Natural Language Applications and the iPhone.
A105 - Advanced applications and technology
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“Just Say It”
Gartner Research

• The Economics of Service Levels
  – On average, every 1 percent increase in **first contact resolution** results in a 0.64 % **increase in customer satisfaction.**
  – On average, with every 1 second decrease in the average speed of answer, customer satisfaction improves only 0.03 %
  – Focusing on things that **drive first contact resolution** generally creates **greater customer satisfaction** and is **often less costly** than focusing on things that improve the average speed of answers

• User Interface Requirements
  – A **multimodal user interface** will be required, as users will expect to use a **blend of speech and graphical interface** in every kind of device or channel
Challenges with Open Ended Dialogs & User Interfaces

• Conversations and human responses can be **unpredictable**
  – In many cases, it is impossible to design a dialog flow that anticipates all user’s responses.
  – Case statements, if-then-else and mix-initiative will not do the trick.

• Phrases must be well understood
  – Just picking up keywords doesn’t do the trick, the context and meaning of the phrase must be captured.

• Find the **single best response** to the question

• Must **keep track of the context** of the conversation.
  – What were we talking about, and is the user now talking about something different?

• **User Interface not intuitive** and user/customer friendly
  – Limitation of technology capabilities (telephone)
How Do We Address the Challenges

- Conversations and human responses can be unpredictable
  - Use AI techniques to build the **dialog on the fly**, rather than attempting to script the dialog.

- Phrases must be well understood
  - Use a combination of **semantics and syntax with computational linguistics**.

- Find the single best response to a question
  - Perform **computational linguistics** for matching the semantics of the question with the semantics of the knowledge base repository.
  - Perform **AI search techniques with heuristics** for sorting through possible answers.

- New capabilities with the introduction of the “smart phone”
  - iPhone, Nokia N95, Blackberry and series of others.

- Introduction of the combination of natural language understanding in text and voice recognition with the graphical capabilities of smart phones, web chat sessions etc.
  - **Interactive Digital Assistant** (IDA)
Natural Language Understanding

- Traditional approaches for Natural Language Understanding (NLU)
  - Statistical Language Modeling (SLM)
  - Statistical Semantic Modeling (SSM)
    - "Say Anything", "Speak Freely"
  - Transcription of 20 - 30,000 utterances
  - Procedural developments

- GyrusLogic Platica approach for Natural Language Understanding
  - Robust Linguistic approach coupled with Artificial Intelligence (no SLM)
  - Full conversational capabilities (no transcriptions)
  - Easy industry standard solution (no proprietary scripting)
  - Interfacing existing “Voice” environments (IVR, ASR, TTS, VoiceXML)
  - Declarative developments
  - Significant less effort, with additional operational savings and more application functionality
Our Language Processing

Speech Input

Speech Recognition

Speech Analysis

Speech Understanding

The Right Answer

What does the speaker say?

What does the speaker mean?

What does the speaker want?

Unambiguous Understanding in the Dialog Context

Acoustic Language Models

Word Lists

Grammar

Lexical Meaning

Discourse Context Knowledge about Domain of Discourse

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The Application Developed

• The user application does not need a specification for how the logic of the dialog should look like. (natural language processing)
  – GyrusLogic’s inference engines mimic human’s reasoning and build the dialog on the fly, thereby delivering a natural conversation.
  – It is a true conversational AI system and a true AI declarative paradigm.
  – It allows the user to be spontaneous and to interrupt a dialog with questions outside the ongoing dialog.

• Interfaced with the Interactive Digital Assistance (IDA) as a new option
  – Emotional expressions and facial gestures based upon human anatomic models
  – Technology aligned to TTS and Audio prompts outputs
Operational savings with Conversational Natural Language Systems

- Directed Dialog
  - 1:48 avg. call

- Conversational Dialog
  - 0:57 avg. call

- Savings
  - 51 seconds per call saved
  - Avg. 50,000 calls / day
  - Initial 20% use of conversational dialog
  - Over 3.1 million minutes saved in initial year
Integrated multimodal natural language solution
GyrusLogic Platica,
Partner ADI, ASR & TTS, VoiceXML/IVR

Examples
In Summary

• Full conversational dialog or natural language understanding application based upon industry standards
• First contact customer resolution for improved customer satisfaction
• Improved “recognition rates” by resolving false positives
• ASR & IVR independent, VoiceXML 2.0 support
• New language developments can be completed in days
• Significant savings in development and total cost of ownership
• Creation of a multimodal user interface to accommodate the user expectation independent of their device or channel
Thank You!
questions, trial or demo,
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