

CONTKOM

Speech Recognition and Voice Control Based Communication for Thalidomiders

Pilot project

of the German Contergan Foundation

Final report



CONTKOM

Final Report

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 Brandt Spracherkennung
 Dipl.Ing. Stephan Brandt
 Thomas Mack
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Dipl. Ing. Stephan Brandt
 Nuance Certified SolutionsPartner
 Tangstedter Landstraße 32 B
 22415 Hamburg
 040/58 96 33 90
 01522/8958 644

st.brandt@brandt-spracherkennung.de
www.brandt-spracherkennung.de

Project Partner:



Hilfswerk für Contergangeschädigte Hamburg e.V.

Dear Sir/Madam,

I am pleased to present the final report of »CONTKOM«.

The Executive Board of the German Contergan Foundation supported a highly interesting pilot project:

The introduction of speech recognition and the voice control of the computer for thalidomiders.

On the one hand the proof of the great reliefs by means of these new aids for thalidomiders provided by the Hilfsgemeinschaft für Contergangeschädigte Hamburg e.V. and Brandt Spracherkennung was a decisive fact for our promotion.

On the other hand I could receive an impression of the high level new technology in use today on the occasion of the presentation of speech recognition at the annual general meeting 2010 of the representatives for disabled employees of the Hamburg industry.



The pilot project did not only succeed in qualifying thalidomiders to professionally use speech recognition, but also to train some of them to even become instructors in speech recognition. They will be able to train physically disabled people in a very authentic way.

As a conclusion we can only encourage all bodies in charge to utilize this new technology and pedagogy for many physically disabled people.

Antje Blumenthal

Chairperson of the Executive Board of the Contergan Foundation for Disabled People



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Finally! No more typing by toes!

the result

CONTKOM, this pilot project supported by the Contergan Foundation for disabled people, aimed at acquainting thalidomiders and other physically disabled people with speech recognition and voice control of the computer on the basis of specifically elaborated training material. And indeed in the way, that they as result can work with it on a professional basis, participate in social communication more comprehensively than up to now and that they can counteract the painful remote damages of relieving postures lasting for decades due to their disability.

This objective was gained in total and in all its sections to its full extent.

An up to now unprecedented **pilot project** comes up with absolutely trend-setting results:

It is possible to train physically disabled people to operate **the computer by speech** within a week. That enables them to carry out office activities just as professional as non-disabled do.

It proves to be very reasonable to accompany the conversion of contents learned in the seminar into practice and to deepen the attained knowledge by means of **workshops**.

Already after few weeks the participants renounce to operate the computer by the keyboard. They are permanently motivated to master speech recognition and voice control ever better because they feel clear physical relief with increasing productivity of their activity.

In an email the participant Christiane Schwartau from Hamburg addresses Brandt Spracherkennung:

»On Thursday I was completely shocked by the great joy I had in dictating an actually unpleasant text at work. A letter which otherwise I would have needed half a day for was ready within an hour now!«



The climax of the pilot project was the **training of the instructors**:

Because of the short-term cancellation of one participant only three thalidomiders participated in it. The intense work with them of course revealed that the leap to become an instructor cannot be mastered by the trainee within just a week although many good individual results were achieved.

In total this part of the training realized the so called **Peer to- Peer** idea: **thalidomiders help thalidomiders**. It can be expected, that thalidomide-affected instructors will specifically be able to train other thalidomiders as well as other physically disabled people in an authentic way.

From the very beginning it was clear to us that the training requires a kind of **traineeship** to perform a professional work as an instructor. For this purpose we suggest to always carry out such training in a team experienced and new instructors in future. The didactic material composed of manual, teaching sheets, practice units, lectures and accompanying materials specifically elaborated for thalidomiders and physically disabled people proved to be very

helpful and also suitable for a rather long period of time. Nevertheless, we gathered many detailed suggestions for improvements and incorporated them into the reworked instruction material.

