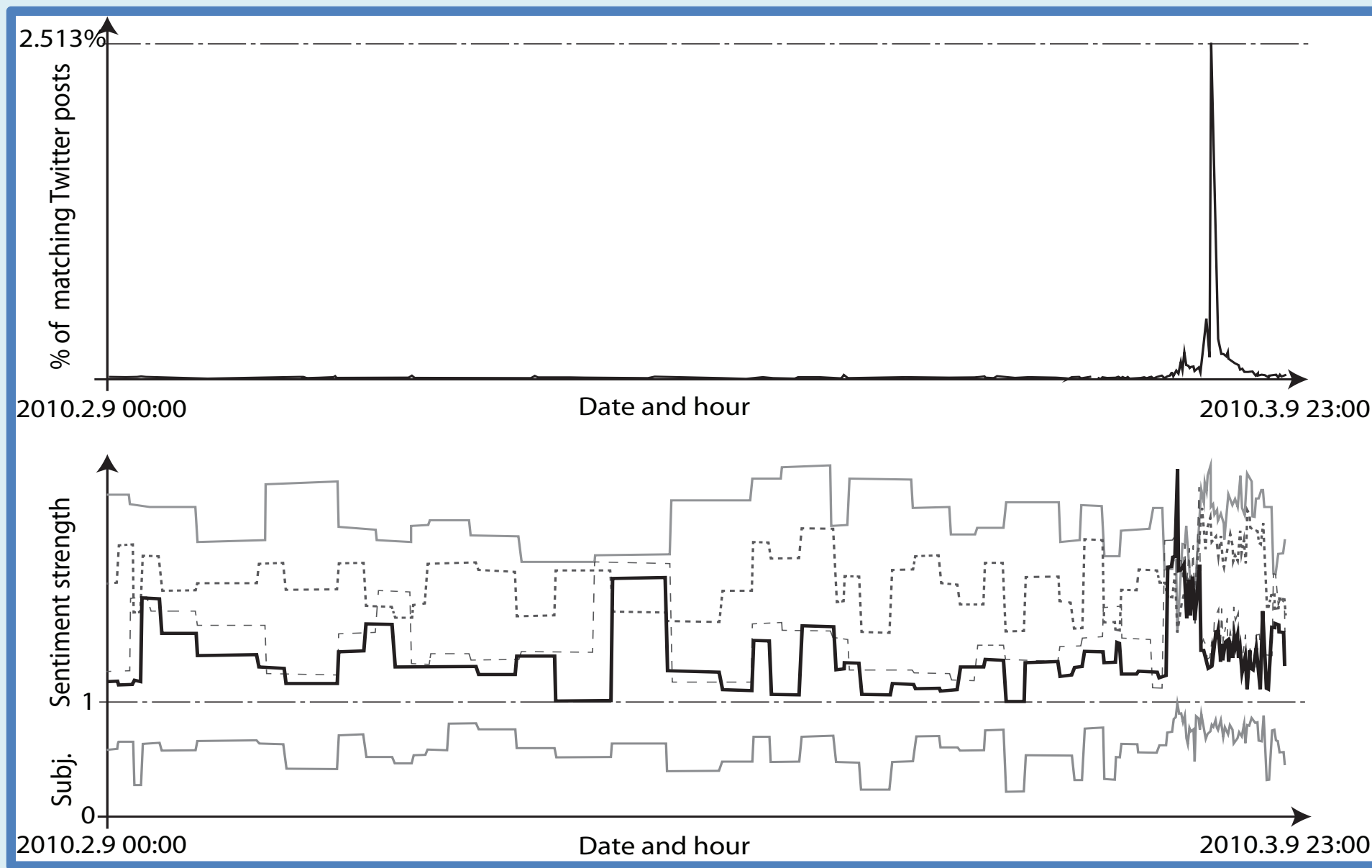
3D-EmoChatting and Emo-Dialog experiments

Developing and performing such experiments where users discussed in real time via their avatars or text interfaces to other avatars or simulated agents. The experiments integrated sentence-based emotion generator and applied graphics engine using models of valence, arousal and dominance for emotional coordinates as well as asymmetric facial expressions. They were carried out by the virtual reality team at EPFL and OFAI in a tight collaboration with UW, ETH, WUT, Gemius and JUB groups.

