

Software

Praat: Doing Phonetics by Computer.

Phonetik Institut, Amsterdam, 1998-

<http://www.praat.org>

EMU: Ein System für die Analyse von
Sprachdatenbanken 1988-

Macquarie Universität, Sydney und IPDS, Kiel

<http://emu.sourceforge.net/>

R: Eine allgemeine Programmiersprache. Das
'open-source' Äquivalent von der 'S' ('Splus')
Programmiersprache. 1988-

<http://www.r-project.org/>

Praat im Datenbankkonzept

Erstellung

Digitale Zeitsignale
akustisch,
artikulatorisch

Signalverarbeitung

abgeleitete Signale
(z.B. spektrale Daten)

Etikettieren

Verknüpfung mit
Symbolen

Signale

Etikettierung

Abfrage

Die Signale davon

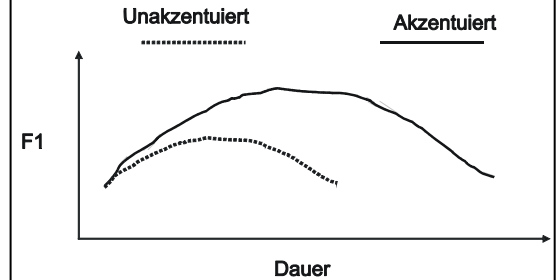
Abfrage

Eine Liste
ausgewählter
Symbole mit
Zeiten

Abfrage

Analyse

Graphik



Statistik

$p \ll 0.001$

Weitere
Signalverarbeitung

PRAAT

- Developer: Paul Boersma & David Weenink
- Praat = dutch for speak
- Where: [Institute of Phonetic Sciences](#)
University of Amsterdam
- [Intension](#): Doing Phonetics by Computer
<http://www.praat.org>

