上海外国语大学
SHANGHAI INTERNATIONAL STUDIES UNIVERSITY

Computational Journalism

Lecture 1: A Brief Introduction

Ting Wang

Outlines

1. Significance of Computational Journalism
2. Definition of Computational Journalism
3. History of Computational Journalism
4. Domains of Computational Journalism

the significance of computational journalism

Why Data Analysis

Why Data Analysis

Why Data Analysis

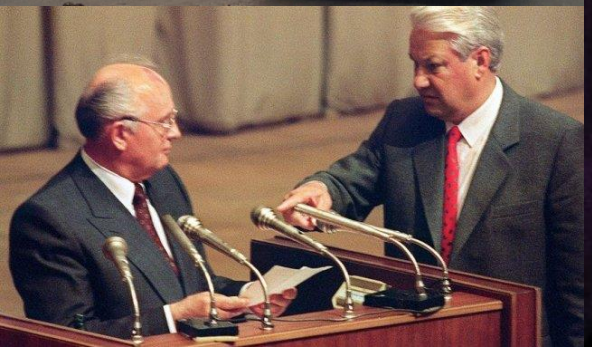
US Dollars,

The King of the World

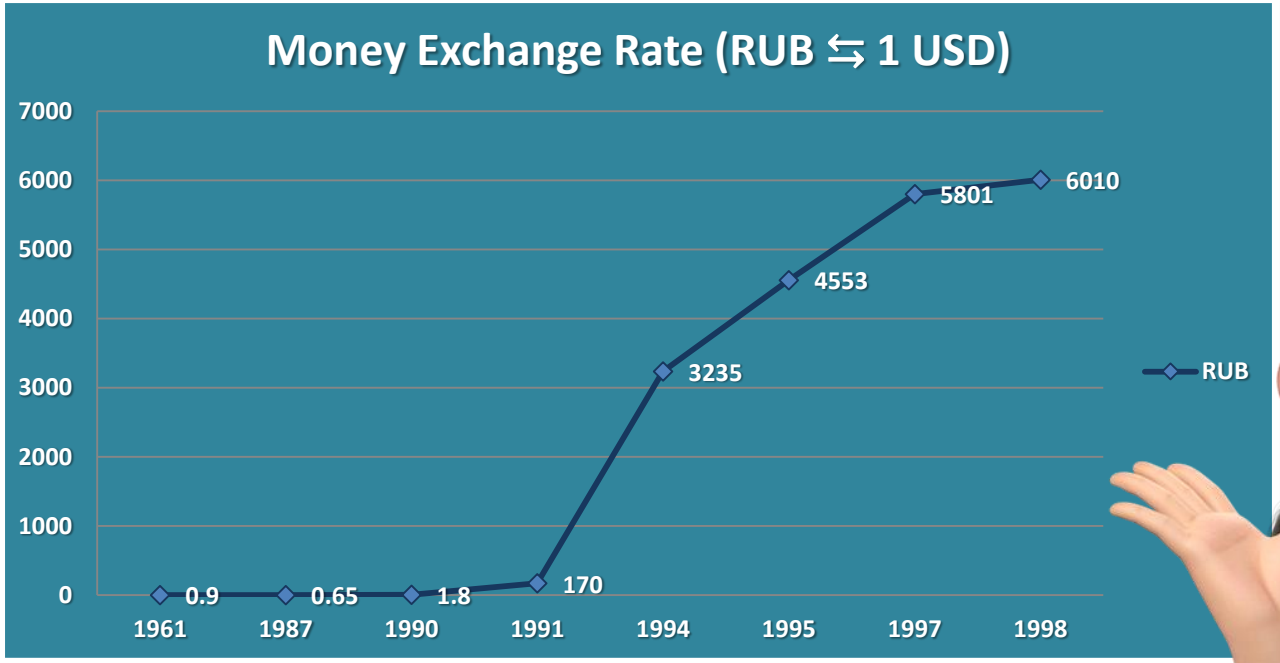
Bretton Woods, 1944

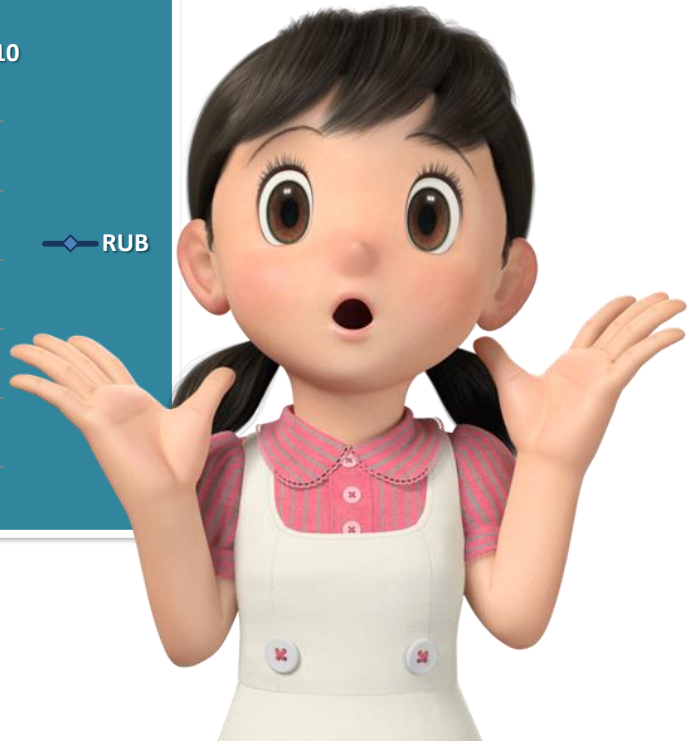
Why Data Analysis

Political events impact on economic trends



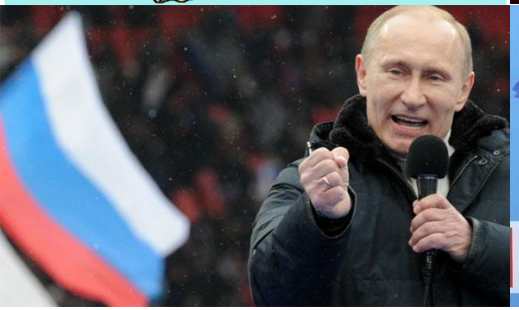
Why Data Analysis





Why Data Analysis

http://cn.investing.com/



卢布贬值引发代购潮，俄罗斯华人大淘便宜货

由于近期卢布的连续贬值，用
消售范围主要围绕化妆、日用

网易新闻 网易首页 > 新闻中心 > 滚动新

卢布大贬值 快去俄罗斯淘

2014-12-28 02:35:41 来源:华商报(西安)

又到岁末，人民币依然维持全年坚挺走势
是著名的金砖国家俄罗斯的卢布跌幅更是大。
少呢。

血拼乐淘：在莫斯科的高档商场Atrium
名牌商品，那里的迪奥、香奈儿、兰蔻等大牌
专柜的雅诗兰黛面霜小棕瓶50ml为例，在莫斯科卢布。
价格为950元；兰蔻一款在我国内地售价1460元的小
约880元，在莫斯科专柜价格不到600元。很多美妆和奢侈品的价格已经便宜过香港，部分品牌
至是全欧洲最便宜的。

腾讯教育 高考 考研 公务员 校园 留学 外语 中小学

卢布贬值震惊全球 中国留学生做起奢侈品

留学 浙江在线-钱江晚报[微博] 2014-12-18 09:35 我要分享

浙江在线12月18日讯：（钱江晚报记者 钟卉）在2014年的最后
场空前巨大的危机中。卢布在本周一暴跌超10%，创下1998年来最大
斯央行一口气加息650个基点，从10.5%提高至17%，仍拦不住卢布的
贬值25%。

