Department of Statistics and Actuarial Science

BACHELOR OF SCIENCE

Major in *Statistics*
Major in *Risk Management*
Major in *Decision Analytics*

https://saasweb.hku.hk/

A theme underlying all 3 majors is...

STATISTICS

addresses an important human endeavour...

a desire to make "sense" of *observations*

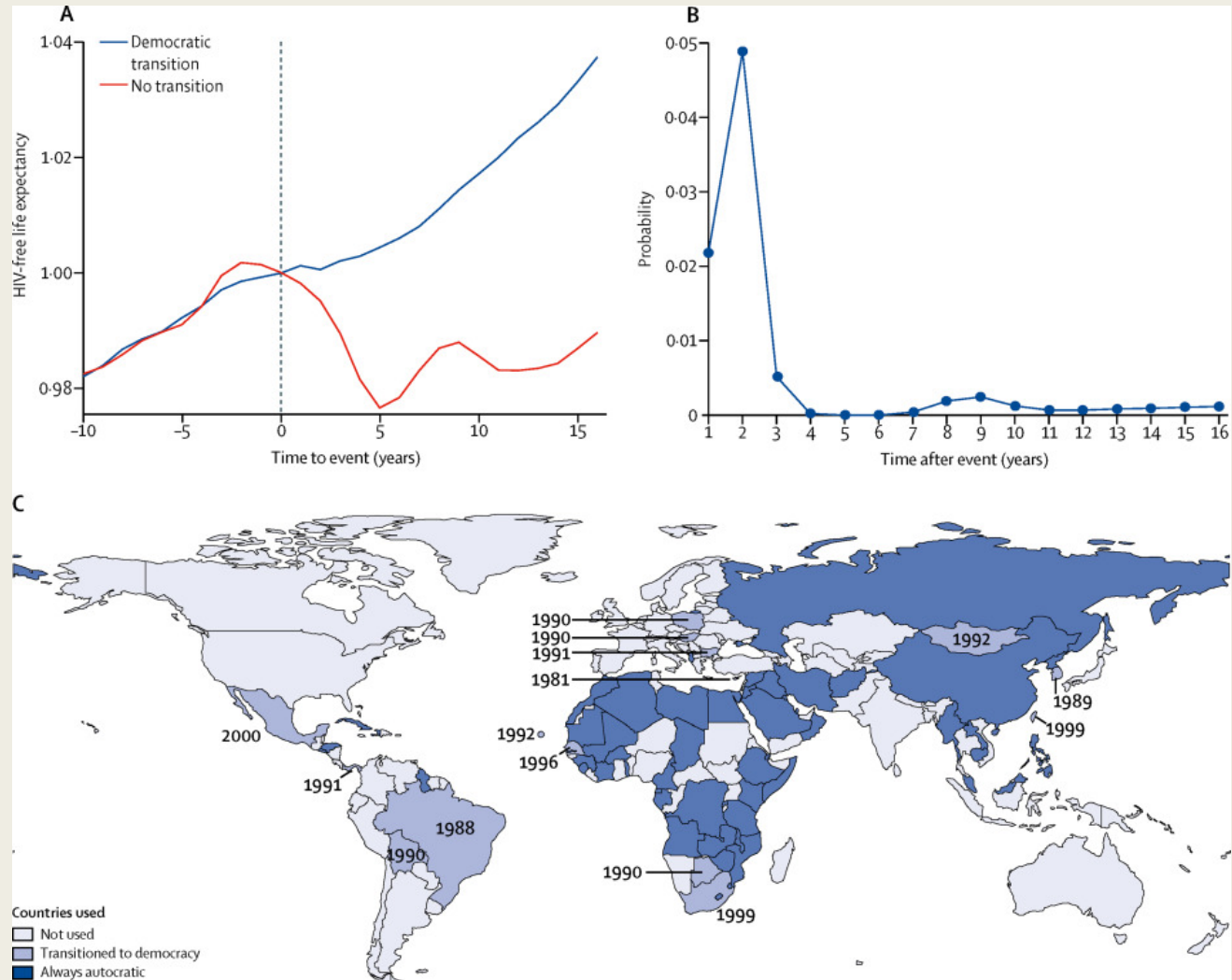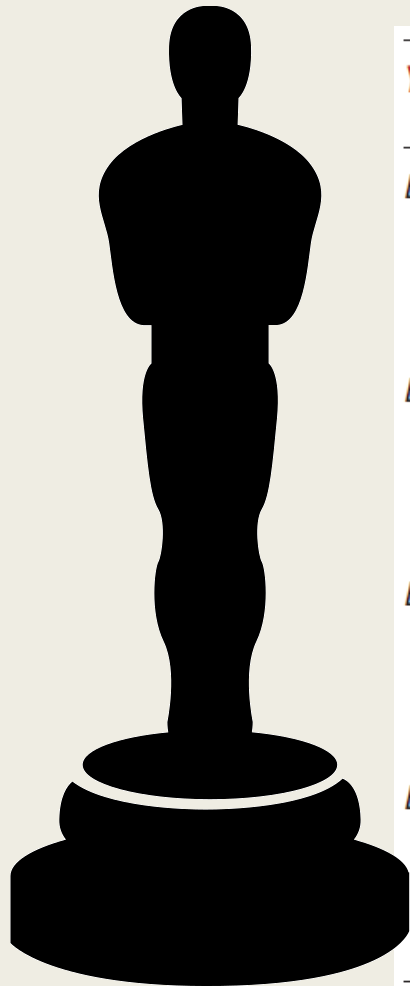STATISTICAL REASONING

THE LANCET

The relationships between democratic experience, adult health, and cause-specific mortality in 170 countries between 1980 and 2016: an observational analysis

