CELTIC
Telecommunication Solutions
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Tele-Immersion For Applications supporting New Interactive Services

TIFANIS will design and build the first real 3D videoconferencing system in Europe. This technology, known as tele-immersion, will empower the industry and the scientific community in their collaborative tasks, especially in the areas research and design, with the help of embedded applications.

Main focus

TIFANIS intends to create a collaborative environment not only for videoconferencing, but for remote real-time collaborative work. Due to this fact, TIFANIS addresses several domains, in the design as well as in the application layer (multimedia, broadband networks, user terminals and interfaces).

The reason why tele-immersion (TI) is becoming an outstanding new application in the Internet2 initiative is twofold. On the one hand it provides new possibilities of personal interaction between distant partners, in a natural way, providing both new capabilities of handling and exchanging information between each other. Current videoconferencing lacks eye-to-eye contact and real-size representation. On the other hand, it requires a high performance of the network platform in terms of QoS parameters. This application has become a key performance test suite to validate new implementations of high-performance networking architectures like those based on the GigaPoPs in Internet2.

Tele-immersion experience
at the University of North Carolina

TIFANIS

Tifanis

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Partners
Alterface, Belgium
Multitel, Belgium
Université Catholique de Louvain, Belgium
Centro de Astrobiologia, Spain
Fundación I2CAT, Spain
Telefónica I+D, Spain
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Approach

In TI applications, the realistic 3D imaging of the distant partner is generated by a three-camera set, taken from a sea of cameras located behind a semi-transparent large-size flat screen in the distant location. The three-camera set chosen in the distant location depends on the relative position of the head of the local partner regarding the viewed image of the distant one in such a way that if the local partner moves his/her head to the right side the set of cameras being activated with the ones situated to the left side of the remote partner that will provide the 3D image of his/her left profile. For a sea of seven cameras, the equivalent computing capacity needed to run the movement predicting algorithm has been proven to be a 8 Pentium IV at 2 Ghz PCs array.

To cope with the networking bandwidth resources optimally, high performance imaging compression algorithms are needed. Finally, taking advantage of the high computing capacity allocated in the TI terminals sophisticated capabilities are supported within the TI session in order to enable both partners having the possibility of interacting or viewing 3D animated sequencing. Thus, they can show a presentation or handle a 3D object jointly.

Some other technologies involved in the TI applications, which need to be evaluated are, for instance, the ones involved in large flat screens, where, as described, a pool of cameras can be embedded behind it in order to provide a realistic view.

In addition, new user interfaces will provide a natural interaction between the user and the application in an intuitive way. One of them is the pointing mechanisms for pointing to or interact with 3D objects shown. Another user interface is a heavy helmet needed in some cases by the users to get the 3D image feeling. These are some challenging aspects of TI which need to be improved. as Another challenge is the costs reduction concerning some implementations that show costs per equipment needed of around 100 times the current costs of a high quality videoconferencing equipment.

Main results

As a result, there will be an overall internetworking scenario throughout two countries and a set of partners distributed along different networks to run the application trials. This scenario points the major project objective, which is to run a four-month trials with two different TI applications among a set of partners:

- Collaborative R&D work in a bio-engineering environment. (Trial 1)
- Remote lab instruments and tools handling in an R&D environment. (Trial 2)

The tele-immersion application will consist of a real 3D videoconferencing system and embedded scientific applications, depending on the trial scenario: 3D molecule handling, for the first trial, and electronic microscope and remote telescope, for the second trial.

The major objective, therefore, of the project is to provide the users with a TI application suited to the two environments above mentioned, based upon the real experience of the users concerning the actual usefulness of the application in their fields of work.

Impact

TIFANIS project will focus in two main fields of applications: bio-engineering and R&D collaborative tools.

In this context, a system such as the one presented in this application could certainly impact in a huge way the pharmaceutical and bio-engineering industry by easing, optimising and speeding up the integration process, reducing costs and thus bringing a competitive advantage and added value to the whole process of drug development, from discovery to preclinical to clinical phases. Regarding the laboratories and research centers, TIFANIS architecture and applications will help on the sharing of information between remote labs, through common applications, sharing of simulation results or files, and real-time conversations between experts located in remote places, so that they join efforts and impressions and together steer an experiment. Also the use of high bandwidth networks for sending huge flows of data for distributed computation purposes will result on improvements on this field.

About CELTIC

CELTIC is a European research and development programme designed to strengthen Europe's competitiveness in telecommunications through short and medium term collaborative R&D projects. CELTIC is the only European R&D programme fully dedicated to end-to-end telecommunication solutions.

Timeframe: 5 years, from 2004 to 2008

Cluster budget: in the range of 1 billion euro, shared between governments and private participants

Participants: small, medium and large companies from the telecommunications industry, universities, research institutes, and local authorities from 33 countries

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