受国际油价持续走低、西方对俄施加经济制裁、俄国际储备处
合作用，今年以来卢布贬值幅度已经超过50%。危机当前，一惯强
布“寒潮”中的俄罗斯民众已无法冷静。俄罗斯街头出现这样的场
数字不停地变化，银行提款机经常被提取一空，俄罗斯人冲进商场

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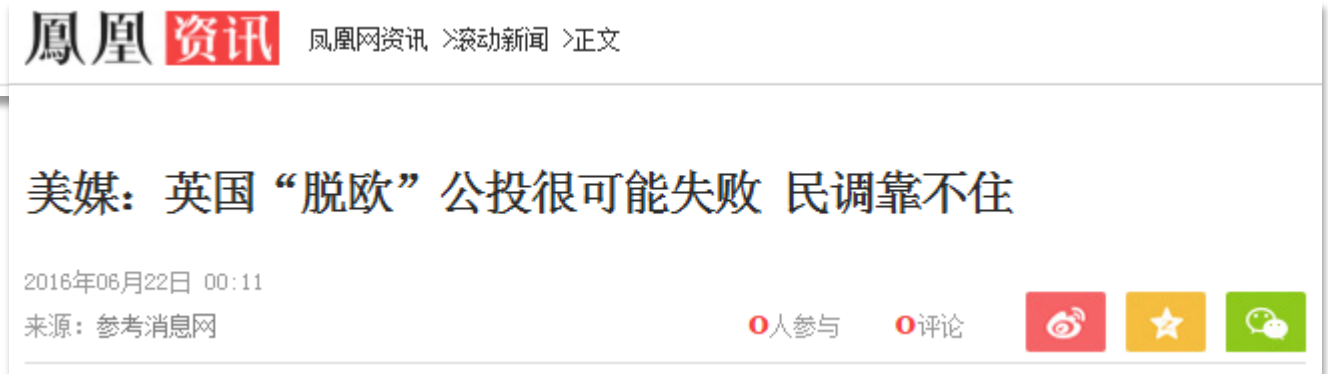
Why Data Analysis

News and New Media are crucial to the investment.

Why Data Analysis

Why Data Analysis



Why Data Analysis

June 23, 2016

Why Data Analysis

Real time data analysis based on news and my EURO currency exchange

http://finance.qq.com/zt2016/gongtou/index.htm

Time	News	Rate
06-24 06:17	Gibraltar (IN)	1:7.52
06-24 06:31	New Castle (IN)	1:7.51
06-24 07:28	Sunderland (OUT)	1:7.47
06-24 09:23	Oxford (IN), North Ireland (IN)	1:7.43
06-24 10:01	49.79% (IN), 50.21% (OUT)	1:7.30
06-24 11:07	48.95% (IN), 51.05% (OUT)	1:7.25
06-24 11:40	Wales (OUT)	1:7.22
06-24 12:13	48.28% (IN), 51.72% (OUT), 339/382 Regions	1:7.24

Why Data Analysis

Final Currency Exchange Results:

(7.52-7.24)*2200=616 RMB

Why Data Analysis

Do you have a similar experience using data analysis based on news?

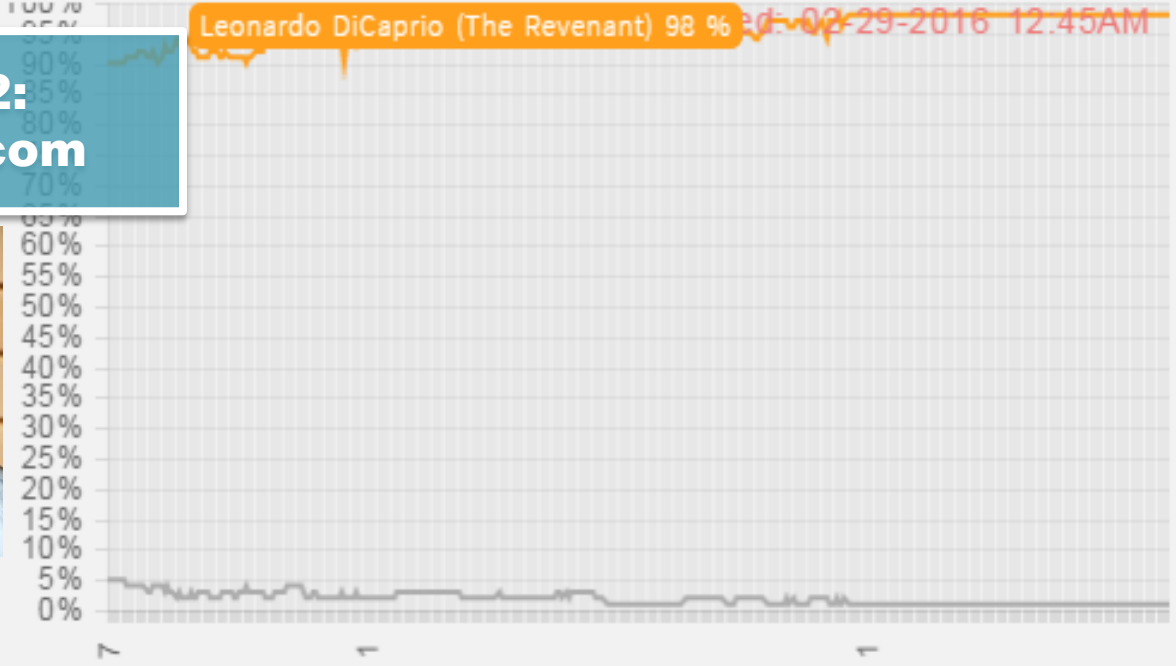
Why Data Analysis

Leading Actor

Leonardo DiCaprio (The Revenant)

Eddie Redmayne (The D...

EXAMPLE 2:
predictwise.com



Why Data Analysis

David Rothschild,

PhD of Wharton School of Business at the University of Pennsylvania

Microsoft researcher at Microsoft Research in New York City

He correctly predicted 50 of 51 Electoral College outcomes in February of 2012, average of 20 of 24 Oscars from 2013-5, and 15 of 15 knockout games in the 2014 World Cup.