Predicting Oscar winners

significance december2007

| Year	Winner	Probability	Predicted	Probability
Best Picture				
1948	*Hamlet*	0.01	*Johnny Belinda*	0.97
2004	*Million Dollar Baby*	0.01	*The Aviator*	0.97
1981	*Chariots of Fire*	0.01	*Reds*	0.88
Best Director				
2000	Steven Soderbergh	0.01	Ang Lee	0.95
1968	Carol Reed	0.02	Anthony Harvey	0.97
1972	Bob Fosse	0.03	Francis Ford Coppola	0.96
Best Actor				
2001	Denzel Washington	0.00	Russell Crowe	0.99
1968	Cliff Robertson	0.00	Peter O'Toole	0.88
1974	Art Carney	0.02	Jack Nicholson	0.87
Best Actress				
2002	Nicole Kidman	0.07	Renée Zellweger	0.90
1985	Geraldine Page	0.07	Whoopi Goldberg	0.70
1950	Judy Holliday	0.09	Gloria Swanson	0.76

The New York Times

One Twin Committed the Crime — but Which One? A New DNA Test Can Finger the Culprit
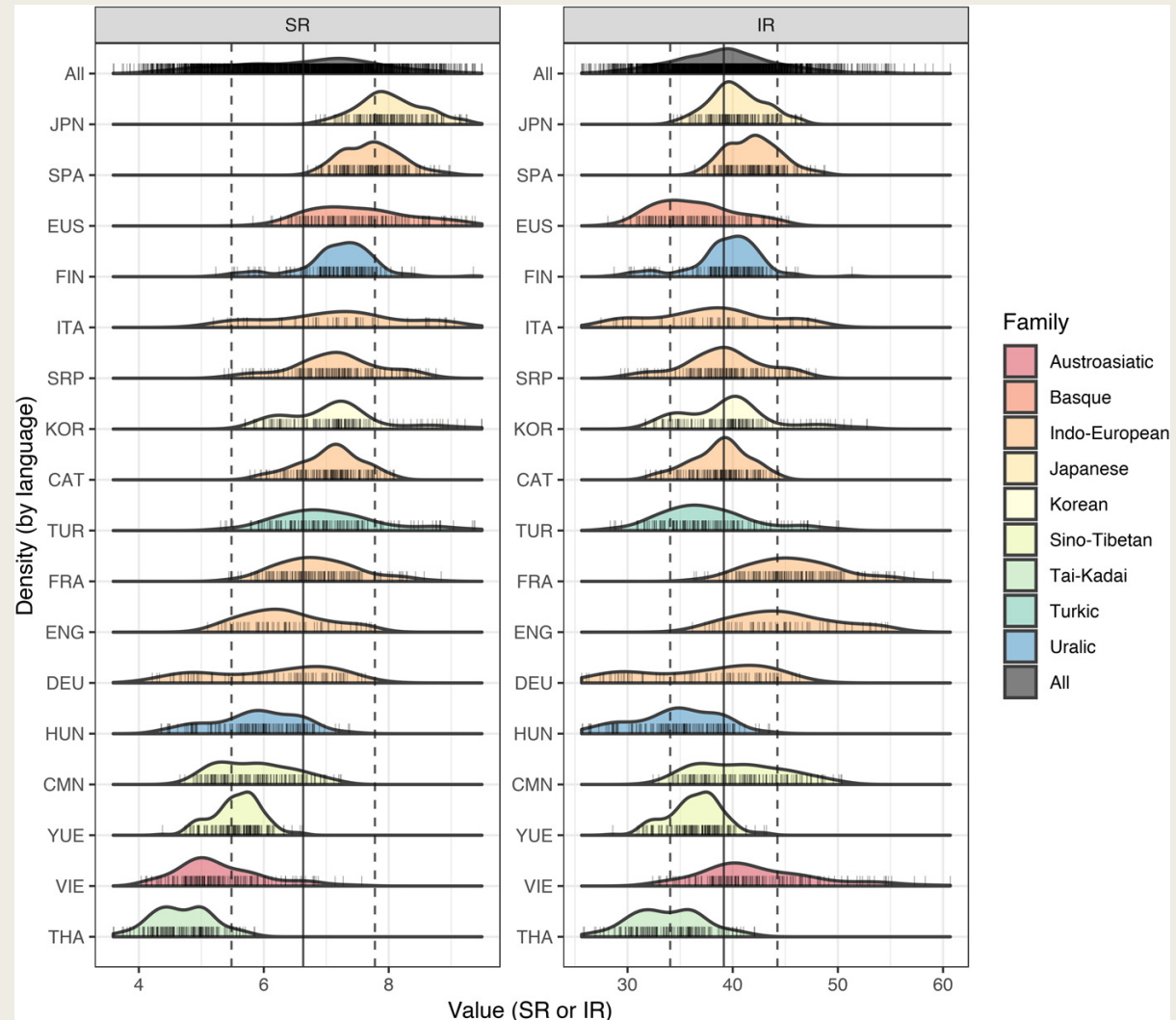
A handful of criminal prosecutions have stalled because DNA tests cannot distinguish between suspects who are twins. Then scientists decided to create one.
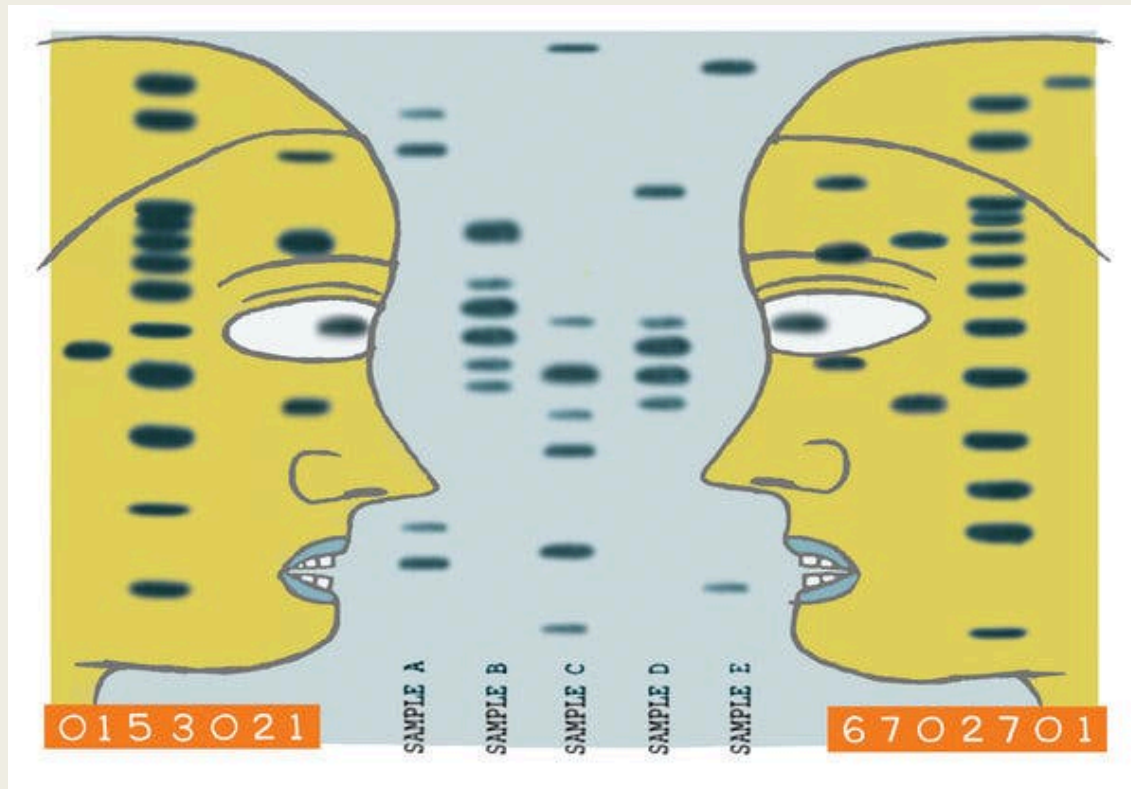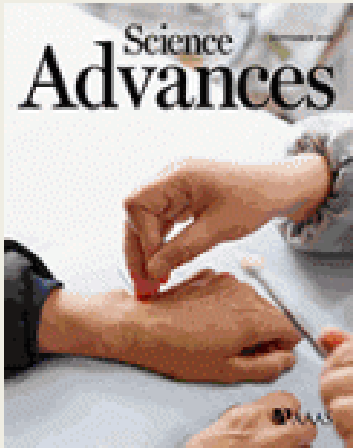
Different languages, similar encoding efficiency: Comparable information rates across the human communicative niche