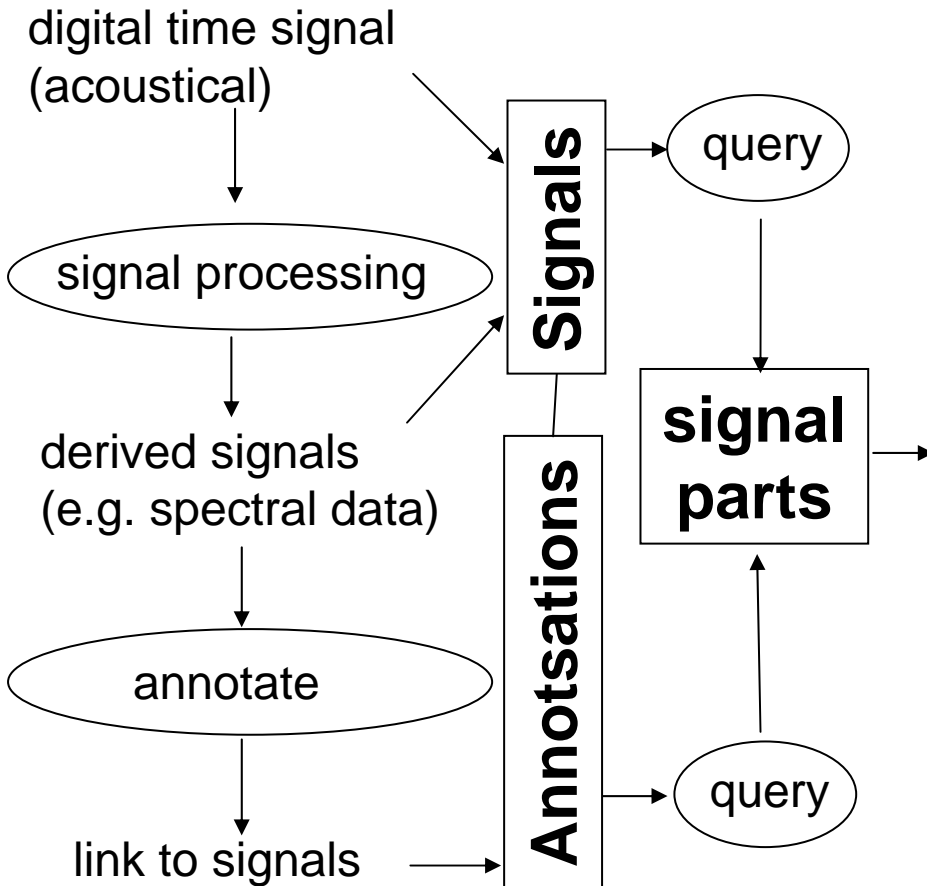
PRAAT - INTENSION

Preparation

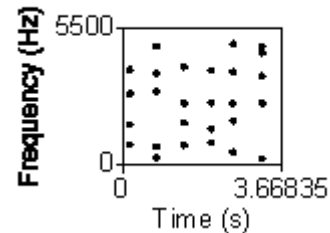
Query

Analysis

Synthesis



Figures

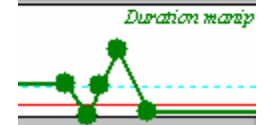
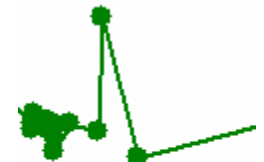
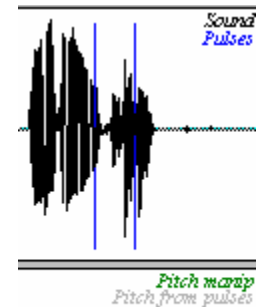


Tables

Time	F1	F2
0.16247	817.92	1631.1
0.77648	299.19	734.21
1.4157	797.26	1685

Statistics

p << 0.001



CONCEPT

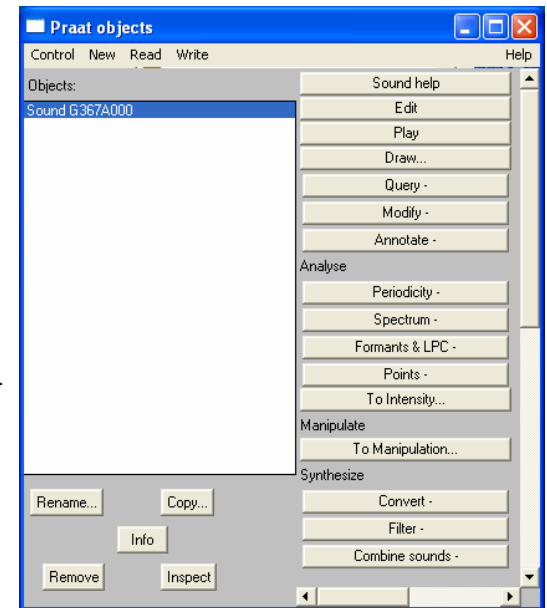
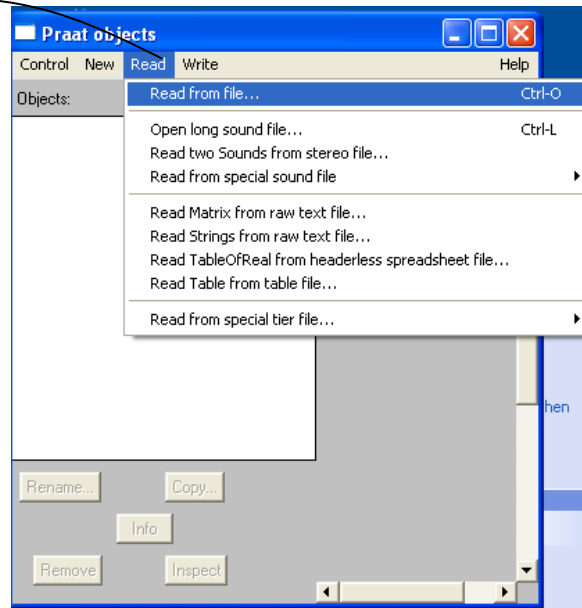
- uses Object Window, Picture Window, Info Window, Editors and Scripts
- works with
 - objects
 - Sounds, Annotations, Tables, Signal Tiers ...
 - several functions for particular objects
 - edit, draw, analyse ...
 - several functions for object collections
 - concatenate, multiply, ...