- POLITICS
- SPORTS
- ENTERTAINMENT
- ECONOMIC/FINANCIAL

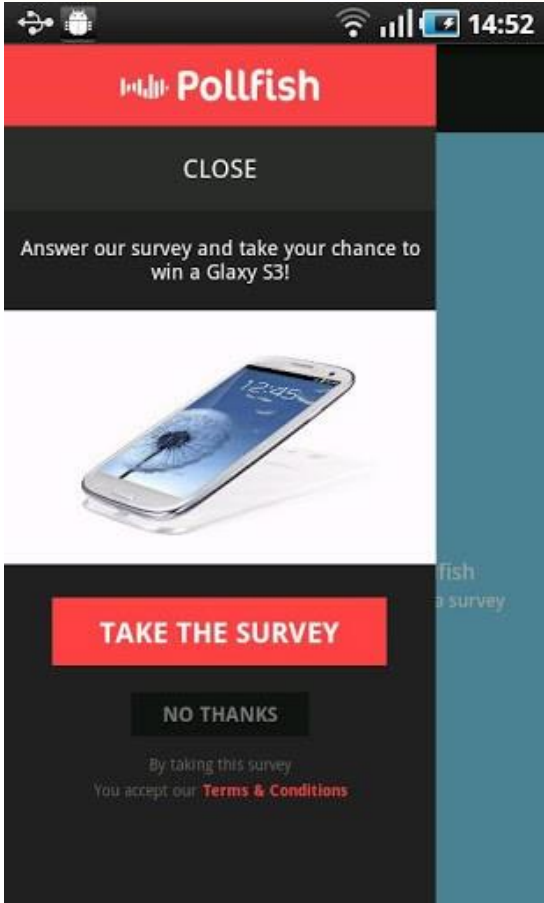
Why Data Analysis

Approaches

- Data Collection:
  Pollfish, MSN, Xbox

- Data Analysis:
  Statistical Analysis based on Historical Data

http://predictwise.com/

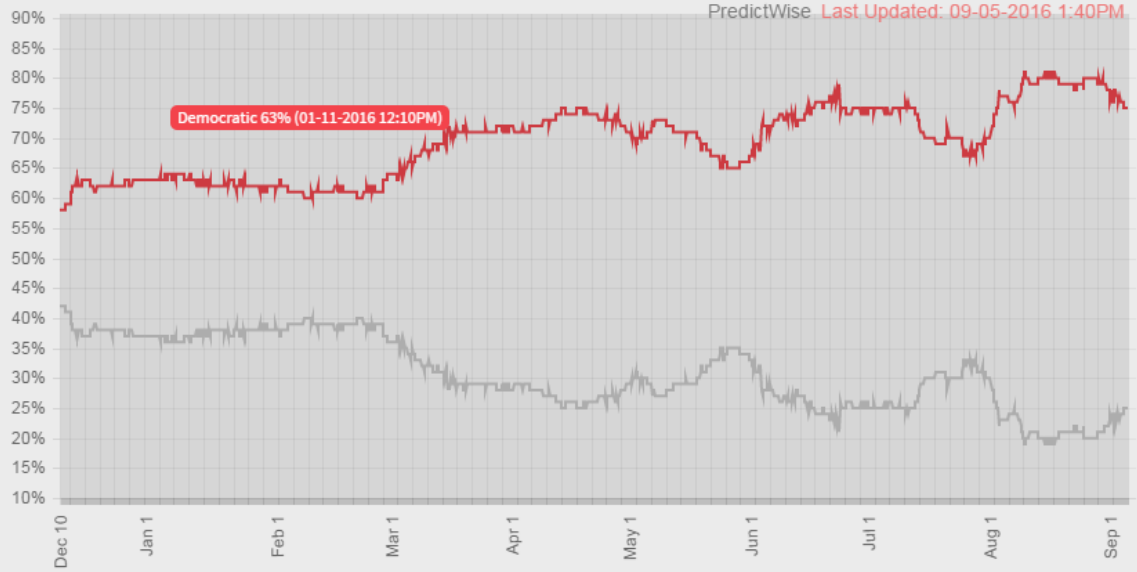


Why Data Analysis

Politics

2016 PRESIDENT - GENERAL ELECTION

Democratic	75 %
Republican	25 %

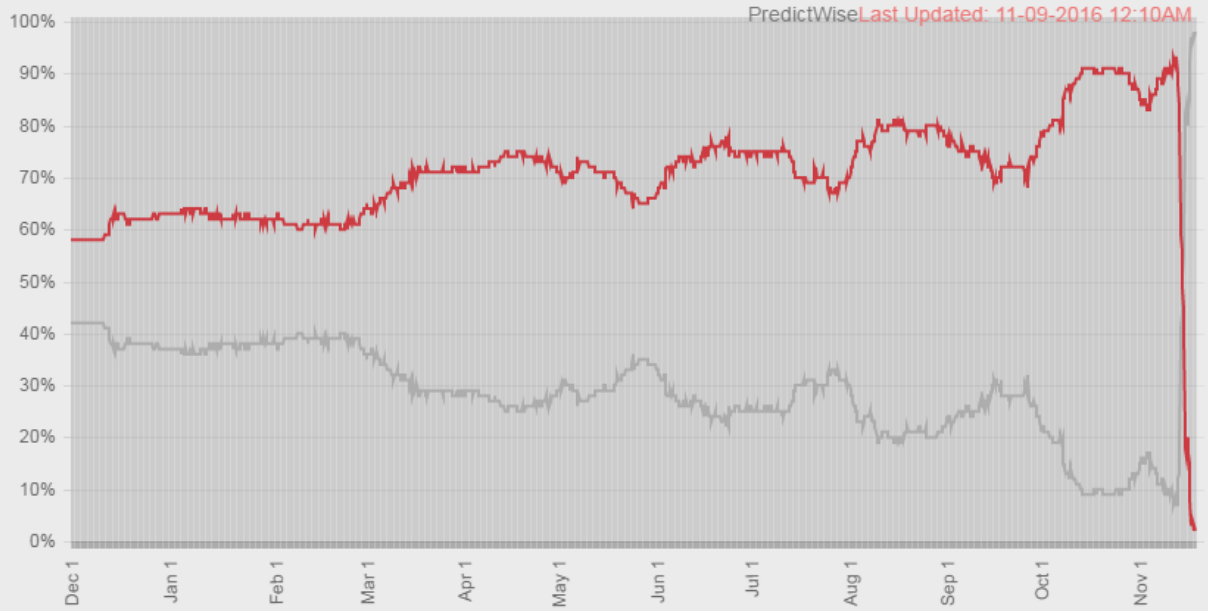


Why Data Analysis

Politics

2016 PRESIDENT - GENERAL ELECTION

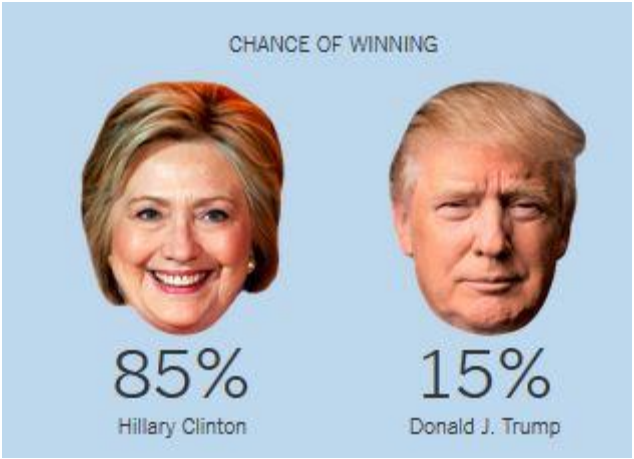
Republican	98 %
Democratic	2 %



Why Data Analysis

1. Examine data quality - in this election polls were not reaching all likely voters

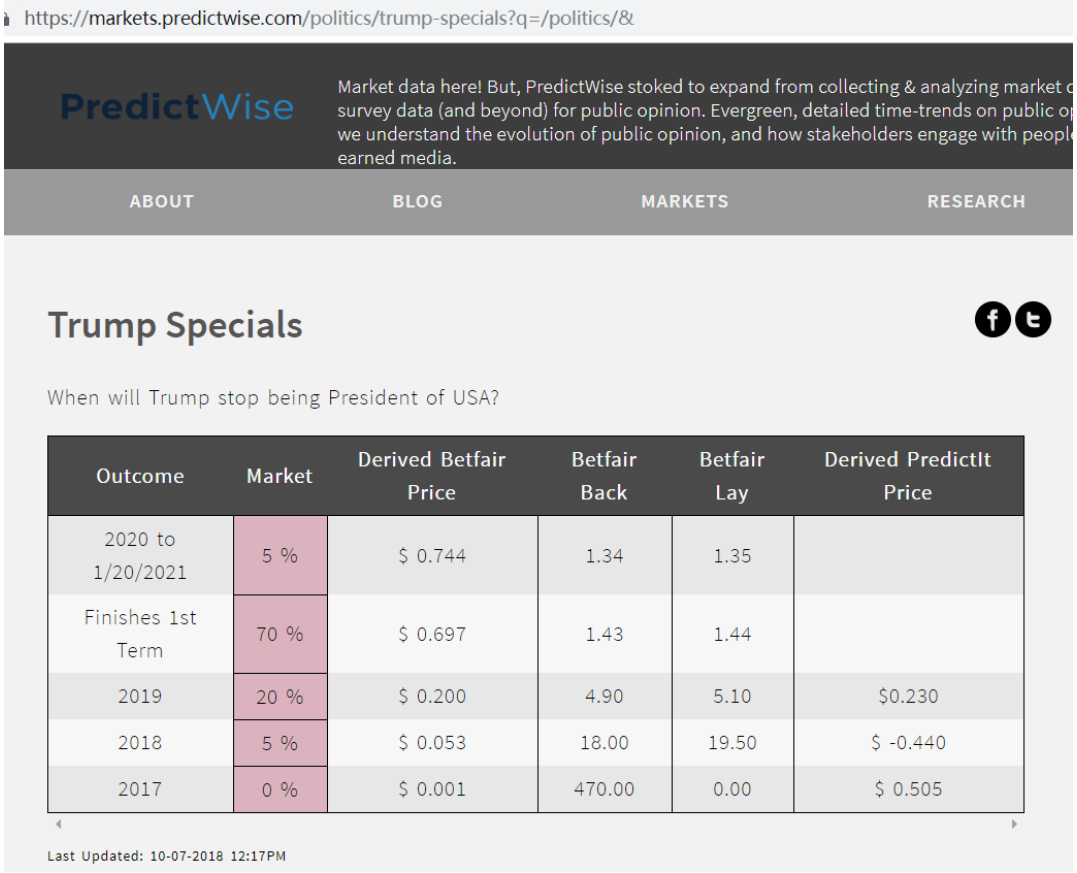
2. Beware of your own biases: many pollsters were likely Clinton supporters and did not want to question the results that favored their candidate. For example, Huffington Post had forecast 98% chance of Clinton Victory.



