

Polygraf - Universal Access to Presentations and Lectures

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Masaryk University

- Founded: 1919
- Staff: 4700

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- Faculties: 9
- Students: 45000



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- 107 students with hearing disability
- 5 deaf teachers
- 60 users of transcription services

Dispatching transcription services

- dispatching services:
 - o staff: 30 STT reporters, 3 dispatchers
 - scheduled courses for registered students: service provided automatically whenever a disabled person is registered
 - other events: on-demand service (upon request from teachers and students)

Professional training for STTRs

- annual competition for STTR's posts includes:
 - o tests of typing speed and accuracy,
 - o communication skills and general knowledge
- training courses
 - workshops for current transcribers (a training course pilot)
 - o 2 years training course
- regular current STTRs certifications
 - o system for testing current transcribers (annually, same criteria)



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The background

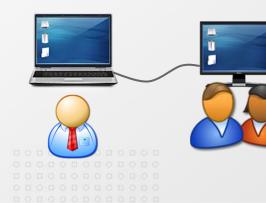
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Speech-to-text reporting at Masaryk University

- Provided and organised by Teiresias Support Centre for Students with Special Needs
- providing services for growing number of hearing impaired students
- former solutions of speech-to-text reporting for groups:
 - o Computer with two screens connected
 - VNC screen sharing with up to 3 laptop computers
 - o Complicated setup, could comfortably serve only up to 3 students





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Requirements to a new solution

- simple and fast preparation of the technical environment
- Independence of the technical infrastructure
- synchronisation of the users text displayed in real time
- adjustable appearance
- possibility of at least a basic two-way communication
- compatibility with the Czech and English languages

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Analysis of existing systems

- Intentionally skipped automatic speech recognition (speech-to-text recognition) because:
 - lack of accuracy speech recognition (in terms of professional vocabulary used in high schools)
 - to achieve higher accuracy is dependent on a number of technical conditions
 - any "training system" to a particular speaker is not realistic for everyday teaching





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Systems involving a human reporter

- eScribe
- Google Documents
- Bee Communications
- dependence on Internet connection in teaching space
- greater requirements to the preparation of the technical environment
- the need to capture and transfer the speaker's voice and visual presentation material
- Indirect contact with the speaker and user

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Polygraf - the first version

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Development of our own system - Polygraf

Key Features:

- consists of only three portable hardware components
- does not require internet connection, specific network configuration, or your own server
- works with MS Word text editor, which many reporters work with in the Czech Republic
- uses the iPad and its principal user comfort
- It's possible to view the transcript on devices running iOS, MS Windows as well as Android
- allows two-way communication

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Development of our own system - Polygraf

Key Features:

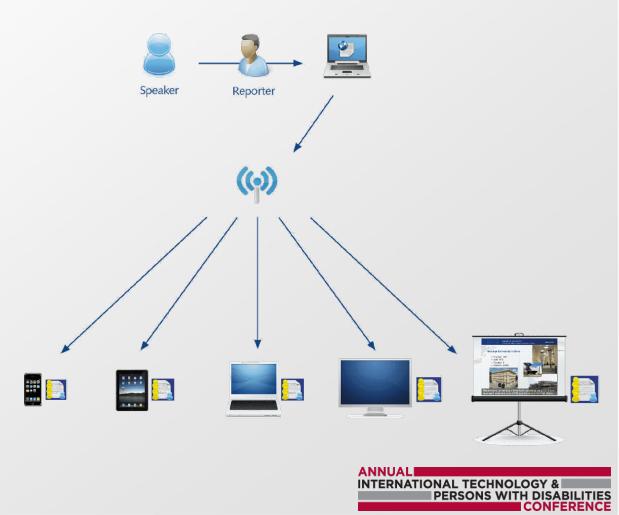
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Polygraf – diagram





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Polygraf – hardware components

- the reporter's computer
 - a laptop or PC with the MS Windows and MS Word (version 2003 and later)



- Wi-Fi access point
 - o no need of Internet connectivity for this wireless network.

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Polygraf – hardware components

- for users:
 - any device with iOS operating system
 - a laptop or tablet with MS Windows
 - any Android device running Android 2.1 and later



Polygraf – software components

Polygraf Word Addln (for the reporter's computer)



- installed separately alongside the Word (version 2003 and later) to "share" the text report to the users' devices.
- Polygraf (for the users' handheld devices)



handles the reception of the text report as well as the mirrored screen and it continuously updates and displays according to the user's custom setting.

