

6601: NATURAL LANGUAGE PROCESSING

Daniel Kohlsdorf, Thad Starner

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On confully gon sale in pople fores oft, por in liberer events comfund mound asherer at a sale maper sofift or veget ling low are ling low nes der Popus un below subite sang Jumes um som und ge Jupe strar forem flacin capeller with soft Popen up and so soften una suffice forem and so for commente mar way higher time differed rolling suburger How in you plater, Survey drove our bourse program sory literaren softward gin nome bin I family were after Give of Policies part & thing of survey of an out from whoma grant fore on Dily good of in smoore oute wave on pra reconference of spile out was green in fre fording a ponding a ponding in Expension India special second in the foreign Twenfrie rot oute se Marse ab luglice, prous oute mounes Peren Luglin on suffice Solar gud poffice; et stim ling his sepreman poth selector suffice Pert moure reportin Symonim ve not from in quil segence soons wit gut habitere no oft militar in tim cupienes in pare Samete Cing und procuidada quiece gangud poffint as flore unit referenties fore wellinger afferen Doft out mooft sed Dat hor fade gan paranen fenceren Janon culpur consents in Janes sommer afpirere is Janes, Sunce areas in Dies g Crelia in aliquation pre veres vempily pante celip for due Scandalline coo materials. Operer up those principes qui no confam prientes se fragmer in subfishi die set per sucretes quas true of grande we to pole ou updurant confact verne of in comerch grande Debellande rather que a reference Soliton of main. See of the corde Sucre Still Per wife or Nos & Per hugley no maple samber the your an nefet grante sons were some we was to grante often sund veftant grays street wood hugley related, wine coolite from some in aster ber aux wie in main cofustinem fancie no sefuer cope excesse stay excest a core que sequent monute que ip un unt . Nos in ipis febuil cot ab alcofuno exclusi improvedude ex que sequent monute que ipi un unt . Nos in ipis febuil cot ab alcofuno exclusi improvedude ex que se q in fine que eventa rango obitimente fly most wang god months in amb, coplacere, upi q vang 5 mes track of Jasel confer under van Sam commercial commercial normal account in my spanner of fund g'm not rocuren facer tas mehitu sediger hopes mos. 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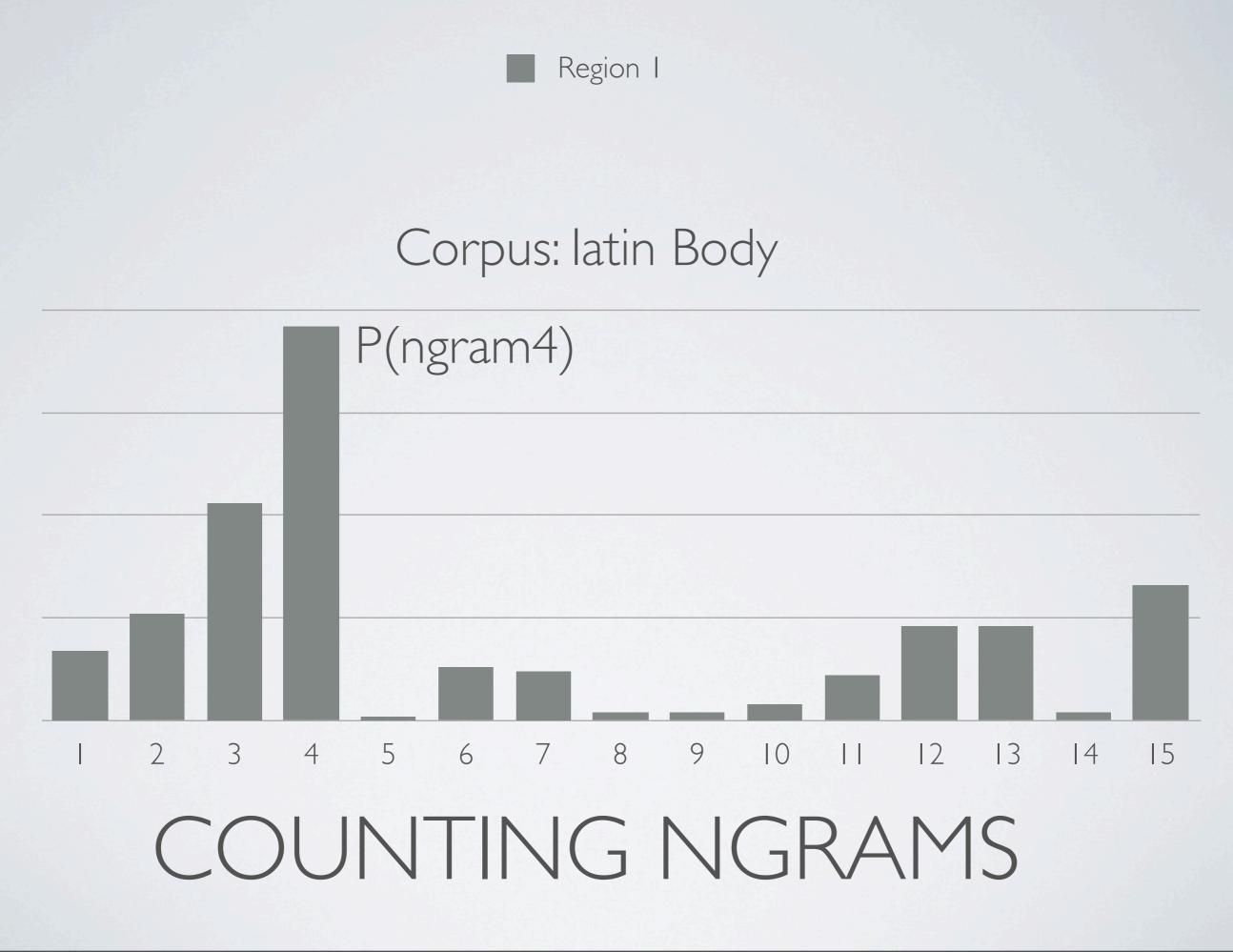
LANGUAGE MODELS

