



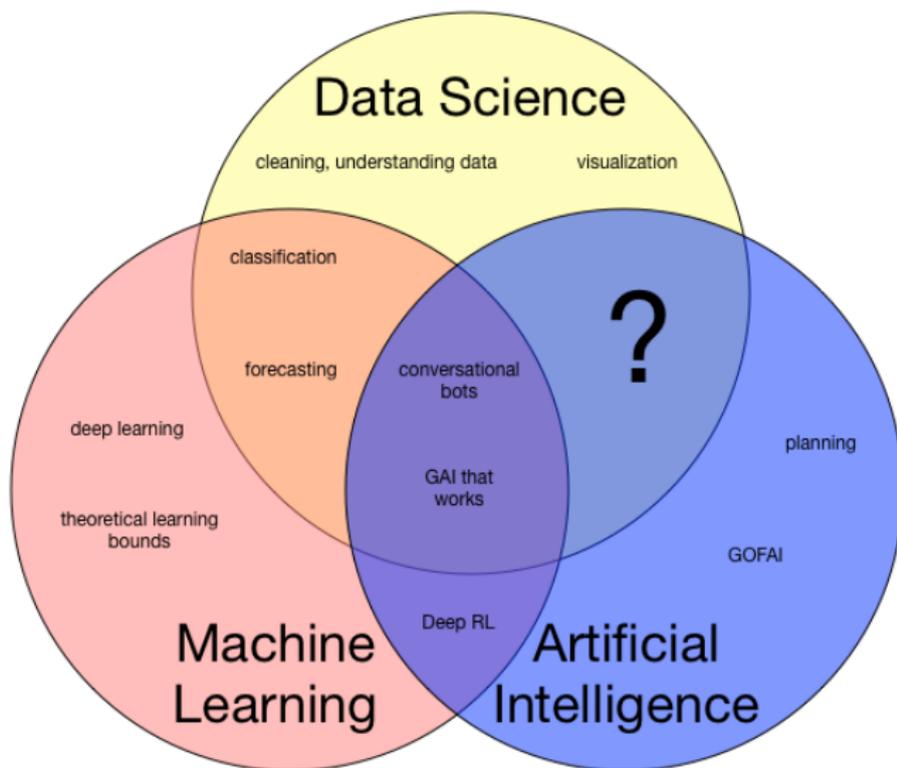
Definitions: AI, ML, DS

Jordan Boyd-Graber
University of Maryland

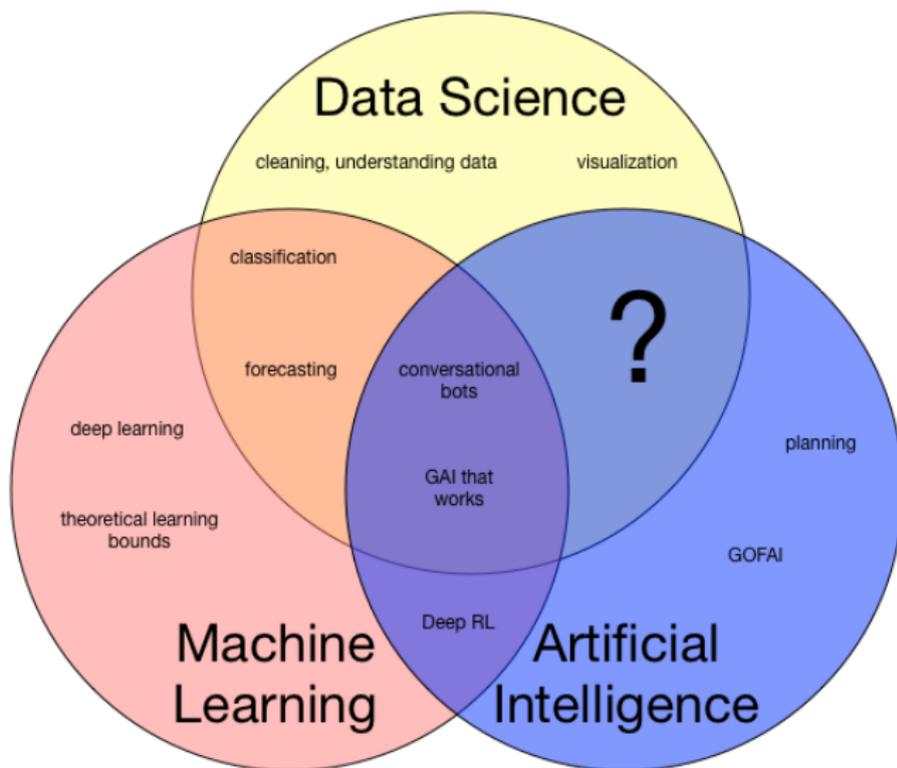
JANUARY 17, 2018

Roadmap

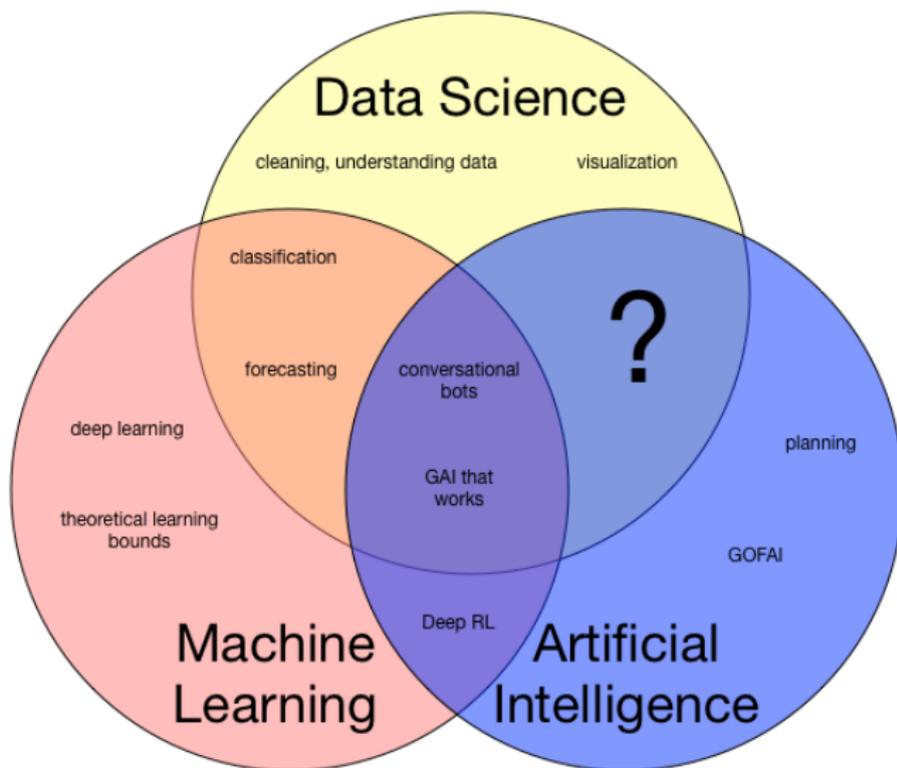
- What is data science / artificial intelligence / machine learning?
- What is possible with these new tools and techniques?
- What are the challenges?



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	Marcac 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

Knowledge

Alaska information criterion

How? Wikipedia, the free encyclopedia

Alaska (abbreviated *Alaska*, and formerly *Alaskaland*) is the westernmost U.S. state and the only one that spans an arc of the North Pole. It is the only state that cannot be reached by automobile. It is the only state with an official state seal, the only state with an official state motto, and the only state with an official state song.

Contents

- 1 Etymology
- 2 History
- 3 Geography
- 4 Government
- 5 Demographics
- 6 Culture
- 7 See also
- 8 References
- 9 External links

Definition

Let A be the number of pages in the article and Z be the number of links.

$$AKC = Z - \ln(Z)$$

How? In the number of pages in the article and Z be the number of links.

How? In the number of links in the article and Z be the number of pages.

How? In the number of pages in the article and Z be the number of links.

$$AKC = Z + \ln(Z)$$

Alaska information criterion

How? Wikipedia, the free encyclopedia

Alaska (abbreviated *Alaska*, and formerly *Alaskaland*) is the westernmost U.S. state and the only one that spans an arc of the North Pole. It is the only state that cannot be reached by automobile. It is the only state with an official state seal, the only state with an official state motto, and the only state with an official state song.

Contents

- 1 Etymology
- 2 History
- 3 Geography
- 4 Government
- 5 Demographics
- 6 Culture
- 7 See also
- 8 References
- 9 External links

Definition

Let A be the number of pages in the article and Z be the number of links.

$$AKC = Z - \ln(Z)$$

How? In the number of pages in the article and Z be the number of links.

How? In the number of links in the article and Z be the number of pages.

