Madeleine, a RavenClaw Exercise in the Medical Diagnosis Domain

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Overall Architecture

Recognition
SPHINX

Parsing
PHOENIX/HELIOS

Dialog Manag.
RAVENCLAW

Back-end
/perl

Synthesis
FESTIVAL

Language Gen.
ROSETTA
Overall Architecture (internals)

Recognition
SPHINX

Parsing
PHOENIX/HELIOS

Dialog Manag.
RAVENCLAW

Back-end
/perl

Synthesis
FESTIVAL

Language Gen.
ROSETTA

FESTIVAL
SERVER

Galaxy

HUB
Overall Architecture

- Recognition: SPHINX
- Parsing: PHOENIX/HELIOS
- Dialog Manag.: RAVENCLAW
- Back-end (perl)
- Synthesis: FESTIVAL
- Language Gen.: ROSETTA

Madeleine: a RavenClaw exercise in the medical diagnosis domain…
Overall Architecture

- Recognition
  - SPHINX
- Parsing
  - PHOENIX/HELIOS
- Text I/O
  - TTYServer
- Synthesis
  - FESTIVAL
- Dialog Manag.
  - RAVENCLAW
- Back-end
  - (perl)
- Language Gen.
  - ROSETTA
Developed Resources

Text I/O
TTYServer

Grammar

Parsing
PHOENIX/HELIOS

Dialog Manag.
RAVENCLAW

Back-end
/perl/

Language Gen.
ROSETTA

RavenClaw
Dialog Task Specification

Templates
Development Time

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RavenClaw Architecture

- Captures all domain-specific dialog (task) logic with a hierarchical description
- The authoring effort is focused entirely here

Dialog Task (Specification)

Domain-independent Dialog Engine

- Manages dialog by executing the dialog task specification
- Provides domain-independent conversational strategies
RavenClaw Architecture

Madeleine

Dialog Stack | Expectation Agenda
---|---

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RavenClaw Architecture

Dialog Stack

Expectation Agenda

Welcome
Madeleine

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Hi, this is Madeleine, the automated...
Hi, this is Madeleine, the automated...
Hi, this is Madeleine, the automated...
Hi, this is Madeleine, the automated...

**Dialog Stack**

- **GeneralFeel**
- **Madeleine**

**Expectation Agenda**

- Chart
- Diagnostic
- General feeling
- Have fever
- Headache
- Travel
- Fever
- Measure temp
- Inform fever

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Hi, this is Madeleine, the automated...
How are you feeling today?

Not so good, I think I have a fever
(soso) (not so good)
[fever] (I think I have a fever)
Illustrated Features

- Dynamic generation of dialog task structure
  - Symptoms loaded from backend, appropriate structures to “talk about them” created on-the-fly
  - New symptoms – no DM changes
- Dynamic dialog control policy
  - The order in which symptoms are addressed is controlled by the backend
- Conversational skills
Illustrated Features

- Dynamic generation of dialog task structure
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  - New symptoms – no DM changes

- Dynamic dialog control policy
  - The order in which symptoms are addressed is controlled by the backend

- Conversational skills
Hi, this is Madeleine, the automated... How are you today?

*Not so good, I think I have a headache*

Sorry to hear you’re not feeling so good, Tell me more about your symptoms...
Do you have abdominal pain?
Illustrated Features

- Dynamic generation of dialog task structure
  - Symptoms loaded from backend, appropriate structures to “talk about them” created on-the-fly
  - New symptoms – no DM changes
- Dynamic dialog control policy
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- Conversational skills
Conversational Skills

- Corresponding agencies added automatically to the dialog task tree
  - Help
  - What Can I Say?
  - Repeat
  - Suspend / Resume
  - Start Over
  - Timeout handling (not illustrated)

- Still need all the language generation prompts and grammar, but some of those are develop-once, too
# Conclusion

## Highlights
- Set task posed no challenges to the framework
  - Easy to implement
- Dynamic dialog structure and control
- Automatic use of domain-independent conversational skills

## Lowlights?
- Toolkit perspective: how easy would it be for someone else to build it?
- Asynchronous behaviors? (timing)
- Couple of bugs / fixes (or is that a highlight?)
- ...
Demo

Run

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RavenClaw Grounding

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Other RavenClaw systems

- **LARRI** – Language Assistant for Retrieval of Repair Information
- **RoomLine** – Conference room reservation within SCS
- **Let’s Go! (BusLine)** – Bus schedule information in Pittsburgh
- **TeamTalk** – Command and control for a team of robots
- **Eureka** – Dialog interface to a clustered web search engine (Vivisimo)