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WISDOM

Wireless Information Services for Deaf people On the Move

Summary

With the advent of 3G and WLAN technologies, sign language communication at a distance and sign language information services become a reality. Following detailed user consultations, experimental work on videophones, and video streaming in a range of networks, WISDOM developed and validated new services: **M**obile and wireless sign language services for Deaf people: **R**eal time conversation service, **S**ign language video relay service, **D**istance sign language interpreting service, **I**nterworking with fixed network text telephony, **O**n-line information in sign language and **A**utomatic sign language recognition.

The automatic sign language recognition activities produced a leap in performance, and an important base for further research. All other actions resulted in services that are deployed and which enhance opportunities for Deaf people in the wireless society. The project also contributed to standardisation to make communication for Deaf people a recognised part of mainstream development.

Setting the Scene

Typically those with special needs are left behind as technology advances. How-ever, occasionally, the needs of one group of people are able to drive technological innovation and to challenge the boundaries of that progress. Such is the situation of Deaf people and mobile and distance video communication. Deaf people need wireless, sign language based services in order to be competitive and to experience a quality of life on equal terms in the modern Information Society. The WISDOM project developed and verified six mobile services enhancing the quality of life for Deaf people.

Approach

The advent of 3G and WLAN technologies in the last five years open the way for sign language based services in mobile and wireless settings. WISDOM tested the concept of mobile video phones for Deaf people and set out the guidance needed for its implementation over the next few years as 3G network services come on stream. WISDOM also prioritised the implementation and testing of video services suited to supporting sign language. The services were verified in early user workshops, and then technology development was delivered. The services were tested in lab trials and field trials and finally validated through user interviews.

Results and achievements

The following services were the developed and tested:

Real time conversation service was created in sign language, lip reading, text and speech according to the Total Conversation concept. It is the "design for all" companion to voice telephony. Sign language conversation is vital between Deaf users. Text interaction can then be a good complement. In conversation with hearing people it text may be required during a video call, with video presence (ie seeing the face) needed for agreement and recognition.

Software for real time conversation in IP networks was implemented in small portable computers with built-in camera, providing an excellent opportunity for good quality sign language calls in WLAN networks, and was demonstrated in a 3G network with live sign language communication.

Investigations were carried out on the use of Bluetooth wireless technology in this application.

User trials were successfully performed, and the new freedom to communicate with sign language wirelessly was well received.

A new platform for sign language video relay service was constructed tested and exploited. Although Deaf people may be able to communicate with each other by video chat, they usually lack the possibility to talk directly with hearing people. The video relay concept forms a convenient link between sign language users and voice telephone users. In WISDOM a technical platform for distribution of calls to remote interpreters was developed. The Deaf person with the wireless or fixed terminal uses sign language to the video relay service which “finds” an interpreter (supplied with the Marvin software) at another remote location. This interpreter is connected seamlessly with the Deaf user and can translate from sign to voice and vice versa for a hearing user with a voice phone. The conversation flows smoothly with both users using their own language. The users may use the real time conversation software. The service was created in Sweden with sign language interpreters and tried, with successful results.

Distance sign language interpreter service is a subset of the above application for a specific scenario. Typically, a Deaf person at a meeting of hearing people is isolated without an interpreter. The video relay platform allows the Deaf person on a wireless version of the development, to access the remote interpreter in order to follow the proceedings. This service gives freedom for Deaf people to participate in small meetings at short notice anywhere.

In addition, the problem of **Interworking** with fixed network text telephones has been addressed. For most countries it is the only means for Deaf people to call emergency services. A small text gateway between text telephony and IP based Total Conversation was developed and successfully tried.

Of the needs expressed by Deaf users, probably the most significant was on-line access to information in their own signed language. WISDOM created www.deafstation.org in order to meet the need for **sign language information services**.

Deaf Station is an end to end solution for the capture, editing, compression, uploading and server management of signed information. It provides sign language daily news and information such as employment details, sports, arts and so on. The news is updated daily. The video interface is designed to be simple with all information including menus available in sign language. All tools were custom built for WISDOM and are unique in offering convenient authoring tools for this sign language dominated medium. It is possible to have the content owners create the sign language contents without deep technical expertise and this content can be created anywhere and at any time and uploaded remotely to the video server. Search and archiving is provided. The development has been exploited and is currently in use for daily news, local council sign language translations, sports events as well as in a new format for hearing people’s access to sign language learning.

www.deafstation.org also demonstrated a mobile phone application in the form of a multi-lingual phrasebook with translations from/to four written and signed languages (British, Swedish, Spanish and German). This application is available on a GPRS phone as well as a 3G phone.

Automatic sign language recognition was researched and developed in WISDOM. The research in the project took the performance level of this technology to new levels. User independent recognition of 250 signs in British Sign Language was demonstrated, performance levels were measured beyond those previously seen in this area and technical and public reports were made. While this technology has some way to go for direct exploitation, the demonstrated application is a state of the art product and an indicator of the way forward in automatic translation in the visual medium.

Conclusions

With these services accessible anywhere, combined with mobile access to the generally available services like multimedia messaging, e-mail and web browsing, WISDOM has taken a huge step forward for Deaf users

Trials of the services were performed in the project in 3G mobile networks and in semi-public WLAN networks. The project demonstrates the usefulness of recently approved standards for accessibility in mobile and multimedia environments.

Available 3G services were very limited during the project, and available devices showed to be at the very rim to be usable. This state is expected to be improved very soon, and useful sign language communication is expected to be possible with standard handsets.

The video relay platform, total conversation software & hardware implementation and sign language information services have all been exploited further and are now publicly available to end users in Europe and beyond.

Research Area keywords

Deaf, Telecommunication, Sign Language, Video, Wireless, Mobile, Relay service, Interoperability, Information retrieval, Conversation

Timescale

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Budget

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Project partners:

Dept of Technical Computer Science,
Aachen University of Technology, DE
Motion Media Technology, UK
Omnitor AB, SE
British Deaf Association, UK
Vodafone, UK
Ericsson Espana SA, ES
Envilogg Datateknik AB, SE
Örebro Läns Landsting, SE
Västanvik Resource and Development
Centre, SE

CDS, University of Bristol
8 Woodland Road
BS8 1TN Bristol
UK
Tel.: +44 117 954 6924
Fax.: +44 117 954 6921

Scientific Coordinator

Prof Jim Kyle
Centre for Deaf Studies
University of Bristol
8 Woodland Road
E-mail: Jim.Kyle@bristol.ac.uk

Project Coordinator

Mr. John Andrews
Centre for Deaf Studies
BS8 1TN Bristol, UK
Tel.: +44 117 954 6900
Fax.: +44 117 954 6921