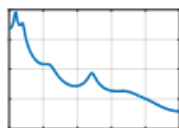


# Neuro-Speech: installation manual

Juan Camilo Vasquez-Correa  
Juan Rafael Orozco-Arroyave  
Jesus Francisco Vargas-Bonilla



# Neuro-Speech



## General description

Neuro-Speech is an open source software platform designed to perform speech analysis of people with neuro-degenerative disorders. Particularly patients with Parkinson's disease. The software is designed to be used by medical examiners such as speech therapists and neurologists, but it can also be used by patients to perform the analysis, and by general population interested in the analysis of pathological speech.

The software computes several measures to evaluate the communication capabilities of the patients and includes analyses of phonation, articulation, prosody, and intelligibility. The software calculates also specific bio-markers related to the dysarthria levels of the patients and perform the prediction of the Movement disorder society-Parkinson's disease rating scale, part III (MDS-UPDRS-III), which is a general evaluation of the motor capabilities of the patients.

Neuro-Speech generates a medical report to describe the different speech deficits of the patients, and how the measures are deviated respect to those computed with information from healthy speakers.

At the moment Neuro-Speech only in 64 bits operative systems based on windows. Currently we are working on deploy the software to other operative systems, and to implement a version to be accessed through internet.

## 1 Third party software

Neuro-Speech is a software platform designed in C++, which runs python scripts in background for the speech analysis. The software uses some third party software that can be freely downloaded and installed for the correct operation of Neuro-Speech. The list of the third party software that must be installed previous to Neuro-Speech is as follows:

- Anaconda: Python 3.6 environment. It can be installed from [https://repo.continuum.io/archive/Anaconda3-5.0.1-Windows-x86\\_64.exe](https://repo.continuum.io/archive/Anaconda3-5.0.1-Windows-x86_64.exe)  
Figure 1 shows the file that you have to download and install.

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Juan Camilo Vasquez-Correa  
Faculty of Engineering, University of Antioquia UdeA, Medellín, Colombia. and Pattern Recognition Lab, Friedrich-Alexander Universität, Erlangen-Nuremberg, Germany,  
e-mail: [jcamilo.vasquez@udea.edu.co](mailto:jcamilo.vasquez@udea.edu.co)

Juan Rafael Orozco-Arroyave  
Faculty of Engineering, University of Antioquia UdeA, Medellín, Colombia. and Pattern Recognition Lab, Friedrich-Alexander Universität, Erlangen-Nuremberg, Germany,  
e-mail: [rafael.orozco@udea.edu.co](mailto:rafael.orozco@udea.edu.co)

Jesus Francisco Vargas-Bonilla  
Faculty of Engineering, University of Antioquia UdeA, Medellín, Colombia.  
e-mail: [jesus.vargas@udea.edu.co](mailto:jesus.vargas@udea.edu.co)

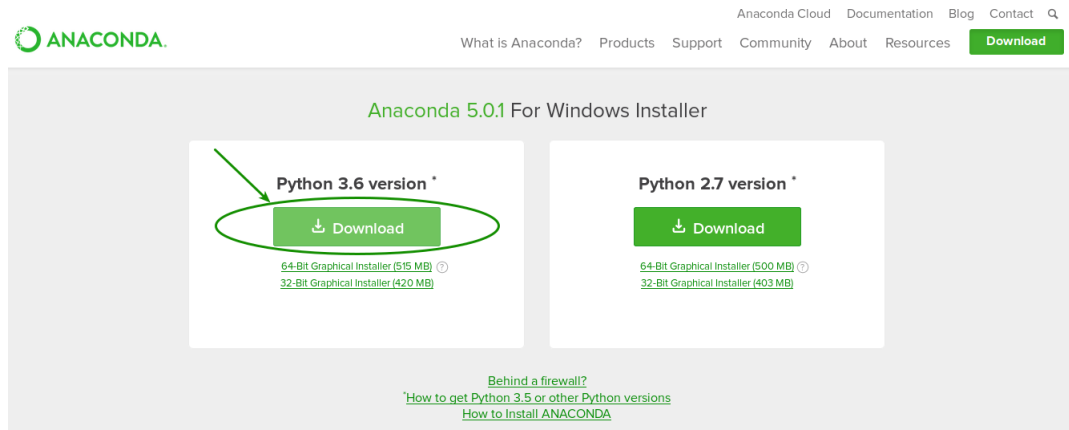


Fig. 1 Download of anaconda framework

- Praat: software for speech analysis. Available at <http://www.fon.hum.uva.nl/praat/>  
Praat is already available when you download Neurospeech in folder /Toolkits/
- ffmpeg: a solution to record, convert and stream audio and video.  
<http://ffmpeg.org/download.html>  
Figure 2 shows the file that you have to download and install  
After install ffmpeg, you have to copy the file /bin/ffmpeg.exe in the directory /Toolkits/

