NITE Annual Report 2001

nite.nis.sdu.dk

NITE (Natural Interactivity Tools Engineering) aims to develop a workbench for annotating and analysing full natural interactive communicative behaviour between humans as well as between humans and systems.

To considerably improve the naturalness of human-system communication, we need a far better understanding of human communicative behaviour than is available at present. First of all, we need high-quality data to better understand the details of human communicative behaviour. Secondly, a wide range of theoretically well-founded coding schemes are needed for coding the details of the communication, each capturing a particular class of phenomena, such as speech prosody or the facial expression of emotion, or the interrelationships among such phenomena.

The purpose of the NITE toolset is to help advance our understanding of complex natural interactive communication by enabling researchers and developers to annotate and analyse high-quality data.

Summary of 2001 Activities

NITE started on 1 April 2001 and has so far focused on the specification of the NITE workbench (documented in deliverable D1.1) and its initial implementation. A number of coding tools covering various aspects of the coding of natural interactive communication are already available and have been surveyed by the ISLE (International Standards for Language Engineering) Working Group on Natural Interactivity and Multimodality (NIMM, isle.nis.sdu.dk) cf. ISLE deliverable D11.1. NITE builds on three of the most important among those tools, i.e. MATE (mate.nis.sdu.dk), ANVIL (www.dfki.de/~kipp/anvil) and Noldus Observer (www.noldus.com/products/index.html?observer/index). Two different development strands are being pursued. One strand will lead to open source software and builds on MATE and ANVIL while the second strand aims at commercial product development and builds on Noldus Observer.

Three project workshops have been held in 2001 at different partners sites and several NITE partners have participated in NITE relevant events to promote the project.

In 2002, work will continue to focus on further workbench development and the development of the NITE markup framework. Evaluation with project-external users will start in spring 2002.

Work progress

Workbench specification

An overall specification of the NITE software has been completed with the aim of providing flexible, user-definable support for coding natural interactivity and multimodal corpora. As point of departure for the software development we are using three different software packages, i.e. the MATE workbench, ANVIL and The Observer. One development strand will lead to open source software and build on MATE and ANVIL while the second strand aims at commercial product development and builds on Noldus Observer. The specification of the NITE workbench includes considerations on target user groups, users' backgrounds, and user needs. A fairly complex use case on turn-taking

negotiation has been used to drive the specification work by helping to determine the extent, complexity, and interrelatedness of the many different kinds of natural interactive and multimodal phenomena for which annotation support is required. This has generated a long series of requirements which are reflected in the functionality and usability specifications.

Markup for natural interactivity

In the ISLE project, a large amount of work is being done on collecting and describing annotation schemes for the markup of facial expression and gesture, both individually and together and both with and without combination with speech annotation. These annotation schemes are documented in ISLE deliverable D9.1, a final version of which will be available in February 2002. In addition, more than 60 annotation schemes for spoken dialogue data have been documented in MATE deliverable D1.1. NITE will build heavily on the state-of-the-art information collected in ISLE in order to identify, and subsequently implement, a set of best practice natural interactivity coding schemes or schemes which can be used as a basis for generating best practice schemes. Moreover, NITE will build on the markup framework developed in MATE and extend it to meet the additional needs which arise when moving from speech only annotation (cf. MATE) to full natural interactivity annotation, including facial expression and gesture.

Workbench development

The purpose of the NITE toolset is to help advance our understanding of complex natural interactive communication by enabling researchers and developers to annotate and analyse high-quality data. Since this data is mainly acoustic and graphical, the NITE toolset must:

i.   allow users to perceive voice and video data and control its presentation.

ii. As users will need coding schemes for their work, the NITE tool must enable users to specify (enter) new coding schemes and use them for annotating any kind of natural interactive communication, however complex, including cross-modality interrelationships between multiple classes of phenomena.

iii. Unless (semi-) automatic and a matter of routine, annotation is usually followed by analysis. The NITE toolset must enable users to analyse their codings through visual inspection of multiple codings of the same data together with visual/acoustic inspection of the data themselves, as well as making advanced queries of the annotations made.

iv. Finally, the NITE tool must be usable by all experts in, and students of, natural interactive communication annotation and analysis.

(i)-(iv) constitute the core NITE requirements because they all have to be met by a general-purpose natural interactivity annotation tool. Surrounding these core requirements are a series of user desiderata which, however, do not necessarily have to be met by the NITE tool itself but could just as well be met by existing, or new, tools developed independently of NITE but preferably capable of exchanging information with the state-of-the-art NITE internal XML engine. For instance, several tools already exist for orthographic and phonetic transcription, and several existing statistics packages have the functionality that NITE tool users will need.

A good user interface is crucial to the tool's success. The NITE user interface will be a uniform visual/acoustic interface which offers the kinds of customisation familiar from many other programs. The interface will otherwise be quite complex since it has to cater for the presentation of raw data, multi-level, cross-level and cross-modality annotation, free-style comments, annotation analysis, annotation comparison, search and inspection of query results, as well as basic interface operations such as file saving, printing, deletion, overview, duplication, import and export. Figure 1 illustrates what the annotation interface will look like.

For software implementation we are using C++ and Java. XML is being used for internal file representation.