The results militate in favor of the professional utilization of speech recognition and voice control to be no longer subject to a handful of participants in this pilot project only. We can only appeal to all benefactors to be considered, to provide their clients the corresponding equipment of hardware and software as well as in particular a professional training.

We owe the Contergan Foundation a sincere debt of gratitude for their excellent support of the pilot project, who in the first place facilitated the results as presented below.



the starting position

Out of the 5,000 thalidomiders born in the beginning of the 1960's in Germany, the 2,700 still living adult thalidomiders are meanwhile aged 50 today.

Permanent malposition and relieving postures as well as unavoidably lacking mobility result in increasing and accelerating physical degeneration.

All this is proven by the study of Marina Enns, David Rester and Bernd Seeberger: »On the Life Situation of Aging Thalidomiders« (Edition Urban & Vogel, May 2009, German).

Next to the physical deficits at increasing age it, however, is just as important to encounter the isolation in order to render an all-round participation in social life possible for them and to open alternative occupational perspectives.

With the speech recognition and voice control of the computer today thalidomiders can replace typing that is so cumbersome for them by spoken dictation that is converted into text on the computer in real time. For them this

opens up more comprehensive utilization of new means of communication like chats and to surf the internet as well as new job opportunities in the office sector. But above all computer harmed persons can bid farewell to physical strenuous and relieving postures sitting in front of the computer putting all implemented (long-term) effects into consideration and to work in a real relaxed way

People with physical disabilities who – as a matter of fact – are the main beneficiaries of speech recognition and voice control hardly encounter with it up to now. This pilot project is supposed to examine how and to what extend that can be changed.



Computer, for dictation, please!

Speech Recognition and Voice Control of Computers for Thalidomiders and People with Physical Disabilities



Users Manual

the project

Up to now there is no education system specifically synchronized with people with physical disabilities on the field of speech recognition and voice control of the computer, yet.

The building of such a system of advanced training includes the training of teachers of speech recognition and voice control, who are thalidomiders themselves and who are specifically capable of corresponding to the specific requirements of the learners.

Thalidomiderd advise and teach thalidomiders – this principle corresponds to the Peer to Peer idea that gives more and more new impulses to the work with disabled people especially in England but also more and more in Germany.

The pilot project supported by the Congtergan Foundation therefore aimed at,

- **developing training schedules**, training material and curricula in particular for adult thalidomiders,
- training thalidomiders in a **pilot project** by two groups of 7 partici-

pants each in the speech recognition and voice control,

- elaborating the basics for the **training of thalidomiders-harmed teachers** for speech recognition and voice control, and at
- training suitable participants to become teachers – both for thalidomiders and **for other physically disabled people**, in particular children and youth.



The participants of basic session A

the people involved

Within the framework of the presentation »Your computer obeys your words«! in June 2010 under the patronage of professor Dr. paed. habil. Norbert Breier – educationalist at the Hamburg University with special consideration of the didactics of computer science –the Aid for Thalidomiders e.V. Hamburg publicly introduced the project for the first.

18 thalidomiders and 5 physically disabled people were represented among the 50 visitors out of whom 12 enrolled themselves into list of interested persons for the pilot project.

Finally the seminars represent 11 thalidomiders from Hamburg, Schleswig-Holstein, Berlin, Bavaria and North Rhine-Westphalia. 3 more physically disabled people participated, among them a young computer student from the city of Greifswald who was born without arms and legs.

The instructors Stephan Brandt and Thomas Mack were brilliantly supported by the actress Franziska Baldes

in the lessons »breathing and articulation exercises«.

With its seminar rooms, its all-round accessibility and its comfortable nature-oriented atmosphere, the conference hotel on a peninsula in the Lake of Plau (Mecklenburg-West Pomerania, Germany) provided the necessary relaxation for the quite exertive seminar program.



the basic training

The one week of basic training in two groups of 7 participants proved to be a necessary and successful method in order guarantee achieving the aim of a professional application of speech recognition (and within certain boundaries also of voice control) after the course.

