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IPAtranscriptor **– A Python program for narrow phonetic transcription for blind and sighted linguists**

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Abstract

IPAtranscriptor is a tool for creating narrow phonetic transcriptions. As it connects to the computer's default text-to-speech engine on demand, the program can be used not only by sighted, but also by partially sighted and blind individuals. Sighted users can choose whether they prefer the mouse or the keyboard as their input device. In contrast to other programs, the full set of symbols and diacritics of the International Phonetic Alphabet (IPA) is implemented and users can produce very narrow phonetic transcriptions as they can insert up to three diacritics above and three diacritics below each IPA symbol to modify it. Furthermore, the program can facilitate the collaboration between blind and sighted phoneticians (or students of linguistics in general) since they can easily exchange their phonetic transcriptions. A conversion of the transcriptions is not necessary as all transcribers can use the same system regardless of their visual abilities. *IPAtranscriptor* is freely available online and is believed to be the first audio-based program for narrow phonetic transcription that can be used by blind and sighted phoneticians.

Keywords: narrow phonetic transcription, computer program, blind & sighted phoneticians, International Phonetic Alphabet, accessible Linguistics

1 Introduction

IPAtranscriptor (Braun 2018, see Figure 1) can be used to create narrow phonetic transcriptions by using symbols and diacritics of the International Phonetic Alphabet. The program was written in Python 2.7.14 and ported to Python 3.6.4. It was tested under Windows 10 with the male pre-installed text-to-speech voice *Microsoft voice David* and under Windows 7 with the female pre-installed text-to-speech voice *Microsoft voice Anna*. The MacOS version of the program was tested under MacOS Sierra 10.12 with the system voice *Daniel*. *IPAtranscriptor* works best with the Unicode-based serif font Charis SIL (SIL International 2018), which is freely available online. For user convenience, the program has been packed as an executable file. Installing Python is not necessary to run the program.

The idea of creating an accessible IPA transcription program arose after the present author had interviewed a blind and a partially sighted employee at the Belgian Police in Antwerp as part of her doctoral thesis (see Braun 2016). The visually impaired employees, who analyse and transcribe forensic audio recordings, said that if they needed a more detailed phonetic description of a word, they would have to use the letters of the Latin alphabet and try to transcribe the word as accurately as possible. From a phonetic point of view, this is an unfortunate situation that is calling for change. Both visually impaired employees expressed a keen interest in further training to expand their knowledge if new accessible tools and methods become available in their field.

Difficulties also occur in the academic environment. In the past, the present author understood that a prospective student of Phonetics who was blind had to be turned away as the course content was deemed to be inaccessible to blind students.

According to the Equality Act 2010, employers and service providers in England, Wales and Scotland are required to make *reasonable adjustments* to ensure that (visually) disabled individuals are not directly or indirectly discriminated against. 'A failure to make a reasonable adjustment for a disabled person can be considered a type of discrimination' and victims can take legal action (Equality Act 2010). The legal situation in Germany concerning this matter is similar (cf. Allgemeines Gleichbehandlungsgesetz – AGG 2006, last updated 2013, and Behindertengleichstellungsgesetz – BGG 2002, last updated 2016).

Tools like *IPAtranscriptor* can help make Phonetics more accessible to visually impaired linguists in the future. An encouraging sign is that the situation of visually impaired students in Linguistics has received more attention recently. In 2017, York St John University in England ran a workshop on Accessible Linguistics for Visually Impaired Students (ALVIS).

