Cooperation in Dialogue Systems from Eliza to Alexa

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Dialogue Systems: A Brief History

<table>
<thead>
<tr>
<th>Computer Prototypes</th>
<th>Interactive Telephone</th>
<th>Devices (e.g. smartphones)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>1970</td>
<td>1980</td>
</tr>
<tr>
<td>1990</td>
<td>2000</td>
<td>2010</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dialogue Systems: A Brief History

ELIZA
(Chatbots)

*Men are all alike.*

*IN WHAT WAY*

*They’re always bugging us about something or other.*

*CAN YOU THINK OF A SPECIFIC EXAMPLE*

[Weizenbaum, 1966]

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**Computer Prototypes**

1960 1970 1980

**Interactive Telephone**

1990 2000

**Devices (e.g. smartphones)**

2010 2016
Dialogue Systems: A Brief History

ELIZA
(Chatbots)

SHRDLU
(Artificial Intelligence)

Pick up a big red block.
OK
Grasp the pyramid.
I DON’T UNDERSTAND WHICH PYRAMID YOU MEAN
[Winograd, 1971]

Computer Prototypes

1960

1970

1980

Interactive Telephone

1990

2000

Devices
(e.g. smartphones)

2010

2016
Dialogue Systems: A Brief History

1960
1970
1980
1990
2000
2010
2016

ELIZA
(Chatbots)

SHRDLU
(Artificial Intelligence)

Allen, Cohen, & Perrault
(Plan-based)

Computer
Prototypes

Interactive
Telephone

Devices
(e.g. smartphones)

Today's
focus
Dialogue Systems: A Brief History

ELIZA
(Chatbots)

SHRDLU
(Artificial Intelligence)

VODIS, VOYAGER
(Speech)

How many hotels are there in Cambridge.
I KNOW OF SIX HOTELS IN CAMBRIDGE
[Glass et al., 1995]

Computer Prototypes
Interactive Telephone
Devices (e.g. smartphones)

Dialogue Systems: A Brief History

ELIZA
(Chatbots)

SHRDLU
(Artificial Intelligence)

VODIS, VOYAGER
(Speech)

Startups

Computer Prototypes

1960
1970
1980

Interactive Telephone

1990
2000

Devices
(e.g. smartphones)

2010
2016
Dialogue Systems: A Brief History

ELIZA
(Chatbots)

SHRDLU
(Artificial Intelligence)

SIRI
(hybrid approach)

VODIS, VOYAGER
(Speech)

Startups

Computer Prototypes

Interactive Telephone

Devices
(e.g. smartphones)

Recent System Landscape

[a] Cortana: Microsoft’s new personal assistant for Windows Phone 8.1.

[b] MMI: In-car multimedia and navigation system from Audi.

[c] Ada and Grace, the virtual guides at the Museum of Science in Boston, developed by the USC Institute for Creative Technologies [2].

[d] Billie, an interactive scheduling assistant [3].

[e] Nao, the interactive robot created by Aldebaran Robotics.

[Lison and Meena, 2014]
Are we done yet?

The Future Directions of Dialogue-Based Intelligent Personal Assistants (SIGdial 2016 panel)

• Yes (one of the panelists)
  – no bottleneck but privacy!

• No (audience members - especially senior NLPers)
  – pragmatics, social dimensions, ...
Back to 1980: Analyzing Intention in Utterances (Allen & Perrault)

• Cooperative behavior in dialogue
  – Indirect speech acts, helpful responses, ...

• A knowledge-based approach
  – Plan construction & execution (agent A)
  – Plan inference & obstacle detection (Agent B)
  – Plan construction & execution (agent B)
What about Siri?
Indirect Speech Acts (beyond literal meaning)

Diane: I don’t know Megan’s address
Siri: Don’t worry about it, Diane

Diane: Are you able to tell me Megan’s address
Siri: We were talking about you, not me

Diane: Can you tell me Megan’s address
(Do you know Megan’s address)
Siri: Here’s the address for Megan ...

Diane: Tell me Megan’s address
Siri: Here’s the address for Megan ...
Helpful Responses
(more information than requested)

Diane: Is Steve Jobs the chairman of Apple
Siri: Thanks for asking about Steve. Here’s Apple’s web page about him

Diane: What day of the week is election day
Siri: Election Day is on Tuesday, November 8 2016

Diane: When can I watch the World Series
Siri: The Indians face the Cubs in game 3 of the World Series tomorrow at 8:08 PM
Diane: I’m hungry

Siri: I don’t want you feeling all peckish. Here’s what I found.

15 results displayed
Filtered to be nearby
... but some of the 15 were closed
Back to the Future? From Siri to Viv

Summary

• While cooperative dialogue research was largely abandoned for more practical approaches (my own research included!)
  – "There is much to be gained from recognizing not just what was said, but why; from identifying conclusions people naturally draw from both what has been said and hasn't" (Workshop CFP)

• Maybe not such an uphill battle anymore?