

AIML Chatterbots

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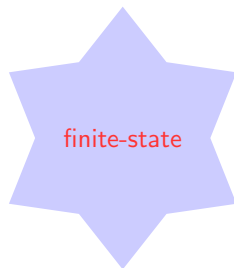
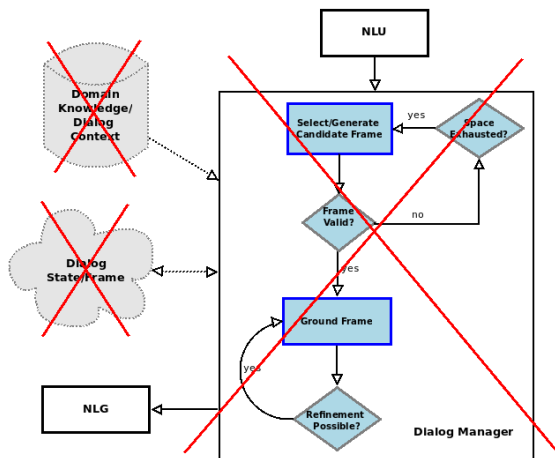
Outline

- 1 Chatterbots
- 2 AIML & Relatives
- 3 Implementations
- 4 Conclusions
- 5 References





Reactive Systems



Chatterbots

- A **chatterbot** is a dialog agent that interacts with users via typically a text interface
- Commonly used in chat forums and automated FAQ answering sites
- May use sophisticated natural language processing systems, but usually match input and pull a reply from a textual database
- Basis of current intelligent assistants for desktops and/or hand-held devices
- Based on finite state automata, to which new components (dialog state, NLU, NLG) can be added to improve user experience



A Simple Dialog

user: blackberry problem
rep.: what kind of problem?
user: black screen
rep.: anything else?
user: keyboard unresponsive
rep.: I'll pass you to the technician
user: thanks!
rep.: bye

QUE: How can a system mimic this simple chat?



A Simple Dialog

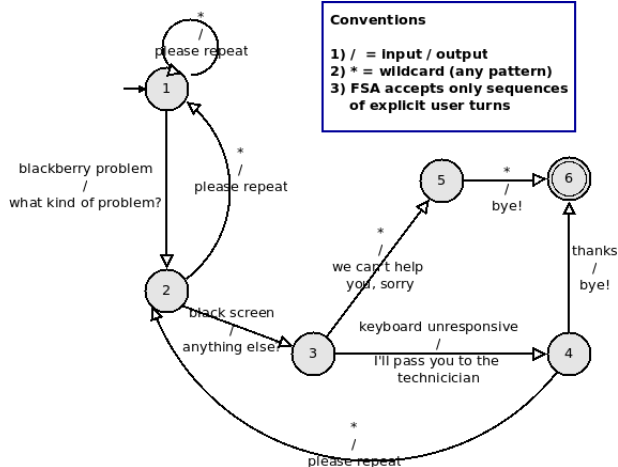
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QUE: How can a system mimic this simple chat?

⇒ use chat patterns!



Finite State Automata (FSAs)



Finite State Automata (ctd.)

- FSAs keep no memory other than their states
- They are **reactive**:
 - transform input into output, but
 - they can't update information
 - allow only system initiative
- A labeled state transition is needed for each pair (u, s) of user-system turns
- Fast and scale well to data (run in time $O(n)$ to dialog size n)

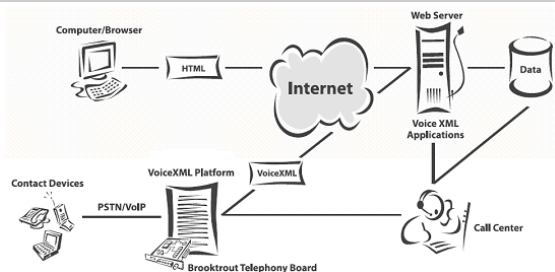


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- Fast and scale well to data (run in time $O(n)$ to dialog size n)
- Are **good as a starting point** but lack expressiveness



VoiceXML



- The **voice extensible markup language** (VoiceXML) is an XML-based W3C standard (see: <http://www.w3.org/TR/voicexml20/>) to build interactive telephone front-ends to internet services
- Designed for creating audio dialogs that feature
 - synthesized speech, speech/key recognition
 - telephony
 - mixed initiative conversations

VoiceXML - Example

```
<var name="hi" ex="what kind of blackberry problem?"/>
<var name="nx" ex="anything else?"/>
...
<form>
  <block>
    <audio src="hi.wav"><value ex="hi "/></audio>
    <goto nx="#continue"/>
  </block>
</form>
<form id="continue">
  <block>
    <audio src="nx.wav"><value ex="nx"/></audio>
    ...
  </block>
  ...
</form>
```

⇒ encodes the first two interactions of our example



Artificial Intelligence Markup Language (AIML) v2.0

- The [artificial intelligence markup language](#) (AIML) v2.0 is a XML standard for configuring the behavior of chatterbots
- Based on [categories](#) comprising
 - ① user input [patterns](#) (simplified regular expression)
 - ② system response [templates](#)
- Implementations can keep a basic DS (current topic, last turn)
- Javascript “scriptlets” can be used to increase/cutomize functionality
- Gave rise to several Loebner prize winners (ALICE, Mitsuku)



AIML - Example

```
<aiml>
  <category>
    <pattern>*BLACKBERRY*</pattern>
    <template>
      what kind of blackberry problem?
      <set name="topic">blackberry</set>
      <think><set_ip>134.155.214.56</set_ip></think>
    </template>
  </category>
  <category>
    <pattern>*</pattern>
    <that>WHAT</that>
    <template>anything else?</template>
  </category>
  ...
</aiml>
```

⇒ encodes (again) the first two interactions of our example



Chatterbots

System	Internal State	Manager Type	Domain	Domain Context	Initiative	Anaphora
VIDIAM [vSodA11]	no	classifier	medical	no	?	yes
SpaceBook [JLL ⁺ 13]	?	?	geography	DB	?	?
Molino et al. [MBS ⁺ 13]	no	lucene	game	KB	user	?
LiteTALK [SCJ ⁺ 12]	no	pattern-based	technical	no	system	?
Sankar et al. [SGVd08]	no	AIML-based	technical	no	system	no
Acomb et al. [ABD ⁺ 07]	no	classifier	technical	KB	mixed	no
LUCY [WP13]	?	classifier	several	?	user	yes
BOB [KB10]	yes	ruled-based & logistic classifier	library	DB & KB	mixed	yes



A Much Better Implementation :-)



Conclusions

- ① Chatterbots are typically used to automate live chats and FAQ systems
- ② They are reactive, but more expressive than pure and plain FSAs
- ③ Many systems are available as open source projects
- ④ Easy to develop as long as one sticks to AIML 2.0 \Rightarrow XML interpreter
- ⑤ **But:** keep a very basic dialog state and require loads of manual configuration \Rightarrow AIML scripts








Thank You!!!

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