Integrating Speech Technologies: Speech-to-Speech Translation and More
Mobile Voice Conference
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Dr. Hassan Sawaf
Human Language Technology Director and Chief Scientist
Our Company

• Primary Business Areas
  – National Security
  – Energy & Environment
  – Health
  – Cybersecurity

• Our Successes
  – 40 years of continuous growth
    • FORTUNE 500® company – No. 219
  – Superb staff of qualified professionals
    • Approximately 41,000 personnel worldwide
    • Over 10,000 employees with advanced degrees
    • Over 20,000 employees with security clearances
  – Leading provider of contracted R&D services

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(Fiscal Year 2011)
Audio- and Signal-Based Human Language Translation (HLT) Components

Automatic Speech Recognition (ASR)
• Analyze audio signal and convert into targeted classes ("words")
• Use character and word context to better recognize sequence of words (lexicons, phrases, n-gram language models)

Derivatives:
• STT: Speech-to-Text, classical microphone speech recognition task
• LID: Language Identification (Language and Dialect ID)
• SID: Speaker Identification
• SVF: Speaker Verification
• SAD: Speech Activity Detection
• KWS: Keyword Spotting
• PHS: Phonetic Search
Text-Based HLT Components

Machine Translation (MT) and Knowledge Management (KM)
• Analyze text input and extract information
• Use a combination of statistical and linguistic models

Components:
• MT: Machine Translation
• SUM: Automatic Text Summarization
• CLA: Topic Identification for documents (classification)
• CLU: Document Clustering
• LIT: Language Identification on text input
• SIR: Statistical Information Retrieval (“Document Search”)
• LIR: Linguistic Information Retrieval (“Text Query”)
• IDX: Keyword Indexing
• NER: Named Entity Identification
• PAR: Parsing
• DIA: Dialog Processing and Understanding
Interview and Dialog Analysis

Operating System (MS Windows/Linux/MacOSX/iOS/Android) and Software Platform (SAIC Omnifluent™ Media)
Omnifluent™ Talk2Me

• Talk2Me is an automated multilingual transcription and translation solution utilizing Omnifluent™ STT and MT:
  • Speech-to-Text
  • Text-to-Text

• Solution can be used for interviews, depositions, and courtroom transcription amongst multiple foreign language speakers

• Computer Hardware:
  • Windows 2003+
  • Linux Ubuntu 10.04
Speech-to-Speech Translation

Operating System (MS Windows/Linux/MacOSX/iOS/Android) and Software Platform (SAIC Omnifluent™ Media)
Omnifluent™ Talk

- Automated multilingual transcription and translation solution utilizing Omnifluent™ ASR and MT:
  - Speech-to-Text
  - Text-to-Text
  - Speech-to-Speech

- Enables automated multilingual communication

- Technology can be used for communication between foreign language speakers in emergency and law enforcement situations

SAIC Omnifluent™ Speech-to-Speech Mobile Application
Next Generation: Multilingual Dialog System

Operating System (MS Windows/Linux/MacOSX/iOS/Android) and Software Platform (SAIC Omnifluent™ Media)
DARPA initiates overarching language translation research

*Publishes broad agency announcement for Broad Operational Language Translation (BOLT) program*

(from DARPA’s site: [http://rs.gs/DARPA-BOLT](http://rs.gs/DARPA-BOLT))

- The Broad Operational Language Translation (BOLT) program seeks to accurately translate Mandarin Chinese and multiple dialects of Arabic into English from all types of media, specifically focused on the challenging task of informal conversational speech, email text and instant messaging. “BOLT also aims to allow users to conduct English-language queries that retrieve targeted information from multi-lingual sources. BOLT would give users the ability to conduct robust searches that yield the most relevant results,” said DARPA Program Manager Joe Olive.

- “DARPA’s Spoken Language Communication and Translation System for Tactical Use (TRANSTAC) program currently enables robust, spontaneous two-way communication through the translation of short and simple phrases,” explained Olive. “BOLT may elevate translation to a new level by providing multi-turn bilingual complex conversation that does not diverge from context.”
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