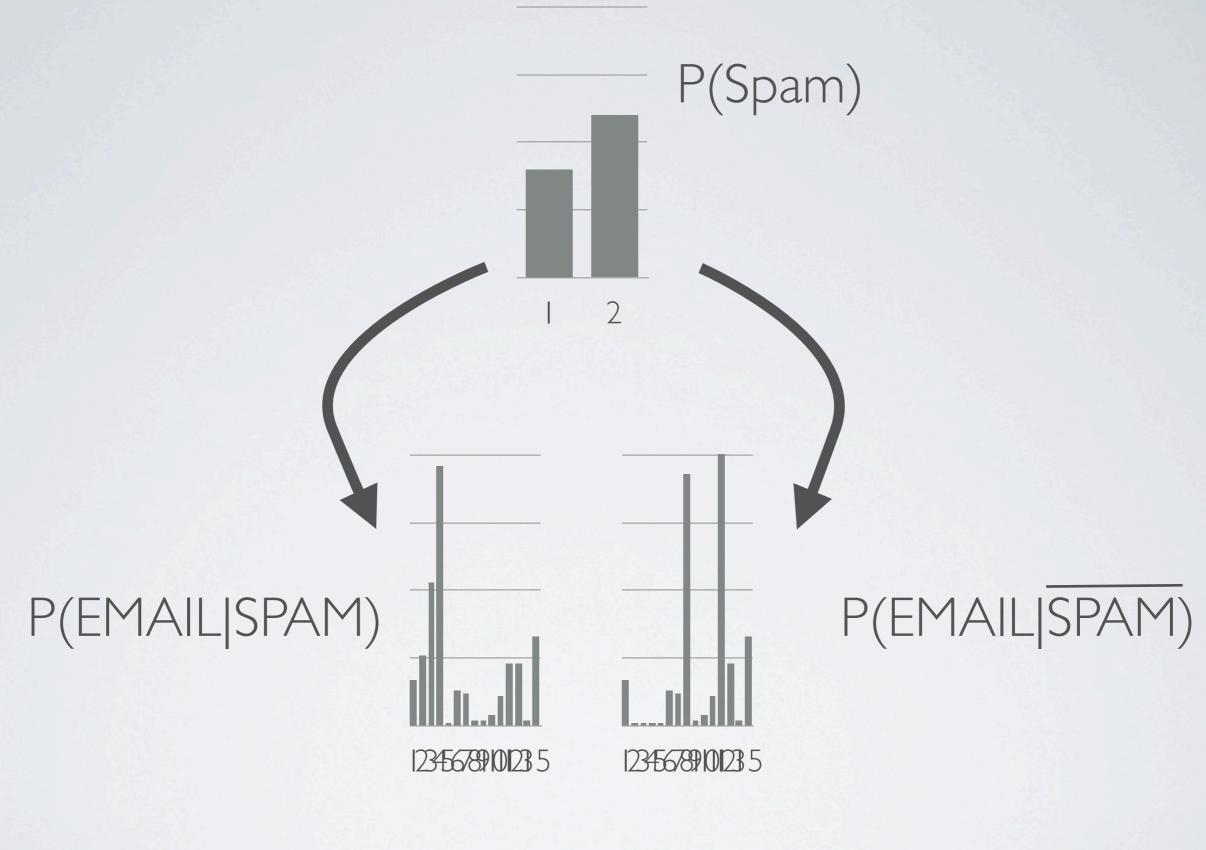
n = 1n = 2n = 3n = 4

That's great, it starts with an earthquake, birds and snakes, an aeroplane - Lenny Bruce is not afraid. Eye of a hurricane, to yourself churn - world serves its own needs, regardless of your own needs. Feed it up a knock, speed, grunt no, strength no. Ladder structure clatter with fear of height, down height. Wire in a fire, represent the seven games in a government for hire and a combat site. Left her, wasn't coming in a hurry with the furies breathing down your neck. Team by