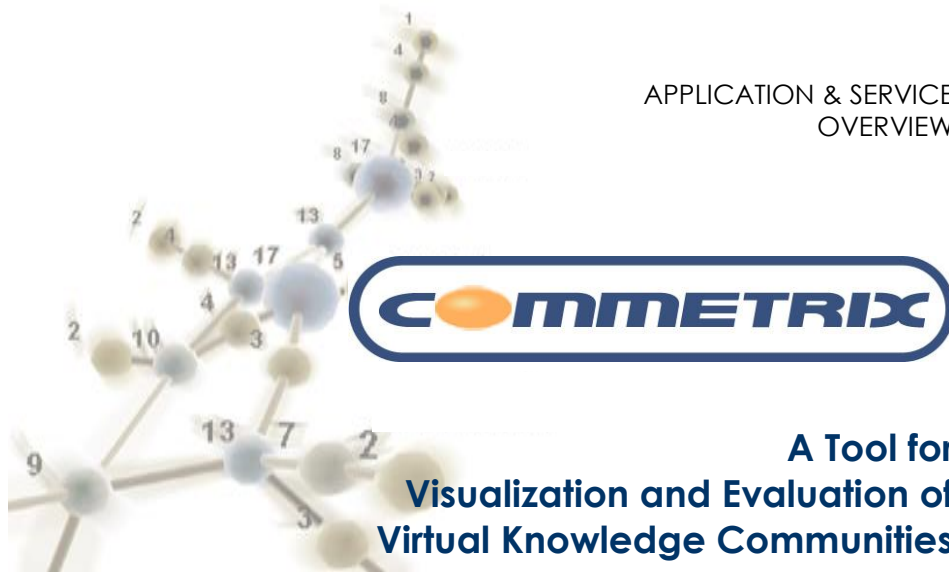




A Tool for Visualization and Evaluation of Virtual Knowledge Communities

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Introduction

For the support of large and geographically separated groups, Community Software usually offers a compilation of features. Traditional features are discussion boards, urgent request facilities, blackboards, e-mail listservers, or membership directories. Advanced Applications may additionally offer synchronous communication spaces like chats (text or video-based), document storage, evaluation systems, buddylists, alert agents, mailcenters, and calendars. What is missing is transparency about the actual structures and properties of these groups. To answer this need, the Commetrix Project develops an application, which is able to connect to common sources of electronic communication (networks). The rich archives are imported and analyzed using statistical analysis, social network analysis, and text-based analysis. For the moderator, researcher or member of a knowledge community, Commetrix provides manipulatable 2D and 3D visualizations which are based on graph visualization algorithms like 3D weighted Fruchterman-Reingold etc. Various filters allow for visualizing EGO-networks (limited set of authors), topical sections etc. over time !

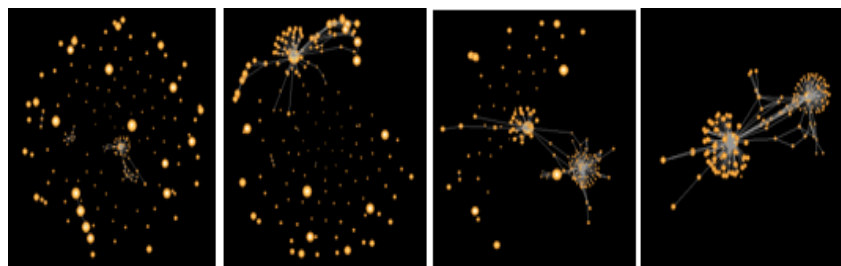


Figure 1: Observing the formation of an electronic communication network in 3D.

Application areas

What can you do with this application? Commetrix is a software application. Its application objectives are to help and support Community Moderators, Members, and Researchers with the following challenges:

- understanding your customer communities
- **understanding** your employee communities
- showing the communication/collaboration patterns in cross-departmental or **cross-organizational collaborations**
- eliciting the **core structures** in massive electronic communication networks
- providing ego-centred 'ego-networks' for busy people with diverse contacts
- **visualizing** and measuring the agility and the speed of a network
- monitoring the **evolvment** and growth of customer communities
- trace special events and their effect on the **communication behaviour**
- elicit **topic and expert maps** from past electronic communication
- identifying clusters of your community working on **topics**
- etc.

