

Dialogue Systems

NPFL123 Dialogové systémy

5. Dialog Authoring Tools

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19. 3. 2019

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 P  p   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
 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

Entity	Context variable	Req.
@date	\$res_date	Y
@time	\$res_time	Y
@number	\$guests	Y

Opening hours

Cancel reservation

Yes

No

<default answer>

Authoring tools



- IBM Watson Assistant
 - <https://www.ibm.com/cloud/watson-assistant/>
 - Video tutorial: <https://console.bluemix.net/docs/services/assistant/tool-overview.html>
- Google Dialog Flow
 - <https://dialogflow.com/>
 - Video tutorials: <https://dialogflow.com/docs>
- Amazon Alexa Skills
 - <https://developer.amazon.com/alexa-skills-kit>
 - Video tutorial: <https://www.alphavoice.io/video/alexa-developers/alexa-skills-kit-developer-console-build>
- Microsoft Cortana Skills
 - <https://developer.microsoft.com/en-us/cortana>
- Apple SiriKit (Siri-enabled iOS apps)
 - <https://developer.apple.com/sirikit/>

Demo

- Create dialog system in Watson Assistant from scratch

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

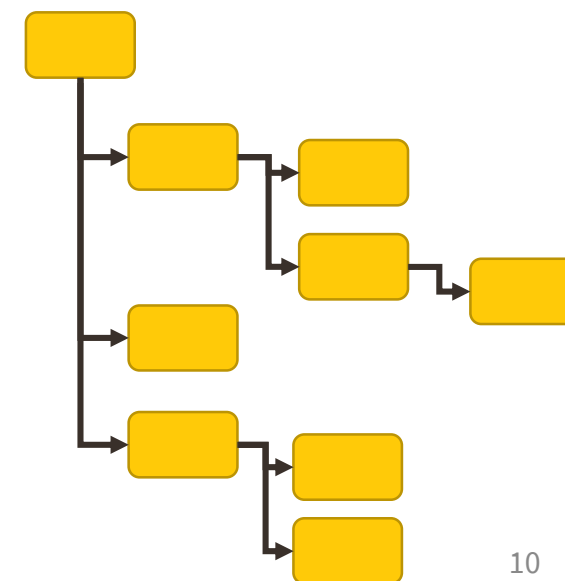
Entities

- ~ 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)

Entity	Context variable	Req.
@date	\$res_date	Y
@time	\$res_time	Y
@number	\$guests	Y



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
 - Simple chatting console
 - Slack
 - Facebook Messenger
 - and many others
- 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