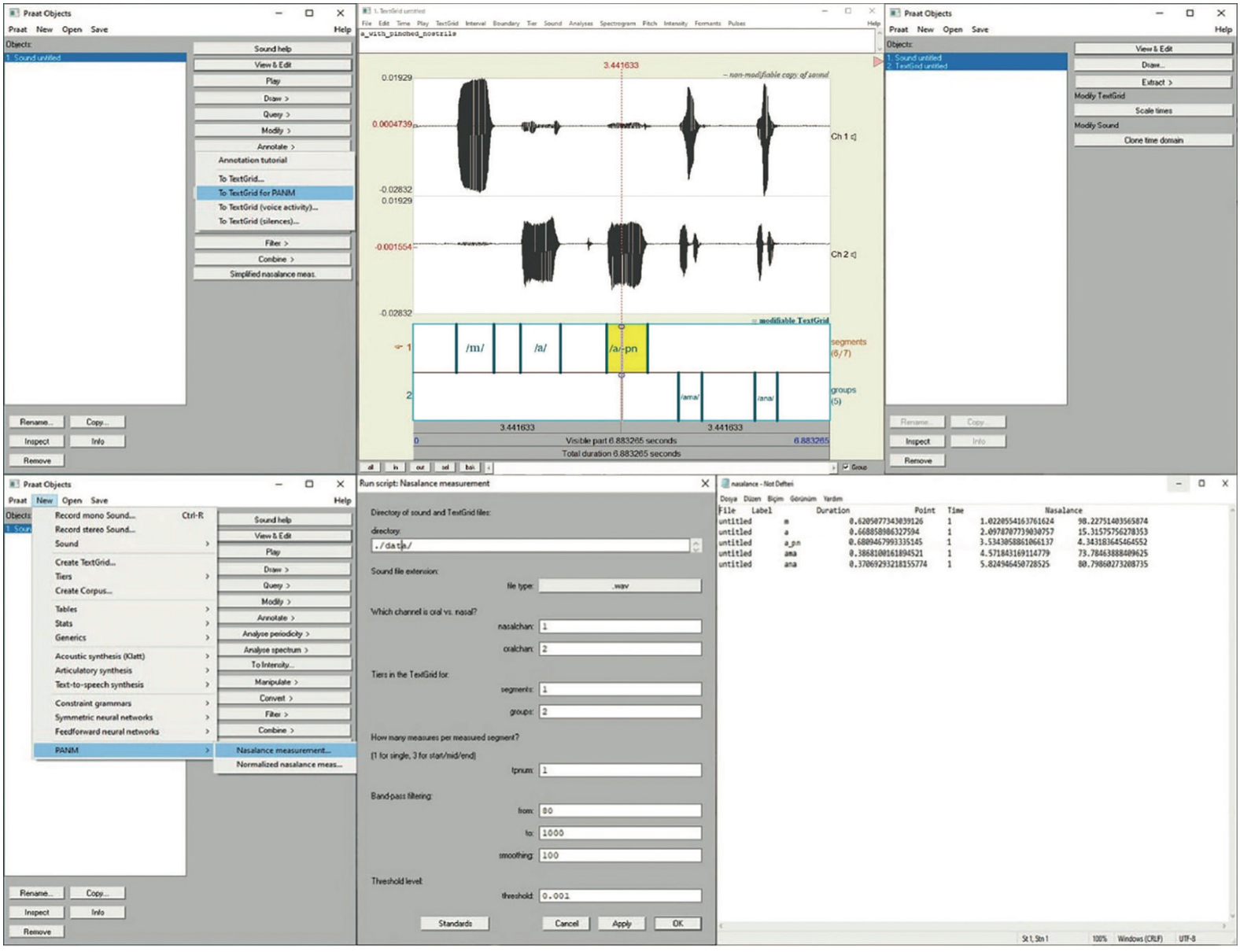
Appendix 1


Praat Objects
Praat New Open Save Help
Objects:
1: Sound untitled
Sound help
View & Edit
Play
Draw >
Query >
Modify >
Annotate >
Annotation tutorial
To TextGrid...
To TextGrid for PANM
To TextGrid (voice activity)...
To TextGrid (silences)...
Filter >
Combine >
Simplified nasalance meas.
Rename...
Copy...
Inspect
Info
Remove
a_with_pinched_nostrils
3.441633
non-modifiable copy of sound
0.01929
0.0004739
-0.02832
Ch 1
Ch 2
-0.001554
modifiable TextGrid
/m/
/a/
/a/-pn
/ama/
/ana/
segments
(6/7)
groups
(5)
Visible part 6.883265 seconds
Total duration 6.883265 seconds
View & Edit
Draw...
Extract >
Modify TextGrid
Scale times
Modify Sound
Clone time domain
New
Record mono Sound... Ctrl-R
Record stereo Sound...
Sound >
Create TextGrid...
Tiers >
Create Corpus...
Tables >
Stats >
Generics >
Acoustic synthesis (Klatt) >
Articulatory synthesis >
Text-to-speech synthesis >
Constraint grammars >
Symmetric neural networks >
Feedforward neural networks >
PANM >
Analyse periodicity >
Analyse spectrum >
To Intensity...
Manipulate >
Convert >
Nasalance measurement...
Normalized nasalance meas...
Run script: Nasalance measurement
Directory of sound and TextGrid files:
directory:
./data/
Sound file extension:
file type:
.wav
Which channel is oral vs. nasal?
nasalchan: 1
oralchan: 2
Tiers in the TextGrid for:
segments: 1
groups: 2
How many measures per measured segment?
[1 for single, 3 for start/mid/end]
tpnum: 1
Band-pass filtering:
from: 80
to: 1000
smoothing: 100
Threshold level:
threshold: 0.001
Standards
Cancel
Apply
OK
nasalance - Not Defteri
Dosya Düzen Biçim Görünüm Yardım
File Label Duration Point Time Nasalance
untitled m 0.6205077343039126 1 1.0220554163761624 98.22751403565874
untitled a 0.668858986327594 1 2.0978707739030757 15.315757562783153
untitled a_pn 0.6809467993335145 1 3.5343058861066137 4.343183645464552
untitled ama 0.3868100161894521 1 4.571843169114779 73.78463888409625
untitled ana 0.37069293218355774 1 5.824946450728525 80.79860273208735
St 1, Stn 1
100%
Windows (CRLF)