Confirming of collective emotions emergence

in cyber-communities by four project teams applying different methods and using independent datasets:

- avalanches distribution observed in BBC blogs, and Digg data by JSI;
- non-random clusters distribution observed in Blogs06, BBC Forum, Digg and IRC channels by WUT;
- persistent character of sentiment dynamics observed by ETH for IRC channels using the Hurst exponent analysis;
- causal sentiment triad distribution found in Network Motif Analysis by TUB.



Twitter analysis

Even positive popular events normally generate increases in *negative* sentiment strength. See Twitter volume (top) and sentiment (bottom) *Sandra Bullock* posts around the Oscars. Thick black line: average negative sentiment strength; thick grey line: average positive sentiment strength. Thinner lines: subjective texts [1].



Physiological observations of emotions

Our approach emphasizes a multi-level perspective on subjective and physiological (e.g., facial EMG, EKG, Skin Conductance) reactions while participants are reading, writing, or responding to emotional online discussions as they occur.

CYBEREMOTIONS

Collective Emotions in Cyber-Space

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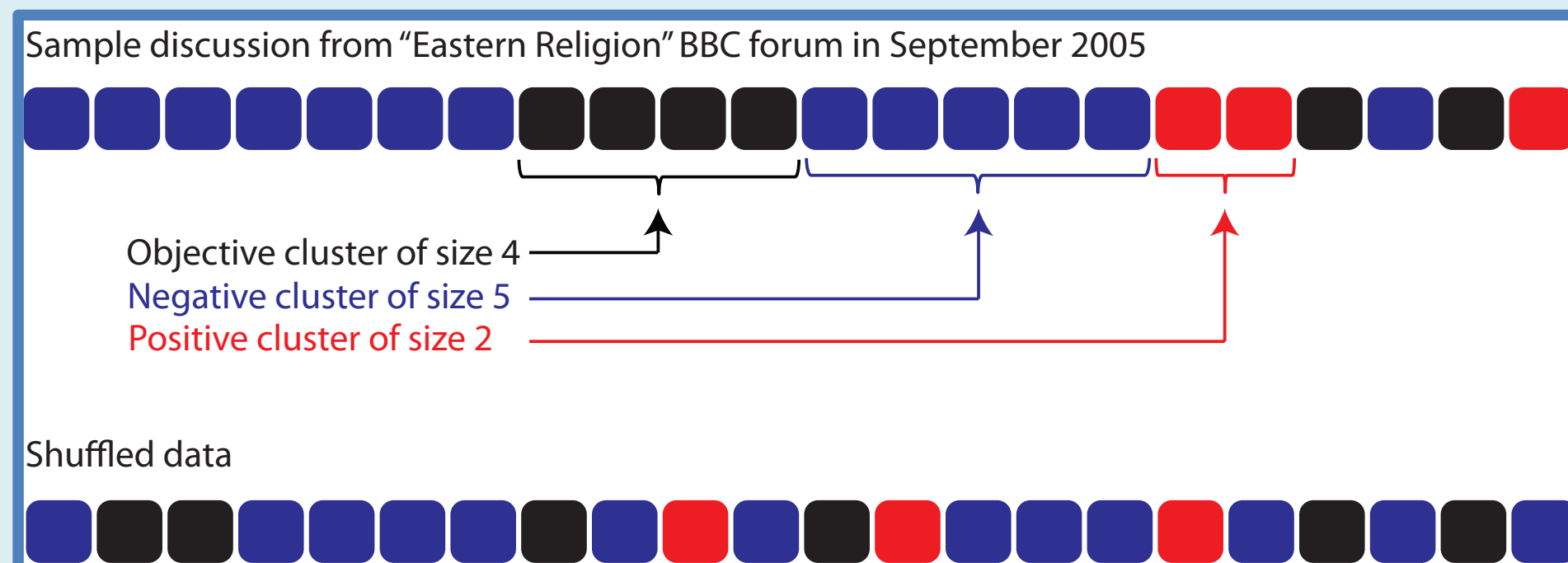
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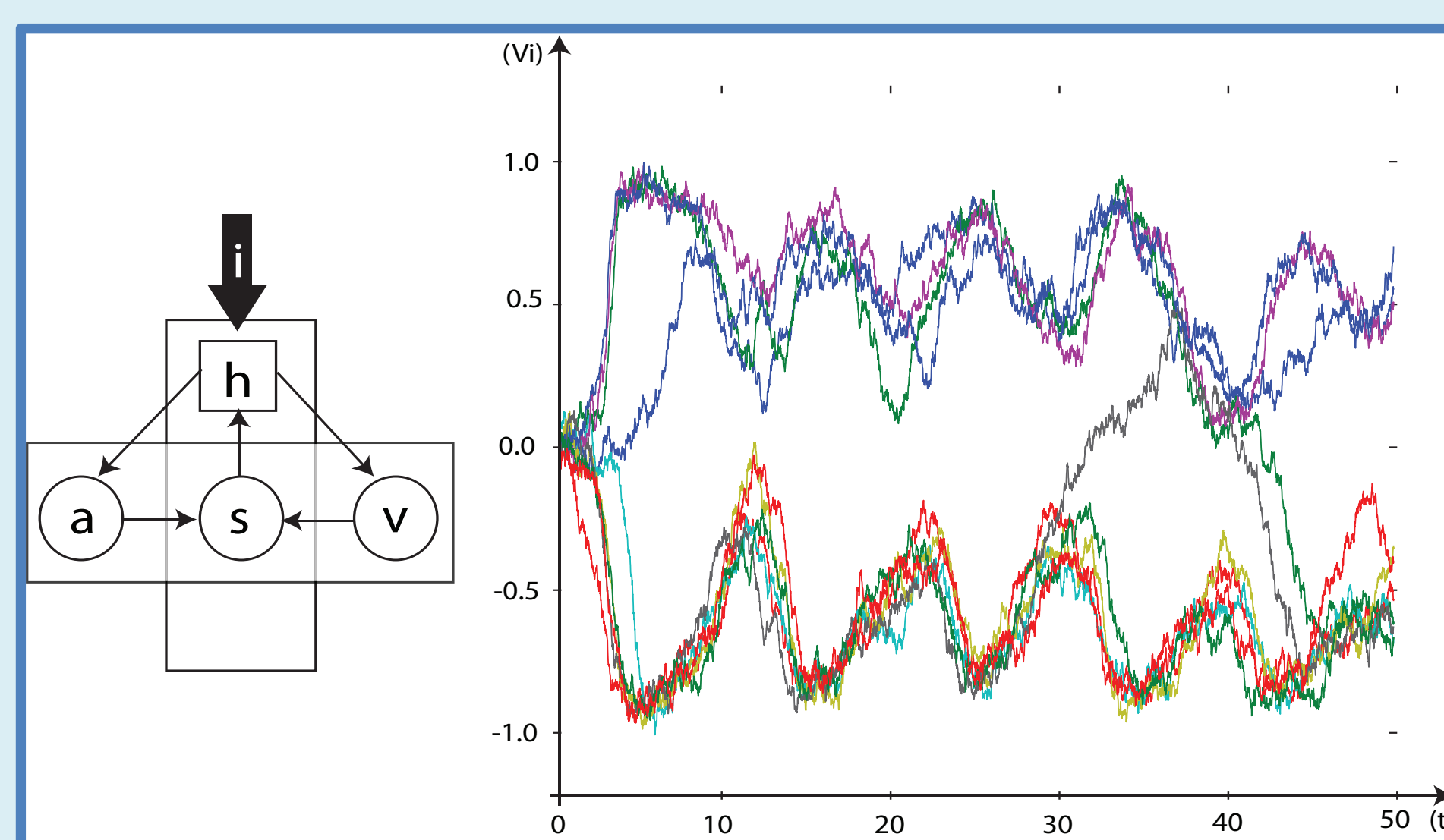


Emotional clusters of Forum posts

To test emotional influence among community members, we grouped posts into clusters with similar emotional valences. The frequency of long clusters was much higher than that predicted by a random allocation of emotions [2].

