

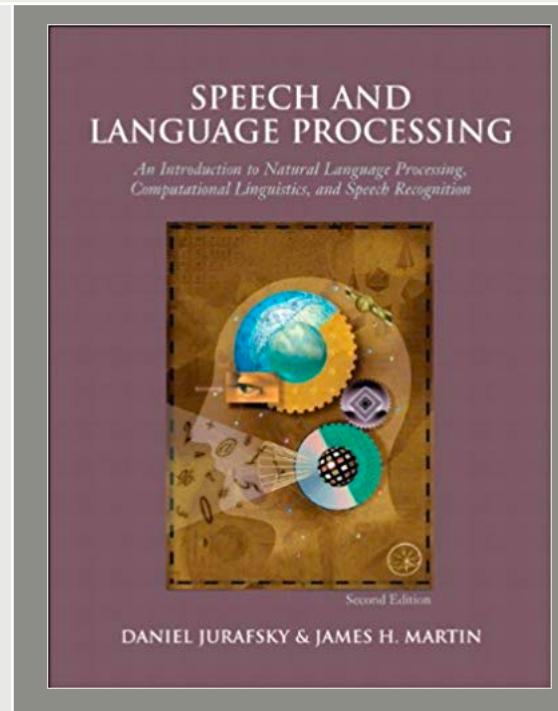
NLP: A Closer Look at Markov Chains and Entropy

Shannon Bingham

Getting a deeper understanding of NLP led to research:

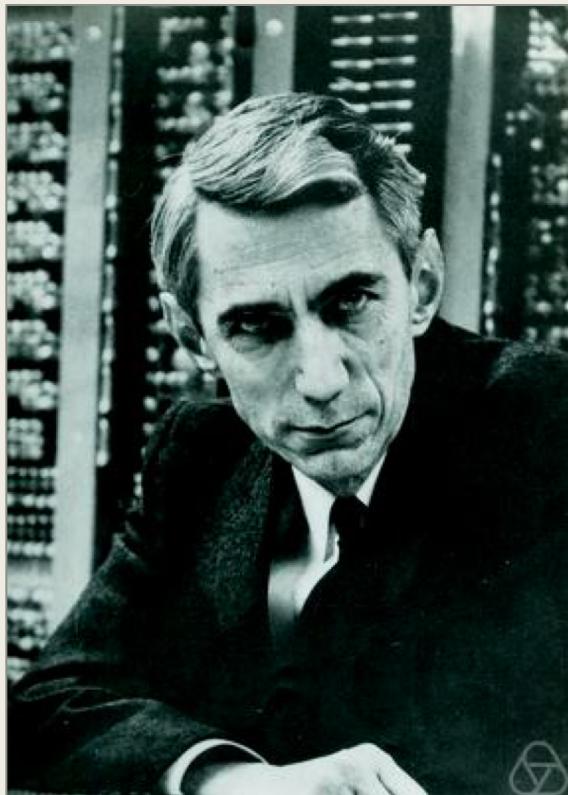
Past
lessons

Internet



Source: Amazon.com

Claude Shannon founded the discipline of information theory in 1948.



Claude Shannon
Source: Wikipedia



Andrey Markov
Source: Wikipedia

Evolution of information as:

Information = (number of symbols) log (# of symbols available at each selection)

to include probability and statistics
(based on experiments).

Information, as framed by Shannon:

"The fundamental problem of communication is that of reproducing at one point, either exactly or approximately, a message selected at another point."

Shannon, C.E. (1948), "A Mathematical Theory of Communication", Bell System Technical Journal, 27, pp. 379–423 & 623–656, July & October, 1948.

Time to experiment!

What are the big takeaways from the experiments?

Ideas by Markov, Shannon, and others are incorporated in many aspects of information theory.

There are connections to other areas of language processing.

Word prediction is one way to measure reading proficiency.

A Town Mouse once visited a relative who lived in the country. For lunch the Country Mouse served (**when, wheat, umbrella**) stalks, roots, and acorns, with a (**nest, stopped, dash**) of cold water for drink. The (**simple, had, Town**) Mouse ate very sparingly, nibbling a (**wheat, lay, little**) of this and a little of (**that, may, so**), and by her manner making it (**loudly, still, very**) plain that she ate the simple (**dash, breathe, food**) only to be polite. After the (**by, meal, water**) the friends had a long talk, (**morning, next, or**) rather the Town Mouse talked about (**then, her, delicious**) life in the city while the (**Country, until, away**) Mouse listened. They then went to (**bed, mice, scurried**) in a cozy nest in the (**visited, mansion, hedgerow**) and slept in quiet and comfort (**yes, dog, until**) morning. In her sleep the Country (**bag, Mouse, hedgerow**) dreamed she was a Town Mouse (**mew, with, imagine**) all the luxuries and delights of (**city, servants, door**) life that her friend had described (**country, my, for**) her. So the next day when (**ate, once, the**) Town Mouse asked the