UTF-8

Appendix 2

Descriptive statistical analysis results of nasalance scores performed at the PANM 80-100 Hz bandpass filter setting are given in the tables below.

Table 1. Descriptive analyses of nasalance scores for A1 and A2

	Software	Hardware		SD
A1	PANM-S	PANM-H	97.86	0.97
	PANM-S	NSMII-H	95.12	1.57
	NSMII-S	PANM-H	98.02	.94
	NSMII-S	NSMII-H	95.82	1.51
A2	PANM-S	PANM-H	34.95	17.98
	PANM-S	NSMII-H	17.96	11.51
	NSMII-S	PANM-H	35.11	19.05
	NSMII-S	NSMII-H	22.51	12.30

A1: Sustained consonant /m/, A2: Sustained vowel /a/, A3: Sustained vowel /a/with pinched nostrils, H: Hardware, S: Software, SD: Standard deviation

Table 2: Descriptive analyses of nasalance scores for B1 and B2

	Software	Hardware		SD
B1	PANM-S	PANM-H	71.93	8.85
	PANM-S	NSMII-H	41.61	9.65
	NSMII-S	PANM-H	69.40	9.15
	NSMII-S	NSMII-H	52.81	6.34
B2	PANM-S	PANM-H	77.77	6.66
	PANM-S	NSMII-H	50.35	10.37
	NSMII-S	PANM-H	75.25	7.32
	NSMII-S	NSMII-H	55.68	7.49

B1: Word (ɑmɑ), B2: Word (ɑnɑ), H: Hardware, S: Software, SD: Standard deviation

Table 3. Descriptive analyses of nasalance scores for C1, C2, C3, C4 and C5

	Software	Hardware		SD
C1	PANM-S	PANM-H	19.12	9.51
	PANM-S	NSMII-H	10.18	5.18
	NSMII-S	PANM-H	19.40	9.62
	NSMII-S	NSMII-H	13.32	5.36
C2	PANM-S	PANM-H	2.00	1.12
	PANM-S	NSMII-H	3.81	1.16
	NSMII-S	PANM-H	4.07	0.90
	NSMII-S	NSMII-H	4.82	1.09
C3	PANM-S	PANM-H	26.60	9.80
	PANM-S	NSMII-H	11.81	5.96
	NSMII-S	PANM-H	26.35	10.93
	NSMII-S	NSMII-H	18.75	7.06
C4	PANM-S	PANM-H	81.32	5.41
	PANM-S	NSMII-H	58.67	9.42
	NSMII-S	PANM-H	80.67	5.85
	NSMII-S	NSMII-H	63.63	5.43
C5	PANM-S	PANM-H	54.70	8.34
	PANM-S	NSMII-H	30.93	6.42
	NSMII-S	PANM-H	50.09	9.60
	NSMII-S	NSMII-H	34.54	4.83

C1: Oral plosive sentence, C2: Oral plossive with pinched nostrils sentence, C3: Oral sibilan sentence, C4: Nasal sentence, C5: Passage, H: Hardware; S: Software, SD: Standard deviation

Appendix 3

The interaction effect obtained from the two-way repeated measures ANOVA was observed only in the B2 and C2 recording materials. Graphs related to the interaction effect obtained are presented below.

