



# Stacking up an AI

**x.ai** makes an AI personal assistant who schedules meetings for you

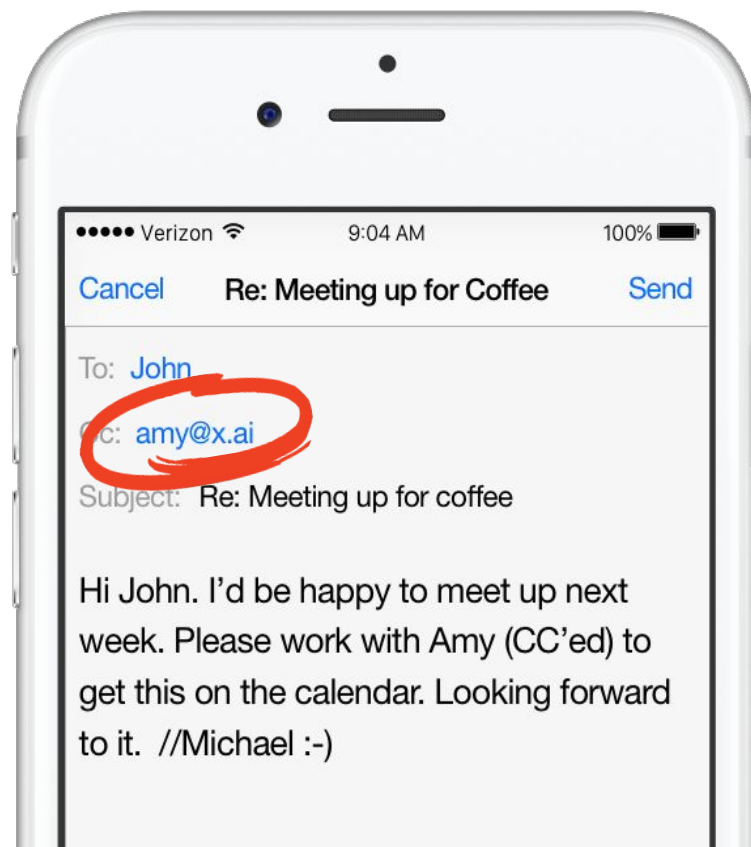
Stackup: AI Edition | 2/20/17 | x.ai

@jeffksmithjr  
jeff@human.x.ai  
@xdotai

# Pain



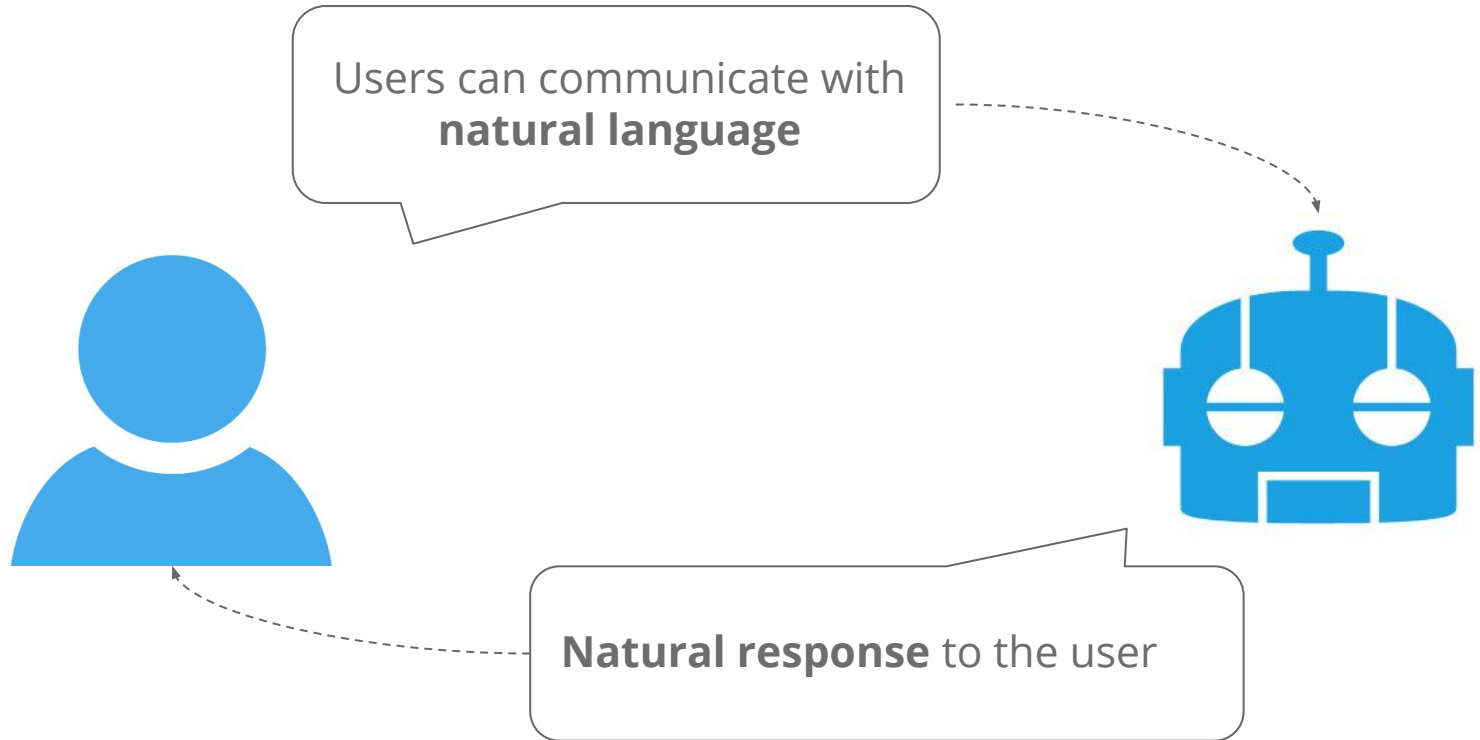
# Solution



Demo



# Natural Language Interface



# The Humans

- Tech