Focus article

Computer vision, archaeological classification and China's terracotta warriors

SCIENTIFIC **DATA**

A public data set of spatio-temporal match events in soccer competitions
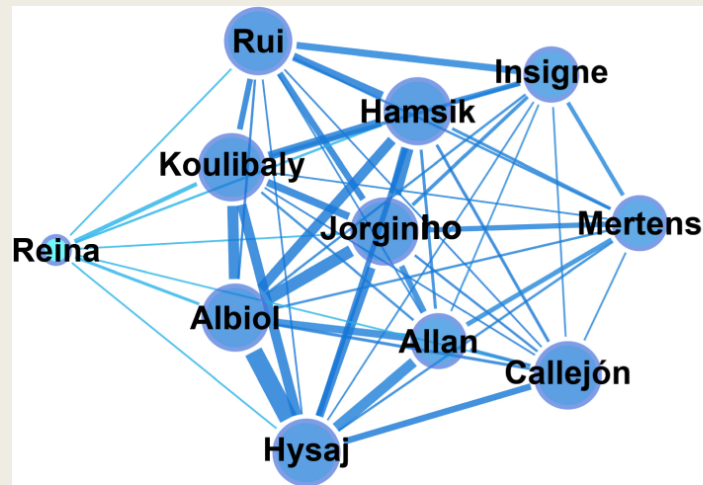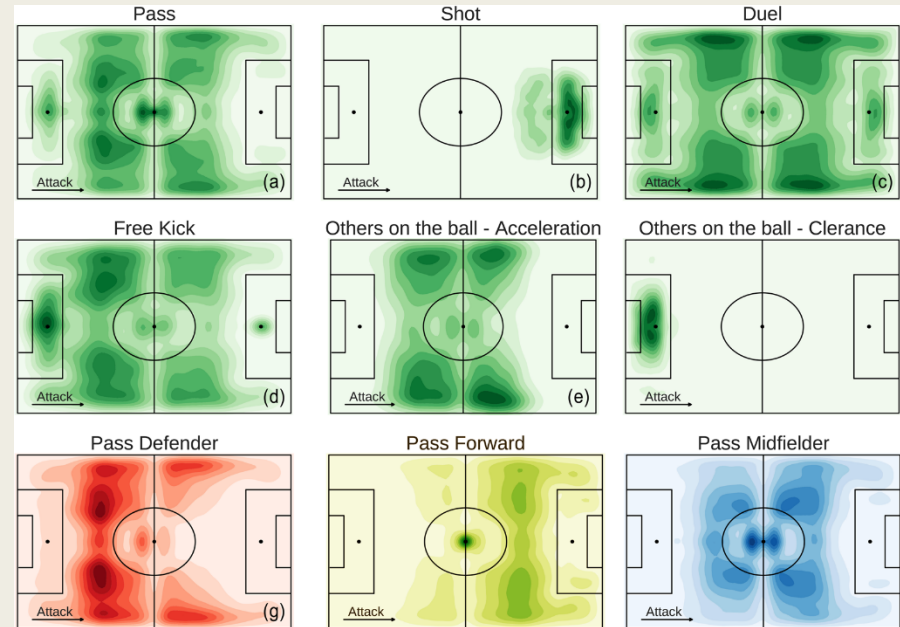
Napoli (0)
connectivity = 14.74
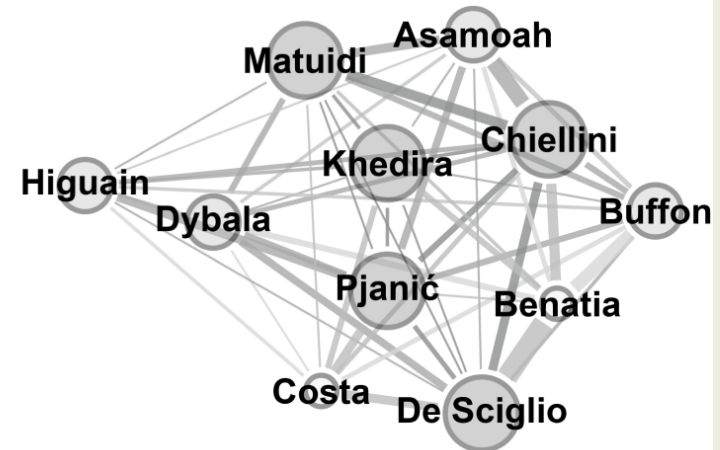
Juventus (1)
connectivity = 19.89

