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Remote Service Provision for Disabled Users of Communication and Environmental Control Devices and their Care Persons

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Abstract

The EU project DE-4208 RESORT (1998-2001) developed a prototype system which provides tele-support for disabled users of PC based Rehabilitation Technology (RT) including their care persons in order to reduce existing barriers in daily usage and service of RT. For single switch (scanning) users RESORT ensures synchronisation also over narrow bandwidth network channels. The scaleable user interface is described and also the remote service API is explained which can be used by already available RT software products. Thus they can benefit from tele-help functionality provided by the RESORT system.

Introduction

An increasing number of disabled people is using Rehabilitation Technology (RT) systems which help them to live more independent and self-determined lives. Analysis of the provision process shows that buying and installing an up-to-date RT system is definitely not the end, but much more the starting point of a process of continuously tailoring the system to the ever changing needs of the individual user. In many cases the carers (teachers, therapists, family members) are the key agents in this process. Often a lack of experience in using and configuring RT systems causes a resulting lack of adaptation and frequently the total abandonment of Rehabilitation Technology. Generally spoken, it is anticipated that the actual use of RT systems is much lower than the real need. Presently, support is a complicated and expensive procedure due to high travel efforts and to frequent hands-on involvement of professional support personnel. The RESORT system was especially designed in order to overcome this situation by providing means for tele-help and remote service functionality dedicated to disabled persons and their carers.

Methods

The RESORT prototype system developed by the EU's DE-4208 RESORT consortium provides the following functionality:

- RCI (Remote Control Interface) for "real-time synchronisation" of two RT systems, one with the disabled user and one at the location of the service provider
- easy-to-use scaleable User Interface
- real time communication and interaction (audio & video, H.323 compliant)
- database access
- file transfer
- synchronisation of file systems
- text communication (chat) – important for non-speaking patients
- platform independency
- security and privacy

and offers three different modes of operation:

- In the <u>telecommunication mode</u> RESORT provides hands free audio communication between user and service provider. If the bandwidth is large enough an additional video link can be established.
- In the <u>student-teacher mode</u> an additional data-link is established. The service provider will load exactly the same RT application as the user is running. The two applications - at the user's site and at the provider's site - will be synchronised via the data link.
- In <u>tele-service-mode</u> the service provider has the possibility to download and upload files from and to the user's PC, modify configurations and test the changes he/she has made.

The RESORT system exploits existing technologies for tasks like video / audio transmission according to H.323 specification and data conferencing according to T.120. The user interface of the RESORT controller

can be tailored according to the needs of the users. Although the full functionality is always available, the degree of complexity of functions and interactions can be varied within a wide range. The RCI (Remote Control Interface) and the RESORT protocol allow synchronisation in real time. This is possible as only small data messages are transferred instead of changed screen contents. This method dramatically reduces the required bandwidth and enables the RESORT system to provide real time monitoring of single switch users [10]. The RESORT controller module (RC) is linked to (a) communication modules for video, audio and text-chat, (b) to the database, (c) to the RT system and (d) via network interface to the remote RC. IP is used for the network protocol. TCP/IP for control messages, UDP mainly for audio and video.
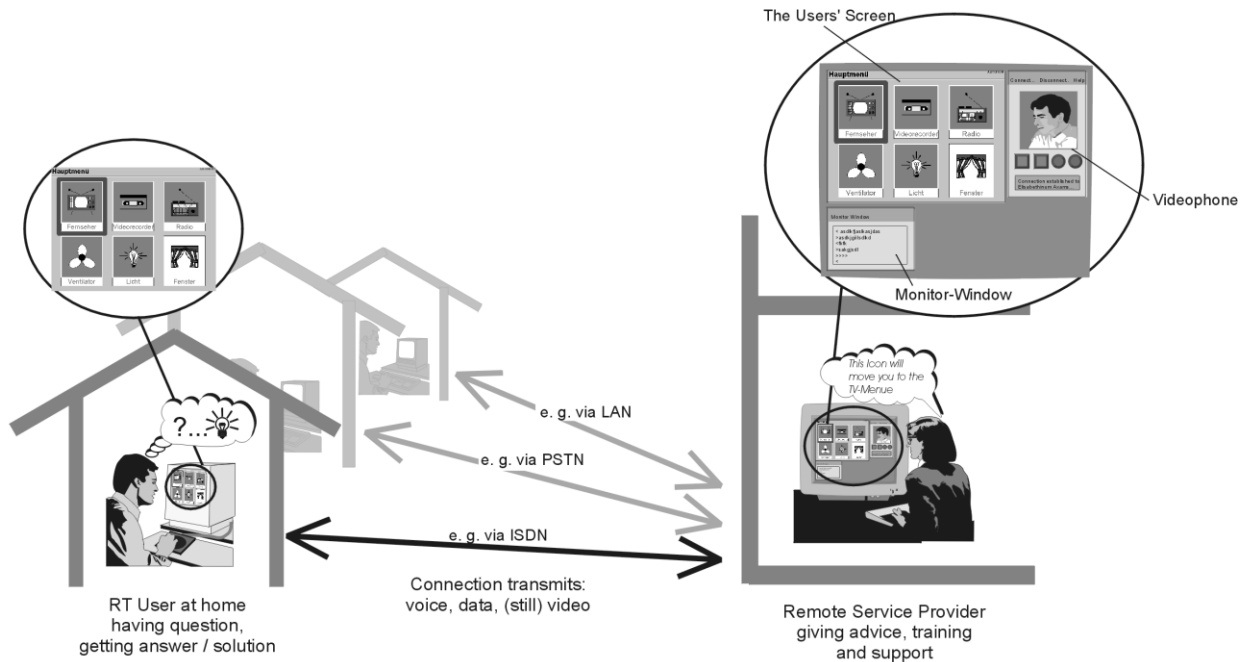