INPUT

- base material: speech signal files
 - read from file
 - automatically converted to Sound Object

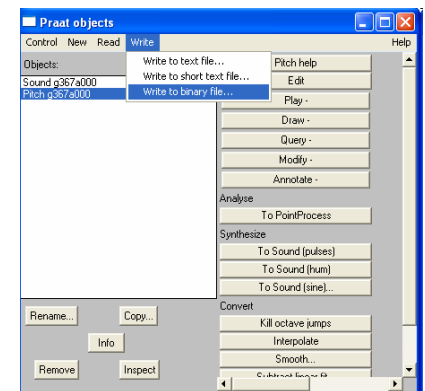
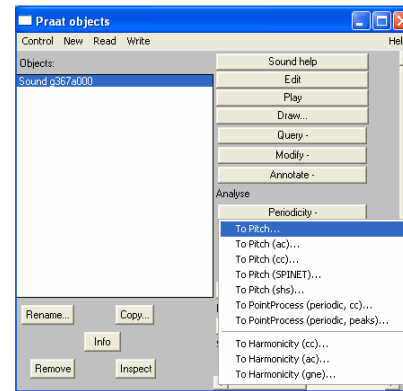
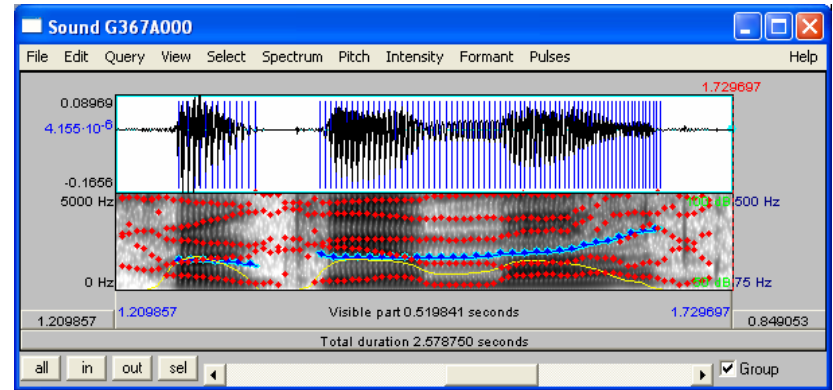


G367A000.wav



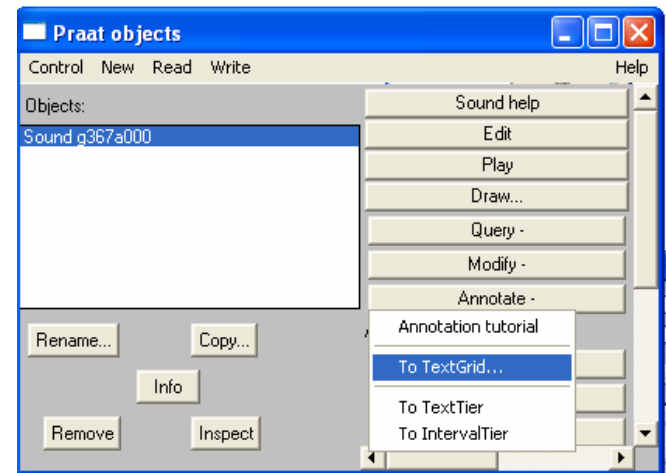
SIGNAL PROCESSING

- carried out internally
 - e.g. signals are derived from input sound within praat
 - derived signals might converted to signal objects and thus be saved to file