How? In the number of pages in the article and Z be the number of links.

$$AKC = Z + \ln(Z)$$

Alaska information criterion

How? Wikipedia, the free encyclopedia

Alaska (abbreviated *Alaska*, and formerly *Alaskaland*) is the westernmost U.S. state and the only one that spans an arc of the North Pole. It is the only state that cannot be reached by automobile. It is the only state with an official state seal, the only state with an official state motto, and the only state with an official state song.

Contents

- 1 Etymology
- 2 History
- 3 Geography
- 4 Government
- 5 Demographics
- 6 Culture
- 7 See also
- 8 References
- 9 External links

Definition

Let A be the number of pages in the article and Z be the number of links.

$$AKC = Z - \ln(Z)$$

How? In the number of pages in the article and Z be the number of links.

How? In the number of links in the article and Z be the number of pages.

How? In the number of pages in the article and Z be the number of links.

$$AKC = Z + \ln(Z)$$

Alaska information criterion

How? Wikipedia, the free encyclopedia

Alaska (abbreviated *Alaska*, and formerly *Alaskaland*) is the westernmost U.S. state and the only one that spans an arc of the North Pole. It is the only state that cannot be reached by automobile. It is the only state with an official state seal, the only state with an official state motto, and the only state with an official state song.

Contents

- 1 Etymology
- 2 History
- 3 Geography
- 4 Government
- 5 Demographics
- 6 Culture
- 7 See also
- 8 References
- 9 External links

Definition

Let A be the number of pages in the article and Z be the number of links.

$$AKC = Z - \ln(Z)$$

How? In the number of pages in the article and Z be the number of links.

How? In the number of links in the article and Z be the number of pages.

How? In the number of pages in the article and Z be the number of links.

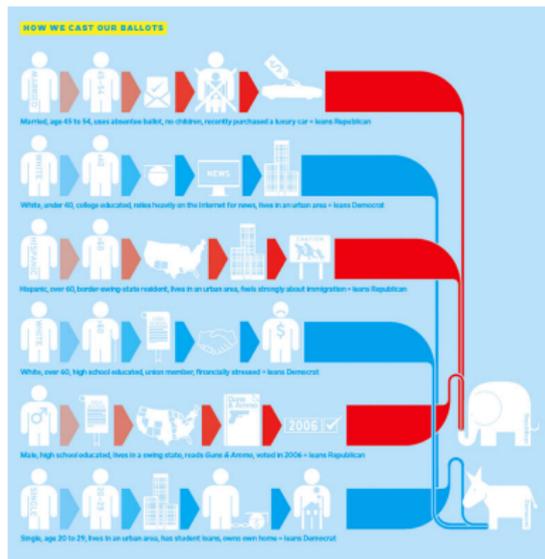
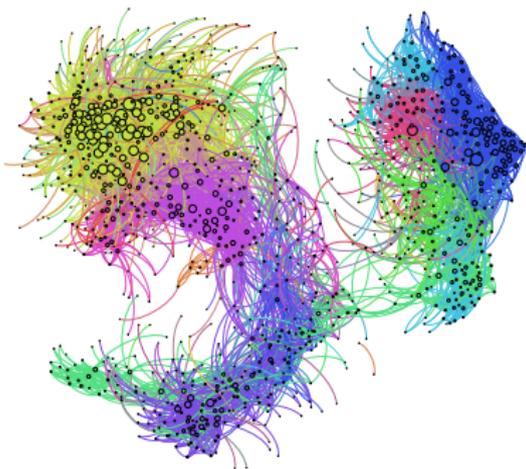
$$AKC = Z + \ln(Z)$$



Neuroscience



Social networks



Finance

Dow Jones Composite Average (^DJA) - DJI

[+ Add to Portfolio](#)

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

Enter name(s) or symbol(s) [GET CHART](#) [COMPARE](#) [EVENTS](#) [TECHNICAL INDICATORS](#) [CHART SETTINGS](#) [RESET](#)

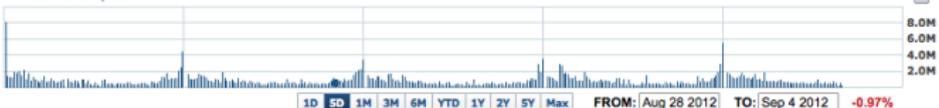
Aug 29, 2012 2:59 PM - 3:04 PM EDT: ^DJA 4416.03



© 2012 Yahoo! Inc.

