

# A FST description of noun and verb morphology of Azarbaijani Turkish

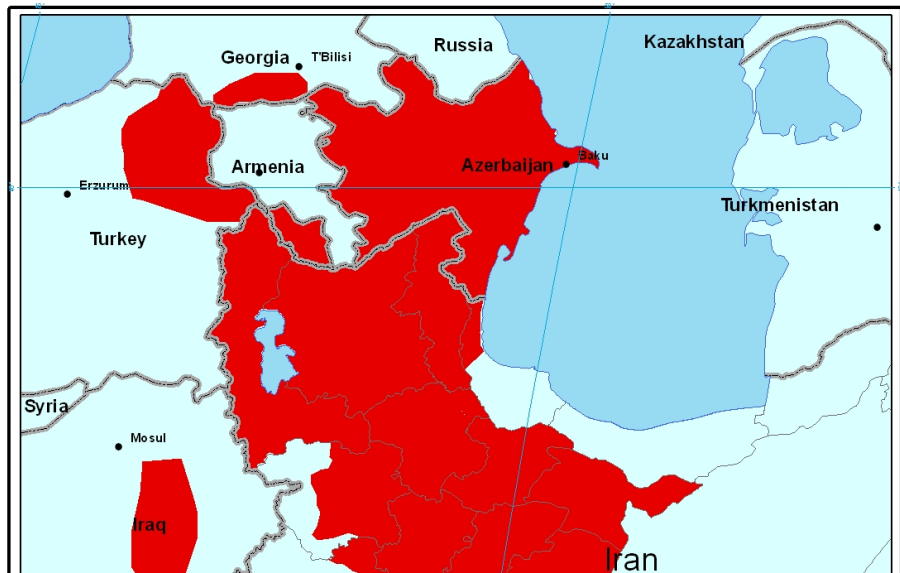
Razieh Ehsani,  
Berke Özenç, Ercan Solak

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# Azərbaycani Türkçesi



oxumayacaqsansa  
read not will you if

# Agglutinative

qutudakılardakılardakılardaki.....lardakinden  
from those in the boxes of those in the boxes (repeat n times)



# Vowel Harmony



# Approach

- Slots
  - <key : value>: surface form
  - Ex: <Case: Abl> : -NAn (Arch-morpheme)
- <key> : surface form

# Nominal and Verb Inflection

- Nominal : Nouns, Adjective, Postpositions
- Verb : Finite inflection



# Nominal Inflection

- Fully slot-based
- Order :  
Stem + Number + Possessor + Family + Case
- Family : not considered in inflection generally
  - xalam**lar**  
aunt-P1SG-PLU
  - xala**larım**  
aunt-PLU-P1SG
  - xalam**gil**  
aunt-P1SG-FAM
  - \*xala**gilim**  
aunt-FAM-P1SG

# Ambiguity in Possessor

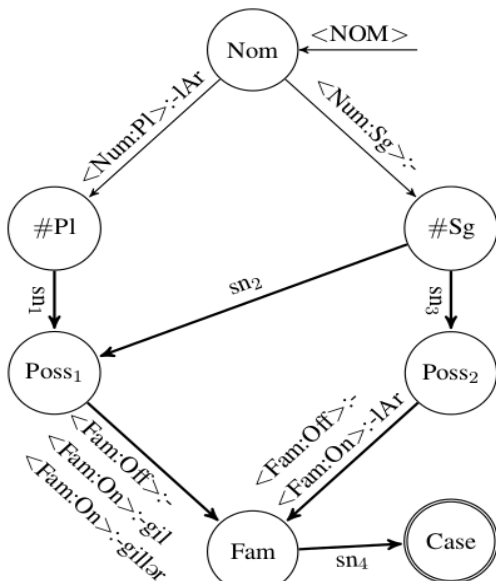
- their book **kitabları**
- his/her books **kitabları**

# Possessor

Abstract morpheme	First level output		
	sn <sub>1</sub>	sn <sub>2</sub>	sn <sub>3</sub>
<Poss:None>	-	-	-
<Poss:1s>	-lm	-(l)m	-(l)m
<Poss:2s>	-ln	-(l)n	-(l)n
<Poss:3s>	-l(n)	-(s)l(n)	
<Poss:1p>	-lmlz	-(l)mlz	
<Poss:2p>	-lnlz	-(l)nlz	
	-lz	-(l)z	
<poss:3p>	-l(n)	-lArl(n)	

**Table :** Possessor person paradigms for Figure 15. Empty cells are undefined. Apart from epenthesis, the only difference between sn<sub>1</sub> and sn<sub>2</sub> is <Poss:3p>.