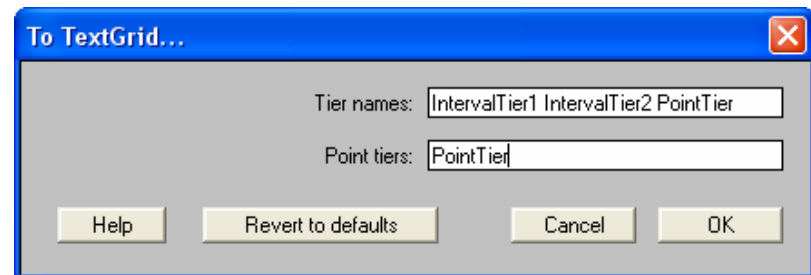


ANNOTATION - CONCEPT

- carried out by TextGrid objects
 - created for a sound object

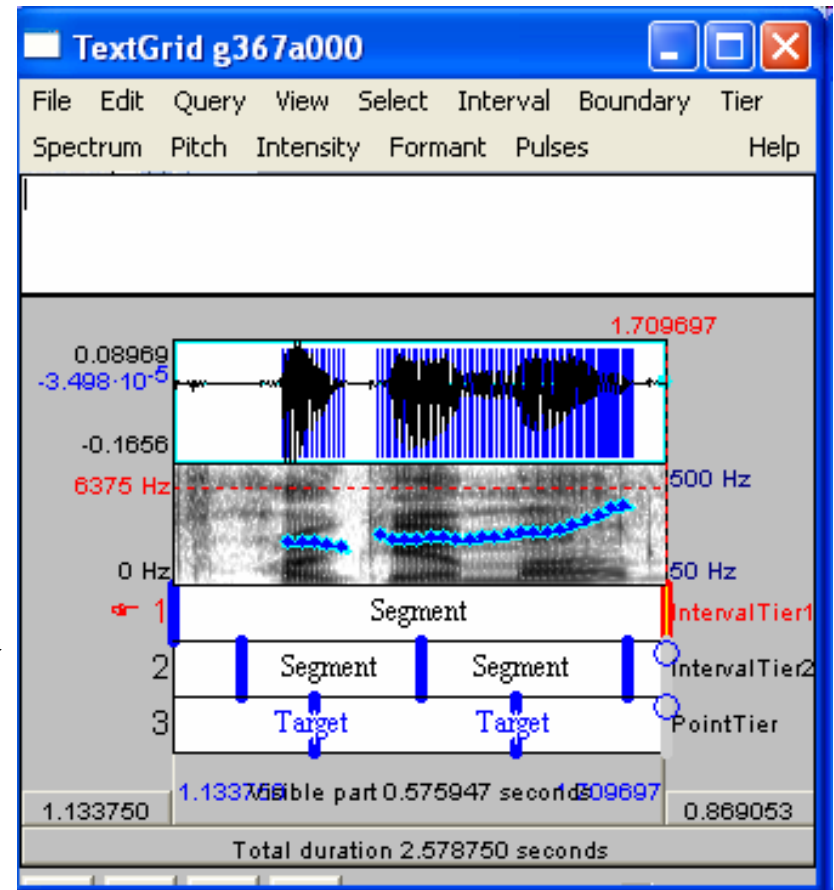
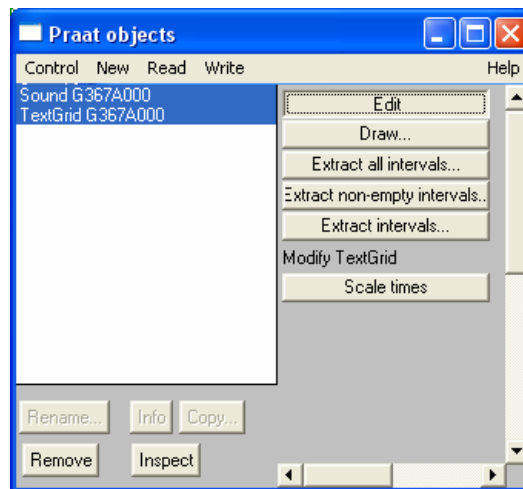


- at one or more levels
 - intervals (segments)
 - points (targets)



ANNOTATION

- always bound to time
- several levels are not related to each other



ANNOTATION

- TextGrid objects are written to TextGrid files
 - in ASCII format (simple text)
 - includes type, time marks and labels

The image shows three windows from the Praat software interface:

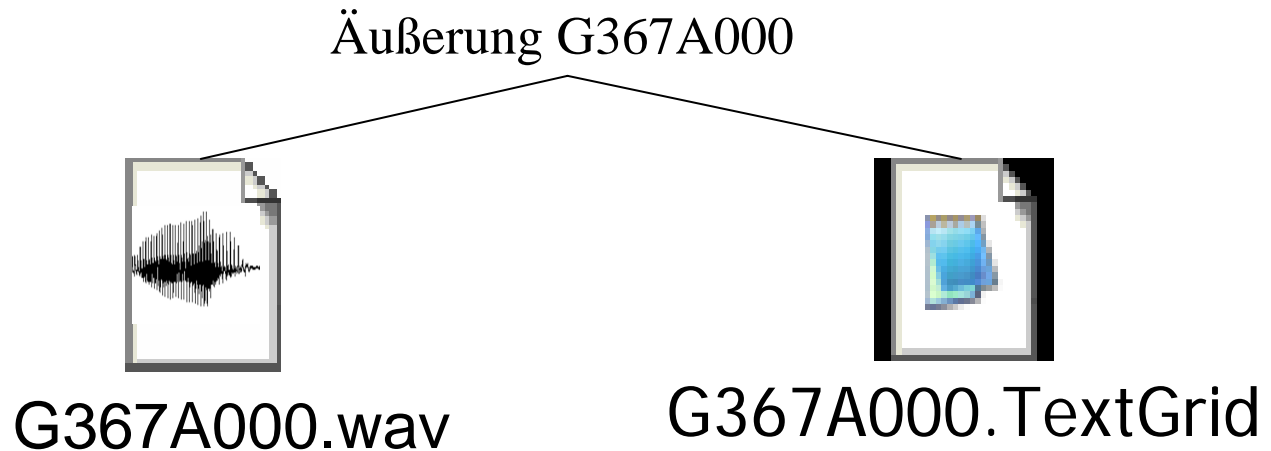
- Praat objects:** A list of objects with 'TextGrid G367A000' selected. The 'Write' menu is open, showing options like 'Write to text file...', 'Write to short text file...', and 'Write to binary file...'. An arrow points from 'Write to text file...' to the central editor window.
- g367a000.TextGrid - Editor:** A text editor window displaying the following code:

```
File type = "ooTextFile"
Object class = "TextGrid"

xmin = 0
xmax = 2.57875
tiers? <exists>
size = 3
item [1]:
class = "IntervalTier"
name = "IntervalTier1"
xmin = 0
xmax = 1.1337503923422532
text = ""
intervals [1]:
xmin = 0
xmax = 1.1337503923422532
text = ""
intervals [2]:
xmin = 1.1337503923422532
xmax = 1.7096969880324557
text = "Segment"
intervals [3]:
xmin = 1.7096969880324557
xmax = 2.57875
text = ""
```
- TextGrid g367a000:** A graphical interface showing a timeline with three tiers. The first tier is 'IntervalTier1' with two segments. The second tier is 'IntervalTier2' with two segments. The third tier is 'PointTier' with two points. The timeline shows time markers at 1.133750, 1.1337503923422532, 1.7096969880324557, and 2.57875. The total duration is 2.578750 seconds. An arrow points from the 'Write TextGrid to text file...' option in the Praat objects window to this window.

Resultat

Zu einer etikettierten Äußerung gehören in Praat eine Signaldatei (Sprachsignal) + eine Etikettierungsdatei (TextGrid Datei)



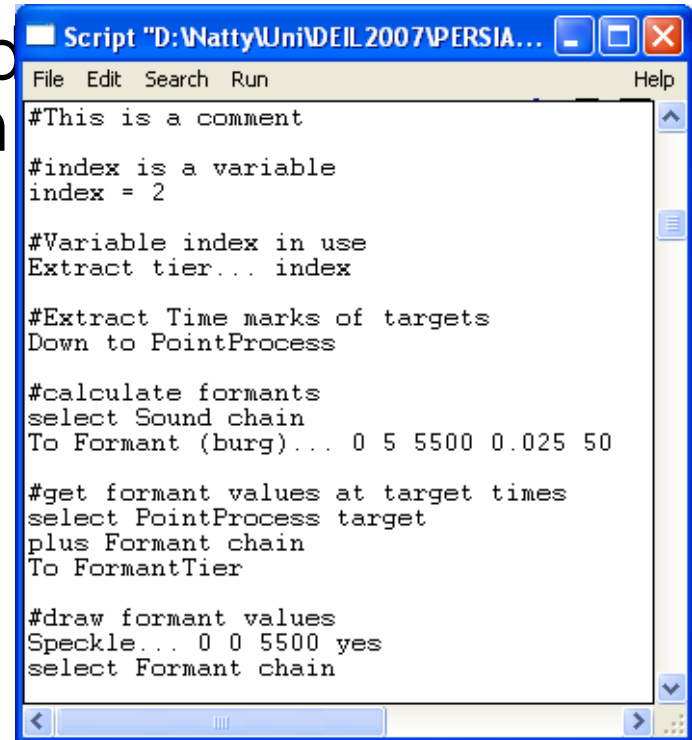
Die Arbeit mit Sprachdatenbanken erfolgt mit Praat indirekt über Sammlungen von Äußerungen.

