

Homework 4: Maxent Phonotactics

Due in class February 16th.

1. Find an electronic dictionary

- You want one with phonetic entries, or with a phonemic orthography.
- Wiktionary seems to be getting better ...

2. Find relevant pairs and count them

- Two choices:
 - You can do medial consonant clusters: All CC / V ___ V
 - You can do all consecutive vowel pairs (separated by zero or more C).¹
 - Something else, if you clear it with me first.

3. Ways to find all vowels

- In a word processor, turn every consonant into a tab.
- Put a tab after every letter.
- Turn every tab sequence into a tab (repeat)
- Paste into spreadsheet and keep first two columns.

4. Form a GEN

- All logical possibilities, given the vowel or consonant inventory.
 - This will be n squared if there are n consonants/vowels.
- Give frequencies for each, including zero for absent ones.

5. Add the frequencies of existing items

- At worst, sort your spreadsheet of data and count by hand.
- You can use the COUNTIF() function of Excel.

6. Form *baseline* MaxEnt model in spreadsheet

- The key idea here is to give precedent to any explanation *other* than sequencing constraints, so use a crude, detailed theory.
- Specifically, penalize each vowel or consonant in each position ($2n$ constraints, where n is the number of vowels or consonants).

¹ For simplicity I would suggest just doing disyllabic words, or (if the phonology fits) the first two vowels of every polysyllabic word.

7. Try plausible new constraints to improve your model

- A method that will help you find them is to arrange your counts in an $n \times n$ matrix.
- Test each added constraint with likelihood ratio test, only add it to the grammar if it does well.
- Plot your model's performance in a scatterplot.
- Look for outliers in an attempt to improve your model.

8. What kind of constraints

- When it's *your* model, you want to be principled and elegant
- See typology below
- Feel free to use negative weights (licenses) if you like.

9. Using features

- Many constraints will be easier to state if you add feature columns.

10. Write up what you did and what you learned

- Describe your procedure
- Insert suitable tables and graphs to back up your exposition.
- Include results of Likelihood Ratio Test
- Please email me the spreadsheet you used.

11. Help

- I will post my Turkish spreadsheet.
- Come see me for advice if you like

12. Typology of consonant sequences

- Place agreement, particular for nasal + C
- No geminates
- Coronals after noncoronals
- Fricatives after stops
- No laterals after coronals
- Various generalizations about sonority (hard to implement without syllable structure)

13. Typology of vowel sequences

- Often richer inventory in initial syllable, or under stress.

- Harmony: backness, rounding, high (but seldom low!), tenseness/ATR
- Sometimes a tendency to favor identical vowel sequences