The best way to understand the inner-workings of the AT&T FSM Library is to understand the traditional definition of a Finite State Machine (FSM): It’s a computational model that takes an input sequence and very efficiently determines if it matches any of a set pre-specified sequences. This pattern-matching ability makes FSMs useful in many fields.

The “brains” underlying AT&T Labs speech recognition technology is the AT&T FSM Library. The AT&T FSM Library is a flexible set of tools that enhances the traditional finite state machine computational model by adding the ability to assign output sequences and/or probabilities to input sequences. This makes it possible to give a response and probability to an input sequence, which is necessary in speech recognition and other similar tasks.

Here’s an example of how we’re putting FSMs to work. AT&T Labs uses FSMs in our speech recognition technology, where the “input” is a speech signal and the “output” is the written word. To make the transformation of the speech signal to written form, the data goes through the following steps: The speech signal is first matched with sequences of phonemes (symbolic sounds). The phonemes are then translated into their matching words. Finally, the output words appear as text.

The AT&T FSM Library is a set of software tools that includes more than thirty operations that can combine, optimize, and search data encoded as FSMs. The AT&T FSM Library also can be used in combination with graph visualization programs to view the graphical representations of finite-state machines.

Although the AT&T FSM Library was developed in conjunction with AT&T’s work in speech recognition, the technology has a wide variety of current applications, including speech translation and DNA-sequence alignment.
What’s special about the AT&T FSM Library:

- Gives a compact representation of a large amount of data
- Uses very efficient algorithms
- Includes new algorithms not previously used for FSMs
- “Input/Output” FSMs (“transducers”) let the user assign responses to inputs
- “Weighted” FSMs let the user assign probabilities to inputs
- Utilizes a flexible set of probabilities
- Fully documented, used and tested in several products and applications

Sample applications:

- Speech recognition
- Language translation
- Speech synthesis
- Information extraction from the Web
- Text and data mining
- Computational biology
- Image processing and compression
- Search engines

For additional information, please contact us via e-mail at attip@att.com