  - Comprehension
  - Response
  - Annotation
- Business



# The Stack

- Scala
- JavaScript
- Python



# The Science

- Traditional machine learning
- Conditional Random Fields
- Deep Learning



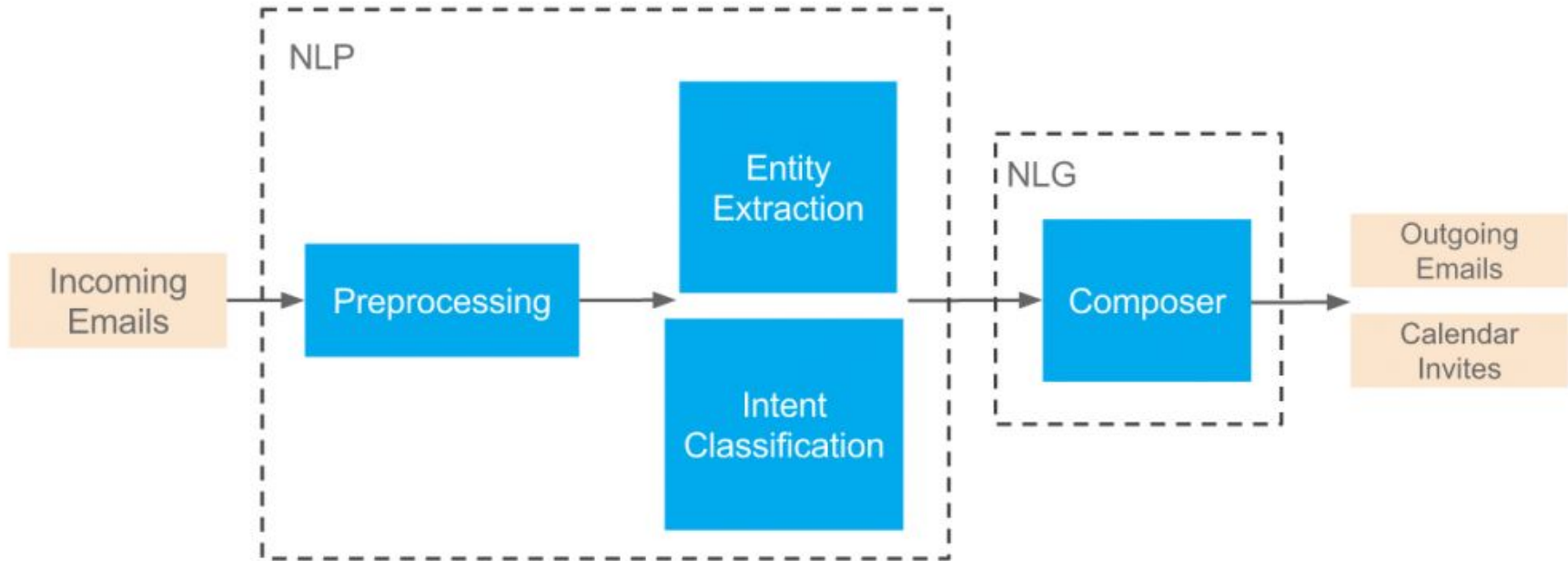
# The Approach

- Judicious determinism





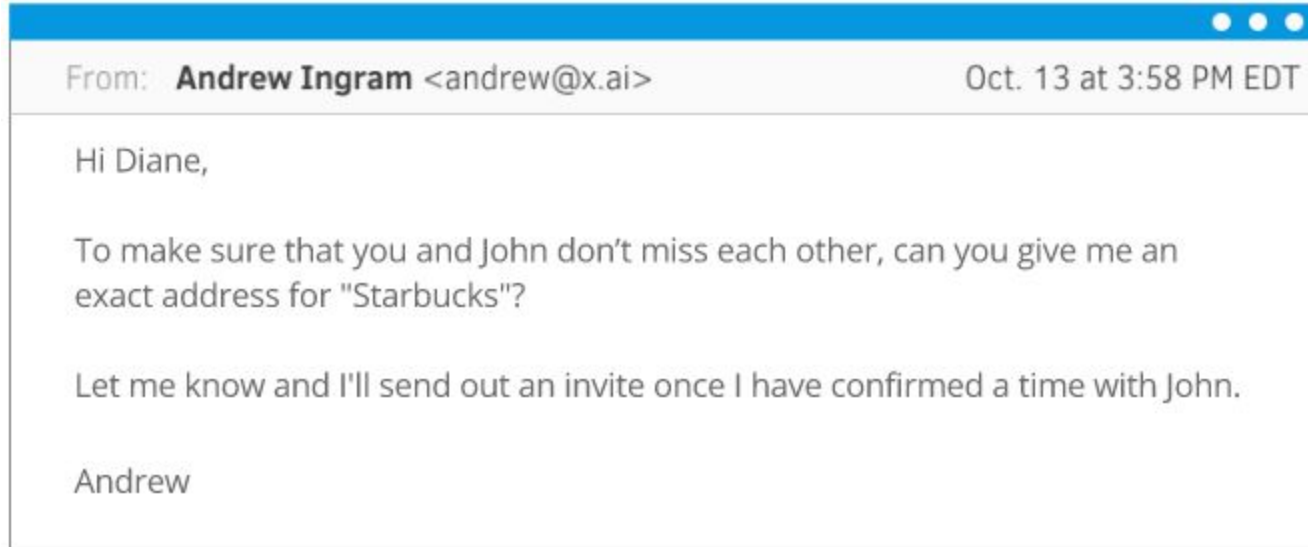