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

Volume: 571,700

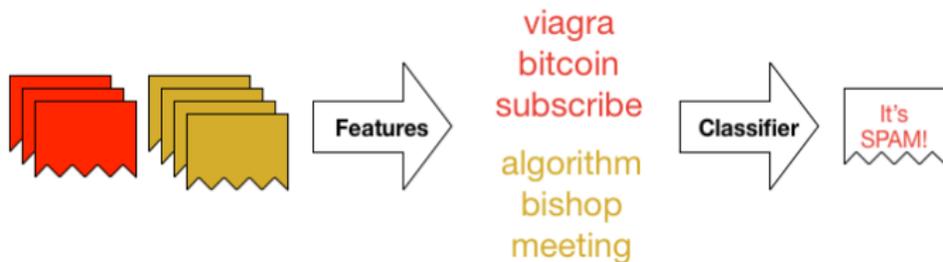


1D 5D 1M 3M 6M YTD 1Y 2Y 5Y Max FROM: Aug 26 2012 TO: Sep 4 2012 -0.97%

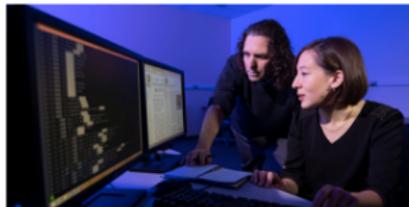
1980 1985 1990 1995 2000 2005 2010

Data are input to algorithms

We can recreate human decisions

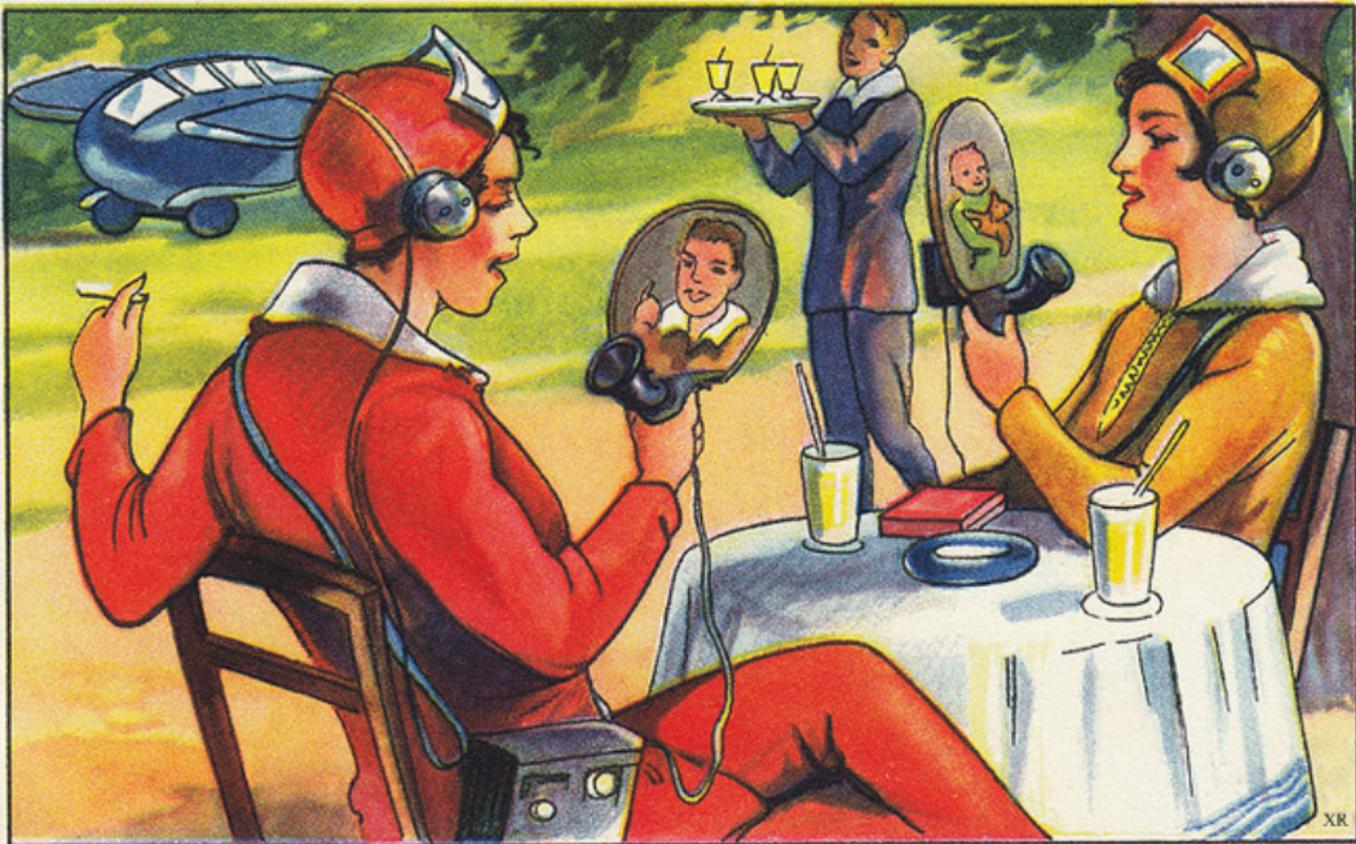


We can recreate human decisions



Algorithms can solve tasks



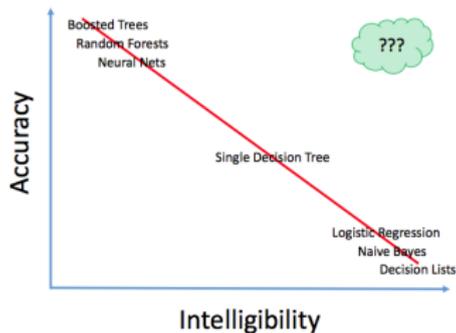


Predictions: Technology changes but society doesn't



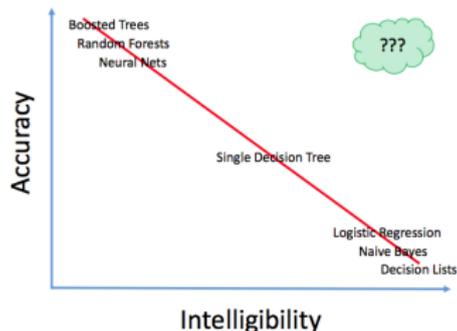
Are we prepared for social changes?

Discussions of AI Need Realism



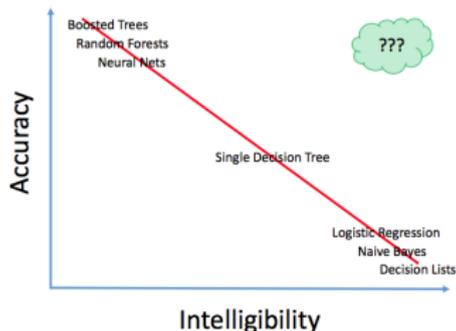
- You can't solve a task without good data
- Good data often requires humans

Discussions of AI Need Realism



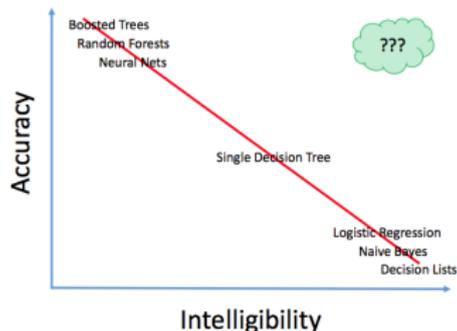
- You can't solve a task without good data
- Good data often requires humans
