The last decade has seen a substantial surge in the use of finite-state methods in many areas of natural-language processing. This is a remarkable comeback considering that in the dawn of modern linguistics, finite-state grammars were dismissed as fundamentally inadequate. Noam Chomsky's seminal 1957 work, *Syntactic Structures* [[3](https://web.stanford.edu/~laurik/publications/ciaa-2000/fst-in-nlp/fst-in-nlp.html#chomsky57)], includes a short chapter devoted to ``finite state Markov processes'', devices that we now would call *weighted finite-state automata*. In this section Chomsky demonstrates in a few paragraphs that

English is not a finite state language. (p. 21)

In any natural language, a sentence may contain discontinuous constituents embedded in the middle of another discontinuous pair as in `` If ... either ... or ... then ...'' It is impossible to construct a finite automaton that keeps track of an unlimited number of such nested dependencies. Any finite-state machine for English will accept strings that are not well-formed.

The persuasiveness of *Syntactic Structures* had the effect that, for many decades to come, computational linguists directed their efforts towards more powerful formalisms. Finite-state automata as well as statistical approaches disappeared from the scene for a long time. Today the situation has changed in a fundamental way: statistical language models are back and so are finite-state automata, in particular, finite-state transducers. One reason is that there is a certain disillusionment with high-level grammar formalisms. Writing large-scale grammars even for well-studied languages such as English turned out to be a very hard task. With easy access to text in electronic form, the lack of robustness and poor coverage became frustrating. But there are other, more positive reasons for the renewed interest in finite-state techniques. In phonology, it was discovered rather early [[6](https://web.stanford.edu/~laurik/publications/ciaa-2000/fst-in-nlp/fst-in-nlp.html#johnson:1972)] that the kind of formal descriptions of phonological alternations used by linguists were, against all appearances, finite-state models. In syntax, it became evident that although English as a whole is not a finite-state language, there are nevertheless subsets of English for which a finite-state description is not only adequate but also easier to construct than an equivalent phrase-structure grammar. Finally, considerable progress has been made in developing special finite-state formalisms that are suited for the description of linguistic phenomena and, along with them, compilers that efficiently produce automata from such a description. The automata in current linguistic applications are typically much too large and complex to be produced by hand.

The following sections will cover these positive developments in more detail.