QUERY

- for very simple queries only
- countings, sequences, positions, structures need to be queried via self written praat scripts
- Extracts:
 - segment intervals of particular (any) label
 - time marks of particular label

Scripting

- Praat provides a simple scripting language
- All actions from Windows and Editors are recorded and can be pasted from a history to a script (text editor).
- These commands can be edited and extended by new commands.
- It is easy to repeat a set of commands with new parameter without using the graphical interface.



```
Script "D:\NattyUni\DEIL 2007\PERSIA..."
File Edit Search Run Help
#This is a comment
#index is a variable
index = 2
#Variable index in use
Extract tier... index
#Extract Time marks of targets
Down to PointProcess
#calculate formants
select Sound chain
To Formant (burg)... 0 5 5500 0.025 50
#get formant values at target times
select PointProcess target
plus Formant chain
To FormantTier
#draw formant values
Speckle... 0 0 5500 yes
select Formant chain
```

ANALYSIS

- appear as functions for particular objects
 - Duration
 - Spectral Analyses
 - Formantfrequency
 - Pitch
 - Intensity
 - complex analyses
 - COG
 - ...
 - many more

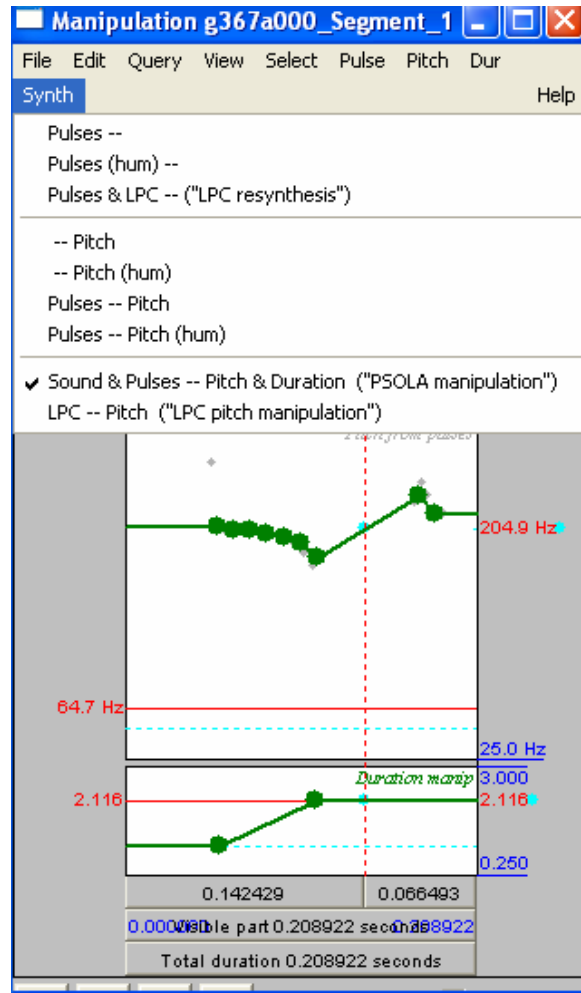
SYNTHESIS

- Manipulation:

- Pitch
- Intensity
- Pulses
- Duration

- Syntheses:

- PSOLA
- LPC
- ...



OUTPUT

- data can be written to file for reuse or export
 - Sound files
 - Signal files
 - TextGrid files
 - Text files (matrices)
- Pictures from Praat Picture made by „draw“:
 - Windows Metafile
 - ESP