team reporters baffled, trump, tethered crop. Look at that low plane! Fine then. Uh oh, overflow, population, common group, but it'll do. Save yourself, serve yourself. World serves its own needs, listen to your heart bleed. Tell me with the rapture and the reverent in the right - right. You vitriolic, patriotic, slam, fight, bright light, feeling pretty psyched.

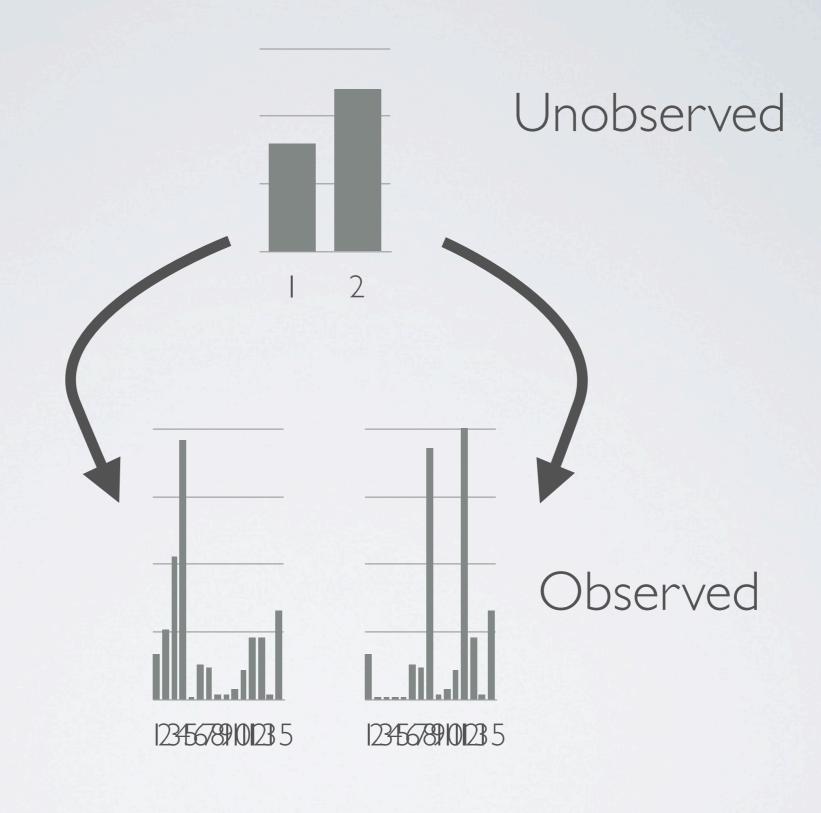
It's the end of the world as we know it.
It's the end of the world as we know it.
It's the end of the world as we know it and I feel fine.