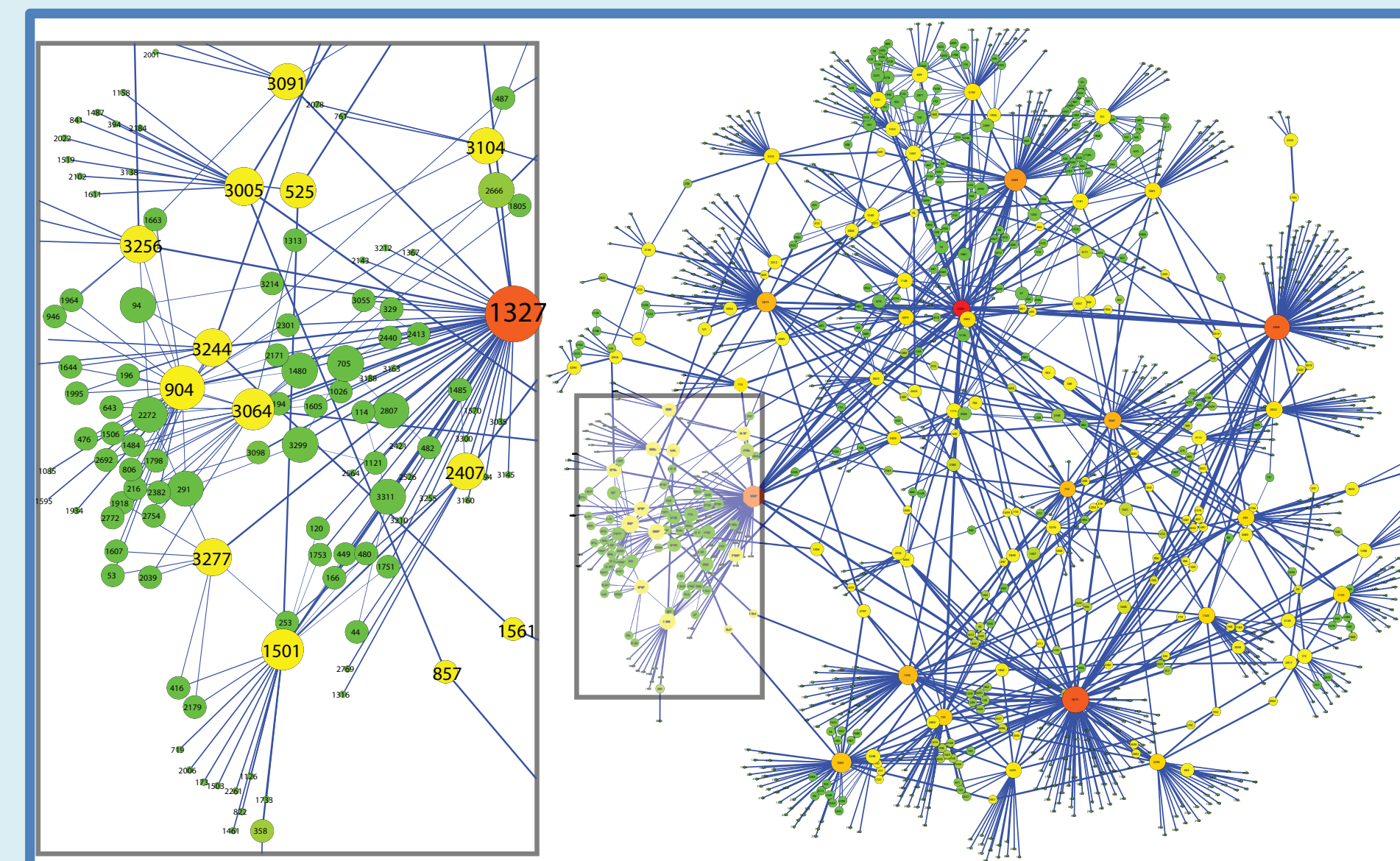
Affective dialog systems

Affect Listeners are dialog systems applied for studying communication processes. These tools are used to investigate the role of emotions in online, synchronous natural-language-based communication. Experiments demonstrated their capability to conduct dialogs as realistic and enjoyable for users as in a Wizard of Oz setting and to establish an emotional connection. Further, users' ratings of the emotional connection to the system correlated with its affective profile [5].



Agent modeling of affective interactions

Agents represent Internet users with an emotional state composed of valence (v) and arousal (a), which determine the expression of the agent (s). These expressions aggregate in a field (h) which might receive external influences (I) [3].