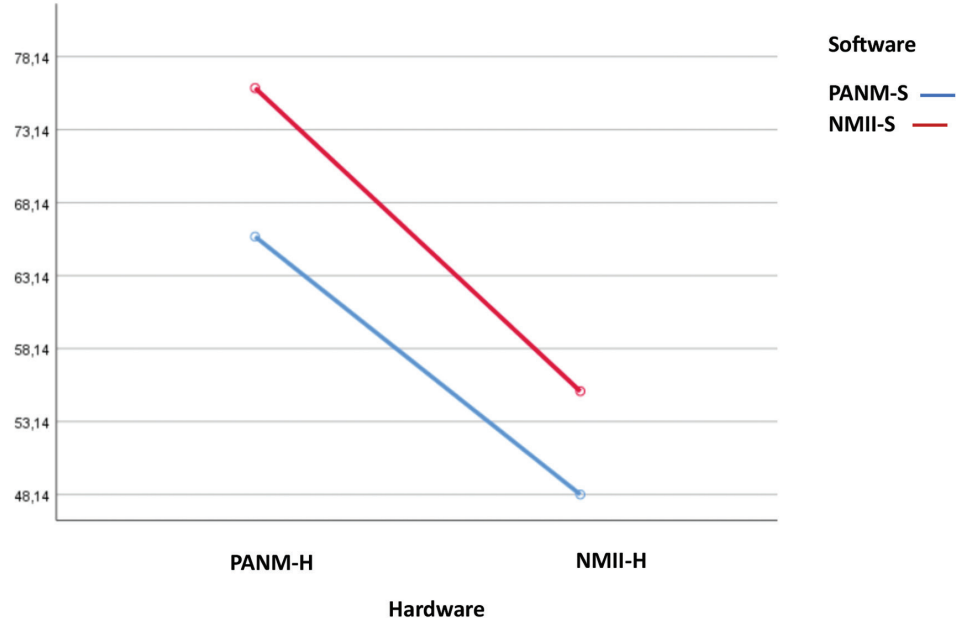


Figure 1. Hardware*software interaction effect graph for B2
Figure 1 shows the graph of nasalance scores according to the hardware-software interaction effect. When examining **Figure 1,** it is seen that nasalance scores recorded from PANM hardware and analyzed with PANM and NMII software are higher than nasalance scores recorded with MNII hardware and analyzed with PANM and NMI software. Furthermore, when examining the results obtained from both NMII and PANM software for B2, it is observed that the nasalance scores obtained from the PANM hardware are higher than those obtained from the NMII hardware
PANM: Praat-assisted nasalance meter, NMII: Nasometer II model

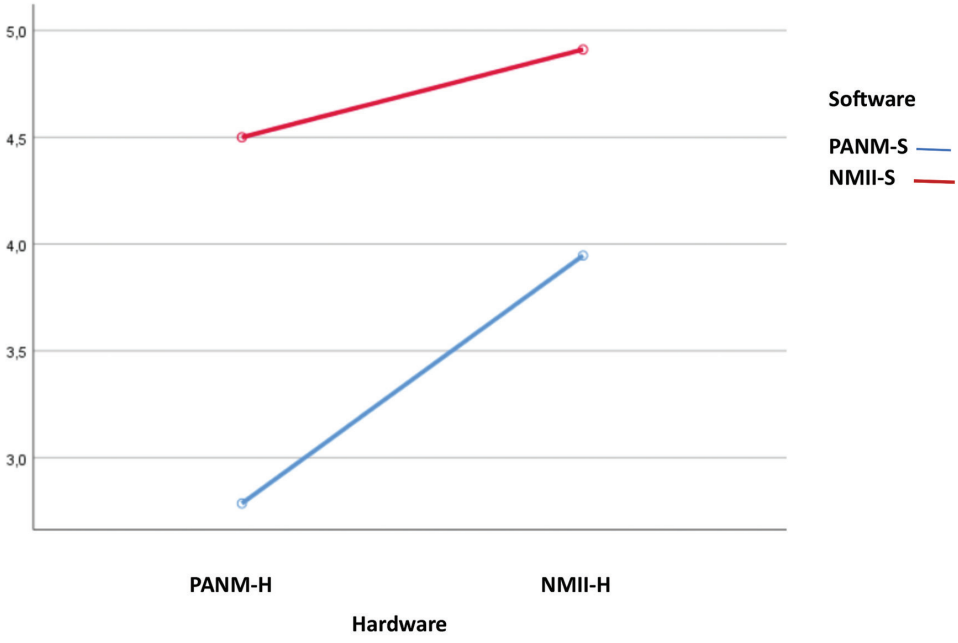


Figure 2. Hardware*software interaction effect graph for C2
Figure 2 shows the graph of nasalance scores according to the hardware-software interaction effect. When examining Figure 2, it is seen that the nasalance scores recorded from the PANM hardware for C2 and analyzed with PANM and NMII software are lower than the nasalance scores recorded with NMII hardware and analyzed with PANM and NMII software. Furthermore, when examining the results obtained from both NM-II and PANM software for B2, it is observed that the nasalance scores obtained from the PANM hardware are lower than those obtained from the NM-II hardware
PANM: Praat-assisted nasalance meter, NMII: Nasometer II model