Company and Product Overview

Carnegie Speech Company
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Introduction

Carnegie Speech is the premier developer and provider of software for assessing and teaching spoken language skills. Using state-of-the-art speech recognition technology developed at Carnegie Mellon University, we market applications that solve specific problems in the corporate business process outsourcing (BPO), government and education markets. These problems have been caused by the explosive growth of non-native English speakers and the manual, inefficient methods for assessing and improving English pronunciation. In particular, the problems are:

• English assessment and tutoring are largely done by English as a Second Language (ESL) personnel today.
• There is a shortage of ESL personnel.
• Assessments and tutoring are costly and difficult to scale.
• Human assessments are difficult to standardize, resulting in lower accuracy.
• Facilitator-led training is not available 24x7.
• Human tutors are not effective at assessing their own students.

To address these problems, Carnegie Speech markets two products: Carnegie Speech Assessment™ (English) and NativeAccent™ (English). Both products are based on an extensible software platform using the our patent-pending speech recognition and pinpointing technology. The pinpointing technology uses automated speech recognition and advanced artificial intelligence techniques to pinpoint exactly where the error is being made in spoken English sounds, rhythm, or pitch.

Product Capabilities

Carnegie Speech Assessment™

Carnegie Speech Assessment™ uses speech recognition and pinpointing technology to listen to a user’s speech and to pinpoint exactly what was correct and incorrect in the sound, rhythm and pitch of the speech. In addition to the technologies described above, this product is also based on a targeted embodiment of the linguistics and second-language learning literature. It is able to classify the quality of the individual’s speech and provides a cost-effective, objective assessment capability for the corporations and educational organizations that need to perform these assessments on a large scale.

The speech assessment market is diverse and includes customers who would like to classify the quality of the speech of individuals ranging from interview candidates to young students. The population of users whose speech needs to be tested is as diverse as the applications for which customers want to assess the users. For instance, a corporate customer may be interested in whether they should hire a potential job candidate and how much speech training that candidate will require to perform some particular task, while a state Board of Education may be interested in classifying students based on what classes they should be taking.

Carnegie Speech’s Assessment technology can tailor the assessment to criteria given by the customer. Other assessment software “grades” users against a general notion of English fluency. This may be insufficient in a BPO/call center environment. Prospective call center agents may attain a grade of “good” after the assessment; however, these agents may not be adequate for the demands of the call center situation. Carnegie Speech uses classified customer data to adapt the assessment to categorize the prospective agents in the most useful way for each customer. The prospect then gets the most meaningful assessment for their specific situation. This ability to automatically adapt to explicit assessment classifications is unique to Carnegie Speech. The resulting applications of this product within the call center market include hiring assessments. The product can also be customized to focus on known regional speech difficulties.

NativeAccent™

NativeAccent™ uses automatic speech recognition and advanced artificial intelligence techniques to pinpoint a user’s pronunciation errors and to show him how to correct them while adapting to his individual abilities and needs. Specifically, NativeAccent™ differentiates itself from other English educational software by:

• Precisely pinpointing where errors are made, rather than leaving the student to guess what he did incorrectly.
• Providing helpful suggestions on how to improve, rather than making the student waste time by simply performing “trial and error” exercises.
• Detecting the needs of the student and adapting the curriculum appropriately.
• Determining the optimal learning strategy for a given student and adapting the curriculum to the methodology that best accommodates the learner’s abilities.
Learning a foreign language is not just a question of getting the words and the syntax right. A student cannot be understood until he can pronounce words well. NativeAccent™ is designed to let the student speak and then give them performance feedback.

This interactive software allows students to speak, get corrections, listen to themselves and a native speaker and try again, over and over, as many times as they want. They can practice with the privacy of their PC and then speak to others when they are ready! NativeAccent™ provides over 100 hours of training for all the sounds of English and its rhythm and pitch.

The market for NativeAccent™ extends beyond non-native speakers to anyone who, due to dialect or other concerns, needs to improve the quality and understandability of his spoken English. Our product tutors students through the following process:

- Listens to the student
- Pinpoints errors
- Gives helpful suggestions
- Adapts to user’s learning capabilities
- Corrects pronunciation in pictures, text and aurally
- Tailors language-learning curriculum to each student based on competency and native language

Unlike most other English educational software products, NativeAccent™ uses speech recognition technology to help with pronunciation. Only Carnegie Speech’s product can immediately pinpoint errors, tell the student what was wrong and deliver helpful corrective instruction. Lessons are then adapted to problems linked to the student’s native language and each lesson plan adapts according to the student’s personal progress. This intelligent tutoring greatly reduces time and effort needed for pronunciation training.

