



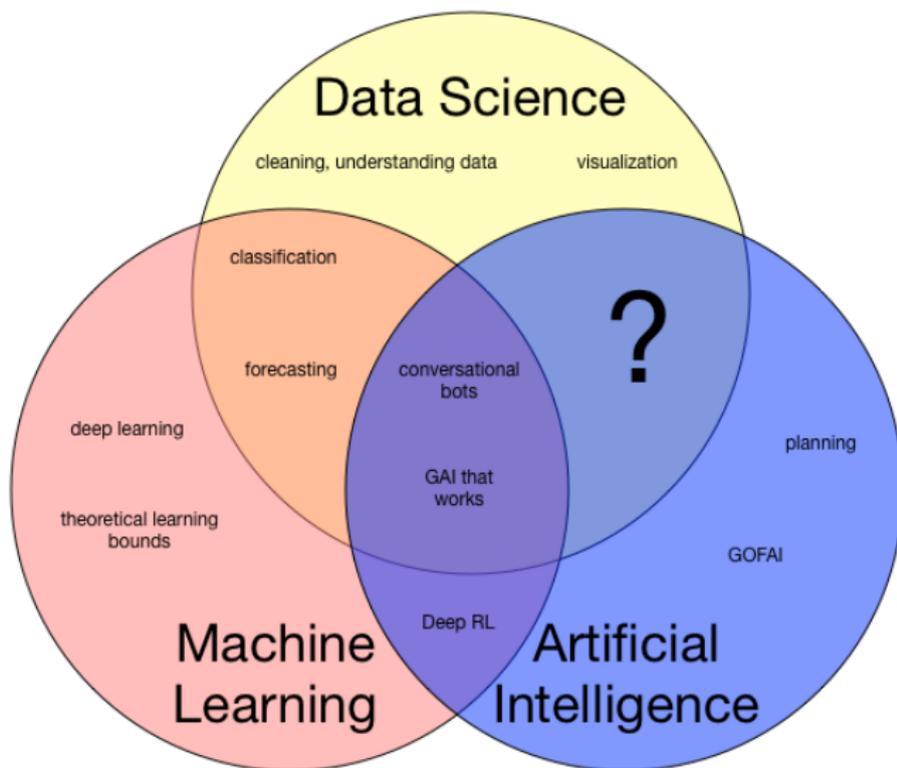
Definitions: AI, ML, DS

Jordan Boyd-Graber
University of Maryland

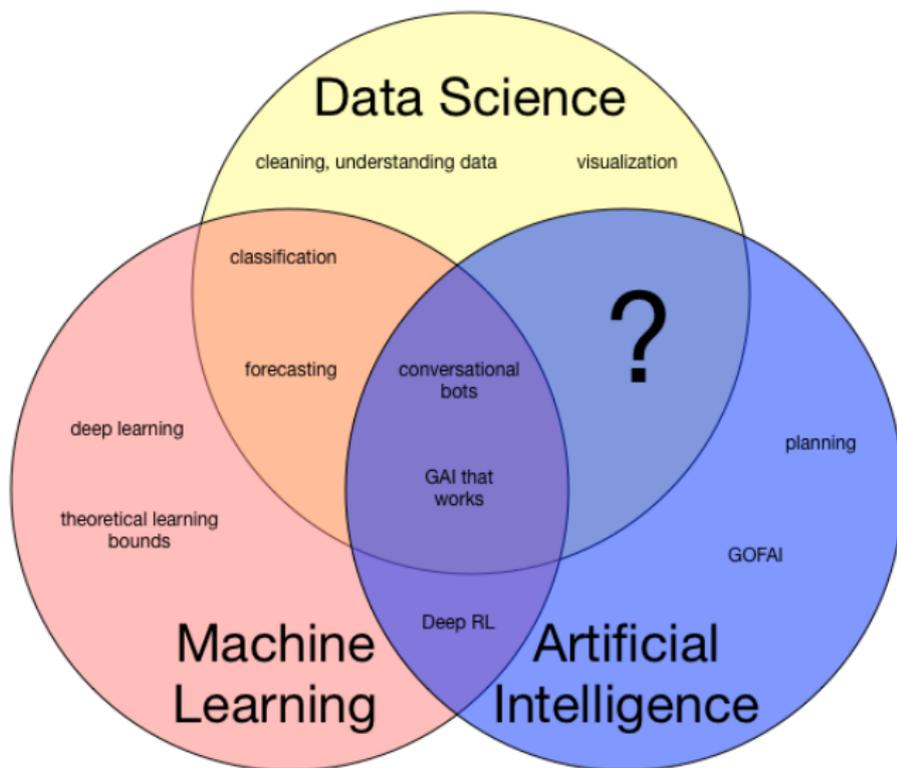
JANUARY 17, 2018

Roadmap

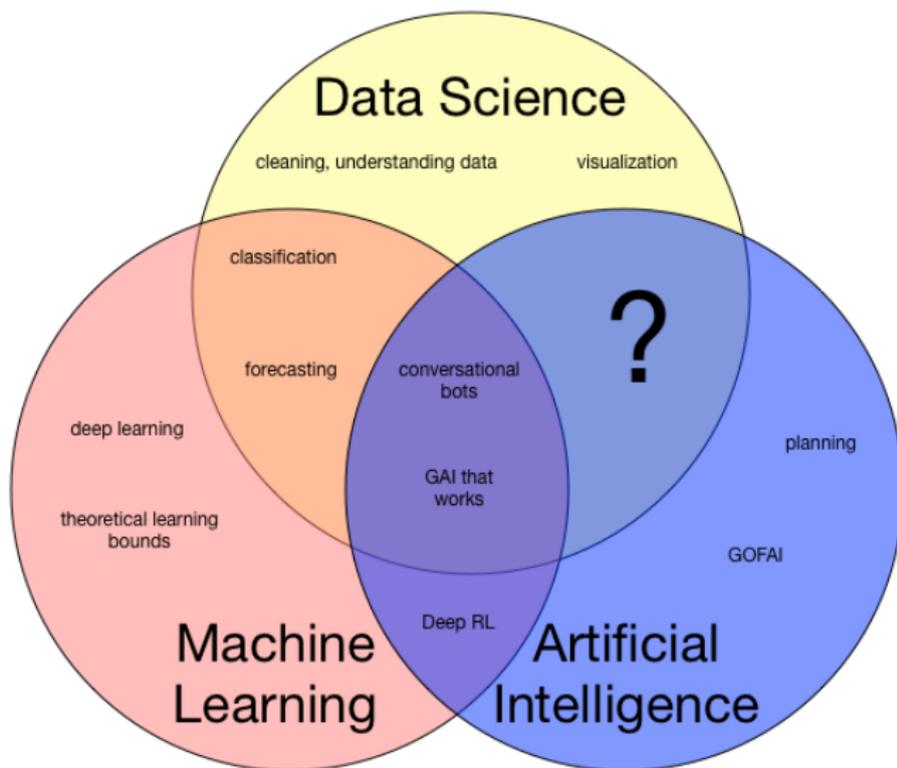
- What is data science / artificial intelligence / machine learning?
- What is possible with these new tools and techniques?
- What are the challenges?



Data provides the foundation



Machine learning provides algorithms



Artificial intelligence defines problems



Nowhere near true AI

Data are everywhere.

Ikiru (1952)	UR	Foreign	     
Junebug (2005)	R	Independent	     
La Cage aux Folles (1979)	R	Comedy	     
The Life Aquatic with Steve Zissou (2004)	R	Comedy	     
Lock, Stock and Two Smoking Barrels (1998)	R	Action & Adventure	     
Lost in Translation (2003)	R	Drama	     
Love and Death (1975)	PG	Comedy	     
The Manchurian Candidate (1962)	PG-13	Classics	     
Memento (2000)	R	Thrillers	     
Midnight Cowboy (1969)	R	Classics	     

