# An Evaluation of Virtual Human Technology in Informational Kiosks

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## Objective:

Evaluate performance of spoken language interactive virtual characters in real-world setting.

## The Application

- Tradeshow Kiosk
  - Provides interactive feedback to booth visitors
  - Spoken language dialog
  - Entertainment + Information

- Domains
  - Exhibitor Tradeshow
  - American Society for Training and Development
  - Space Congress

## The Technology
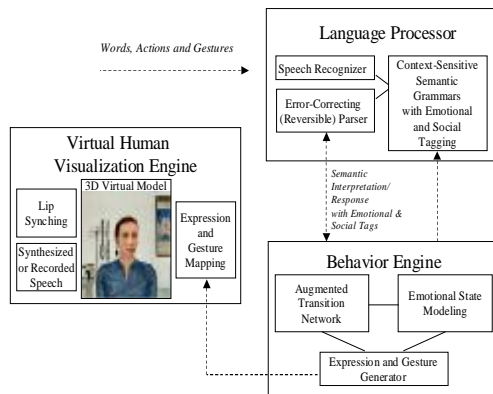
§ Language Processor
  § Off-the-shelf speech recognition
  § Minimum Distance Parser
  § Grammars change with context
  § Reversible Grammars for both recognition and generation
§ Behavior Engine
  § Augmented Transition Networks
  § Emotional State Modeling
  § Expression and Gesture Generator
§ Virtual Human Visualization Engine
  § Synthesized or Recorded Speech
  § Emotional expressions
  § Lip Synching

## Lessons Learned

- Explicit or implicit prompting beneficial
  - Prompting can lead to longer conversations
- Detection of "bad" input critical
- Prompting also helps to set expectations for what the system can understand

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## Results:

Performance greatly enhanced by the use of implicit and explicit prompts. Prompts may be spoken or displayed visually.

| Show | # Users | Avg. # of Turns | Avg. Time (sec.) | % Yes/No Answers |
|---|---|---|---|---|
| **Exhibitor** | 45 | 2.8 | 21.4 | N/A |
| **ASTD** | 197 | 3.3 | 28.4 | 51 |
| **Space Congress** | 335 | 5.6 | 61.4 | 66 |

## Keeping the User Engaged

- Without prompting, users often did not know how to proceed
- The use of visual prompts displaying a subset of possible questions aided greatly.
- Having the virtual attendant prompt the user with speech, either implicitly ("I know more about that subject.") or explicitly ("Would you like to hear more about our work for NASA?") helped keep the user involved.

| | Greet | Help | Character | Chatty | Information |
|---|---|---|---|---|---|
| Exhibitor | 11% | 25% | 28% | 6% | 30% |
| ASTD | 11% | 8% | 13% | 18% | 50% |
| Space Congress | 11% | 6% | 8% | 10% | 64% |

## User Utterance Type

§ Without prompting, the user was much more likely to
  § Ask for help (25%) or
  § Talk about the virtual character itself (28%)
§ With prompting, the user asks significantly more questions related to the topic of the booth (50-64%)
§ "Chatty" or character-related utterances are still a significant part of the conversation, even with prompting (18-31%).

## Topic Coverage

| Semantics | Example | % Among Users |
|---|---|---|
| What_do_you_do | "What does your company do?" | 50 |
| greeting | "Hello" | 33 |
| Current_time | "What time is it?" | 19 |
| How_work | "How does this thing work?" | 19 |
| lsso | "Tell me about the Launch Systems Safety Office." | 17 |
| Nuclear_propulsion | "What are you doing in the field of nuclear propulsion?" | 14 |
| What_should_I_say | "What kinds of things can I say?" | 13 |
| Launch_sites | "What support do you provide for launch site?" | 13 |
| nasa | "Do you work for NASA"? | 13 |
| Launch_vehicles | "What launch vehicles have you worked with?" | 12 |

- The virtual attendant may know information about many topics (in these three domains, 26, 39, and 63 topics were covered).
- Prompting increases coverage.
- The example at left presents the top 10 question categories asked by users at Space Congress.