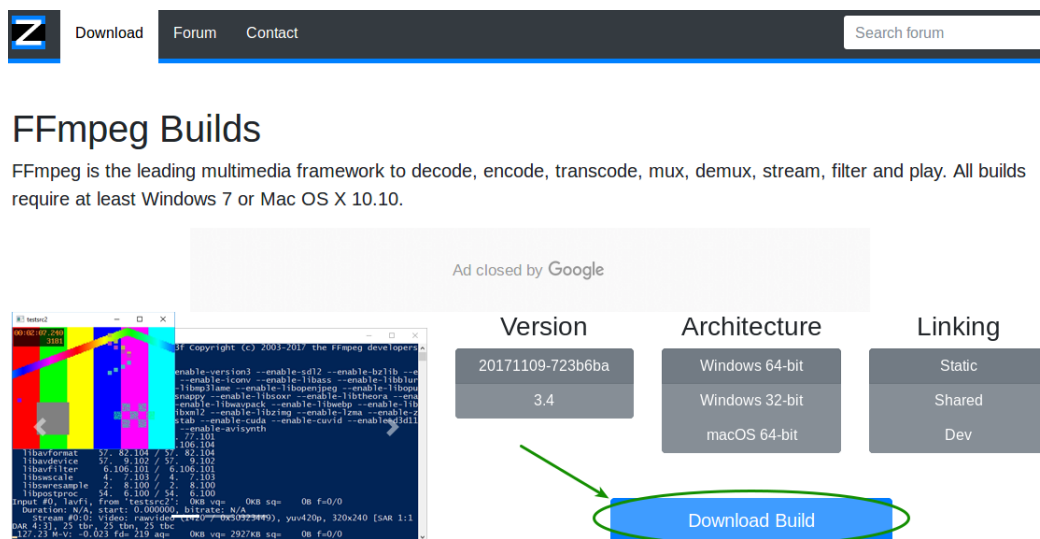


Fig. 2 Download of ffmpeg library

At the end, the folder Toolkits should contain the three files, as it is observed in Figure 3

## 2 Run

To execute Neuro-Speech, please go to the folder *Release*, and then click in the icon of PDTool.exe, observed in Figure 4. Then the main window shown in Figure 5 is displayed for the analysis.