One of the talks addressed the development and use of teaching and learning materials for visually impaired students in an introductory phonetics class and how students manipulate the symbols when they produce phonetic transcriptions (ALVIS workshop 2017). The challenge as such, i.e., how to teach Phonetics to students with a visual impairment, is not new and questions regarding the topic have been raised on academic online platforms before (Gough 1999, Szczech 2015).
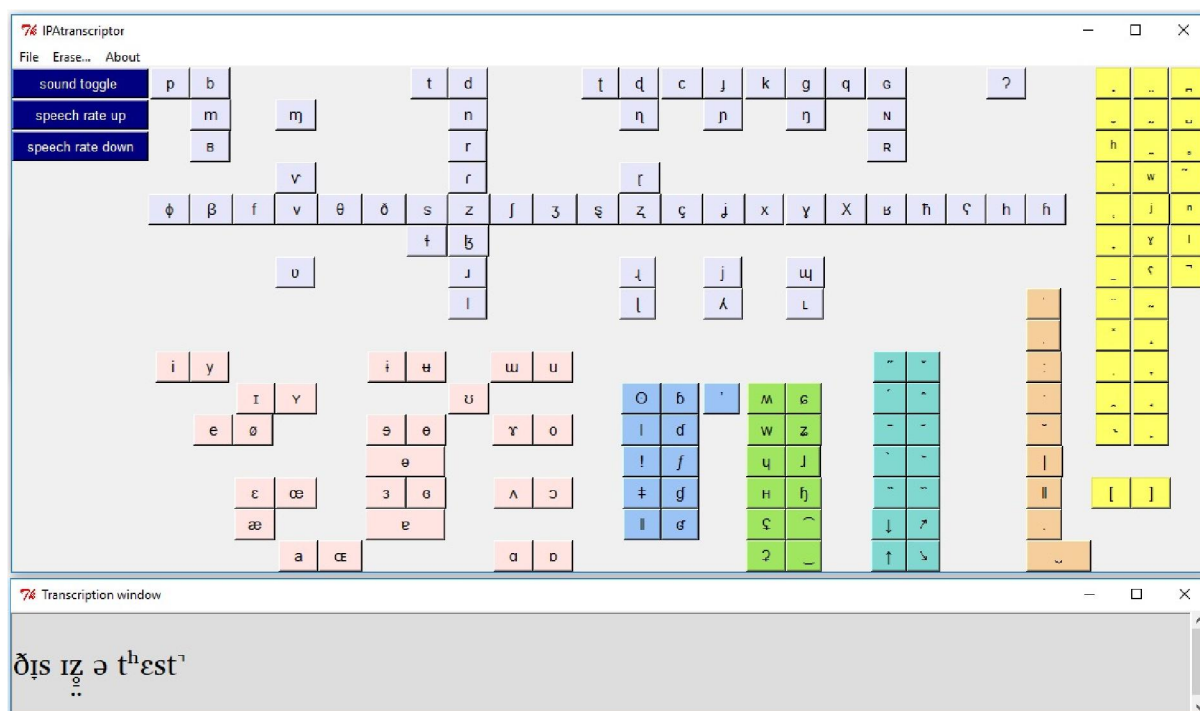

Figure 1: IPAtranscriptor's graphical user interface (upper pane) and its transcription window (lower pane). (Windows version)

2 How *IPAtranscriptor* works

The following description refers to the Windows version of *IPAtranscriptor*. User guides for the Windows and the MacOS version can be found together with the program itself on the program's website (http://phonetics.ezyro.com).

As *IPAtranscriptor* can be fully controlled via keyboard input and synthesised audio feedback is given via a text-to-speech (TTS) engine, blind individuals can use the program to express the same level of detail in phonetic transcriptions as sighted people – provided they have had a similar amount of phonetic training. When the sound is toggled on and the user inserts, for example, the IPA symbol [ʃ] (either by pressing the left ALT key + s or by

clicking on the respective button in the graphical user interface), the TTS engine says 'insert: voiceless postalveolar fricative'. The use of three-word-labels like 'voiceless postalveolar fricative' was preferred over the use of letter names like 'esh' as it was sometimes not easy to perceive a clear difference between the synthetic voice output for two different letter names, for example 'esh' and 'ezh'.

In order to facilitate learning of the keyboard shortcuts for sighted users, a-shaped IPA symbols are, for example, bound to the a-key on the keyboard: pressing the a-key in isolation = [a]; pressing the a-key + left ALT key = [ɑ] and so on. A list of all IPA symbols and diacritics and their keyboard shortcuts can be found on the program's website. For the convenience of sighted users, *IPAtranscriptor's* transcription window opens as a separate window, is resizable and can be dragged to different positions on the screen. As it is known that a lot of blind individuals are trained to listen to synthesised voices at considerably high speed (cf. Moos & Trouvain 2007), the speech rate of the TTS voice used in *IPAtranscriptor* can easily be adjusted within the program. Pressing CTRL + u increases the speech rate stepwise whereas CTRL + d decreases it.

