

Key milestones in NLP

1948

In the area of automated translation, a dictionary look-up system developed at Birkbeck College, London can be seen as the first NLP application. In the years following World War II, researchers attempted translating German text to English. Later during the era of the Cold War, it's about translating Russian to English.

1957

American linguist Noam Chomsky publishes *Syntactic Structures*. Chomsky revolutionizes the theory of linguistics and goes on to influence NLP a great deal. The invention of Backus-Naur Form notation in 1963 for representing programming language syntax is influenced by Chomsky's work. Another example is the invention of Regular Expressions in 1956 for specifying text search patterns.

1966

In the U.S., the Automatic Language Processing Advisory Committee (ALPAC) Report is published. It highlights the limited success of machine translation. This results in a lack of funding right up to 1980. Nonetheless, NLP advances in some areas including case grammar and semantic representations. Much of the work till late 1960s is about syntax though some addressed semantic challenges.

1970

In this decade, NLP is influenced by AI with focus on world knowledge and meaningful representations. Thus, semantics becomes more important. SHRDLU (1973) and LUNAR (1978) are two systems of this period. Into the 1980s, these led to the adoption of logic for knowledge representation and reasoning. Prolog programming language was also invented in 1970 for NLP applications.

1980

This decade sees the growing adoption of Machine Learning and thereby signalling the birth of statistical NLP. Annotated bodies of text called corpora are used to train ML models to provide the gold standard for evaluation. ML approaches to NLP become prominent through the 1990s, partly inspired by the successful application of Hidden Markov Models to speech recognition. The fact that statistics has brought more success than linguistics is echoed by Fred Jelinek, Every time I fire a linguist, the performance of our speech recognition system goes up.

1982

Project Jabberwacky is launched to simulate natural human conversations in the hope of passing the Turing Test. This heralds the beginning of chatbots. In October 2003, Jabberwacky wins third place in the Loebner Prize.

1998

The FrameNet project is introduced. This is related to semantic role modelling, a form of shallow semantic parsing that continues to be researched even in 2018.

2001

For language modelling, the classical N-Gram Model has been used in the past. In 2001, researchers proposed the use of a feed-forward neural network with vector inputs, now called word embeddings. In later years, this led to the use of RNNs (2010) and LSTMs (2013) for language modelling.

2003

Latent Dirichlet Allocation (LDA) was invented and became widely used in machine learning. It's now the standard way to do topic modelling.

2013

Improvements to word embeddings along with an efficient implementation in Word2vec enable greater adoption of neural networks for NLP. RNNs and LSTMs become obvious choices since they deal with dynamic input sequences so common in NLP. CNNs from computer vision get repurposed for NLP since CNNs are more parallelizable. Recursive Neural Networks attempt to exploit the hierarchical nature of language.

Mar 2016

Microsoft launched Tay, a chatbot on Twitter that would interact with users and get better in conversing. However, Tay is shut down within 16 hours after it learns to talk in racist and abusive language. A few months later Microsoft launched Zo chatbot.

Sep 2016

Google replaces its phrase-based translation system with Neural Machine Translation (NMT) that uses a deep LSTM network with 8 encoder and 8 decoder layers. This reduces translation errors by 60%. This work is based on sequence-to-sequence learning proposed in 2014, which later becomes a preferred technique for NLG.