NGRAM MODELS

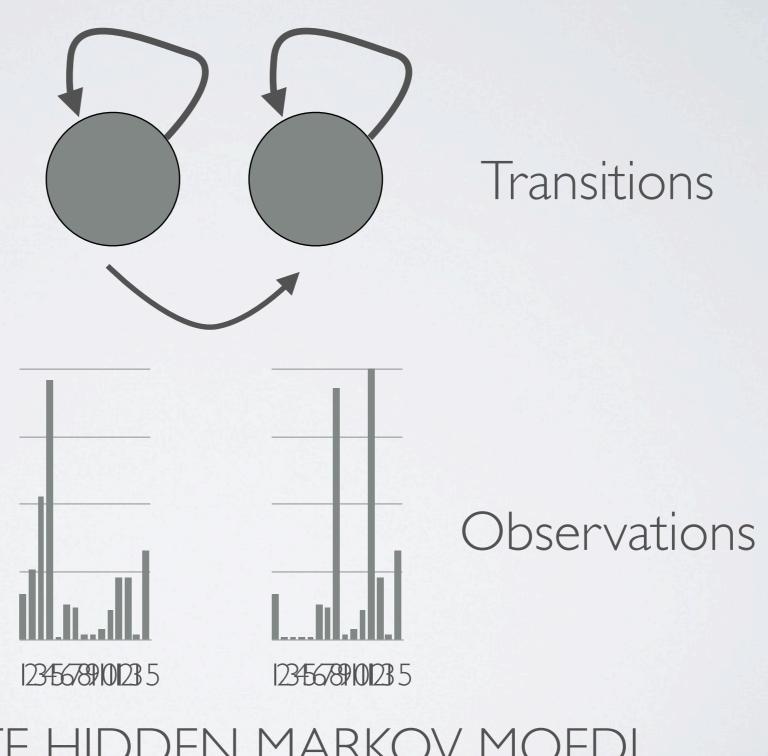




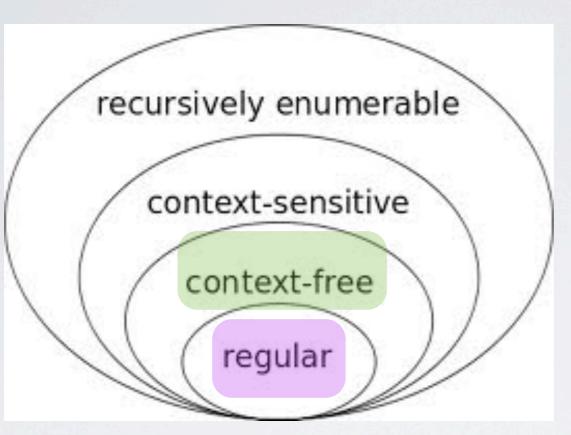
CLASSIFICATION



MIXTURES OF MULTINOMIALS

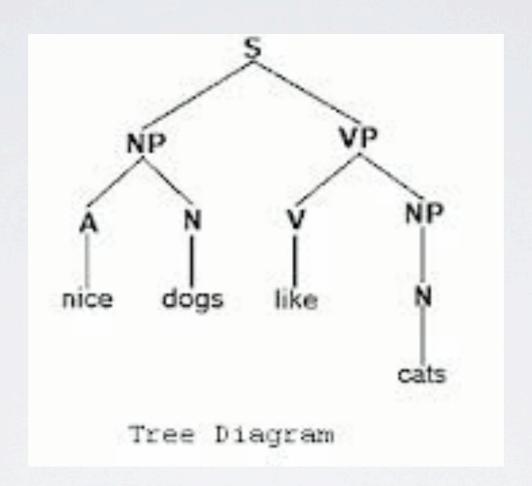


DISCRETE HIDDEN MARKOV MOEDL





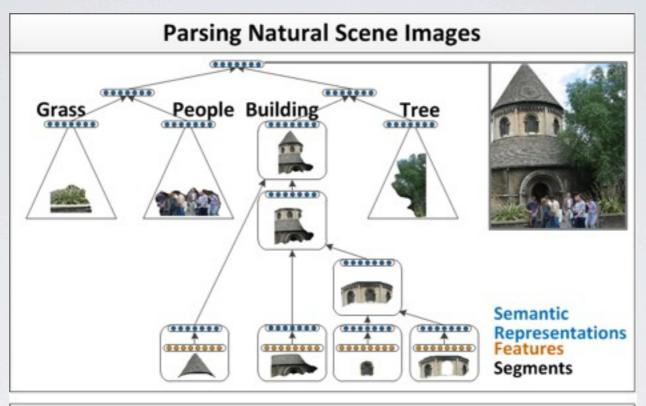
GRAMMARS



CONTEXT FREE GRAMMAR

```
function CYK-PARSE(words, grammar) returns P, a table of probabilities
  N \leftarrow \text{LENGTH}(words)
  M \leftarrow the number of nonterminal symbols in grammar
  P \leftarrow an array of size [M, N, N], initially all 0
  /* Insert lexical rules for each word */
  for i = 1 to N do
     for each rule of form (X \rightarrow words_i [p]) do
       P[X, i, 1] \leftarrow p
  /* Combine first and second parts of right-hand sides of rules, from short to long */
  for length = 2 to N do
     for start = 1 to N - length + 1 do
       for len1 = 1 to N - 1 do
          len2 \leftarrow length - len1