The Guardian

Aliens may not exist – but that's good news for our survival

A new study suggests that we could well be on our own in the universe. Yet loneliness might have its advantages
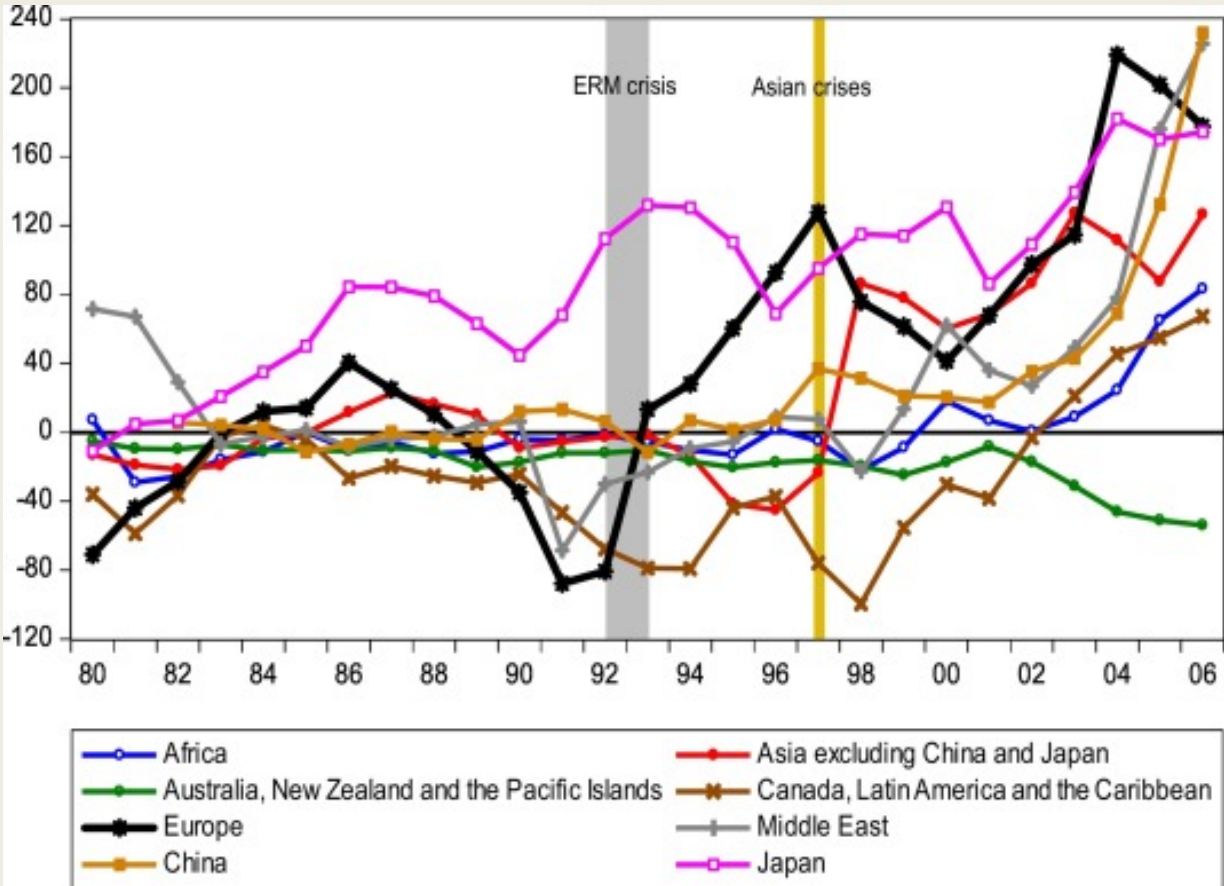
International Review of Financial Analysis

Volume 69, May 2020, 101377

ELSEVIER

The run-up to the global financial crisis:
A longer historical view of financial liberalization, capital inflows, and asset bubbles

Some days are more equal than others?
China, covid-19, 2020, new confirmed cases, by day

Hubei province

- New diagnostic guidelines issued
- New party leadership in Hubei and Wuhan
- Guidelines rescinded

All provinces, excluding Hubei

- Zhejiang province announces 335 new clinics and backup hospital
- Xi Jinping speech to the politburo
- Shandong provincial justice department chief removed
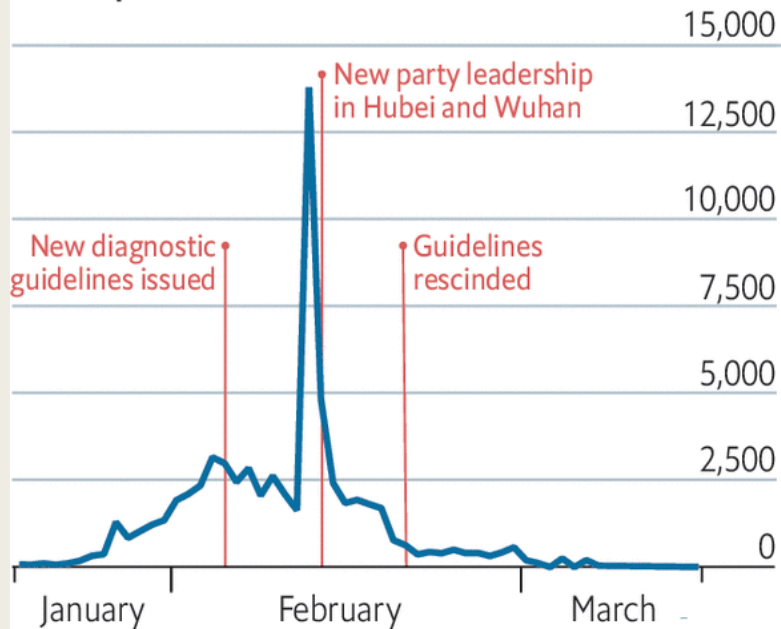
Source: China's National Health Commission

