Portable Software Modules for Speech Recognition

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We have completed Phase I of an SBIR project that aims to develop a unix software package that will support R&D in speech recognition.

Technology transfer among speech recognition groups is inhibited by the lack of convenient and powerful means for exchanging programs and data. The new Speech Recognition Package (SRP) will emphasize extensibility, robustness, and portability. The design will exploit advanced software engineering techniques such as abstract interfaces, objectoriented programming, and self-describing objects. The technology base for the SRP includes two existing commercial software packages - the Entropic Signal Processing System (ESPS) and its waves+ graphics interface.

The Phase I goals were:

- to design and implement a new Entropic Signal Processing System (ESPS) program to compute the FFT-based cep strum (with mel-warping);
- to design and implement an ESPS feature file containing acoustic parameters for speech recognition applications;
- to design and implement a prototype acoustic feature extraction module of the SRP (including a user interface that allows the specification of desired acoustic parameters via screen buttons);
- to demonstrate the integration of the new module with ESPS and waves+; and
- to design extensions and revisions of ESPS that would yield a suitable SRP.

All of the Phase I technical objectives were met. Furthermore, we developed a suitable software engineering methodology for the SRP, and we demonstrated the methodology by designing, implementing, and testing three low-level modules:

- user_messages - facilities for issuing information, debugging, and error messages to the user, as well as for obtaining user inputs in response to prompts;
- initstop - facilities for initializing programs and for stopping them (both normal and abnormal termination); and
- errors - facilities for declaring/reporting fatal and non-fatal errors, facilities for handling fatal errors, and facilities for function tracing.