



# Icelandic 2 IPA

## Online converter of Icelandic text to IPA phonetic transcription

MLT201F Language resources for software development and research  
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### Abstract

Icelandic 2 IPA allows language specialists and other users to quickly transcribe Icelandic vocabulary words and sentences to their corresponding IPA phonetic transcription. With an interactive layout, that allows the user to simply paste or type Icelandic text into a text field and by a press of a button receive a highly accurate transcription of the whole text. Icelandic 2 IPA is a web application developed with the use of the Django web framework, and hosted at <https://icelandic2ipa.herokuapp.com>. The source code is available at <https://github.com/egillanton/icelandic2ipa>

## 1 Introduction

This paper describes the system design, implementation, and development process of the Icelandic 2 IPA project. This project is the second out of two final projects for the course *Language resources for software development and research* at the University of Iceland in cooperation with Reykjavik University (RU). This course is part of the MSc. Language Technology program at RU.

### 1.1 About the Project

This project aims to create a practical tool for linguists, students and other language specialists, capable of transcribing Icelandic texts to their IPA transcription, allowing the users to compare the original text and the phonetic transcription. This web application has the name Icelandic 2 IPA, where the 2 is used mainly to behave as a shorthand for the word *to*.

This web application will be the first of its kind for the Icelandic language. It will be based on other similar tools such as the tool available at <https://tophonetics.com>. It will be trained on the General pronunciation dictionary for Icelandic (Almenn framburðarorðabók fyrir talgreiningu).

## 1.2 General pronunciation dictionary for Icelandic

General pronunciation dictionary for Icelandic (GPD) has its roots back to the Hjal-project from 2002. It was a part of the LT initiative of the Ministry of Education, Science and Culture, which was done to strengthen the support for the Icelandic language in various computer systems. A byproduct of the Hjal-project was the first Icelandic pronunciation dictionary composed of 65.021 entries, where each entry was a split into three: the grapheme, the IPA transcription, and the SAMPA transcription.

In 2017, a project by the name Ice-ASR led by Anna Björk Nikulásdóttir continued improving upon the previously mentioned project. This was due to the fact she was developing an Automatic Speech Recogniser (ASR) based on a data-driven model within Kaldi ASR toolbox. So more data was needed. GPD became a byproduct of Ice-ASR consisting of 136.082 entries, where each entry only maps the vocabulary words to their IPA transcription.

The goal of this project is to allow users to use the GPD dictionaries directly, but as well to offer them a solution that could transcribe new words that do not necessarily appear in the dictionaries already. In section 2 we will talk about the methodology, where we look at the capabilities of the Django web framework and how we can use it to create our web application. In section 3 we will talk about the initial design and see how they can better address the points mentioned here above. In section 4 we talk about our result and what particular challenges we had to face, and how we solved them. Finally, in section 5 we give a brief conclusion of our work and point out some future improvements.

## 2 Methodology

In this section, we briefly go over the software and tool used for this implementing this project, and some of the main libraries used. For the full list of libraries, take a look at the *requirements.txt* file in the root of the project. For further information about the setup procedure, refer to the *README.md* markdown file in the root of the project.

### 2.1 Django Web Framework

There are many frameworks out there; for this project, we chose the Django web framework for one main reason. In the IceAlign project, we got a good understanding of how to use it efficiently and decided to use the experience that we already had. The main difference between the two projects is that I am not using any database storage, which abbreviates the perquisites for relying on Django.

Django (Current Version 2.2.0) is available at <https://www.djangoproject.com/>

### 2.2 Sequitur G2P

There are several libraries available for converting grapheme to phoneme, yet Sequitur G2P is the most used one, and most of the other transcribers are different flavors of this tool such as Sequitur G2P Lite and Sequence-to-Sequence G2P toolkit

Sequitur G2P (Current Provision 1667) is available at <https://github.com/sequitur-g2p/sequitur-g2p>

## 2.3 UIKit Front-End Framework

When it comes to styling our front-end HTML code, there is an option creating custom CSS style files, or import a third-party library and add specific class attributes to the HTML elements. For minimalist and free to use front-end library, we decided to go with UIKit that offers an excellent range of class attributes.

UIKit (Current Version 3.1.4) is available at <https://getuikit.com/>.

## 3 Design

In this section, we will only address the overall final design because we had skipped the lo-fi prototyping, and instead base our design directly on the design of the layout of a similar web tool at <https://tophonetics.com/>.

### 3.1 Landing Page

We wanted the user to have a clear understanding of what to do and for what reason. So we accompanied that by keeping the design simple by having only one text field and one button. The user is supposed to type in text in Icelandic in the text field, and by pressing the button, the IPA transcription will then appear below allowing the user to compare two texts.

## 4 Results

In this section we will summarize the procedure and what were the main obstacles that stood in our way and how we were then able to pass them.

### 4.1 The G2P Model

It took approximately 12 hours to complete training the six G2P models necessary to be seen efficient transcription. The web service uses the sixth model where it shows only 0.3% improvement on the string error rate instead of the fifth resulting in a final error rate of 8.6%.

### 4.2 Front-end

As we can see from figure 1 we kept the design minimalist with only one text field and one button, even though it appears to be another text field below it is a read-only text field that only displays the output of the transcription model.

## 5 Conclusion

Even though this project fulfilled its purpose by allowing users to transcribe Icelandic text to its IPA transcription, there are still several missing improvements. Here are some of the following features that can be done to enhance this tool:

1. Create more complex G2P models and see if the error rate would decrease.

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Hani, krummi, hundur, svín  
hestur, mús, titlingur.

TRANSCRIBE

[ha:nɪkʰrʏmɪhʏntʏrsvɪnhɛstʏrmu:stʰɪhtlɪŋkʏr]

[Source Code](#)

Figure 1: Icelandic 2 IPA landing page

2. Improve on GPD and make it larger; this would result in a better model especially loan-words from other languages.
3. Offer a SAMPA transcription.
4. Allow hover comparison. When hovered over the original text, see an underline under the transcribed text that corresponds to that word.
5. Add a context-dependent model so it will transcribe text better based on its surrounded words.