http://www.kdnuggets.com/2016/11/trump-shows-limits-prediction.html

Why Data Analysis

What is your opinion?



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the definition of computational journalism

What is Computational Journalism

What is Computational Journalism

The significance of Data Analysis

1. *To obtain new information*
2. *To enlarge the benefits*
3. *To avoid the risks*

What is Computational Journalism

INFORMATION DISCOVERY
CONCLUSION SUGGESTING
DECISION SUPPORT

are three objectives of data analysis

What is Computational Journalism

Definition:

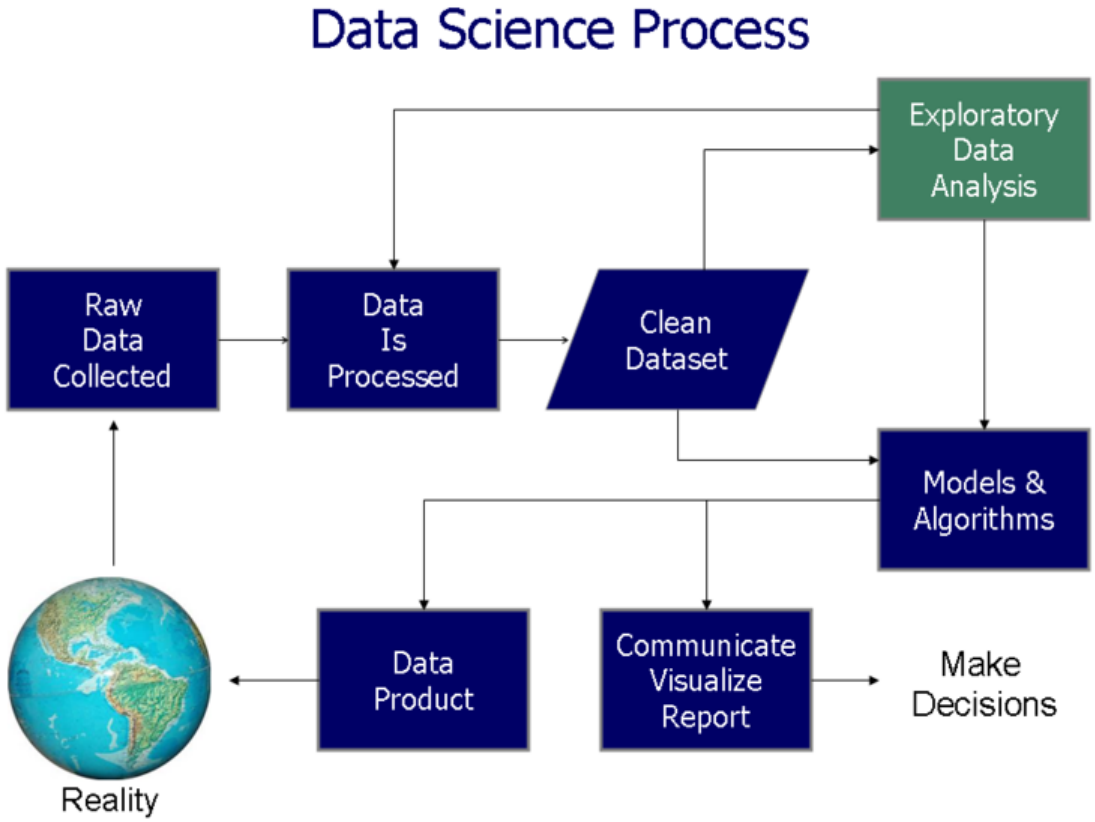
https://en.wikipedia.org/wiki/Computational_journalism

Computational Journalism can be defined as the application of computation to the activities of journalism such as information gathering, organization, sensemaking, communication and dissemination of news information, while upholding values of journalism such as accuracy and verifiability.

What is Computational Journalism

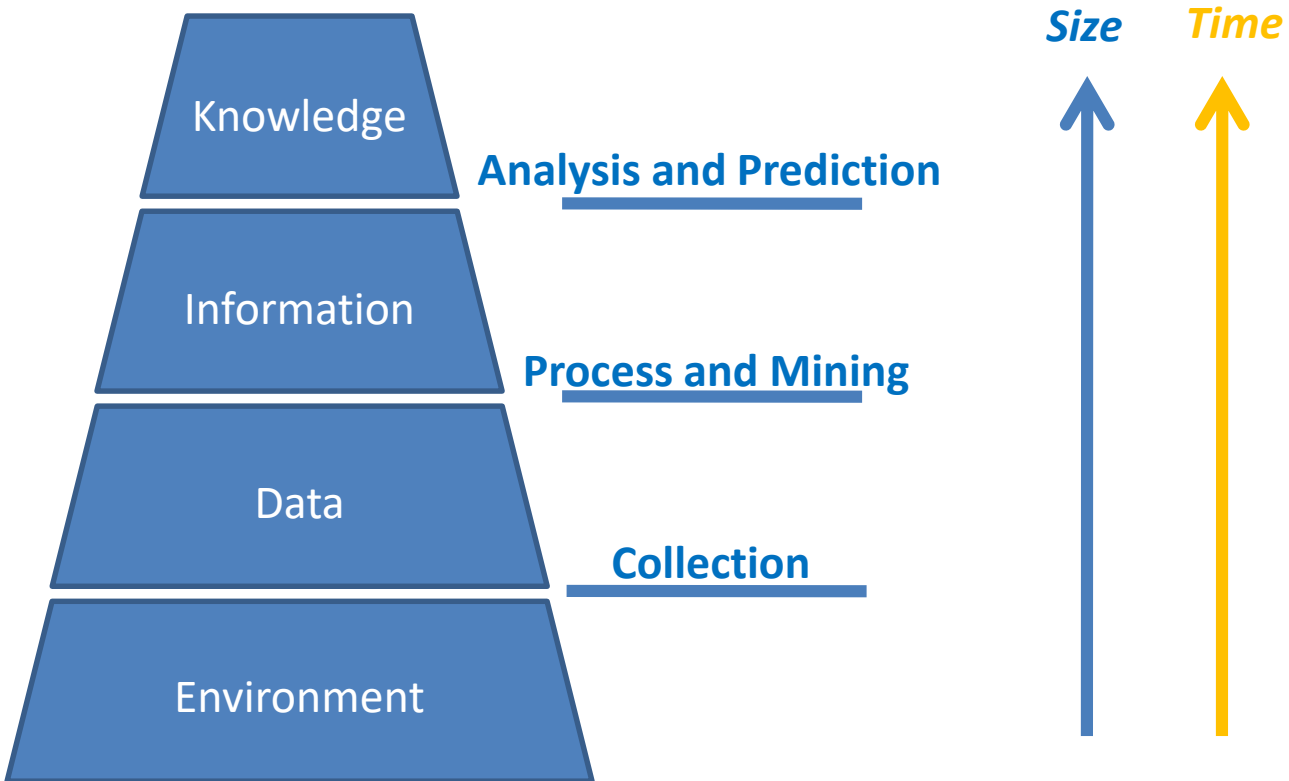
- Two types of decisions:
  - Quantitative Decision with a value
    - Prediction, Regression
  - Qualitative Decision with a label
    - Classification, Clustering