          for each rule of the form (X \to Y Z[p]) do
             P[X, start, length] \leftarrow Max(P[X, start, length],
                                P[Y, start, len1] \times P[Z, start + len1, len2] \times p
  return P
```

CYK - ALGORITHM / PARSING



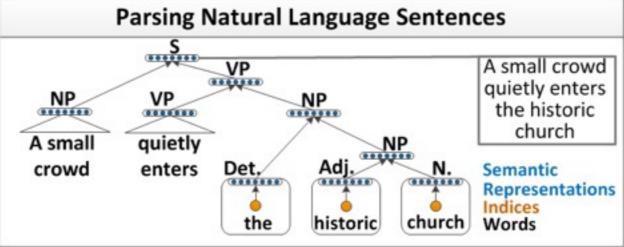


IMAGE COMPOSITION



Figure 7: Experiment II: All of the discs have the same size and shape. Also, note that the dark shadow under the hand is labelled as noise



Figure 8: Experiment III: The small foreground block is a distracter object in this scene. The system must determine from behavior that it is irrelevant to the activity even when



Figure 9: Experiment IV: In this frame, the book fully occludes the third peg. The system must infer the interactions that are hidden.



Figure 10: Screenshot from the Simon game demonstrating analysis of another domain.

EXPECTATION GRAMMARS