Network Analysis Projects

There are three areas of application for the three domains corporate users, academic researchers, and private users.

I. For corporate users interested in an innovative communication network analysis project, we offer two methods: Single channel analysis and multiple channel analysis. The latter includes the integration of various communication channel to derive the whole picture of the invisible networks and pathways in the organization. Additionally we can extend the analysis with features for continuous monitoring (see E4 below).

Ia. Corporate Single channel analysis project: We seek project partners, who are interested in discovering and analyzing their corporate communication networks. This can elicit groups of experts engaged in furthering various corporate issues or simply give insights about existing communities to elicit their active and inactive parts. Object of analysis can be the e-mail network, a discussion group, instant messaging, or even VoIP usage. The project could also be targeted at understanding and analyzing customer communities. Dynamic analysis can show the parts with largest growth or decline or alert when sudden changes and dynamics occur. If you are interested in this option, please send an e-mail to trier@sysedv.tu-berlin.de. (also see CORE below)

Ib. Corporate Multiple channel analysis project: This project proposal will tap the full potential of visualizing virtual communication and collaboration. We seek a project partner to identify and elicit various channels of communication and collaboration, including joint meetings of people, joint document authorship, joint team actions, and of course communication traces. This will allow to create a picture of the real work patterns in a corporation. As multichannel analysis is still in its research stage, we currently invite project partners, who are willing to cooperate in this research on a self-cost-base, i.e. by funding the costs of this exploratory venture. This will primarily include the costs of capturing requirements and data plus the costs of developing the necessary integration transformations. If you are interested in this option, please send an e-mail to trier@sysdev.tu-berlin.de. (also see E3 below)

II. Academic Research Cooperation. Coming from academic research ourselves, we would like to assist researchers in better understanding their datasets with complementing visualizations and the extraction of main network cores and clusters. If you are interested in such a cooperation, please send an e-mail to trier@sysdev.tu-berlin.de. Describe the demand you need, and we will have a look, what we can do for you.

III. Individual (private) Users. Next to seeking project partnerships with professionals, we also want to consider the private user who wants to see his environment of electronic communication in e-mail, instant messaging or (nntp, php, slashdot) newsgroups. For this application, we currently also work in parallel on a client version, which will soon enable individual users to apply the tool to analyze their personal dataset. To simplify the tool for end users, a Commetrix client will connect to a secure online application server and a secure data server via internet. If you are interested in trying this option, please send an e-mail to trier@sysdev.tu-berlin.de. We will put you on a list and offer you a test licence, as soon as the appropriate project status is achieved.