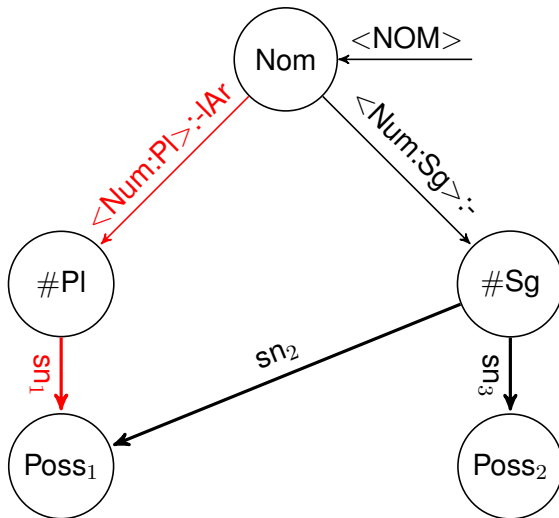
# Nominal Inflection

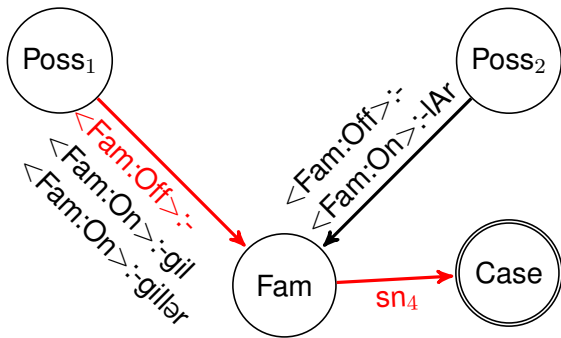


# Nominal Inflection Ex.

kitablarımızın  
book s our with  
Nom Pl Poss1 Case

# Slot-based nominal inflection in AT





## Case slot values

The case symbols for  $sn_4$  are of the form  $\langle \text{Case:v} \rangle$ : a where (v,a) pair is one of

- (Nom,-)
- (Dat,-(y)A)
- (Loc, -dA)
- (Acc, -(n)I)
- (Abl, -NAn)
- (Gen, -(n)In)
- (Ins, -(y)InAn)



# Verb paradigm

## Order of sub-paradigms

- Stem + Voice + Ability + Polarity + Probability + TAM + Person

# Voice

- 5 Voices : Active, Passive, Reflexive, Reciprocal, Cause
- Order : (Recip|Refl) + Cause + Passive

Symbol	Morpheme
sv <sub>1</sub>	<Caus>:-lrt
	<Caus>:-Art
	<Caus>:-(l)t
sv <sub>2</sub>	<Caus>:-dlr
sv <sub>3</sub>	<Pasv>:-(l)l
	<Pasv>:-(l)n