User ratings

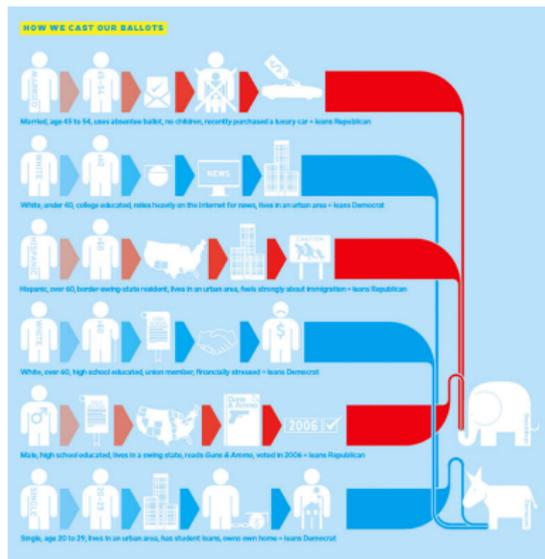
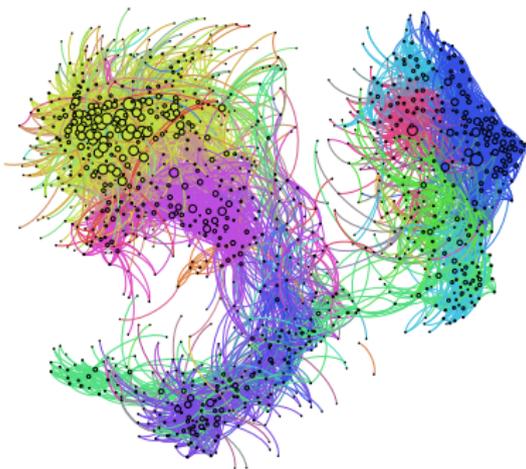
0.5/0.51 lb	Cheese Cabot Vermont Cheddar	0.51 lb	\$7.99/lb	\$4.07
	Dairy			
1/1	Friendship Lowfat Cottage Cheese (16oz)		\$2.89/ea	\$2.89
1/1	Nature's Yoke Grade A Jumbo Brown Eggs (1 dozen)		\$1.49/ea	\$1.49
1/1	Santa Barbara Hot Salsa, Fresh (16oz)		\$2.69/ea	\$2.69
1/1	Stonyfield Farm Organic Lowfat Plain Yogurt (32oz)		\$3.59/ea	\$3.59
	Fruit			
3/3	Anjou Pears (Farm Fresh, Med)	1.76 lb	\$2.49/lb	\$4.38
2/2	Cantaloupe (Farm Fresh, Med)		\$2.00/ea	\$4.00
	Grocery			
1/1	Fantastic World Foods Organic Whole Wheat Couscous (12oz)		\$1.99/ea	\$1.99
1/1	Garden of Eatin' Blue Corn Chips (9oz)		\$2.49/ea	\$2.49
1/1	Goya Low Sodium Chickpeas (15.5oz)		\$0.89/ea	\$0.89
2/2	Marcial 2-Ply Paper Towels, 90ct (1ea)		\$1.09/ea	\$2.18
1/1	Muir Glen Organic Tomato Paste (6oz)		\$0.99/ea	\$0.99
1/1	Starkist Solid White Albacore Tuna in Spring Water (6oz)		\$1.89/ea	\$1.89

Purchases

Neuroscience



Social networks



Finance

Dow Jones Composite Average (^DJA) - DJI

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4,372.78 **+20.68 (0.47%)** 1:48PM EDT

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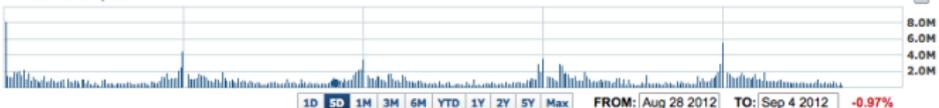
Aug 29, 2012 2:59 PM - 3:04 PM EDT: ^DJA 4416.03



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Tue Aug 28, 2012 Wed Aug 29 Thu Aug 30 Fri Aug 31 Tue Sep 4