The Economist

DECISION ANALYTICS

addresses decisions for modern human ...

a desire to make sense of "big data"
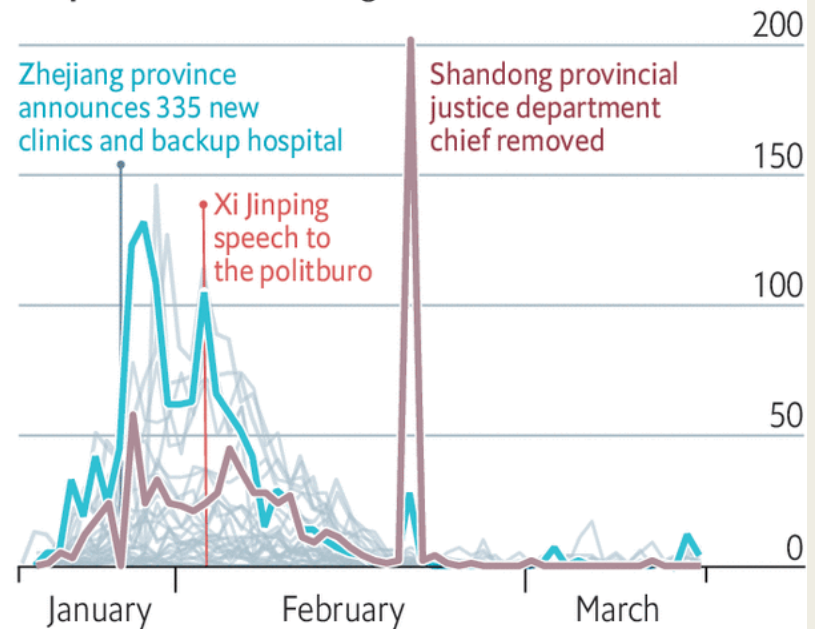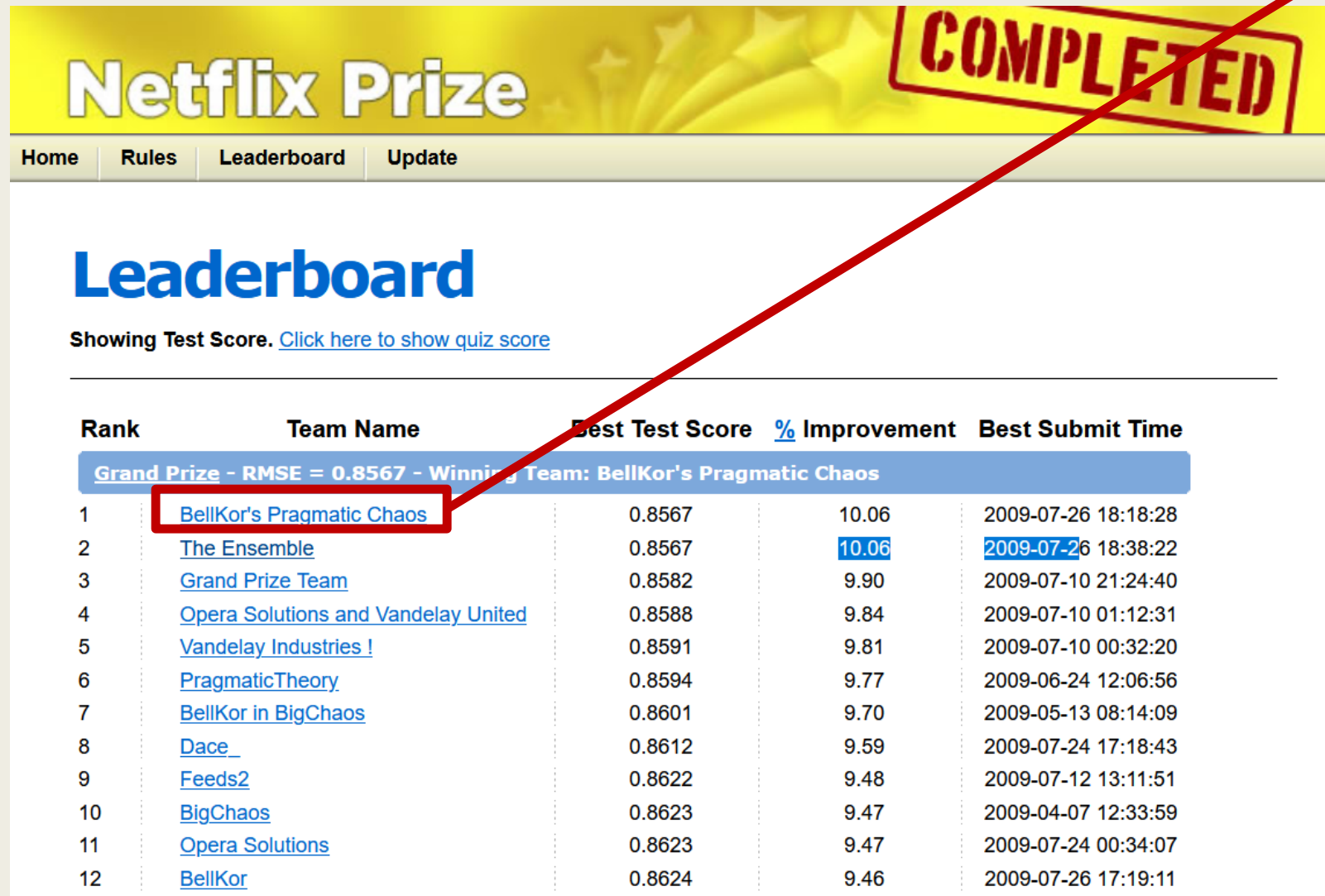
Netflix movie-rating challenge