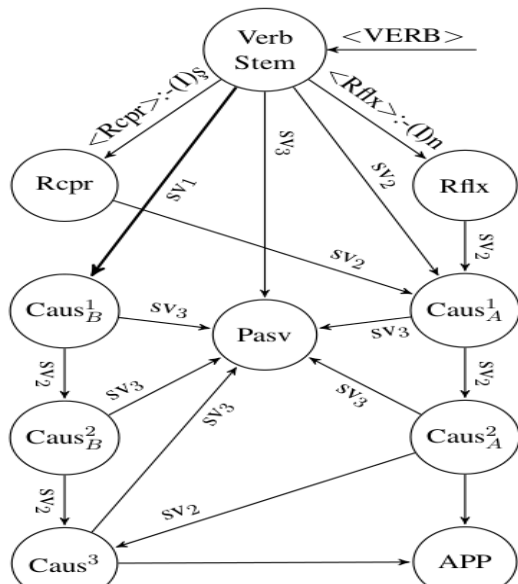
Table : Voice suffixes

# Lexical Conditioning

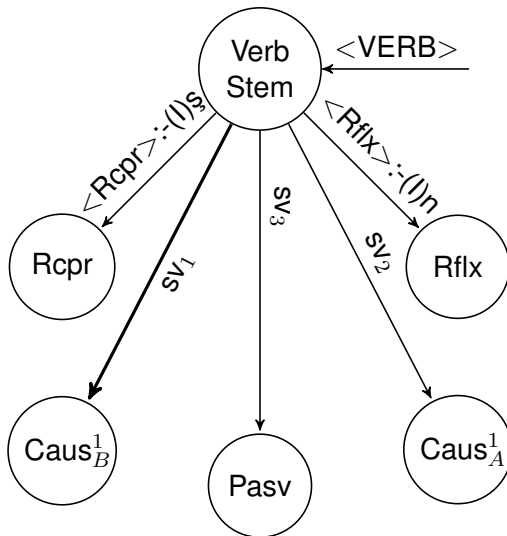
- Attachment to stem is mostly lexically conditioned
- Manually marked, 5909 verb-stems

	VS1	caus-d1r	pasv-1l
	VS2	caus-d1r	pasv-1n
	VS3	caus-1t	pasv-(y)1l
əm VS1	VS4	caus-1t	pasv-1n
əndər VS3	VS5	caus-1r	pasv-1l
ərəmıkləş VS1	VS6	caus-1r	pasv-1n
əri VS4	VS7	caus-ar	pasv-1l
ərsinlə VS4	VS8	caus-ar	pasv-1n
əsaslan VS1	VS9	--	pasv-1l
əsdır VS3	VS10	--	pasv-1n
əşəbiləş VS1	VS11	caus-d1r	--
əşirgə VS3	VS12	caus-1t	--
əşkil VS4	VS13	caus-1r	--
əs VS1	VS14	caus-ar	--
	VS15	--	--