Volume: 571,700

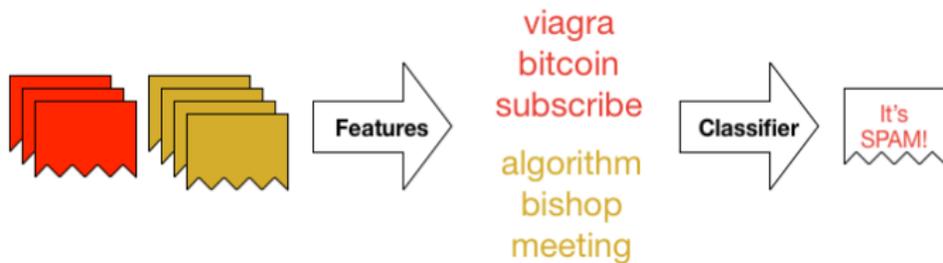


1D 5D 1M 3M 6M YTD 1Y 2Y 5Y Max FROM: Aug 26 2012 TO: Sep 4 2012 -0.97%

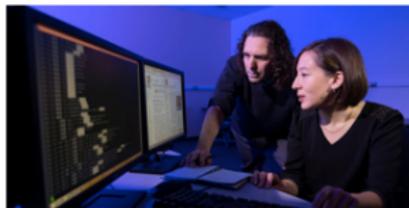


Data are input to algorithms

We can recreate human decisions

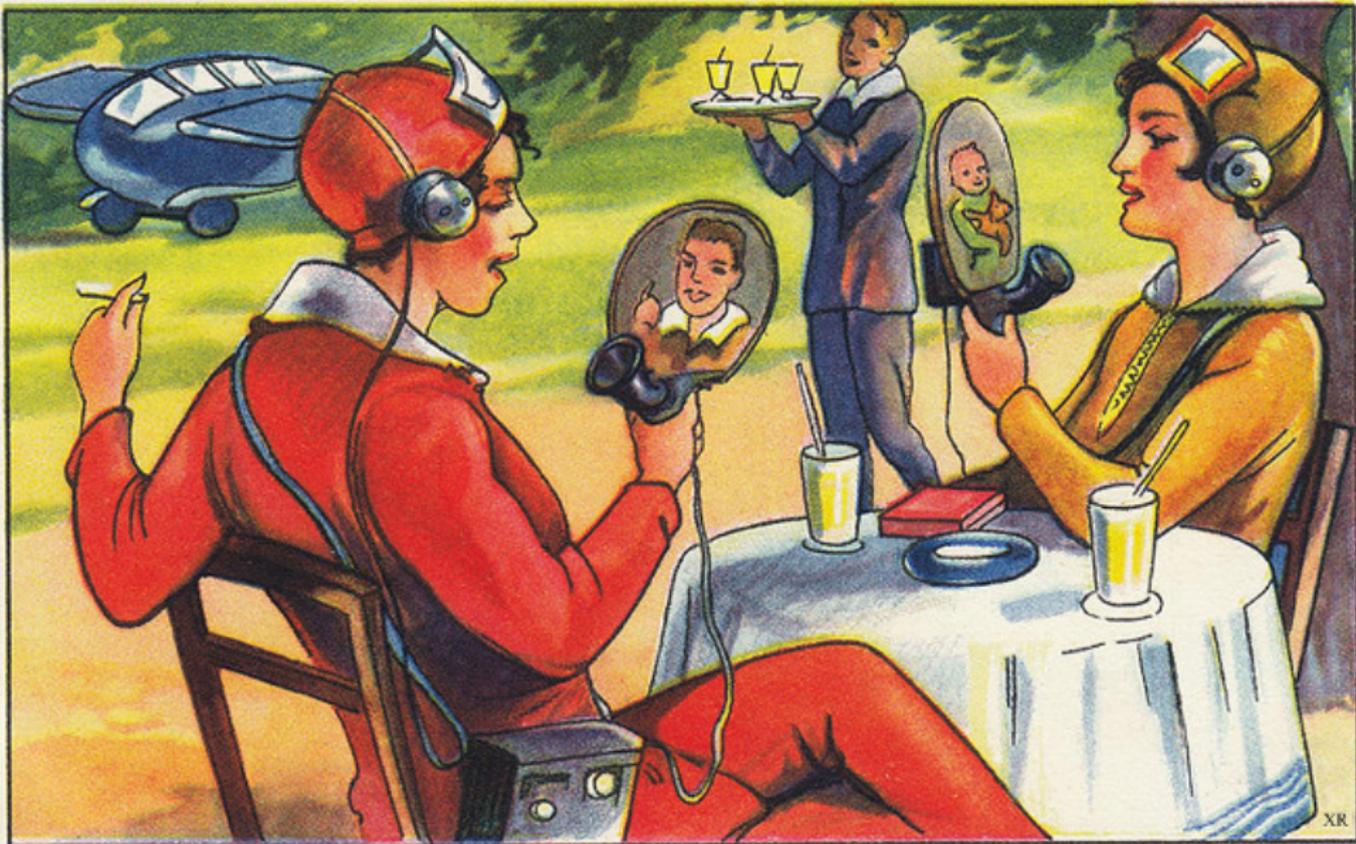


We can recreate human decisions



Algorithms can solve tasks



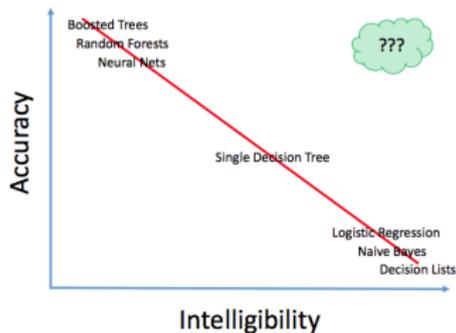


Predictions: Technology changes but society doesn't



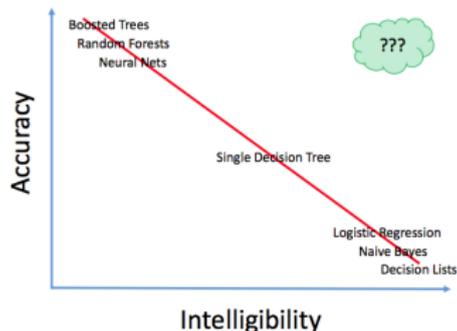
Are we prepared for social changes?

Discussions of AI Need Realism



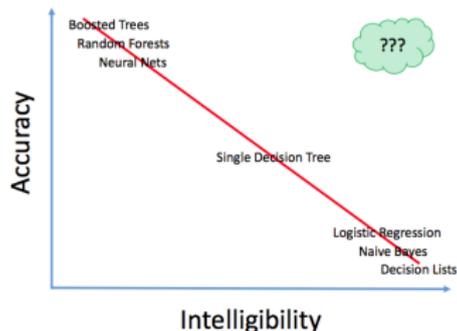
- You can't solve a task without good data
- Good data often requires humans

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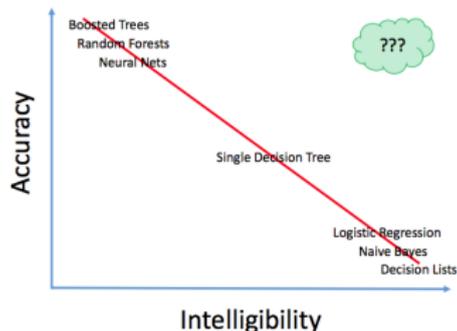
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- Unless task is super-straightforward, also need ML expertise

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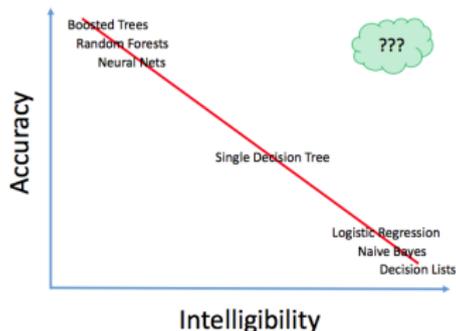
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- Effective solutions often require infrastructure

Discussions of AI Need Realism



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- Unless task is super-straightforward, also need ML expertise
- Effective solutions often require infrastructure
 - Explanations
 - Retraining
 - Socio-technical interfaces

Discussions of AI Need Realism



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- Unless task is super-straightforward, also need ML expertise
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 - Explanations
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 - Socio-technical interfaces
- DS/ML/AI is **hard** (but rewarding!)