In ten lessons – two of 1.5 hours a day in the morning and four practice afternoons – the participants learned

- the historical and technical basics of speech recognition,
- dictate in documents and emails,
- correct articulation and dictation,
- creation of individual speech commands for the acceleration of workflow,
- basics of the control of the computer as well as surfing the Internet by speech commands.

Certainly, the breathing and articulation exercises by Ms Baldes were a

highlight of this training. Here it is about the training of speech as the new input medium that replaces the medium used while typing, the hands, replaced and this needs to be trained accordingly, of course. Approximately 80 % of all recognition errors in speech recognition are to be put down to articulation errors.

In addition, speech recognition requires pre-formulating the text to be dictated in mind before expressing it. Increasing the hit rates after the breathing and articulation exercises impressed all participants.

Christian Arndt declared after the basic training to be much faster now by means of speech recognition in comparison to the method he previous applied by operate the keyboard with a mouth stick.



One of the best: Christian Arndt, without arms and without legs. All by speech!

the workshops

The workshops six weeks after completion of the basic course were attended by all participants – without exception.

That underscores the great interest, to keep on working intensely with speech recognition and voice control and to improve one's own level.

Both workshops were carried out in accordance with the prepared conception:

- Introduction to DNS version 11 professional – what's new – corresponding dictation and control exercises,
- systematic solution of hitherto unclear questions, and
- systematic control training. All commands of an extensive command overview laid down in particular for this workshop are tried out and the most important new ones are recorded.

With all enthusiasm, however, during the introduction of the new commands it became obvious that the abilities of the participants in text processing and other programs are very different. More attention must be paid to these different initial prerequisites with regard to future courses and must be resolved by special introductions to the operating system and the most important application programs where appropriate.

All participants were satisfied with the solution of all questions and problems that occurred in the meantime. They suggested organizing ca. semiannual such an exchange of experience among each others in the future.



For good dictation you must learn to breathe accurately.

the training of the instructors

Three thalidomiders successfully participated in the course for instructors.

Unfortunately, one of the most promising candidates, Christian Arndt, had to call off a day before the beginning of the course for personal reasons. As soon as there is an opportunity he wants to make up for this course.

The consistent application of the five step method was significant for the success in order to enable the participants to carry out a precise instruction. That meant, that

1. every task was introduced with a short lecture by the training management explaining the learning objectives,
2. the demonstration of the learning-contents attached to it, followed by
3. a phase of practice for the preparation of the presentation of the instruction unit by the participants,

4. the lectures and presentations by the participants themselves, and
5. in the common »debriefing« the training success was thoroughly discussed.

In the evaluation all underscored that they mastered the tasks but the one week seminar at the same time is too exhausting and should be carried out in more extensive time units in the future.

The three thalidomider graduates now embody the Peer to Peer idea: thalidomiders train thalidomiders. We recommend to carry out future seminars first of all together with experienced instructors as a kind of traineeship a before you do this on your own.

CONTKOM-Lehrbögen I

CONTKOM - Kommunikation für Congerangeschädigte per Spracherkennung und Sprachsteuerung. Ein Förderprojekt der Congeranstiftung.

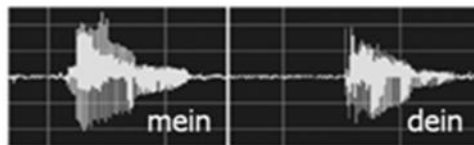
Kurs A 22.-24.9.2010	Ausbildung Congerangeschädigter und körperbehinderter Menschen in der Spracherkennung und Sprachsteuerung des Computers - Wochenseminar im Ferienpark Plauer See
Lektion I	Aufgabenstellung und Einführung in die Spracherkennung
Leitung	Dipl.Ing. Stephan Brandt, Thomas Mack, Franziska Baldes