17,770 movies

480,189 customers

	Dirty Dancing	Meet the Parents	Top Gun	The Sixth Sense	Catch Me If You	The Royal Tenen	Con Air	Big Fish	The Matrix	A Few Good Men
Customer 1					4					
Customer 2			3				3			3
Customer 3		2		4					2	
Customer 4	3									
Customer 5	5	5			4					
Customer 6						2	4			
Customer 7			5					3		
Customer 8						2				3
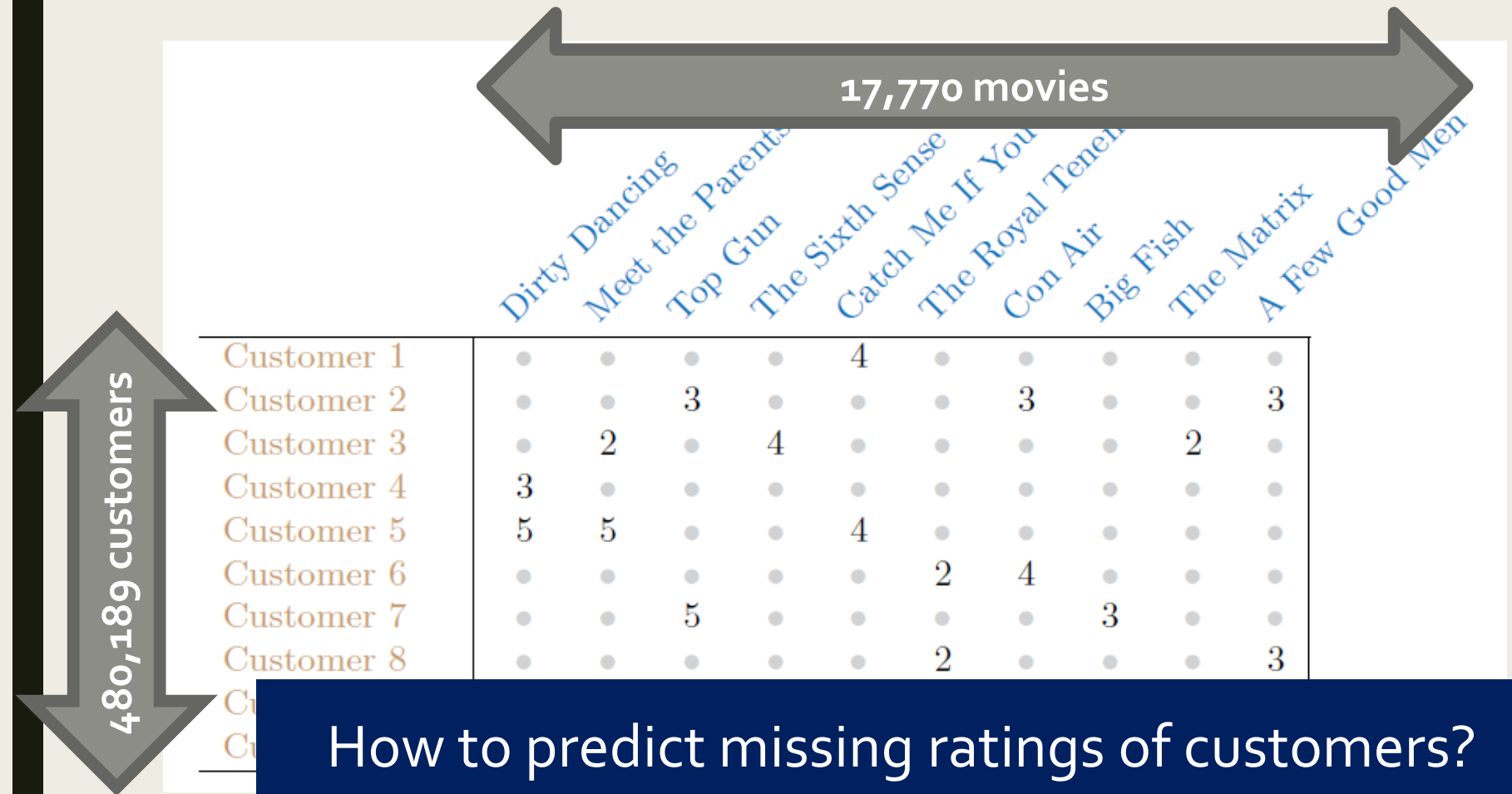
How to predict missing ratings of customers?

… involved many statistical techniques, of which most important is SVD (Singular Value Decomposition)

Netflix Prize

COMPLETED

| Home | Rules | Leaderboard | Update |

Leaderboard

Showing Test Score. Click here to show quiz score

Rank	Team Name	Best Test Score	% Improvement	Best Submit Time
Grand Prize – RMSE = 0.8567 – Winning Team: BellKor's Pragmatic Chaos				
1	BellKor's Pragmatic Chaos	0.8567	10.06	2009-07-26 18:18:28
2	The Ensemble	0.8567	10.06	2009-07-26 18:38:22
3	Grand Prize Team	0.8582	9.90	2009-07-10 21:24:40
4	Opera Solutions and Vandelay United	0.8588	9.84	2009-07-10 01:12:31
5	Vandelay Industries !	0.8591	9.81	2009-07-10 00:32:20
6	PragmaticTheory	0.8594	9.77	2009-06-24 12:06:56
7	BellKor in BigChaos	0.8601	9.70	2009-05-13 08:14:09
8	Dace_	0.8612	9.59	2009-07-24 17:18:43
9	Feeds2	0.8622	9.48	2009-07-12 13:11:51
10	BigChaos	0.8623	9.47	2009-04-07 12:33:59
11	Opera Solutions	0.8623	9.47	2009-07-24 00:34:07
12	BellKor	0.8624	9.46	2009-07-26 17:19:11

RISK MANAGEMENT

a desire to make sense of, & manage, "risk"

■ **Risk Management** is a logical and systematic methodology of studying the risks involved in any activity or process.
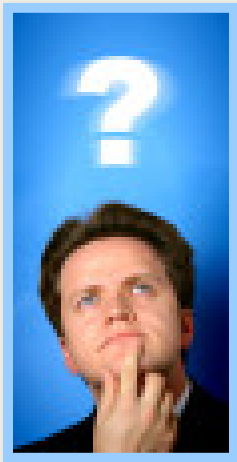
○ Monitoring risk