Visually impaired users who want to access their transcription in the transcription window can press the left SHIFT key to activate the TTS engine and get a description of the IPA symbol that is at the current cursor position. For example, if the user has transcribed a devoiced alveolar fricative [z̥], the TTS engine will say 'diacritic voiceless' [̥] (because the diacritic 'voiceless' is immediately at the cursor position). The user can press the arrow keys to move through the transcription. If the user presses the left arrow key once and afterwards presses the left SHIFT key again, the TTS engine will say 'voiced alveolar fricative' [z]. Via the backspace key, users can delete the symbol that is closest to the cursor or they can press CTRL + 2 if they want to delete the entire transcription. More detailed information on how to use *IPAtranscriptor* is available online (see URL of the program's website above). Users can open and save their phonetic transcriptions as .docx files or use the copy & paste function to transfer their phonetic data to another program. The created .docx files are already formatted in a way that all diacritic symbols are visible and do not overlap with the diacritic symbols from the line above or below. The program also comes with a print function that calls the default printer.

3 Accessible phonetic transcription tools

Other methods and tools already exist which help to make the International Phonetic Alphabet assessible to blind people. One example is a *tactile IPA magnet-board system* (Lillehaugen et al. 2014). It consists of a box with magnetic tokens which have either embossed and printed IPA symbols on them or Braille characters and printed descriptions like, for example, 'nasal'. The *tactile IPA magnet-board system* was devised when a blind student enrolled in a Phonetics and Phonology course at Haverford College in Pennsylvania (Heffernan 2016). While this tool is particularly useful for collaborative in-class activities of visually impaired and sighted students of Linguistics, it is not suitable for storing accessible phonetic transcriptions more permanently and electronically.

This is where *IPAtranscriptor* comes in. Since its phonetic transcriptions are always in the same electronic text-based format regardless of whether the transcriber is visually impaired or not, transcriptions can easily be created, opened, amended, stored and exchanged by blind, partially sighted and sighted phoneticians.

Another example of an accessible Linguistics tool is *IPA Braille* (Englebretson 2009), which is very useful for Braille-literate visually impaired linguists. Its transcripts can also be stored electronically, and documents can be converted from *IPA Braille* into print and vice versa – either by using professional Braille transcription software or by writing a conversion algorithm (Englebretson 2009, p. 77). However, not all visually impaired individuals are Braille-literate. In the UK, for example, fewer than 1% of the two million visually impaired people use Braille (Rose 2012). Therefore, it is also desirable to have an audio-based accessible IPA transcription tool. *IPAtranscriptor* files do not have to be converted, as visually impaired and sighted transcribers use the same IPA transcription format.

It is important to acknowledge that people with a visual impairment are a very heterogenous group and individuals may require different forms and amounts of accommodation. As Dr Sheri Wells-Jensen, a blind Associate Professor of Phonetics and Applied Phonology, puts it: 'There is no one-size-fits-all or best set of adjustments that will suit every situation' (Wells-Jensen 2005, p. 222). Therefore, it would be most beneficial to have a range of tools available which help make Phonetics more accessible to visually impaired students.

A freely available accessible program for playing back, recording and editing audio files that could be used in combination with *IPAtranscriptor* is *Audacity* (Audacity 2018).

Audacity also has a Wiki page for visually impaired users (Audacity for blind users, last updated 2018).

4 Comparing *IPAtranscriptor* to other phonetic transcription tools

In order to create a language-independent phonetic transcription tool, all phonetic symbols and diacritics from the standard IPA chart have been implemented in *IPAtranscriptor*. Other programs for creating phonetic transcriptions, like *IPAEdit* (Lüders 2011), only use a subset of the IPA chart, though there is an extra input field for inserting Unicode directly.

A further limitation of *IPAEdit* and online phonetic transcription tools like *PhoTransEdit Type IPA* (PhoTransEdit 2008) is that diacritics are not displayed correctly in the transcription window when more than one diacritic is used to modify a particular IPA symbol. Further diacritics are only visible when the text is copied into a word processor like Microsoft Word and the line spacing is manually enlarged. In the online phonetic transcription tool *Type IPA Phonetic Symbols* (Szynalski [no date]), inserted diacritics are visible, but they overlap if a phonetic symbol from the line above has diacritics below it. In *IPAtranscriptor*, the user can place at least three diacritics on top of a symbol and further three symbols below it. All of the used diacritics are visible in the transcription window and do not overlap with those of the line above or below.

A further advantage over *PhoTransEdit Type IPA* and *Type IPA Phonetic Symbols* is that *IPAtranscriptor* displays buttons of the phonetic symbols in a similar order as they appear on the standard IPA chart, which makes it easier for users, who are already familiar with the standard IPA chart, to find a particular symbol.