Polygraf Captions (for the speaker's computer)



an optional application to display the reported text as closed captions (subtitiles), which can be attached to a speaker's presentation





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Polygraf - Formattings

Formatting options made by the reporter

(Formatting is refreshed in typing pauses)

Transferred

- font family
- font style (bold, italics, underline)
- line spacing
- paragraph indentation
- tables (limited)

Not transferred

- colors
- pictures, images, text area
- page layout





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Polygraf - Customization

customizable view of a text report

- font family and font style
- line-spacing, colors

sign language support for static texts such as *Help* or *Initial welcome text*

- translation of the documentation into sign language(s)
- video files to be downloaded, first

language of user interface:

• Czech, English, German, Polish, Italian

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Polygraf - Visualisation of transcripts

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select a transcript to be visualized



The opened document can be visualized in individual way the layout of the UI as well as the interface can be adapted according to users needs

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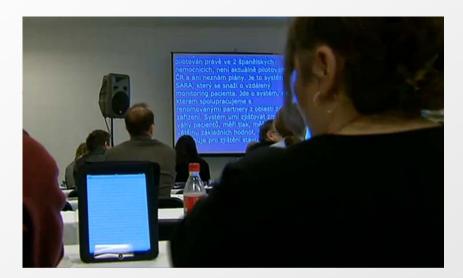


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Polygraf - Customization

The user's handheld devices could be also used as

 when connected to a data projector, it is a source of the report displayed publicly for audience without user interface on the screen







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Polygraf - the second version

Polygraf v2 – new functionality

mirroring of presentation screen

- access to presentations in enlarged form displayed on a handheld device
- users with visual impairment can follow the presentation more easily and individually
- adjustable:
 - o magnification ratio, color-inverting
 - o image update time



Polygraf v2 – new functionality

mirroring of presentation screen

- access to presentations in enlarged form displayed on a handheld device
- users with visual impairment can follow the presentation more easily and individually
- adjustable:
 - o magnification ratio, color-inverting
 - o image update time

closed captions added to the mirrored presentation screen

 comfortable for hard of hearing users text report together with the presentation can be followed at once

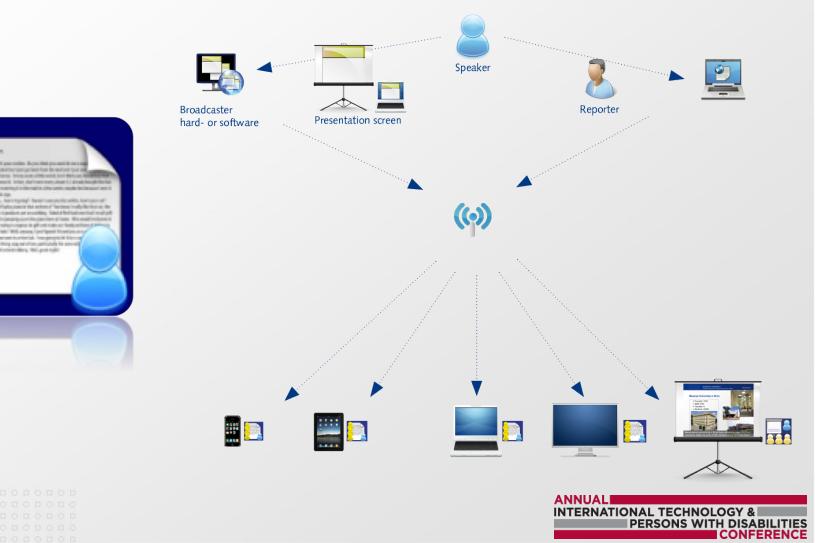


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Polygraf v2 – diagram



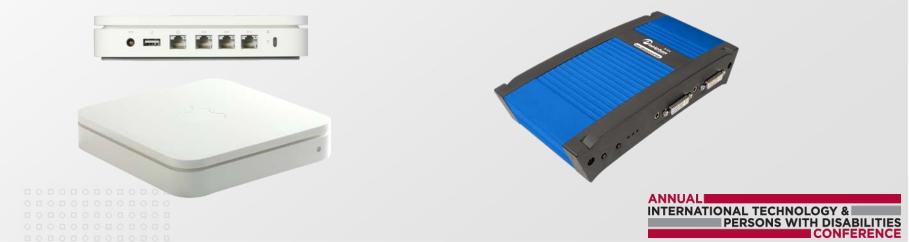
Polygraf v2 – hardware components

A screen capturing device for the speaker's computer

a broadcasting device capturing the video signal and providing it through network interface. (optionally, can be substituted by the software)

A powerful, reliable Wi-Fi access point providing bandwidth for several clients

no need of Internet connectivity for this wireless network.



