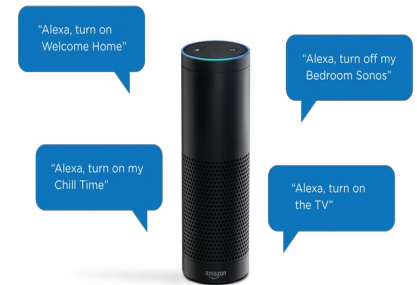


Cooperation in Dialogue Systems from Eliza to Alexa

```
=====
ELIZA > (PLEASE TYPE IN ALL CAPS) WHAT'S YOUR NAME DEAR ?
AMET
ELIZA > HI, I'M ELIZA. WHAT DO YOU WANT TO TALK ABOUT ?
AMET > CAN I TALK ABOUT MY PROBLEM ?
ELIZA > SURE.
AMET > DUE TO ON GOING EXAMS IN COLLEGE, I HAVE A LOT OF STRESS.
ELIZA > PLEASE RELAX A LITTLE, SLEEP WELL.
AMET > THANKS FOR YOUR ADVICE.
ELIZA > NO MENTION.
AMET > BYE.
ELIZA > BYE AND KEEP IN TOUCH...
=====
```



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Dialogue Systems: A Brief History

Computer
Prototypes

Interactive
Telephone

Devices
(e.g. smartphones)

1960

1970

1980

1990

2000

2010

2016



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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1970

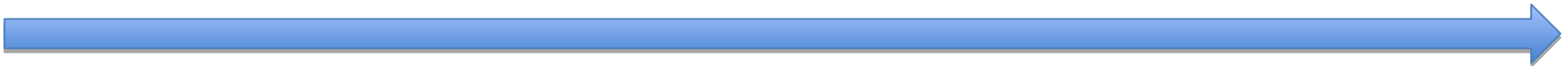
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2016



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]

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Dialogue Systems: A Brief History

ELIZA
(Chatbots)

SHRDLU
(Artificial Intelligence)

Allen, Cohen, & Perrault
(Plan-based)

Today's
focus

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(e.g. smartphones)

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1970

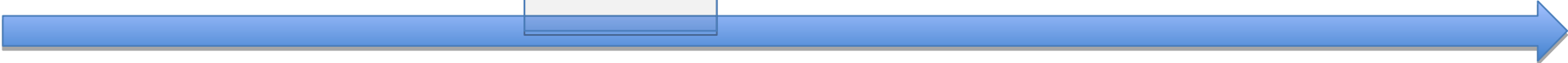
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2016



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]*

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(e.g. smartphones)

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1970

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2016



Dialogue Systems: A Brief History

ELIZA
(Chatbots)

SHRDLU
(Artificial Intelligence)

VODIS, VOYAGER
(Speech)

Startups

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(e.g. smartphones)

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2016



Dialogue Systems: A Brief History

ELIZA
(Chatbots)

SHRDLU
(Artificial Intelligence)

SIRI
(hybrid approach)

VODIS, VOYAGER
(Speech)

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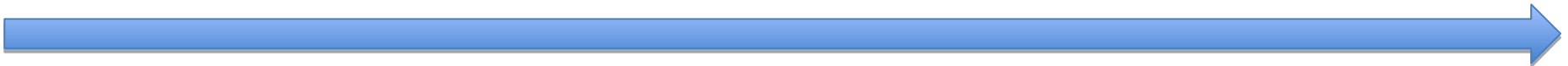
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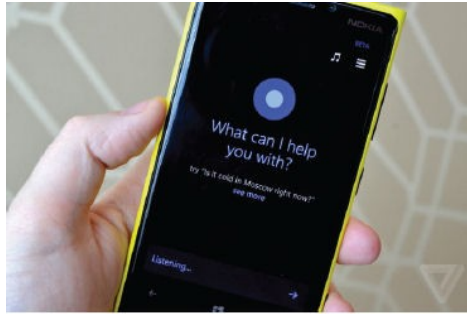
2000

2010

2016



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.

Images used with permissions from Microsoft, Audi, USC Institute for Creative Technologies, CITEC, Bieler and 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

Indirect + (Mixed) Helpful

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

<https://techcrunch.com/2016/05/09/siri-creator-shows-off-first-public-demo-of-viv-the-intelligent-interface-for-everything/>

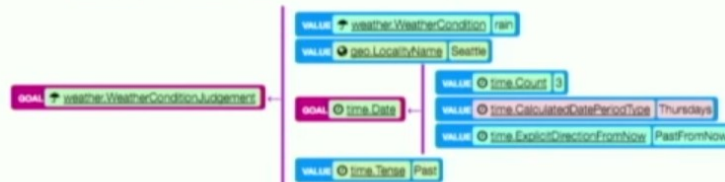
Beyond Siri: The World Premiere of Viv with Dag Kittlaus

Developer center

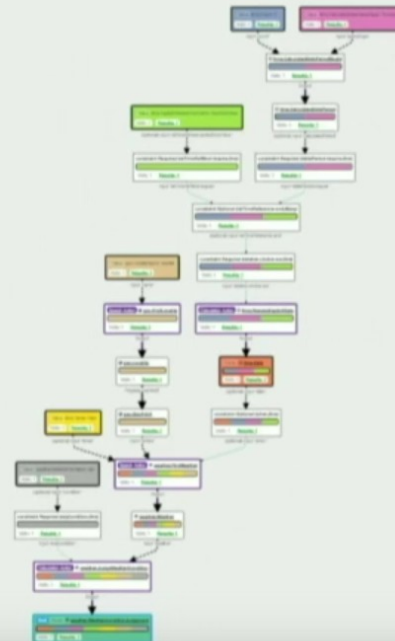
Develop Train Test Submit Docs



Natural language input
Was it raining in Seattle three Thursdays ago?



Computed plan



TC

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?