Product Benefits

Carnegie Speech’s cost-effective software-based solutions can measurably enhance customers’ voice assessment and training programs by providing:

- Scalable, consistent, reliable and distributed spoken language assessment
- Individualized training on spoken language with immediate feedback and effective remediation
- Maximum training effectiveness in minimum training time
- Assessment and training on the sounds, grammar, rhythm, and pitch of the language
- Class-room based or independent self-study assessment and training

The Company

Carnegie Speech has an experienced management team that combines prior successes in technology software start-up companies with worldwide domain expertise in the areas of artificial intelligence and language technologies. Jaime Carbonell is the Chairman of Carnegie Speech and is one of the world’s foremost experts in artificial intelligence and language technology. He is the Director of the Language Technologies Institute at Carnegie Mellon University and is a serial entrepreneur. The CEO is Angela Kennedy, who has significant sales and marketing experience in the software industry and was previously CEO of Wisdom Technologies. Maxine Eskenazi is the CTO and has published over 40 papers in the area of speech recognition and modern language pedagogy. In addition to the many research appointments in both Europe and the United States she has held, she served as the Head of the Assessment and Variability Theme in the Speech Group at the LIMSI laboratory from 1984 to 1994. She is currently the Director of the Masters Program in Computer-Assisted Language Learning at Carnegie Mellon University.

The Industry Leader in Language Assessment and Training Software

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Challenge

One of India’s significant business challenges in its growing call-center operations is to scale its human resources to support its fast-paced growth. In particular, identifying and training call center representatives is a serious gating factor, due to the large number of trainees and the shortage of qualified voice and accent instructors. The quality of the English spoken by call center representatives is a significant competitive advantage for organizations, and hence maintaining or further improving this high quality level is crucial to organizations’ continued call-center success. As a result, Carnegie Speech recently ran a pilot study with a leading call center to evaluate the functional and cost effectiveness of Carnegie Speech’s pronunciation software, NativeAccent™. The primary goals of the pilot study were to examine the software’s impact on training effectiveness and trainer time. The secondary goals were to determine how to best use NativeAccent™ in the organization’s voice and accent training, and to evaluate the software’s ease-of-use. The results were positive on all counts.

Methodology

The basic methodology of the study was to use the NativeAccent™ software to train a voice and accent class on half of the difficult sounds of English and on word stress. The human facilitator trained the same class on the other half of the difficult sounds of English and on grammar and soft skills.

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Results

According to the pre- and post-training assessments, the voice and accent training using Native Accent™ was extremely effective. Of the 24 students, all either improved (75%) or remained the same (25%). No student’s scores worsened. In addition, the training greatly improved the students’ performance on the two areas that were most in need of improvement (see figure). 88% of the students passed the “Articulation” portion of the post-training assessment where only 33% of the students passed on the pre-training assessment. Similarly, 96% of the students passed the “Pace and pausing” section of the post-training assessment as compared to 21% on the pre-training assessment. These results were shown to be statistically significant.

The software also has the potential to decrease the required facilitator time by up to 64%. In the 27.5 - hour curriculum that was implemented in the pilot study, 17.5 hours were spent in tutoring the difficult sounds of English or tutoring word stress. Since these are the skills that NativeAccent™ teaches, the facilitator does not need to spend class time in these areas. This decrease in required facilitator time could be used by the call center to either train more employees in the same amount of time, thereby decreasing throughput costs, or to give more individualized instruction to students on particular problem areas, contributing to further quality increases.

The secondary goals of the study were also achieved in that the organization’s voice and accent team produced a curriculum for the study that was effective, even on its first implementation. In addition, the facilitator and the students found the software easy to use and required little training. As a result, the call center concluded that Carnegie Speech’s NativeAccent™ would be a valuable addition to their training process.

In this study, Carnegie Speech’s NativeAccent™ software demonstrated significant functional and cost effectiveness in crucial areas of voice and accent training. In addition, the software provides an easily implementable solution to address the organization’s core business challenges of scalability and quality in voice and accent training.

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