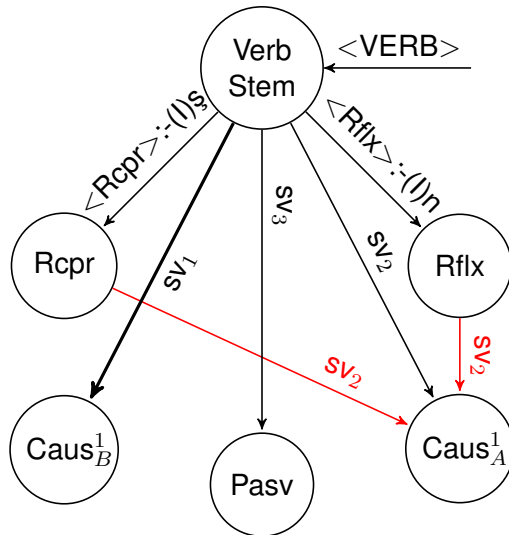
# Voice paradigm



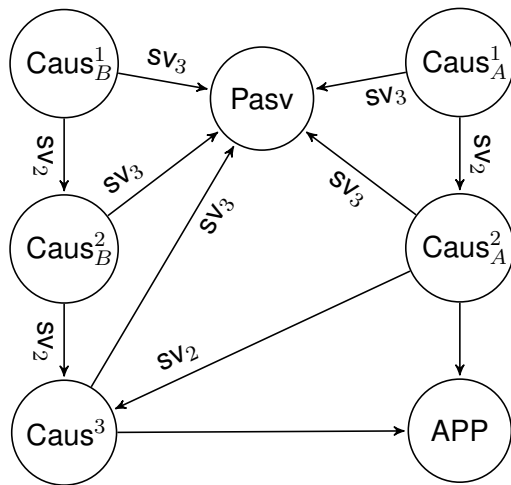
# Voice



# Voice Diagram



# Voice paradigm

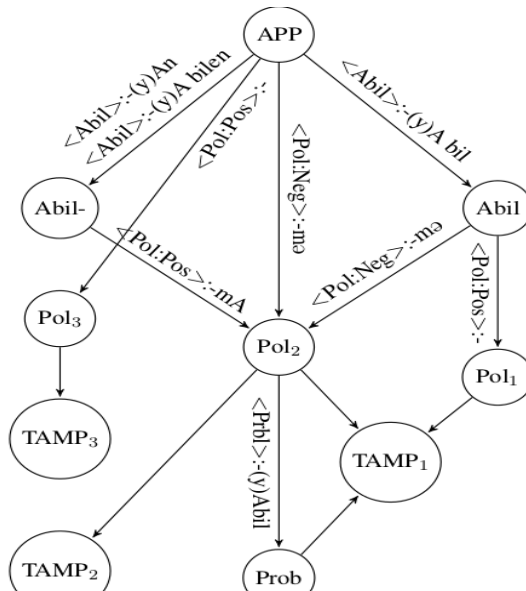


# Ability, Polarity, Probability

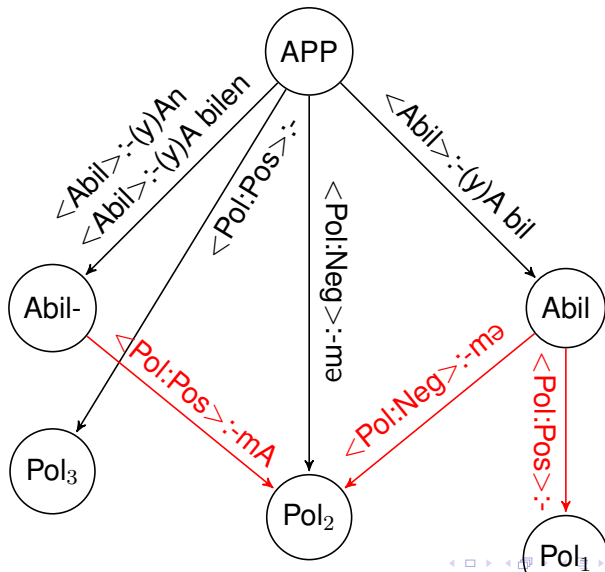
- Polarity slot: <Pol:Pos> , <Pol:Neg>
- Ability, Probability same surface form in positive polarity.  
cannot say : I may be able to come.  
\*gələ**bil**ə**bil**ərəm  
can say : I may not be able to come.  
gələ**bil**ən**m**ərəm