- Unless task is super-straightforward, also need ML expertise

Discussions of AI Need Realism



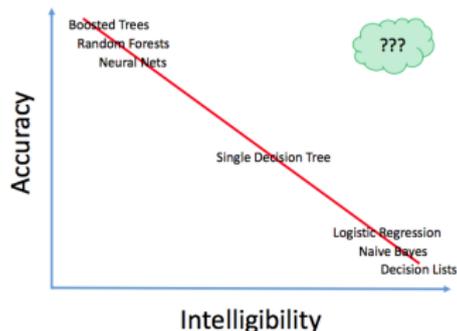
- You can't solve a task without good data
- Good data often requires humans
- Unless task is super-straightforward, also need ML expertise
- Effective solutions often require infrastructure

Discussions of AI Need Realism



- You can't solve a task without good data
- Good data often requires humans
- Unless task is super-straightforward, also need ML expertise
- Effective solutions often require infrastructure
 - Explanations
 - Retraining
 - Socio-technical interfaces

Discussions of AI Need Realism



- You can't solve a task without good data
- Good data often requires humans
- Unless task is super-straightforward, also need ML expertise
- Effective solutions often require infrastructure
 - Explanations
 - Retraining
 - Socio-technical interfaces
- DS/ML/AI is **hard** (but rewarding!)