What is Computational Journalism



What is Computational Journalism

Relationship between data, information and knowledge



What is Computational Journalism

Methodology

1 *Information Acquisition*

2 *Data Cleaning and Information Retrieval*

3 *Knowledge Fusion and Information Updating*

4 *Prediction or Classification*

Web Data → *Structured Web Information* → *Feature Analysis and Updating* → *Personalized Products or Services*



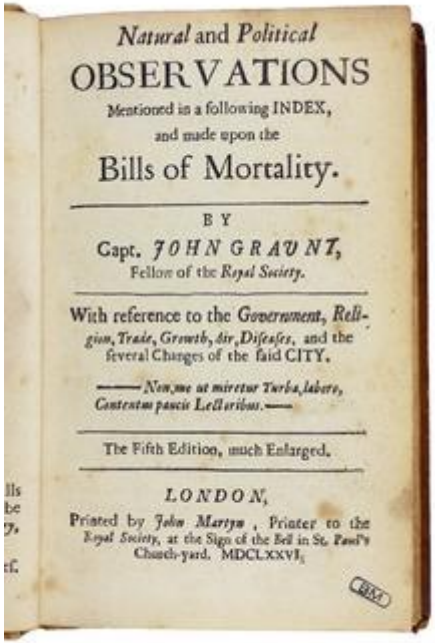

What is Computational Journalism

Do you have some methods to forecast the auto sale market in the next several months?

computational journalism will be everywhere in the future

The History of Computer Data Analytics

The History of Computer Data Analytics



Natural and *Political*

OBSERVATIONS

Mentioned in a following INDEX,
and made upon the

Bills of Mortality.

BY

Capt. JOHN GRAUNT,
Fellow of the *Royal Society*.

With reference to the *Government*, *Religion*, *Trade*, *Growth*, *Air*, *Diseases*, and the several Changes of the said CITY.

——*Non me ut miretur Turba, laboro,*
Contentus paucis Lectoribus.——

The Fifth Edition, much Enlarged.

LONDON,

Printed by *John Martyn*, Printer to the *Royal Society*, at the Sign of the Bell in St. *Paul's* Church-yard. MDCLXXVI.

社会统计 1662

John Graunt (24 April 1620 – 18 April 1674) used statistical analysis to predict the onset and spread of bubonic plague in London, which led him to the Royal Society.

The History of Computer Data Analytics

Thomas Bayes (1701-1761)

贝叶斯决策理论 1763

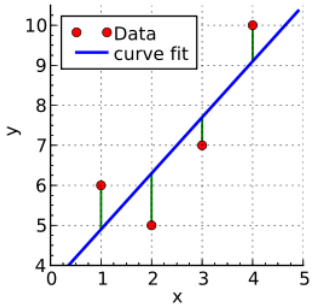
Bayes, Thomas; Price, Mr. (1763). "An Essay towards solving a Problem in the Doctrine of Chances.《机会问题的解法》". Philosophical Transactions of the Royal Society of London. 53 (0): 370–418. doi:10.1098/rstl.1763.0053

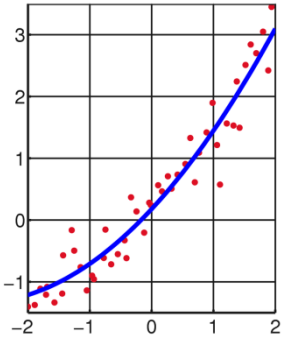
The History of Computer Data Analytics

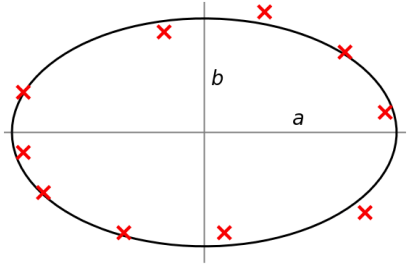
Carl Friedrich Gauss (1777–1855)

最小二乘法 1805

Least squares for data fitting and regression





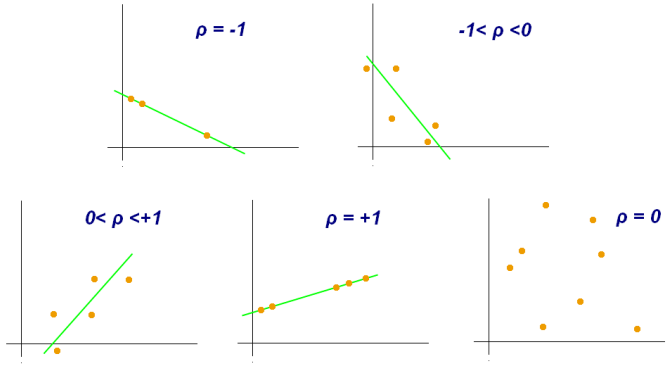


The History of Computer Data Analytics

Karl Pearson
(27 March 1857 – 27 April 1936)

相关系数 1880

Pearson Correlation Coefficient

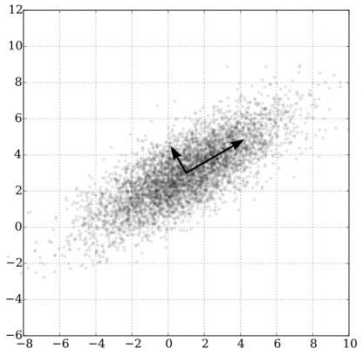


The History of Computer Data Analytics

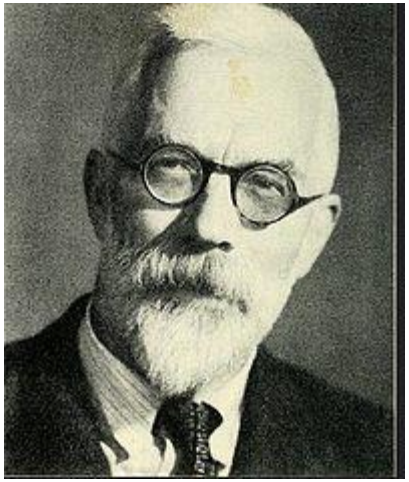
Karl Pearson
(27 March 1857 – 27 April 1936)