# High Level Architecture



Orange box = External Services  
Blue box = Amy's Brain



# Response Generation



# Response Generation

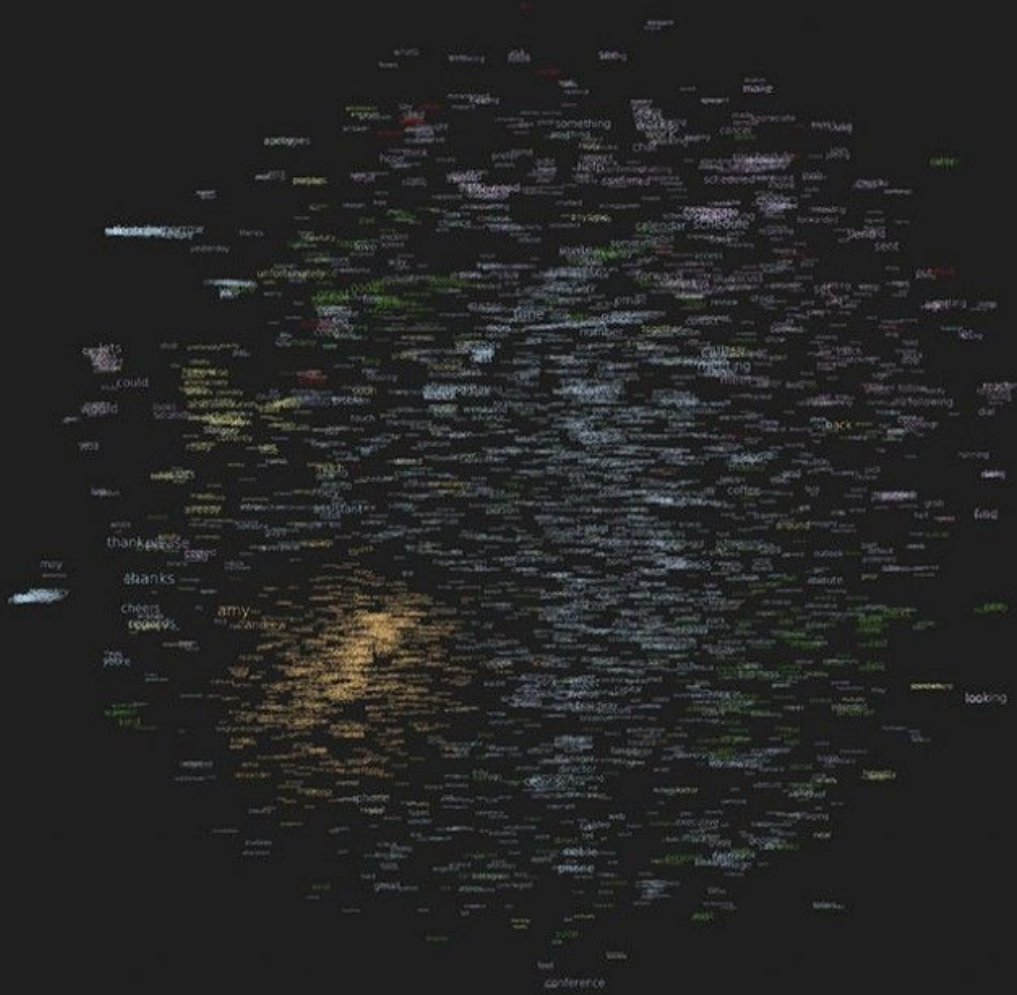
```
<%> } else if (typeof currentLocation.name === 'undefined') { <%>  
  Where would you like to meet <%> if (typeof currentLocation.activityAlias  
    !== 'undefined') { <%> for <%> currentLocation.activityAlias <%><%> }  
    <%>?  
<%> } else { <%>  
  To make sure that you <%> guestNameCount > 1 ? ", " : " and" <%> <%>  
    guestName <%> don't miss each other,  
    can you give me an exact address for "<%> currentLocation.name <%>"?  
  <%> } <%>  
<%> } <%>  
} else { <%>
```