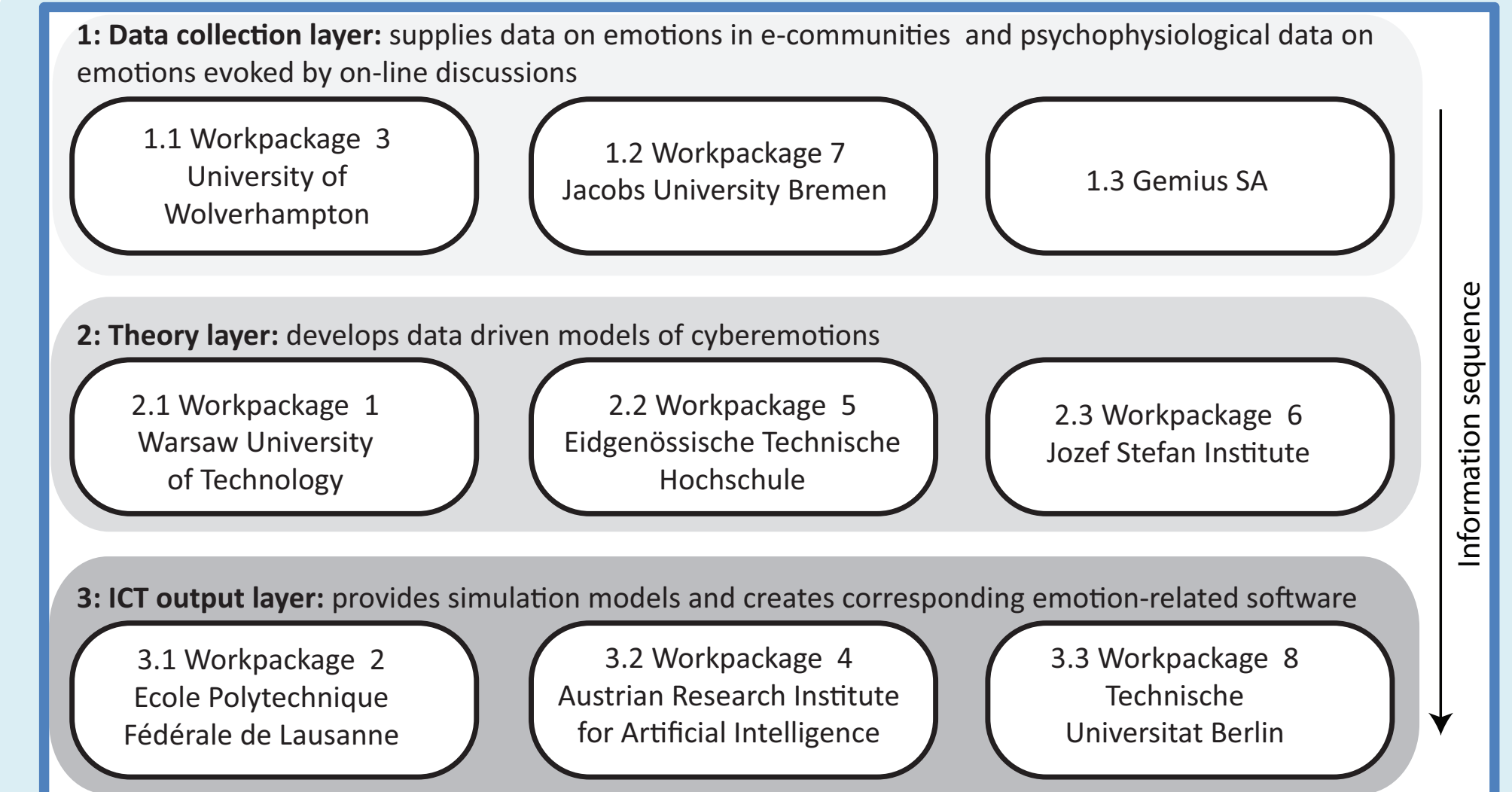


Propagation of emotions in social networks

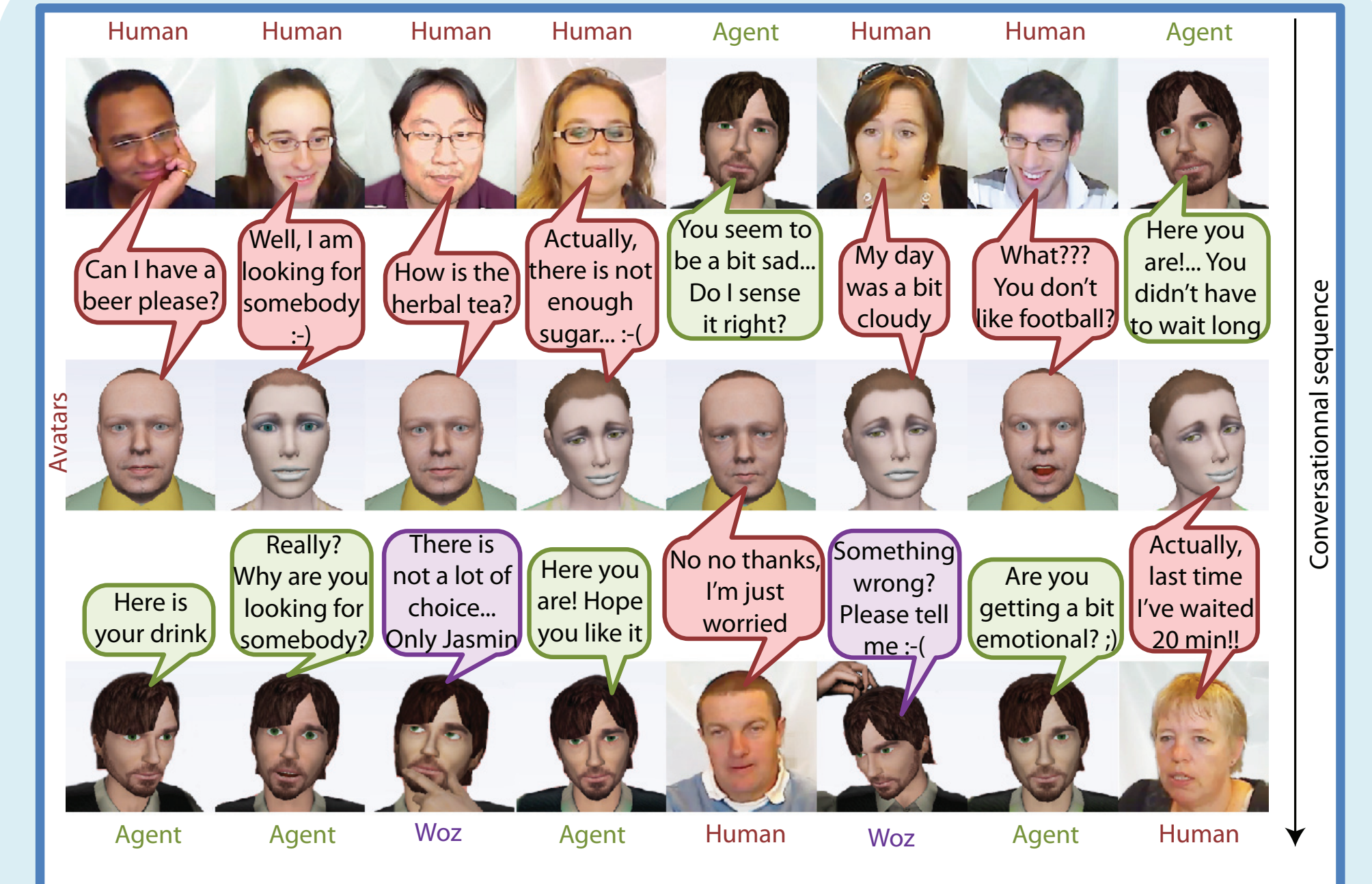
An example of dialogs network in MySpace. Emotional avalanches reflect collective behavior among Web users on Blogs and in the dialogs on social networks. The phenomenon of self organized criticality has been observed [4] (Fig. by JSI team).

Goal

Our goal is to understand the role of collective emotions in creating, forming and breaking-up ICT mediated communities and to prepare the background for next generation of emotionally-intelligent ICT services. Nine Project teams are organised in three layers. **The data collection layer** supplies data on emotions in e-communities and psycho-psychological data on emotions evoked by on-line discussions. **The theory layer** develops data driven models of CYBEREMOTIONS. **The ICT output layer** provides simulation models and creates emotion-related software.