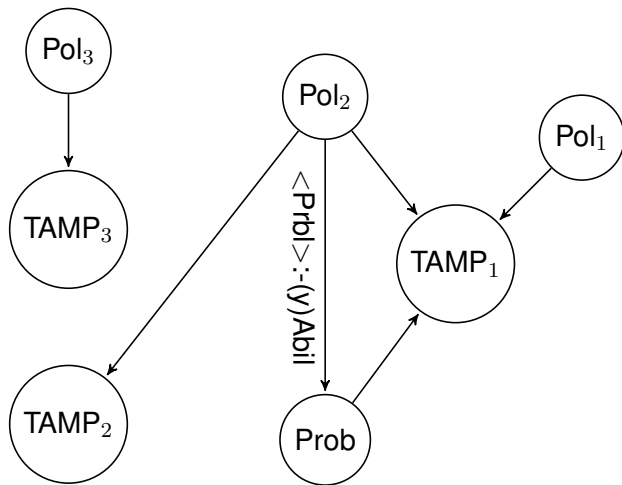
# Ability-Polarity-Probability



# Ability, Polarity, Probability



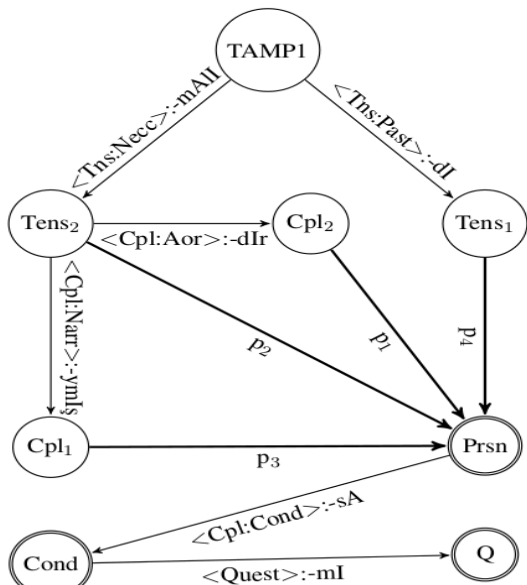
# Ability, Polarity, Probability



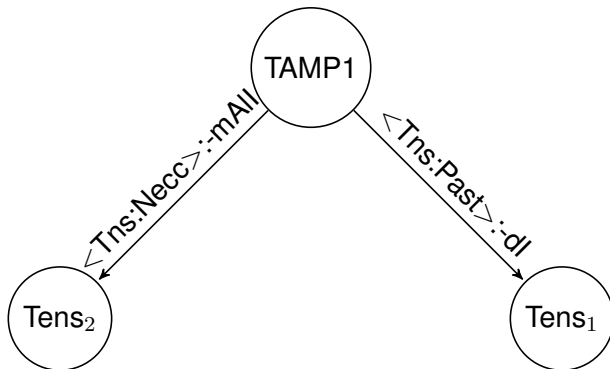
# Tense-aspect-mood and person paradigm

- Order : Tense + Copula + (Person + Condition + Question)
- 11 Tense values ( 9 distinct behavioral groups)
- Too complicated to put on a single slide

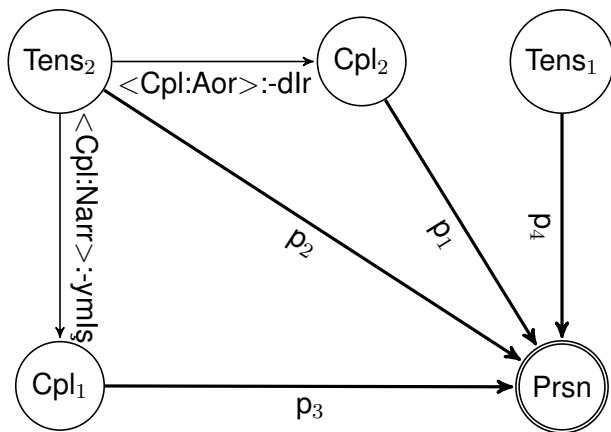
# Tense-aspect-mood and person paradigm



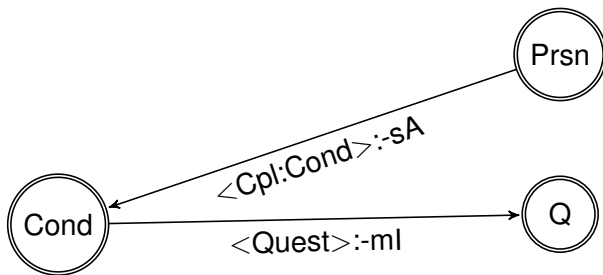
# Tense-Person



# Tense-Person



# Tense-Person





# Person morphemes

<b>Person</b>	<b>p<sub>1</sub></b>	<b>p<sub>2</sub></b>	<b>p<sub>3</sub></b>	<b>p<sub>4</sub></b>
<Prsn:1s>		-yAm	-Am	-m
<Prsn:2s>		-sAn	-sAn	-n
<Prsn:3s>	-		-	-
<Prsn:1p>		-yIQ	ıQ	-q
<Prsn:2p>		-sInIz	-sInIz	-nIz
<Prsn:3p>	-IAr		-IAr	-IAr

Table : Person morphemes in Figure 32.

- Epenthetics
  - 1 (y), (s), (n)
  - 2 Considered as part of morphemes
  - 3 Dropped depending on the context
- Harmony, Velarization and Approximation
  - 1 N → n or m
  - 2 A → a or ə
  - 3 Q → K (after front vowel)
  - 4 K → k, y
  - 5 Q → q or ğ

# Future Work

- Derivation (Productive ones)
  - 1 Noun to Verb
  - 2 Verb to Noun
  - 3 Verb to Adverb
  - 4 Noun to Adverb
- Nominal Predicates
- Lexicon Reduction
- Publicly available as a web service