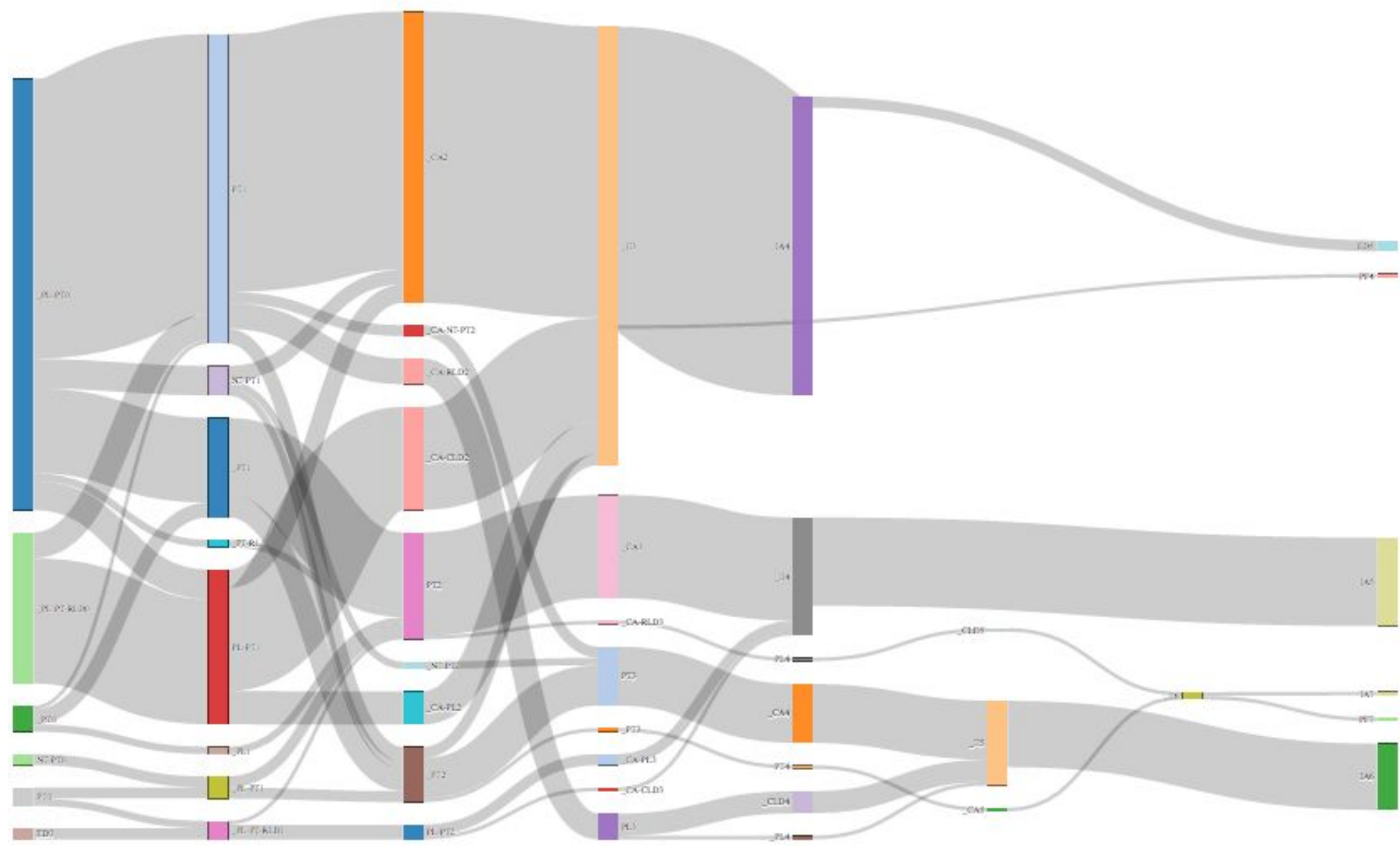


# The Approach

- Judicious determinism
- Problem decomposition





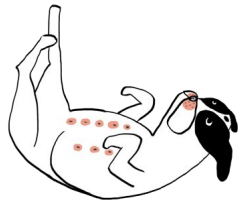


# The Approach

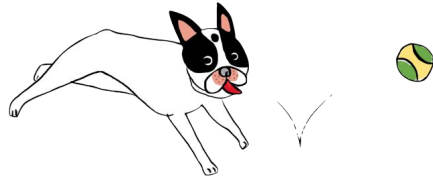
- Judicious determinism
- Problem decomposition
- Reactive systems