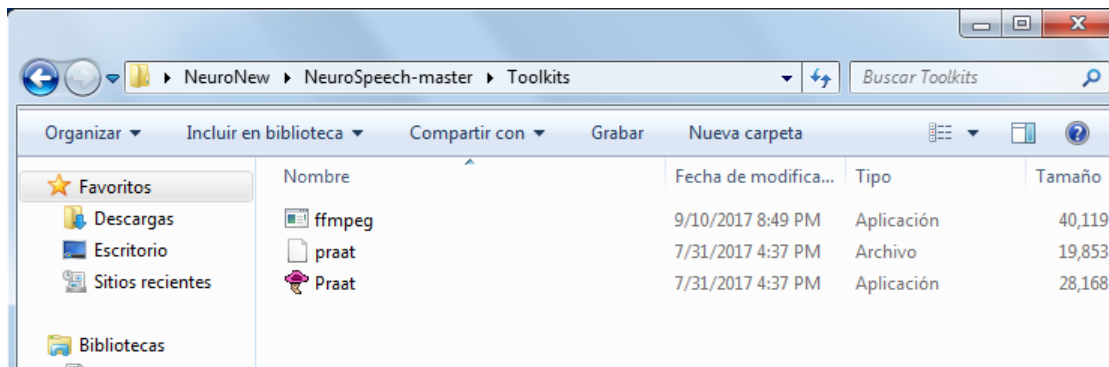


Fig. 3 Installation of third party software in Neuro-Speech

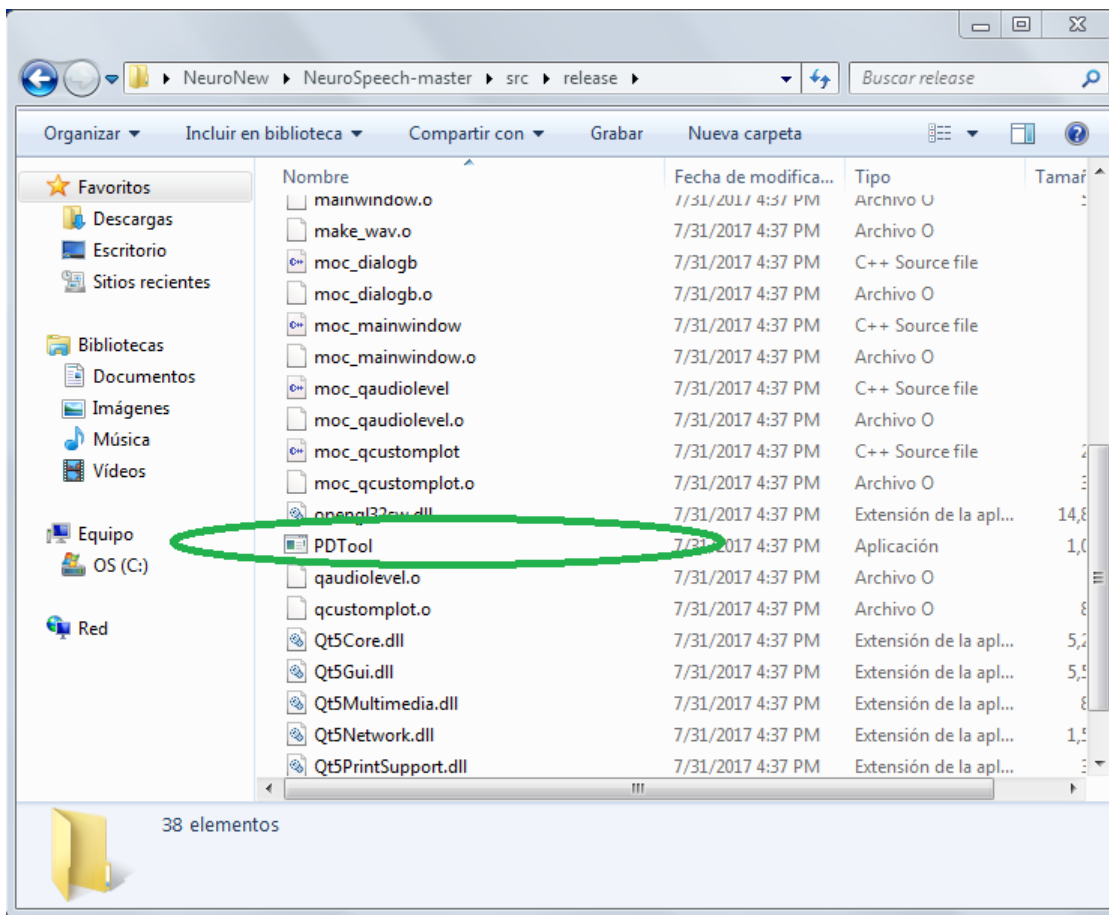
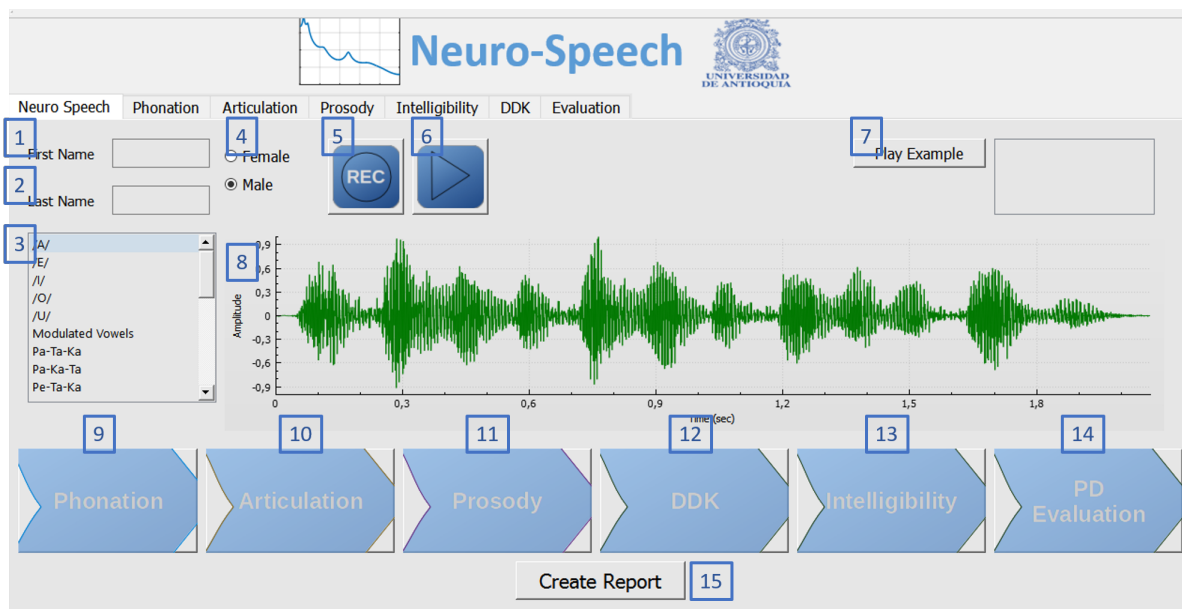


Fig. 4 Icon to open the main window of Neuro-Speech

### 3 Main Window

Figure 5 shows the main window of Neuro-Speech. It contains buttons to record and play the speech signals. The recording can be visualized also in this window. The main window contains also six different buttons to perform each one of the speech analysis: (1) phonation, (2) articulation, (3) prosody, (4) diadochokinetic (DDK), (5) intelligibility, (6) PD evaluation, and the last button to create the medical report. Table 1 details the description of each part of the main window.



**Fig. 5** Main Window of Neuro-Speech

**Table 1** Description of each part of the main window

Button Description	
1	Input of the first name of the patient
2	Input of the last name of the patient
3	List of tasks for the speech recordings (one of them must be selected to record)
4	Select the gender of the speaker
5	Record button
6	Play button
7	Play an example of the task to record
8	Field to visualize the speech signal after recording
9	Perform the phonatory analysis
10	Perform the articulatory analysis
11	Perform the prosody analysis
12	Perform the DDK analysis
13	Perform the intelligibility analysis
14	Perform the dysarthria and PD evaluation
15	Generate the medical report