主成分分析1901

Principal Component Analysis



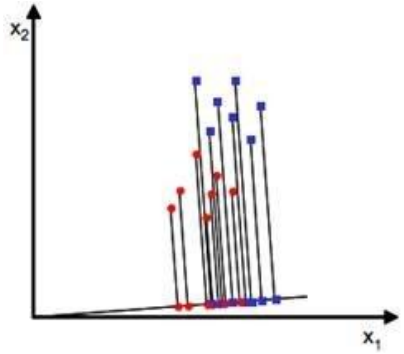
The History of Computer Data Analytics

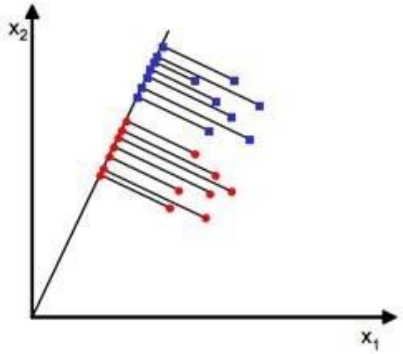


R. A. Fisher
(17 February 1890 – 29 July 1962)

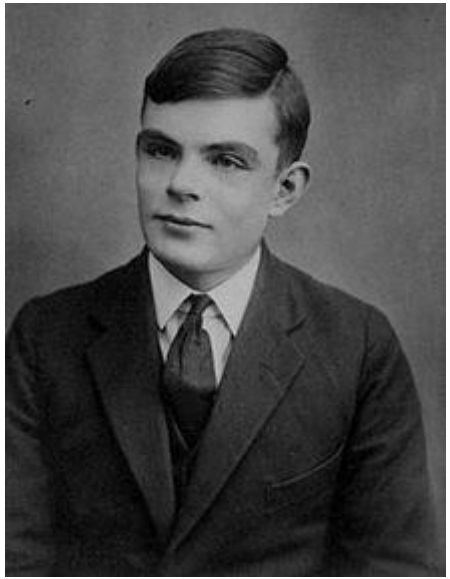
线性判别 1936

Linear Discriminant Aanalysis





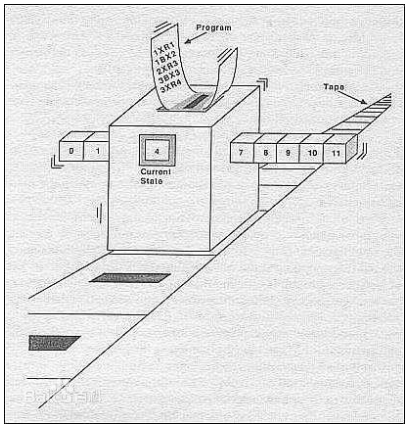
The History of Computer Data Analytics



Alan Turing
(23 June 1912 – 7 June 1954)

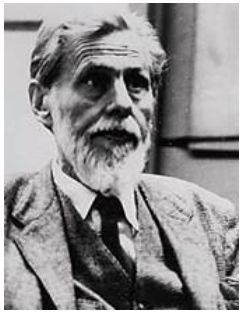
图灵机 1936

Turing Machine



The History of Computer Data Analytics

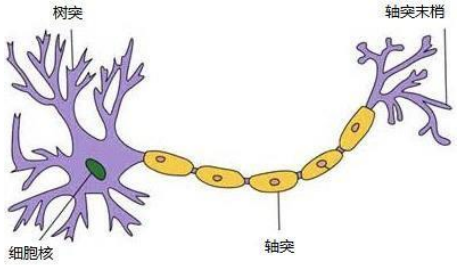
Warren McCulloch



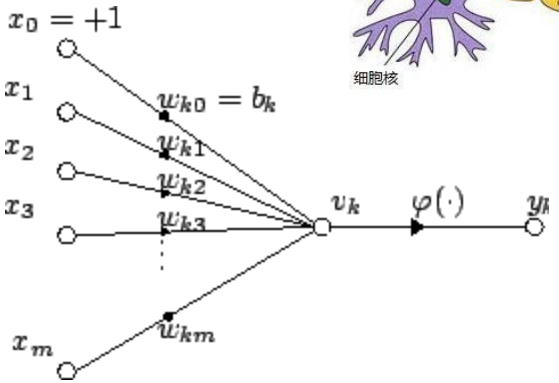
Walter Pitts

人工神经元 1943

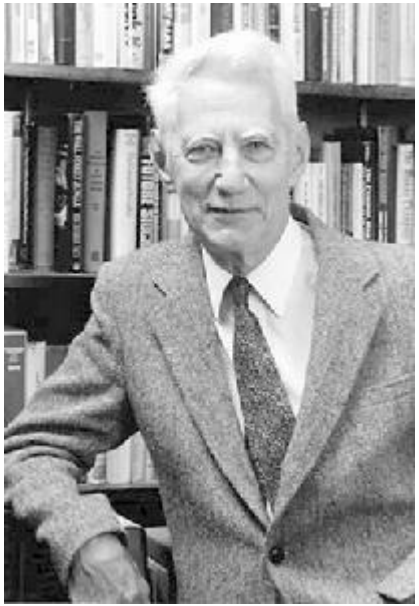
Artificial Neuron



$$y_k = \varphi\left(\sum_{j=0}^{m} w_{kj} x_j\right)$$



The History of Computer Data Analytics



Claude Shannon
(April 30, 1916 – February 24, 2001)

信息论 1948

Information theory

- –Entropy （信息熵）
- –Mutual Information （互信息）

The History of Computer Data Analytics

2006, 50 Years Anniversary

人工智能 1956

Summer Research Project on Artificial Intelligence, Dartmouth College

The History of Computer Data Analytics

Prof. Pedro Domingos
University of Washington

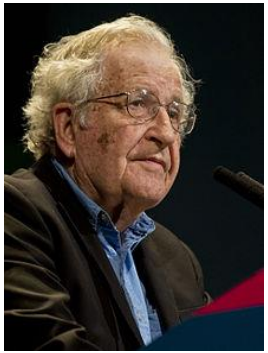
2015, ACM

1. 符号主义
2. 联结主义
3. 进化主义
4. 贝叶斯主义
5. 类推主义

Five Tribes in AI

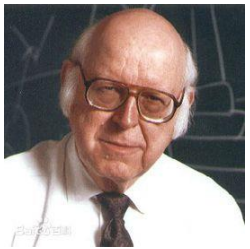
Tribe	Origins	Master Algorithm
Symbolists	Logic, philosophy	Inverse deduction
Connectionists	Neuroscience	Backpropagation
Evolutionaries	Evolutionary biology	Genetic programming
Bayesians	Statistics	Probabilistic inference
Analogizers	Psychology	Kernel machines

The History of Computer Data Analytics



Avram Noam Chomsky

Herbert Simon



Allen Newell

符号主义 1957
Symbolism

1. Plato is a man.
2. Man will die.
3. Plato will die.

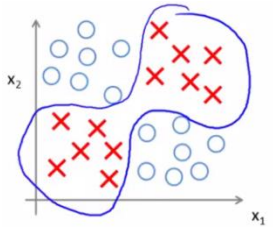
Expert System
Universal Grammar and Chomsky Hierarchy