○ Treating risk

○ Analyzing risk

○ Identifying risk

■ **Major Objectives of Risk Management:**

– *To avoid or minimize potential losses*

– *To help managers make best use of their available resources*

Professional Qualification

- **Financial Risk Manager (FRM) Certificate Exam**
  - *awarded by Global Association of Risk Professionals (GARP)* *http://www.garp.com* *(founded in 1996)*

- **Professional Risk Managers (PRM) Exam**
  - *awarded by Professional Risk Managers' International Association (PRMIA)* *http://www.prmia.org*

- **Chartered Enterprise Risk Actuary (CERA)**
  - *awarded by CERA Global Association* *https://ceraglobal.org*
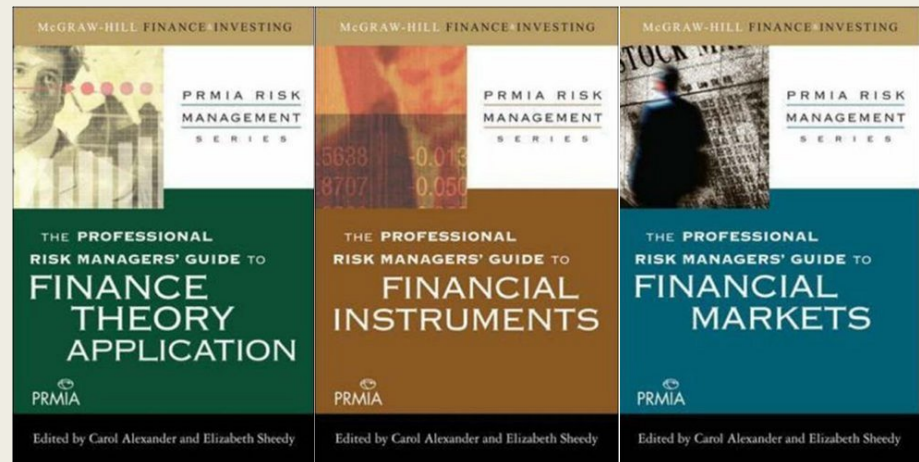
Statistician
- #3 in Best Business Jobs
- #7 in Best STEM Jobs
- #8 in 100 Best Jobs

Data Scientist
- #3 in Best Technology Jobs
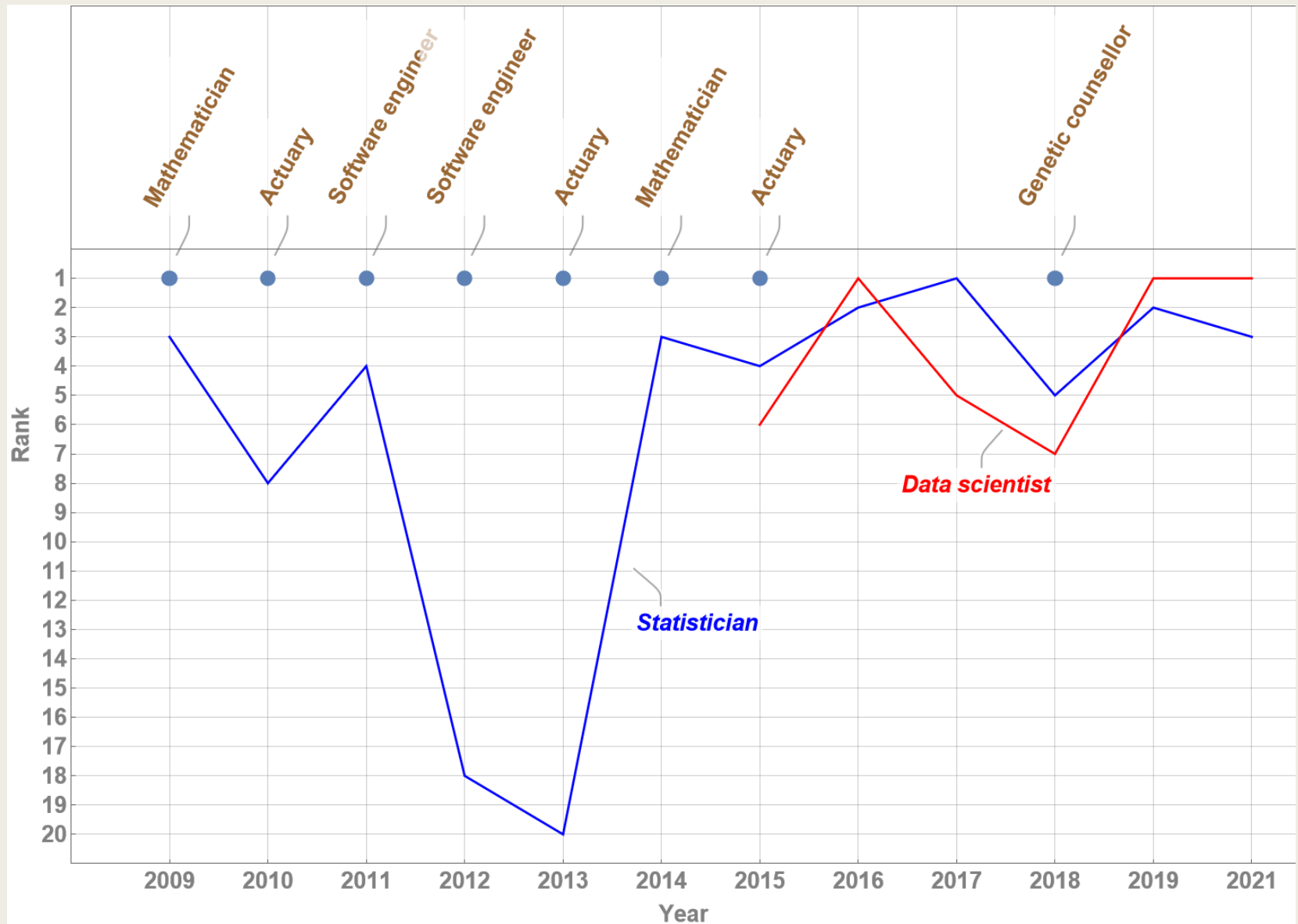- #6 in 100 Best Jobs
- #6 in Best STEM Jobs

Actuary
- #7 in Best Business Jobs
- #11 in Best STEM Jobs
- #20 in 100 Best Jobs
- #24 in Best Paying Jobs

Management Analyst
- #6 in Best Business Jobs
- #17 in 100 Best Jobs

Market Research Analyst
- #4 in Best Business Jobs
- #14 in 100 Best Jobs

https://www.careercast.com/jobs-rated/best-jobs-2021

1. University Professor

Median Salary: $80,790

Post-secondary teachers tend to enjoy flexible schedules. While some teach classes at night or on weekends, these professionals generally find their jobs rewarding and appreciate the opportunity to share their expertise with students, according to the BLS. CareerCast ranked university professor as one of the careers with the lowest stress level in 2019, the most recent year the job website compiled its list.