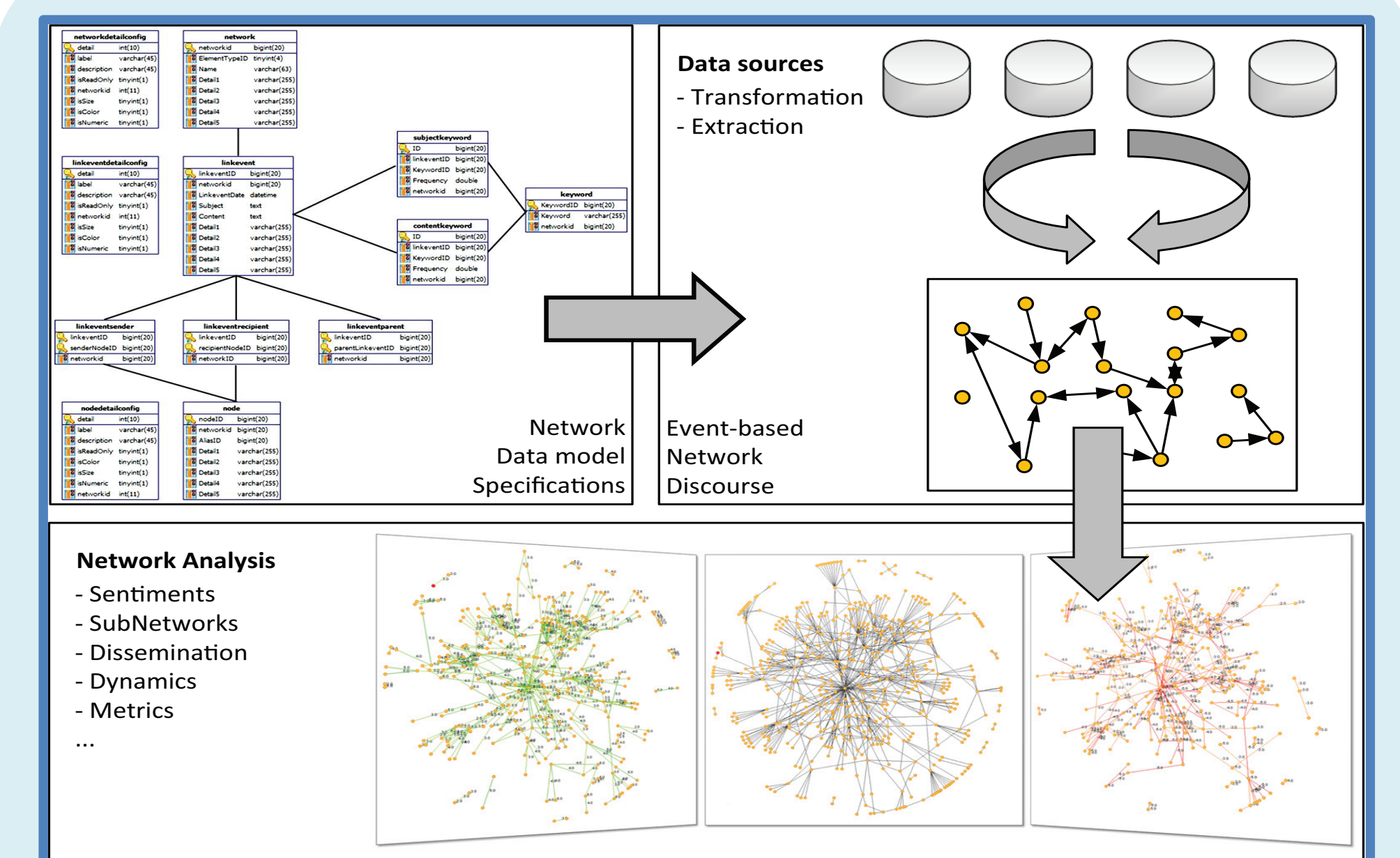


Input and output workpackages (WP)



Emotional avatars and agents

We elaborated two models and respective real-time 3D software to simulate verbal and non-verbal communication between virtual humans. The resulting simulator—tested by user-tests similar to MMO systems—is a first step towards a micro virtual society including interpersonal relationships [6].



Event based network discourse

The dynamic analysis of sentiment propagation in social networks is an event-based network data model, capable of accommodating direct as well as indirect interaction data of any kind, such as online fora or e-mails [7].

References

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