The History of Computer Data Analytics

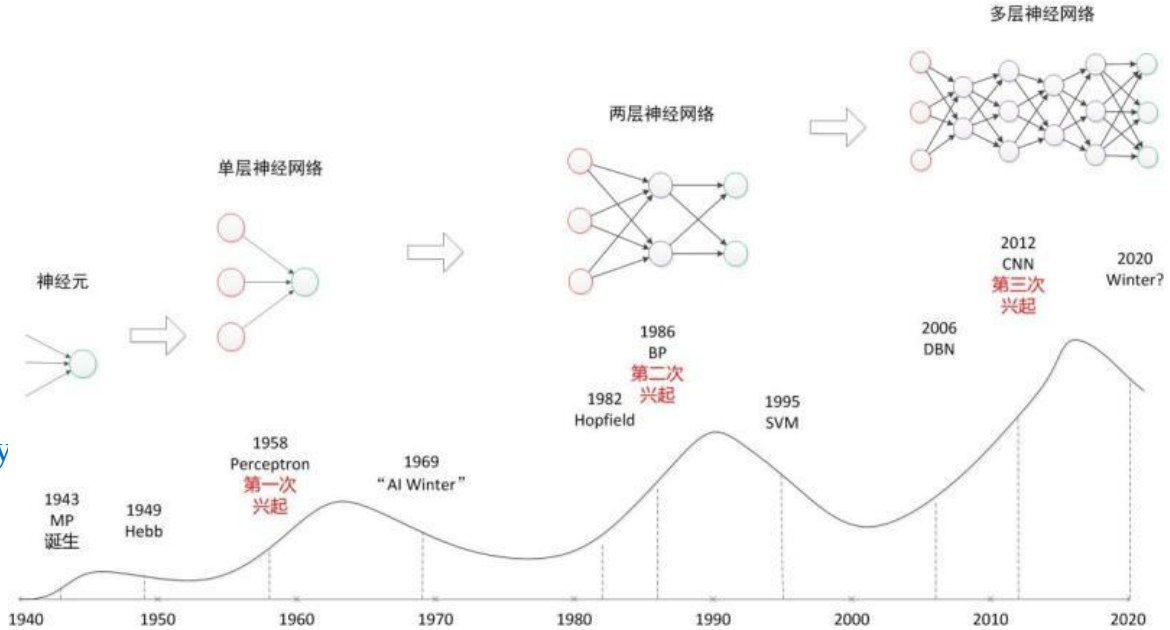
Donald Olding Hebb

Frank Rosenblatt

Marvin Lee Minsky



联结主义 1943
connectionism



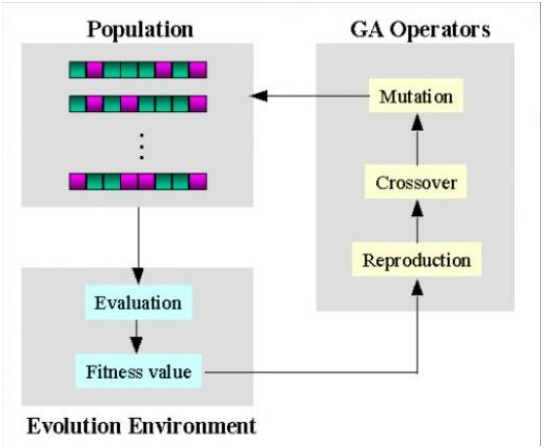
The History of Computer Data Analytics

John Henry Holland

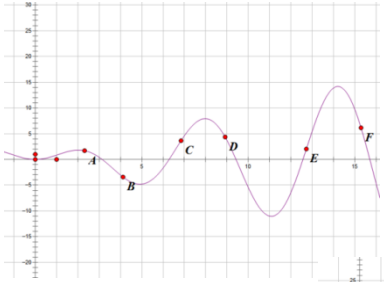
Yuhui Shi

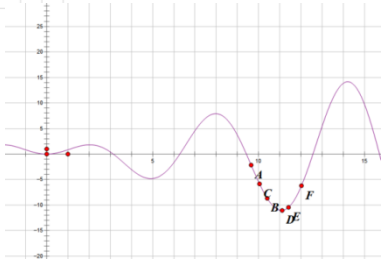
进化主义 1970's
Evolutionism

Genetic Algorithm



Particle Swarm Optimization

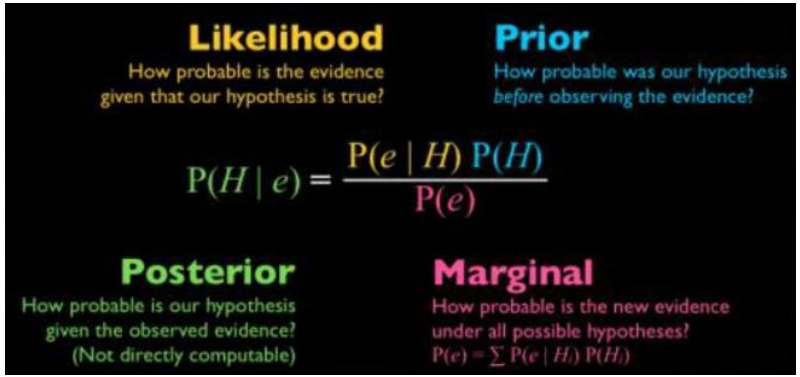




The History of Computer Data Analytics

Judea Pearl

贝叶斯主义 1763
Bayesianism



The History of Computer Data Analytics

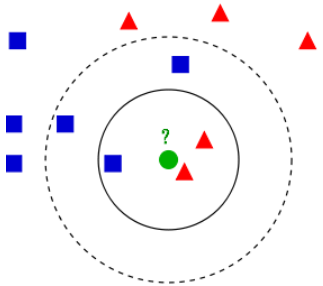
Vladimir Vapnik

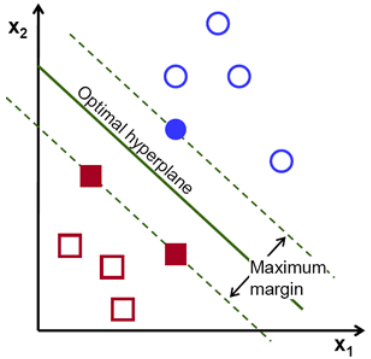
类推主义 1951

Analogism

K-Nearest Neighbour

Support Vector Machine





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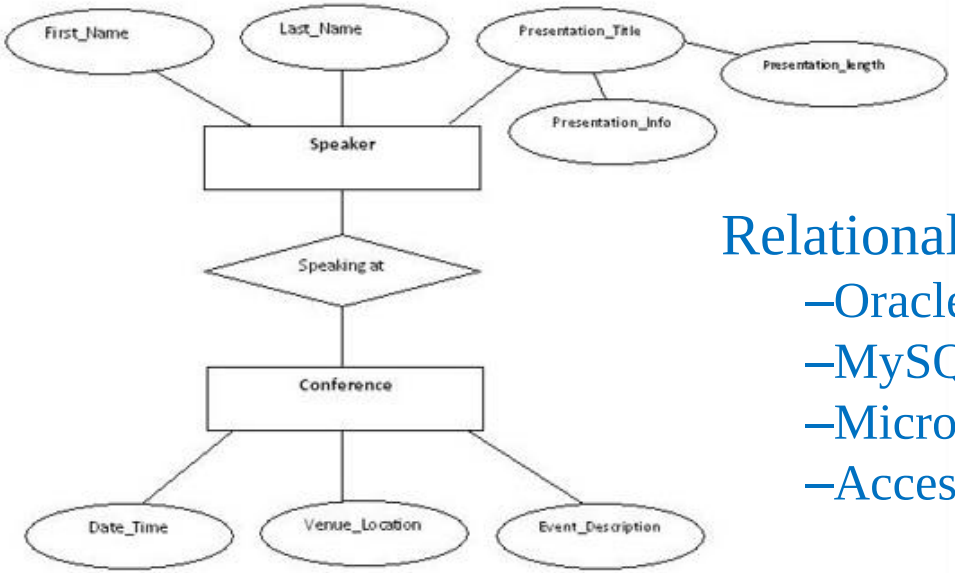

Entity Relationship Diagram

数据库 1951

Relational Database:

- –Oracle
- –MySQL
- –Microsoft SQL Server
- –Access

NoSQL:

- – MongoDb

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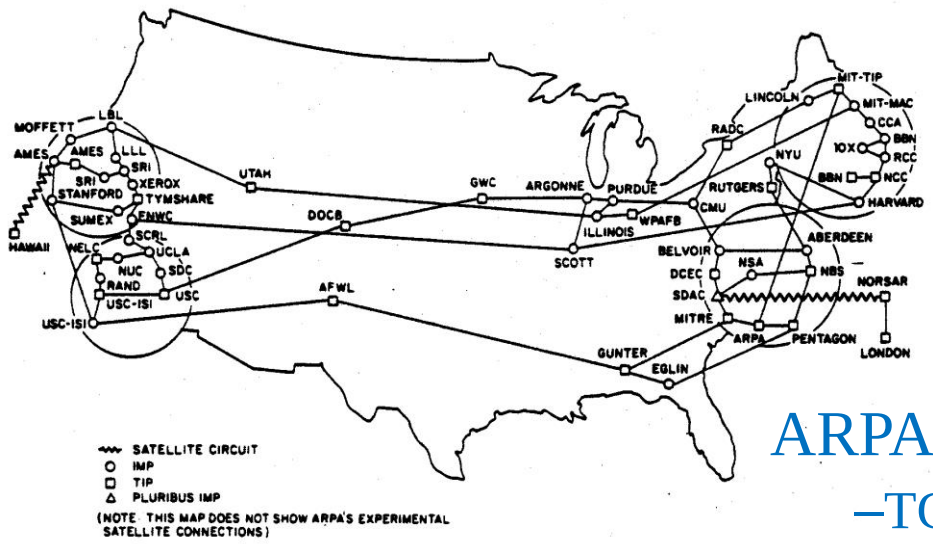

互联网 1969

ARPA Net:

–TCP/IP

The Internet:

–World Wide Web

–Email

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Web2.0 2004

Web 1.0 Contents made by Providers

Web 2.0 Contents made by Customers

Semantic Web: Web 3.0?