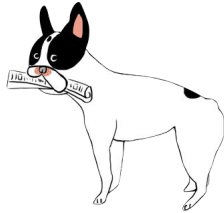
# Reactive Machine Learning



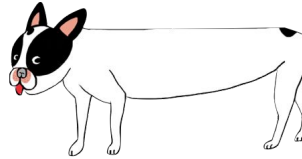
RESILIENT



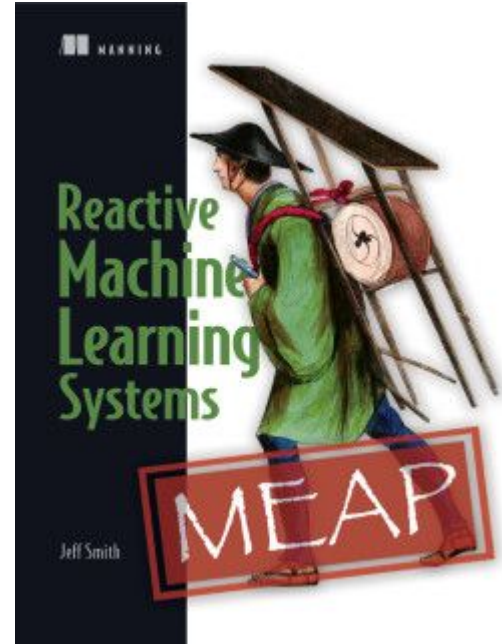
RESPONSIVE



MESSAGE-DRIVEN



ELASTIC

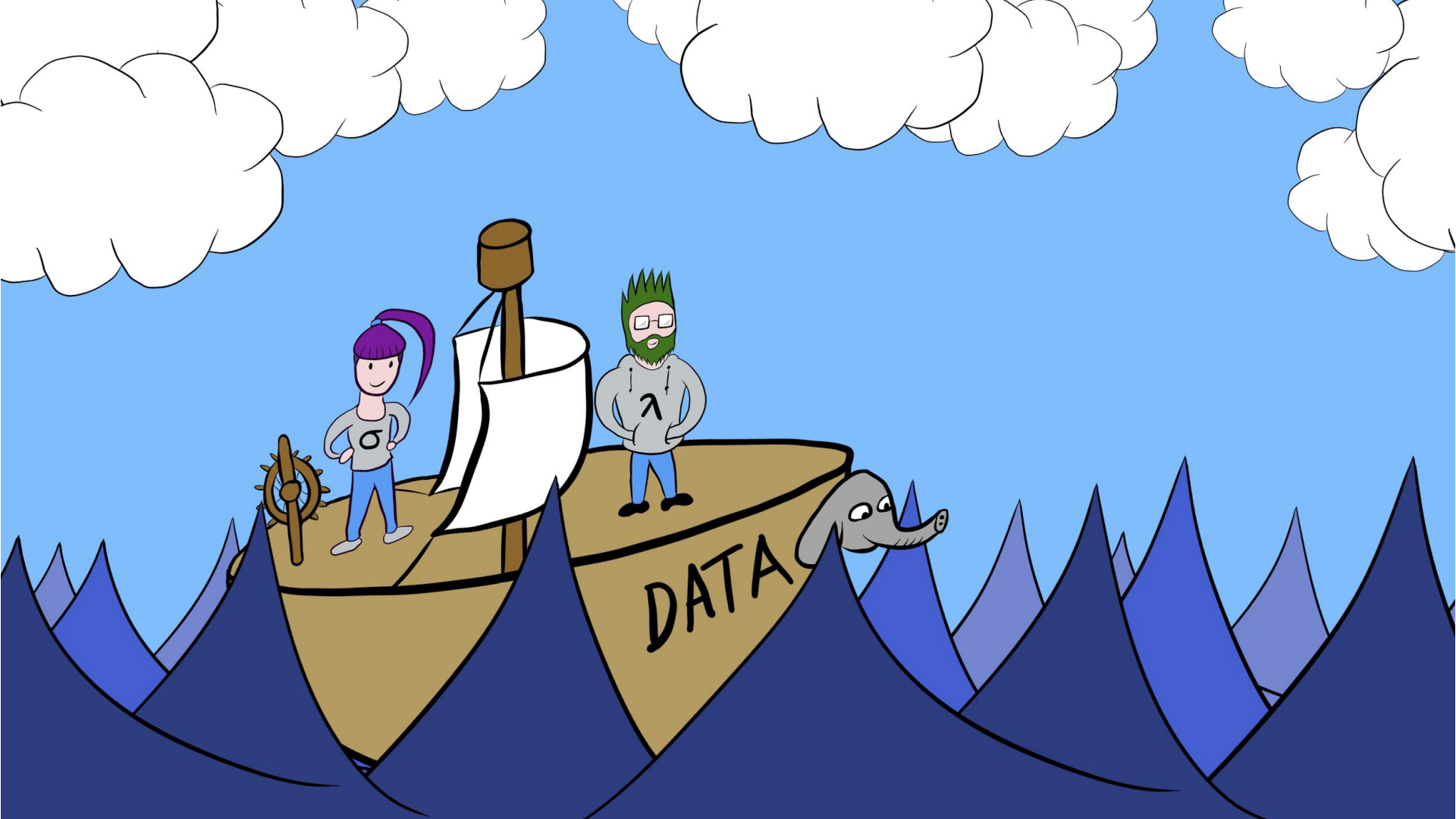




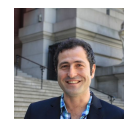
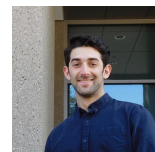
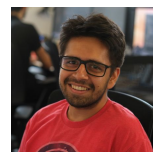
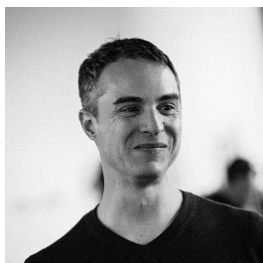
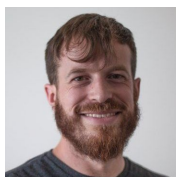
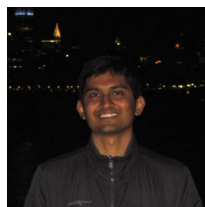
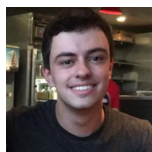
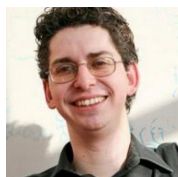
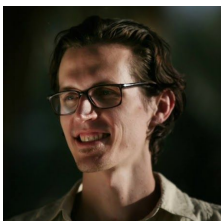
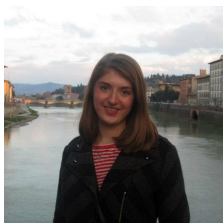
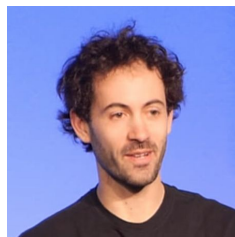
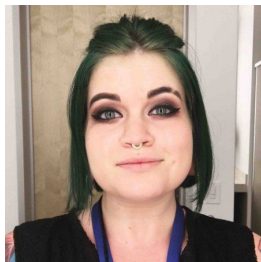
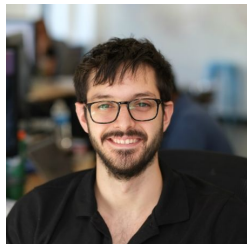
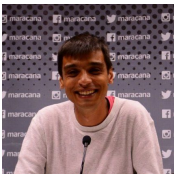
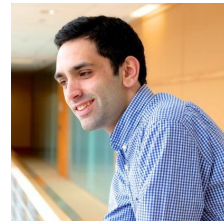
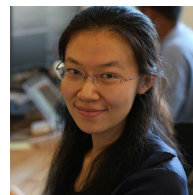
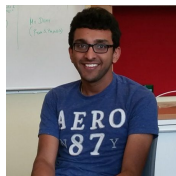
# The Approach

- Judicious determinism
- Problem decomposition
- Reactive systems
- Datanauts





DATA



# Results



# Turing Test

On Mon, September 26th, 2016 at 3:12 pm (EDT), [REDACTED] wrote:

Thanks Amy - has to happen this week - can you call me: [609-575-2121](tel:609-575-2121)?

...



**Amy Ingram**

Sep 26 ☆



to [REDACTED]

Hi [REDACTED]

I'm a personal assistant powered by artificial intelligence that schedules meetings via email, so unfortunately I cannot talk with you over the phone.

Does **today at 4:00 PM PDT** work?

Amy

Amy Ingram | Personal Assistant to [REDACTED]  
Artificial intelligence that schedules meetings. Learn more at [x.ai](http://x.ai).

3:38 PM EDT



# Gratitude

People are thanking Amy in ~11% of all meetings



**Ryan Kuder** @ryankuder · Oct 11

When my AI assistant (Amy by @xdotai) sends me an FYI email, I send her a thank you email back. Probably extraneous, but a good habit.



**Adam Thornhill** @adam\_thornhill · Jun 1

I just thanked an AI personal assistant believing it was human. The team at @xdotai have made a #gamechanger



**Courtney Schulz** @courtneyschulz · Jul 22

@xdotai is AWESOME! Amy is my new BFF! #ai



jeff@human.x.ai  
@jeffksmithjr

x.ai  
@xdotai





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