Figure 1. Remote service provision for PC based RT systems in the framework of the RESORT project

In order to test and demonstrate the benefits two existing RT systems have been equipped with RESORT interfaces [1], [15]. The prototype system was demonstrated in 15 workshops organised for care persons, disabled users, manufacturers and service providers in Austria, Germany, The Netherlands and Scotland. Additionally, real life tests have been carried out.
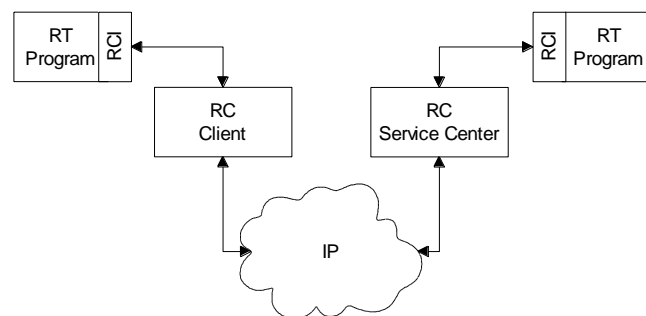

Figure 2. Remote Control Interface (RCI) between RT software application and RESORT Controller (RC) software running on client side and on Service Centre side. The specification of remote service API [12] allows to integrate an RCI into already existing RT software products

Results
The results from the real life tests have shown that the system was usable by disabled people and their primary carers. Furthermore, both primary and secondary carers consider the system a viable tool for the delivery of support for users of RT systems. When demonstrated to care service providers, they were

particularly interested in the potential for rapid access to engineering and technical support. They also saw great potential for on-line conferences involving a group of different care providers involved with an individual client. It was recognised that RESORT would cause operational changes in the care services. The RESORT prototype system demonstrated a multitude of benefits which will help to overcome existing barriers in the field of RT service provision. Additionally to the RESORT prototype software, the RESORT protocol has been developed and documented. This allows third party manufacturers to adopt the RESORT protocol for their products in order to strengthen their market position [12], [13].

Figure 3. Screen Shot from a RESORT Client during a Tele-Service session. A non-speaking head stick using person runs an environmental control and communication system called AUTONOMY [1], [5], [17] which is equipped with a RESORT Interface. The service center can be called from inside the AUTONOMY system

Figure 4. Screen Shots from RESORT Service Center during a Tele-Service Session. Left picture shows controls for video and text communication, right picture is showing controls for remotely starting and terminating RT applications at the client side (Prototype version written in Delphi running on WindowsXP)

Discussion

RESORT not only aims at technical service delivery but also at pedagogic and therapeutic support via the telematic channel. In order to ensure ongoing research and development a RESORT Interest Group (RIG) [13] was set up. The RIG provides a framework for disabled users, care persons, manufacturers, service

providers, and researchers to continue the engagement in the area of remote service provision. Interested parties are invited to watch the progress of RIG by visiting the RESORT home page [13]. In mid of year 2001 first part time service centres have been set up at TU Wien and at an Austrian SME. An evaluation version of the RESORT software package is available from the RIG home page [13]. Tele-Support and Remote Service Provision is an emerging field which will improve significantly the quality of life of disabled persons.

Acknowledgements

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