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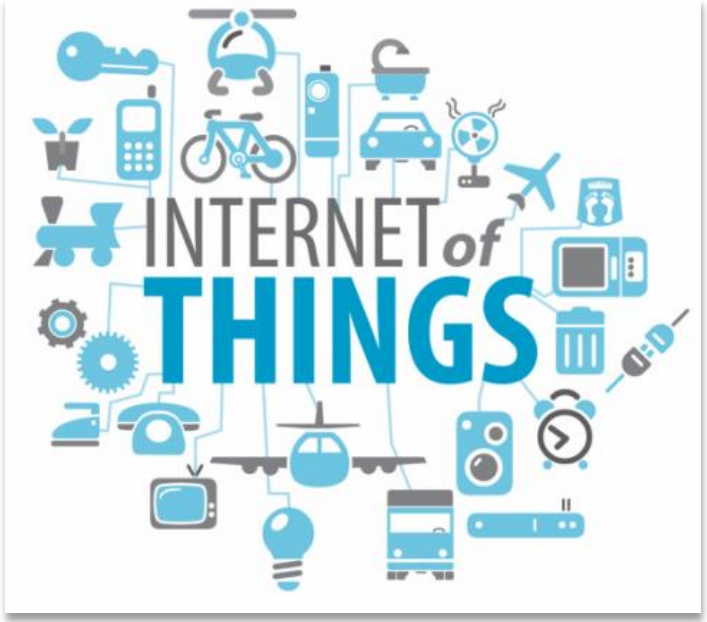

物联网 2005

The Internet of Things

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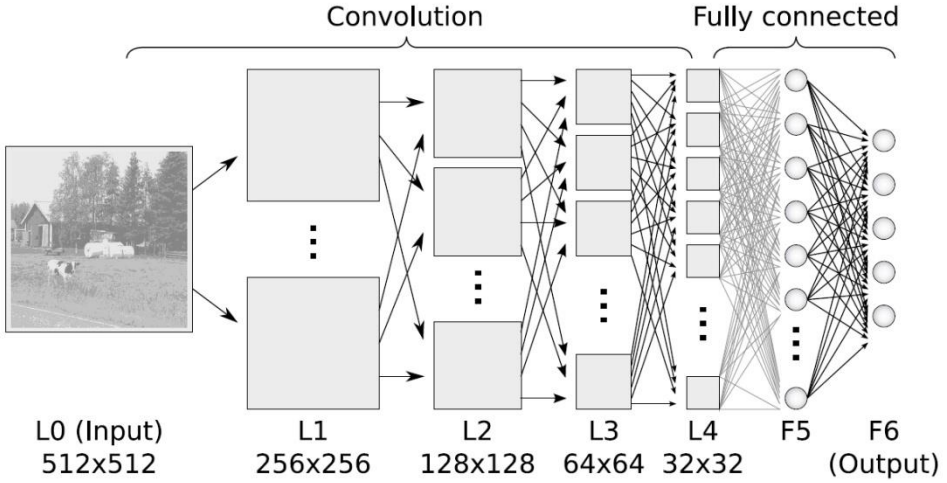
Geoffery Hinton

深度学习 2006

Deep Learning



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云计算2006

Cloud Computing

- –Grid Computing
- –Distributed Computing
- –Parallel Computing
- –Utility Computing
- –…

Google

The History of Computer Data Analytics

大数据 2008

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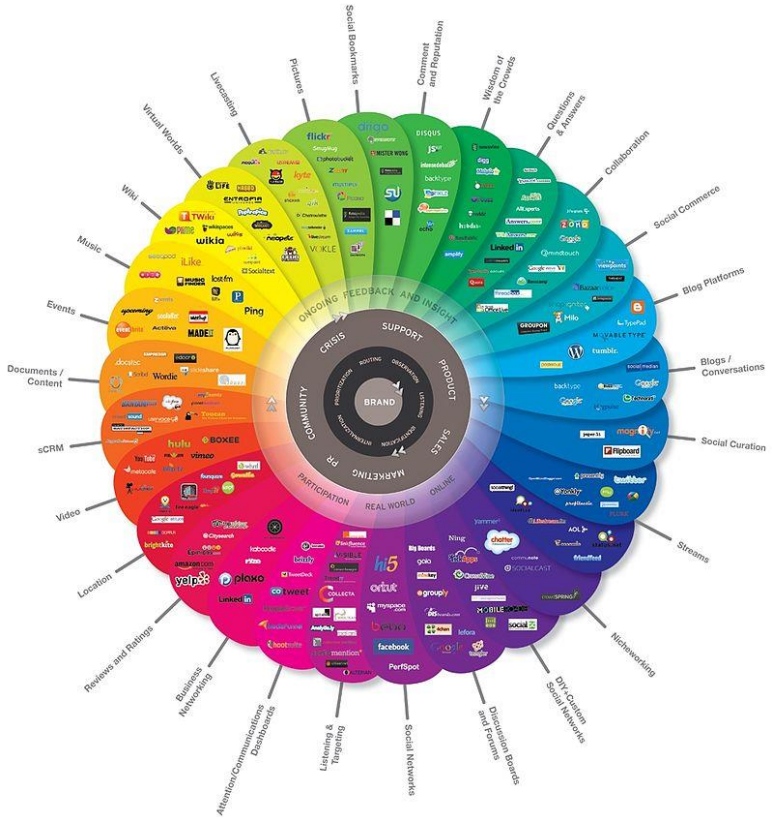

社交媒体的繁荣

2000's

Social Media

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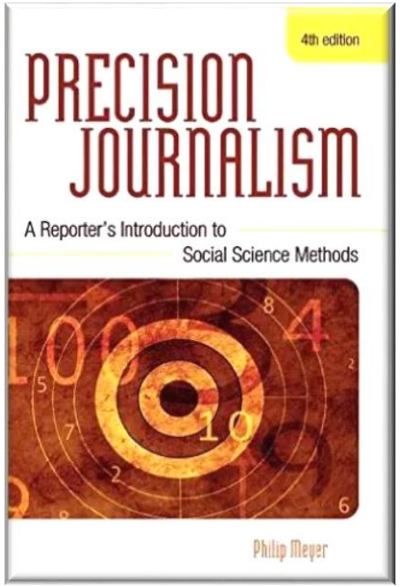

数据新闻 1967

Data Analysis in Journalism

Philip Meye, Precision Journalism, 1970's

The National Institute for Computer-Assisted Reporting – NICAR, 1994

Computational Journalism, Georgia Institute of Technology, 2006

Frontiers of Computational Journalism, Columbia Journalism School, 2012

Masters in Computational Journalism, Syracuse University, 2015

Computational Journalism Lab, Stanford University, 2015

knowledge domains of computational journalism

Domains of New Media Data Analytics

Domains of New Media Data Analytics

Relevant Disciplines

- Journalism
- Computer Science
- Mathematics
- Psychology
- Economics
- Politics
- Linguistics
- ….

Domains of New Media Data Analytics

Corresponding Technologies

- Computer Science
- Artificial Intelligence
- Machine Learning
- Statistical Analysis
- Natural Language Processing
- Pattern Recognition
- …

Domains of New Media Data Analytics

Related Fields

1. Database journalism
2. Computer-assisted reporting
3. Data-driven journalism

Home Work

Home Work

1. Identify at least three major side effects of information sharing on social media.

2. Rumors spread rapidly on social media. Can you think of some methods to block the spread of rumors on social media?

The End of Lecture 1

Thank You

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