In addition to teaching, university professors advise students and conduct research in their fields. While most positions require you to hold a Ph.D., a graduate degree might be sufficient for community colleges, according to the BLS.

5. Statistician

Median Salary: $92,270

If you're good with numbers, you might want to consider a career as a statistician. These individuals collect data to help solve problems in a variety of industries and generally work full time. They could need to work overtime to meet a deadline or fill a last-minute request for information.

Job growth for this profession is currently high, as an increasing number of businesses are using statistical analysis to make decisions, according to the BLS. Most opportunities require candidates to hold master's degrees in statistics, mathematics or similar fields.

9. Mathematician

Median Salary: $110,860

Mathematicians utilize techniques to solve problems in business, engineering and other fields. U.S. News ranked mathematician as the sixth-best job in business in 2021 and noted that mathematicians enjoy a variety of professional opportunities.

To qualify for a mathematics position, you'll need at least a bachelor's degree in math. Some positions require further education.

10. Actuary

Median Salary: $111,030

An actuary analyzes the financial costs of risks taken by businesses and clients. However, pursuing a career as an actuary involves little risk and plenty of rewards. South Dakota State University touts the profession for its "high pay, low stress, good job security" and contribution in solving important problems.

Actuaries commonly hold bachelor's degrees in math or related analytical fields. Additional certification is needed to achieve full professional status.

10 well paid jobs that are relatively low stress:

1.Statistician

2.Dental Hygienist

3.Librarian

1. Statistician

[Glassdoor Average Salary:](#) £39,473

Statisticians use mathematical techniques to interpret data to draw parallels or to come to conclusions. Statisticians can work across various sectors, including public, private and academic. Freelance statisticians - those who are self-employed and work on a project basis, are in high demand.

Using logical thinking, combined with mathematical techniques to draw facts from raw data, statisticians can work solo or in a collaborative team. Having this option means, being a statistician is a relatively low-stress job.

An interest in mathematics and the ability to understand complex mathematical functions is important. When hiring, employers look for candidates who have a degree in maths or a related subject.

We offer to B.Sc. the following programmes:

- Major in *Statistics*
- Major in *Risk Management*
- Major in *Decision Analytics*

- Minor in **Statistics**
- Minor in **Risk Management**
- Minor in **Actuarial Studies**

* No quota on student no. of each option!

Unique combination

■ Major in

Statistics or *Risk Management* or *Decision Analytics*

plus

Minor in **Actuarial Studies**

■ Combines broad exposure of

Statistics/Risk Management/Decision Analytics

and professional knowledge in **Actuarial Science**

Difference in focus between the 3 majors

■ **Decision Analytics** –

heavier emphasis on

COMPUTER SCIENCE + MATHEMATICS

■ **Risk Management** –

courses focus primarily on business-related topics: e.g.

investment, insurance, finance, banking, etc.

■ **Statistics** –

courses cover wide range of topics with emphasis on

"METHODS", their applications, and underlying theory.

A few practical reasons for majoring in

Statistics / Risk Management / Decision Analytics

- Flexibility of the programme enables you to tailor-make your course of study.

- Develop your interest at your own pace.

- Pre-mature commitment not required.

Mathematical background adequate?

Students must have <u>level 2 or above</u> in

- HKDSE Extended Module 1 or 2 of Mathematics or equivalent

Otherwise, strongly advised to take

<u>MATH1011 University Mathematics I</u>

in Semester 1.

What do we need from your Mathematics?

- Set notation and theory

- Functions (*incl.* limits, continuity)

- Sequences, series

- Basic calculus (*incl.* partial differentiation, double integration)

- Vectors, matrices (basic operations)

Support from University and Department

- **HKU** : Centre of Development and Resources for Students
    - *NETmatch, NETjobs, JIJIS (Joint Institutions Job Info. System)*

- **Department** : Internship / Job Online Application System

Career Development Training

- **Summer IT course:**
  - *Essential IT skills (certificate course)*

- **Career Advising Programme (CAP) to prepare students for:**
  - *internships and job opportunities*
  - *advancing resume and interview skills*
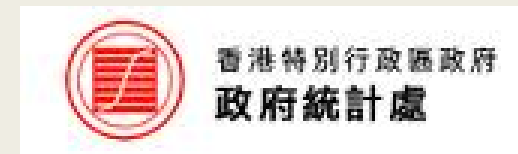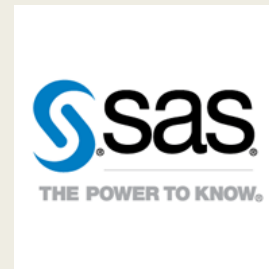
Computing facilities

- two statistical computer laboratories

- up-to-date software for teaching, learning, research

Besides career…

- ■ Opportunity for further studies
  - – Recently our graduates had pursued Masters and PhD studies in universities including Harvard, UC Berkeley, Yale, Stanford, Cambridge

- ■ Scholarships/Awards

- ■ Other learning opportunities

  (e.g. overseas exchange, mentorship, internship, research projects)

A reminder

- Admissions requirement same as

  6901 Bachelor of Science
  - *All* students need to study two math courses in junior years
  - *Decision Analytics* students need to study two computer science courses in junior years
  - Students without M1/M2 are advised to take an extra math course to get better prepared

QUESTION AND ANSWER

Our Homepage: www.hku.hk/statistics