Dialogue Systems
NPFL123 Dialogové systémy

5. Dialog Authoring Tools

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**Intro to IBM Prague Watson AI Lab**

**Watson Services** (Prague)
- **Watson** Assistant
- **Watson** Speech
- **Watson** Language Translator

https://www.ibm.com/cloud/watson-assistant/
https://www.ibm.com/cloud/watson-text-to-speech
https://www.ibm.com/cloud/watson-speech-to-text
https://www.ibm.com/cloud/watson-language-translator
Business Use Of Dialog Systems

• Chat consoles on web pages
  • Navigation through the content of the web pages (smart search)
  • Frequently asked question (FAQ)

• Mobile applications with open text input
  • Domain specific apps with chatting functionality, even banking apps
  • Intra company systems

• Assisting systems
  • Intra company “expert” system
  • Support for human operators

• Speech based systems
  • Call centers automation – handling top x% of traffic

• Automotive applications
  • Search, calls, navigation, infotainment/entertainment (music, POIs)

• Infotainment systems
  • Infotainment systems for hotels, banks’ lobbies, home, etc …
Challenges of Creating Good DS

• Data
  • Use of existing of human-to-human logs
  • Use of intracompany structured and unstructured data
  • No data, just ideas
  • No idea at all

• Scenarios, use-cases
  • Single domain
  • Single domain with chit-chat capability
  • Multi-domain
Authoring a Dialog

Restaurant booking scenario

• S: Hello, this is Chez Pépé restaurant reservation system. How may I help you?
• U: I would like to reserve a table for tomorrow for 5 people
• S: From what time?
• U: From 7pm
• S: OK, I will make a reservation for tomorrow at 7pm, table for 5.
• U: Great!
• S: Looking forward to see you soon.
Authoring a Dialog

Restaurant booking scenario

**Intents**

- **#reserve_table**
  - I would like to reserve a table for 5 people for tomorrow at 7pm.
  - Can I make a reservation?
  - I need a reservation for tomorrow.

- **#opening_hours**
  - Until when are you open?
  - What are the opening hours?

- **#cancel_reservation**
  - I made my reservation yesterday, I want to cancel it.
  - We could not make it today, may I cancel the reservation?

**Entities**

- I need reservation for **5** people for **tomorrow** at **7pm**.
- **Next Friday** from 6pm.
- For **two**.
- **@date**
- **@time**
- **@number**
- **@restaurant_location**

**Dialog**

**Welcome**

**Book a table**

<table>
<thead>
<tr>
<th>Entity</th>
<th>Context variable</th>
<th>Req.</th>
</tr>
</thead>
<tbody>
<tr>
<td>@date</td>
<td>$res_date</td>
<td>Y</td>
</tr>
<tr>
<td>@time</td>
<td>$res_time</td>
<td>Y</td>
</tr>
<tr>
<td>@number</td>
<td>$guests</td>
<td>Y</td>
</tr>
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</table>

**Opening hours**

**Cancel reservation**

Yes

No

<default answer>
Authoring tools

• IBM Watson Assistant
  • [https://www.ibm.com/cloud/watson-assistant/](https://www.ibm.com/cloud/watson-assistant/)
  • Video tutorial: [https://console.bluemix.net/docs/services/assistant/tool-overview.html](https://console.bluemix.net/docs/services/assistant/tool-overview.html)

• Google Dialog Flow
  • [https://dialogflow.com/](https://dialogflow.com/)
  • Video tutorials: [https://cloud.google.com/dialogflow/docs/video](https://cloud.google.com/dialogflow/docs/video)

• Amazon Alexa Skills

• Microsoft Cortana Skills

• Apple SiriKit (Siri-enabled iOS apps)
Demo

• Create dialog system in Watson Assistant

Restaurant booking scenario
Intents

• Collection of example how users will trigger the intent
  • Can be added/edited in the Tooling UI
  • Can be imported from CVS file

• Should correspond to the actions supported by the dialog
• ML model will be trained based on these examples
• Potential use of n-bests in the dialog
Entities

• ~ Named entities recognition (NER)

• Different type of entities
  • Prebuilt (system) entities
    • Numbers, dates, time, GEO location, person names, units, currency
  • User defined
    • Gazetteers – fixed list of entities/synonyms
    • Regular expression based
    • Trained – sequence labelling model based on sample annotations (in context)
Dialog Flow/Tree

• Slot filling style (linear dialog)
  • Set of slots to fill is (required/optional)
  • Able to fill all slots partially or at once
  • Asking just for missing information
  • Ability to customize questions and answer for a particular slot
  • Ability to correct already filled information
  • Tight to user variables

• Dialog tree (non-linear dialog)
  • Dialog flow driven by a tree or graph structure
  • Conditions to get to the individual nodes of the tree/graph
  • Fallback strategies (none of the conditions is specified)

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Features used in runtime

• Dialog context / history
  • Condition on context variables collected in previous turns
  • Reference/anafora resolution using collected variables

• Fallback strategies / Digression
  • Allow "jumping" to different topic for a while and then return back

• Disambiguation support
  • Similar confidence of multiple choices – ask user to select

• Learning from user selections
  • Statistics on user selections – automated "pre-selection"

• Calling external APIs
  • Webhooks/Cloud functions ...
Deployment and Usage

• Authoring tools usually go with an integration support
  • WebWidget - chatting console
  • Slack
  • Facebook Messenger
  • Intercom (voice) …

• APIs
  • To include it in customer apps, integration to other solutions
  • Using sessions or conversation ids to track context/history
  • REST API with JSON request/response

• Watson SDK
  • Python, Java, Node.js, .NET
  • https://github.com/watson-developer-cloud
References / Use cases

• IBM Watson Assistant Customers

• Forrester report
• WA on the Czech market
  • Vodafone CZ – Vodafone Samoobsluha password reset
  • Česká spořitelna – George login page
  • Virtuální sestra Anežka
Virtuální sestra Anežka

https://koronavirus.mzcr.cz/