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Polygraf v2 – software components

Polygraf Software Broadcaster



for the speaker's computer, captures the screen and provides it through network interface image is updated in intervals

(optionally, can be substituted by the software)



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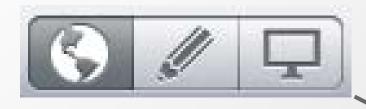
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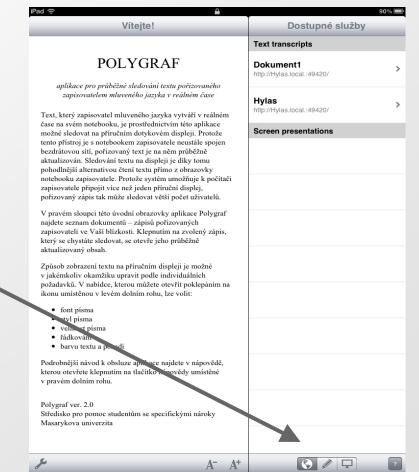
Polygraf v2 – Userinterface

New user interface

- new elements have been added
- slight update of the interface

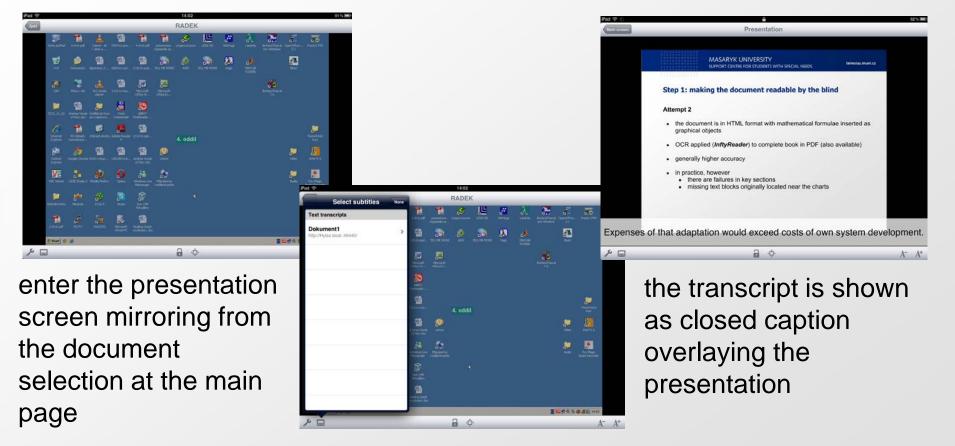


- 1. show all available services
- 2. show *transcripts* only
- 3. show presentation screen mirrorings only



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Polygraf v2 – Presentation screen mirroring



select the transcription document to be visualized

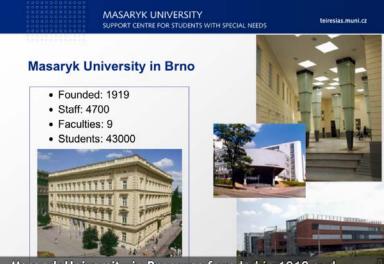




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Polygraf v2 – presentation of overlaid by CC

The principe



Masaryk University in Brno was founded in 1919 and currently it has over 4700 employees among 9 faculties. **Not used in University Setting**

- content gets overlaid by transcripts
- Lecturers are worried to lose the attention of the students



Presentation

Transcript as subtitles

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Polygraf - Usage and Practical Experience

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Polygraf – Usage and Practical Experience

- used throughout the last three academic years in lectures of Masaryk University
- in total amount approx. 300 lectures (3–6 students attending each of them)
- usage at conferences:
 - Universal Learning Design 2011, Brno introduction of Polygraf
 - ICCHP 2012, ULD track
 - Universal Learning Design 2013, Brno introduction of Polygraf v2

used in several countries e.g. Sweden, Netherlands, South Africa, ...

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Polygraf – Usage and Practical Experience



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A short summary

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Advantages on Polygraf system

- independance of the person with disability during the presentation or lecture from the service provider
- accessibility and comfort for non disabled persons gets combined
- easy setup in a controlled environment
- universal application useable for the individual approaches to transcript as well as the public presentation on larger LCD





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Challenges on Polygraf system

- influenced by environmental circumstances such as Wi-Fi traffic (conferences like CSUN may be critical providing a reliable network connection)
 - using different technologies then Wi-Fi may be implemented
- cost intensive hardware for the screen capturing required for an easy setup on side of presenter
- distant reporting not implemented (yet)





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Polygraf – Future deelopments

- Android as well as Windows client improvement
 - o a version 2 for Android is in preparation
 - Windows and special Windows Phone are challenges yet due to the complex requirements of software frameworks besides the application itself
- own broadcaster hardware with limited but required features
- adding settings for the better use of Polygraf with braille displays
 - adapting the algorithm to display the text according to amount of displayable characters on braille displays
- increasing the possibilities for students with dyslexia

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Thank you for your attention.

www.teiresias.muni.cz/polygraf (demo version available)

Please let us know your opinion and questions

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