Prototype software running on a Windows platform is scheduled to be demonstrated and tested by conference participants at LREC 2002.
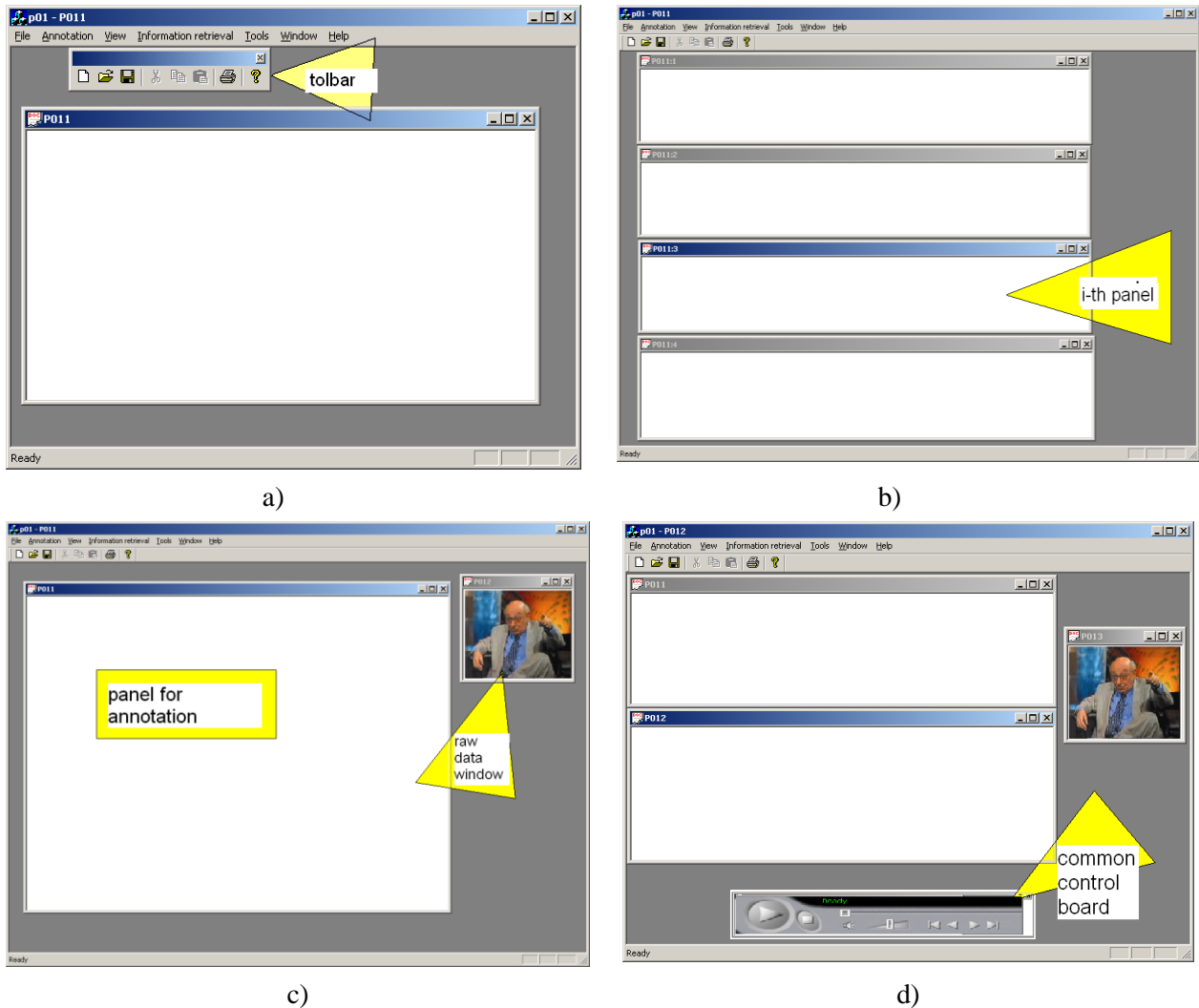
Figure 1. a) shows the main window toolbar which contains the changeable (contents-sensitive) set of buttons. b) shows the changeable amount of *panels* of the *i*-th class of phenomena to be annotated – 1 up to 10 panels. c) shows the raw data window displaying the different types of raw data (video, audio). d) shows the common control board.

User Group, Promotion and Awareness

The NITE project and its results have many potential users in research and development from many different areas including, e.g., multimodal dialogue systems, linguistics, psychology, anthropology, and human factors. To make results as widely useful as possible, the NITE consortium would like to involve workers in all those areas in toolset development and evaluation. Thus,

- A public web site (nite.nis.sdu.dk) informs about the project, its activities and results.
- An Advisory Panel will be established in early 2002. Potential NITE users from many different areas will join the Panel to discuss progress and results with the NITE partners.
- NITE partners will participate in international and national conferences and workshops to promote the project through talks and demonstrations.
- NITE prototype demonstrations have already been planned for LREC 2002 in Las Palmas and Measuring Behaviour 2002 in Amsterdam, and more will follow. On these occasions, conference participants will be invited to try the software and provide feedback.

Future Work

During the first half of 2002, we will continue to focus on the development of the NITE workbench and the NITE standard markup framework. In early 2002, colleagues from across the world will be invited to join the NITE Advisory Panel in order to follow, comment on, and evaluate the project and its results based on early access to deliverables and software, and NITE workshop participation opportunity. If you are interested in joining the NITE Advisory Panel, please just send an email to NITE coordinator Prof. Niels Ole Bernsen at NISLab (nob@nis.sdu.dk) or contact any other NITE partner.

A first prototype of the NITE workbench is scheduled to be available in spring 2002 for demonstration at LREC 2002 together with The Observer from Noldus. Conference participants will be invited to evaluate the software for annotation of multimodal corpora. Test scripts will be provided by members of the NITE consortium. Feedback received during this event will help the NITE consortium to improve functionality and usability of the software to better meet users' needs.

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Further Information

NITE and NITE-related reports and publications from the MATE and ISLE projects are available at:

- isle.nis.sdu.dk
- mate.nis.sdu.dk
- nite.nis.sdu.dk