5 The advantages of *IPAtranscriptor* at a glance

- Usable by blind, partially sighted and sighted linguists
- Implementation of the full set of IPA symbols and diacritics
- Narrow phonetic transcriptions are possible as more diacritics can be added to a symbol
- Sighted students could also benefit from the sound output while they are learning the IPA
- Sighted linguists can choose between using the mouse or the keyboard to insert symbols

- Transcription work can easily be exchanged between visually impaired and sighted users

- The program does not require internet access

- Since all letter keys on the keyboard return their usual characters when they are pressed in isolation, transcriptions can easily be annotated with text

- The output files are formatted .docx files

- Adjustable speech rate of the TTS voice

- Built-in print function

6 Limitations

So far, the *IPAtranscriptor* has only been tested on Windows 7, Windows 10 and MacOS Sierra 10.12.

Unlike *PhoTransEdit Type IPA*, *IPAtranscriptor* does not yet provide an option for converting IPA into X-SAMPA.

Acknowledgements

References

Allgemeines Gleichbehandlungsgesetz (AGG). 2006. last updated 2013 https://www.gesetze-im-internet.de/agg/ [accessed on 18/06/2018].

ALVIS workshop. 2017. https://www.yorksj.ac.uk/events-calendar/events/languages--linguistics/alvis-workshop.html [accessed on 18/06/2018].

Audacity. 2018. http://www.audacityteam.org/ [accessed on 18/06/2018].

Audacity for blind users (Wiki). last updated 2018. http://wiki.audacityteam.org/wiki/Audacity_for_blind_users [accessed on 18/06/2018].

Behindertengleichstellungsgesetz (BGG). 2002. last updated 2016. https://www.gesetze-im-internet.de/bgg/ [accessed on 18/06/2018].

Braun, Almut. 2018. IPAtranscriptor http://phonetics.ezyro.com [accessed on 18/06/2018].

Braun, Almut. 2016. *The Speaker Identification Ability of Blind and Sighted Listeners: An Empirical Investigation.* Wiesbaden: Springer.

Englebretson, Robert. 2009. An overview of IPA Braille: An updated tactile representation of the International Phonetic Alphabet. *Journal of the International Phonetic Association* 39(1), 67–86.

Equality Act 2010. (Factsheet) http://www.rnib.org.uk/information-everyday-living-your-rights/equality-act-2010 [accessed on 18/06/2018].

Gough, Dave. 1999. https://linguistlist.org/issues/10/10-710.html [accessed on 18/06/2018].

Heffernan, Maggie. 2016. 'These students are studying how to make tech more accessible at Haverford College,' *Technical.ly Philly*. 25th May 2016. https://technical.ly/philly/2016/05/25/haverford-college-accessible-technology/ [accessed on 18/06/2018].

Lillehaugen, Brook D., Gabriela Echavarría Moats, Daniel Gillen, Elizabeth Peters & Rebecca Schwartz. 2014. A tactile IPA magnet-board system: A tool for blind and visually impaired students in phonetics and phonology classrooms. *Language* 90(4), e274–e283.

Lüders, Björn. 2011. IPAEdit http://www.mpiorn.de/ipa-edit/ [accessed on 18/06/2018].

Moos, Anja & Jürgen Trouvain. 2007. Comprehension of ultra-fast speech – blind vs. "normally hearing" persons. *Proceedings of the 16th International Congress of Phonetic Sciences. Saarbrücken, Germany*, 667–680.

PhoTransEdit. 2008. Type IPA http://www.photransedit.com/online/TypeIPA.aspx [accessed on 18/06/2018].

Rose, Damon. 2012. Braille is spreading but who's using it? *BBC NEWS Magazine.* 13th February 2012. http://www.bbc.co.uk/news/magazine-16984742 [accessed 18/06/2018].

SIL International. 2018. Charis SIL font, https://software.sil.org/charis/download/ [accessed on 18/06/2018].

Szczech, Monika. 2015. https://www.researchgate.net/post/How_can_I_teach_IPA_International_Phonetic_Alphabet_to_students_who_are_blind [accessed on 18/06/2018].

Szynalski, Tomasz P. [no date]. Type IPA Phonetic Symbols http://ipa.typeit.org/full/ [accessed on 18/06/2018].

Wells-Jensen, Sheri. 2005. The Braille International Phonetic Alphabet and other options: the blind student in the phonetics classroom. *Journal of the International Phonetic Association* 35, 221–230.