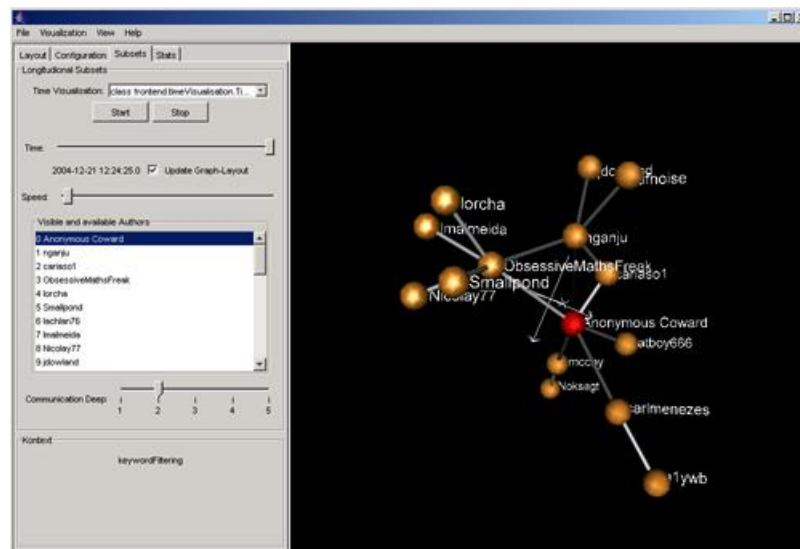


Figure 2: The user interface and a 3D visualization of an electronic discussion

Project approach and procedure

Project approach. We suggest the following project procedure (see figure below). After defining your project's objectives and selecting your communication channels (E1), we will check the availability of those channels for analysis. The next step (E2) can be necessary to develop the required connectors to capture data from the selected data sources, i.e. communication channels. Further, according to the project objectives, it can be required to develop extended analysis and visualization functionality to meet your personal monitoring needs (alerting functions, special coloring methods, reporting features, etc.)

The main element of the project (CORE) is then the implementation and test of the application, including the required user clients, the server and the database. After test imports of the data, the single channel analysis can be executed. This can be seen as a special analytical method (project) including structural and social measurements, visual structural and social network analysis, keyword and content analysis and egonet and growth/evolution analysis to see your networks' dynamics.

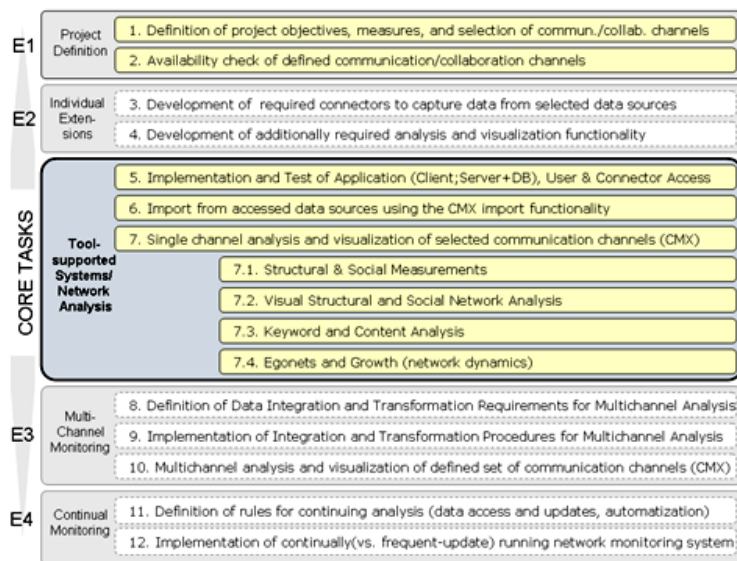


Figure 3: Commetrix Project Approach.

After successful single channel analysis, a multi channel monitoring can be optionally added (E3). It will include the definition of data integration and transformation procedures and another analysis iteration. Finally, the project can be manifested with continual monitoring (E4) to have a continuous monitor running which includes new communication data on a real-time basis.

The figure also implies that the steps 5 to 7 (implementing the tool and conducting the analysis) are the CORE PROJECT. All other blocks are optional extensions (E for extension). E1 and E2 are highly recommended to elicit the most value out of your analysis project. E3 and E4 can extend the picture and application. E3 and E4 are currently in research and development stage, therefore we invite you to become a project partner on a self-cost-base.

Features

Commetrix offers a variety of features to access, retrieve, show and manipulate networks of electronic communication. The following list shows an incomplete list of those features:

- Supports individual connectors to virtually any electronic communication net
- Imports NNTP-based standard newsgroups
- Imports Slash.dot based HTML discussions
- Imports MBOX-based Unix e-mail archives
- Imports Outlook e-mail archives (planned)
- Imports Notes e-mail archives (planned)
- Updating existing discourse imports with new data
- Extracting Keywords from discourses
- Annotates the relationship network with keywords
- Calculating network analysis measures
- Adding editable author and relationship properties (like affiliation, evaluation)
- Allows for content coding and visualization
- Renders 2D and 3D networks of communication
- Rotate and zoom the network graphs
- Allows for time-based observation of growth of the network
- Clusters network into subgroups based on network structure
- Stores screenshots
- Allows for picking authors to observe their author properties
- Allows for limiting visible authors to generate EGOnets and partial networks