Lektionen	Der Kurs besteht aus folgenden 10 Lektionen: I. Einführung in die Spracherkennung, ihre Geschichte und Funktionsweise II. Als Benutzer anlegen, Einführung in das Diktieren und erste Diktate (kleines Lernprogramm) Übung: Zeitung lesen als Übungsdictat III. Die Dragon-Leiste - Einführung in das Sprachprogramm IV. Sprachbefehle und das Diktieren von E-Mails Diktieren von E-Mails und Versenden untereinander V. Atmen und artikulieren VI. Artikulation und die Regeln des Diktierens Einzelübungen zu Artikulation und Diktieren VII. Einführung in die Sprachsteuerung. Sprachsteuerung Desktop VIII. Sprachsteuerung im Internet Sprachsteuerung Desktop und Internet IX. Das Erstellen eigener Befehle X. Eigener Befehle erstellen / Auswertung des Seminars Übungen zur freien Verfügung
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Einführung in die Spracherkennung

1. Was ist Sprache und wie wird Sprache sichtbar?



Stimmfrequenzdiagramme. Der Sprach-input (Wörter) wird unterteilt bis auf die Ebene von Sprachlauten (Phonemen). Bei jedem neuen Input werden diese kleinsten Elemente zu sinnvollen Einheiten zusammengesetzt und als wahrscheinlichster Ausdruck vorgeschlagen (Trefferquote).

the training and learning aids

Reproducible training on a professional level is inconceivable without a corresponding didactic conception and material. The project therefore contained the task, to create, use, assess and further develop such a material for thalidomiders for speech recognition and voice control.

We only had the opportunity to fall back to the user manual provided for speech recognition software which proved to be inadequate, however, for our purposes because it was designed for another target group. Stephan Brandt and Thomas Mack provided their long-standing experiences for the pedagogic tasks in speech recognition,, training of disabled person and adult education and on the fields of IT, disability person sports and rhetoric.

In consultations in particular with professor Dr. habil Helmut Richter, department education at the Hamburg university a »3-stage manual« was designed and systematically built up as didactically ambitious manual for thalidomiders by Brandt Spracherkennung. It stood the test of practice very well

and the participants report that they also work intensely in this way after the course.

The training itself was carried out along specifically elaborated curricula that found their expression in lesson sheets that were submitted to the participants after every lesson just as the exercises for the individual units in the afternoon. Furthermore, particularly elaborated PowerPoint presentations accompanied every lesson. The training the instructors was additionally intensified by a specific education plan as well as lectures on every lesson that was also provided for the participants.

In the final assessment the participants expressly emphasized the usefulness of these materials. They especially evaluated positive the intense personal care by the instructors through the entire training period.



the conclusions

The Pilot Project of the German Contergan Foundation proves that speech recognition and voice control of the computer for thalidomiders and other physically disabled people are very good aids that make work and life easier for them and facilitate and prevent further long-term effects of their disability.

Approximately 800 out of the 2,700 thalidomiders in Germany coming into consideration to use speech recognition and voice control, out of the more than 70,000 Dysmeli-harmed aged between 15 and 65 years these are at least 30,000.

Many new coaches are needed on the basis of the Peer to Peer idea: »thalidomiders help thalidomiders«.

The following experiences were stated with regard to the seminars:

- Within one week participants can be enabled to master the basics of speech recognition and to work successfully with it. For this purpose the training material must be completely concentrated on the

necessary, however, in order not to overstrain the participants.

- As initial prerequisites basic knowledge must be provided with regard to operating systems and word processing programs where appropriate.
- At the maximum five participants per group, in order to facilitate a joint as well as individual training.

The successful conclusion of the pilot project represents an encouragement for all institutions in charge, to use these new aids to a massive extend in order to make a more comprehensive participation in social life possible for physically disabled people and to prevent long-term effects of their disability effectively.

