Dennis Lin’s Lectures at 中山

15 Dec 04 to 15 Jan 05
DKL5@psu.edu
Room 4043-1 (ext 4521)
Dennis Lin’s Lectures at 中山

- 9:00 to noon, Thursday
- Dec 16th, Lecture 1: Search Engine
- Dec 23rd, Lecture 2: RFID
- Dec 30th, Lecture 3: Response Surface methodology
- Jan 6th, No Class
Dennis Lin’s Lectures at 中山

- 9:00 to 10:00, Student Presentation on previous assignment
- 10:00 to 11:30, General Introduction
- 11:30 to noon, new assignment
Tea-Break/Beer Conversation with Lin
(3:00 to 5:00pm, Tuesday)

- Dec 21st
- Dec 28th
- Jan 4th, Cancel
- Jan 11th
Bachelor

Master

PhD (Degree of Philosophy)
Research & Thesis

- Problem Identification/Formulation
- Problem Solution
- Presentation/Marketing
- Applications
Obtaining a good problem is harder than obtaining a good solution

Problem-Base Learning (R.A. Wysk)
The Japanese eat very little fat and suffer fewer heart attacks than the British or Americans.

The French eat a lot of fat and also suffer fewer heart attacks than the British or Americans.

The Japanese drink very little red wine and suffer fewer heart attacks than the British or Americans.

The Italians drink excessive amounts of red wine and also suffer fewer heart attacks than the British or Americans.

Conclusion:

Eat and drink what you like.
It is speaking English that kills you.
引擎擁有者與搜尋結果資訊提供者之關聯情形
引擎擁有者與搜尋結果資訊提供者之關聯情形
Topics for Assignment #1

1. Page Ranking
   - Pros and cons and improvements
2. Search Engine & Citation Analysis
   - Suggest strategy for journal, author and article
3. What is the requirement of a good Search Engine (criteria).
   - How to measure? How to compare? And how to make it happen?
4. Intelligent Applications (e.g., Yams.com)
5. Pricing
More:

What are Research Problems here?

- Propose one or two potential research problems for discussion next time. Email me before Dec 22nd at noon at DKL5@psu.edu.
- We will discuss about its potentials and difficulties.
奧運 (Olympic)

- 百米（一百公尺）
  - 高低欄
  - 馬拉松
  - 競走
- 游泳--百米
  - 溜冰
  - 跳水
- 舉重
Did You Know?

- 管理 (Management)
- 會計 (Accounting)
- 統計 (Statistics)
- 數學 (Mathematics)
- 物理 (Physics)
- 管理 (Management)

Your Own Identity!!!
大學在轉型之中
The University Environment is Changing…

Webster’s New World Dictionary defines “ivory tower” as a place, such as a university, thought of as being more peaceful than the real world and set apart from its problems.
Key aspects of the corporate university:

- Requiring more and more faculty members to generate revenue to support themselves and their graduate students,
- viewing students as customers to be satisfied,
- increasing class sizes,
- devaluing faculty input in university goals and decisions,
- hiring part-time and adjunct faculty for cost savings,
- and directly or indirectly attacking tenure.
The University Environment is Changing...

Publish or Perish!

Show Me the Money!
What should professor really Profess???
The corporate model leads to a lowering of the quality of education and, in the extreme, to a loss of academic freedom.

Overall, academic life is becoming more difficult and demanding for those of us interested in industrial statistics.
What about tenure system?

Lifetime employment study
Why tenure system in academics?

- Freedom of academics to run their own affairs
- Freedom to pursue research no matter how unpalatable the conclusions
- Freedom to express one’s opinions
Why Not?

- The only people who deserve tenure are the ones who do not need it!
- Academic freedom should be for everybody— instructor, assistant professors as well
- The market will take care of academic freedom
- Freedom of speech is already guaranteed
History of Tenure System

- University of Paris in the 13th century
- Stanford economist story at Stanford in late 19th century
- AAUP 1915, declaration of General Principles
- AAUP 1940 statement
Academic Freedom & Evaluation

Carmichael

Relative Performance evaluation
(peer review)
The Model

- Two Universities: \( U_1 & U_2 \)
- Two Faculty Members: \( M_1 & M_2 \)
- Faculty can be High or Low Type, with probabilities, \( P_H & P_L \) respectively, of producing high output (\( P_H > P_L \))
- Probability of high type is \( \pi_0 \)
- University maximize average output per person
- Everyone risk-neutral
- Four time points, \( t=0, 1, 2 & 3 \)
Payoff Function
(Chatterjee & Marshall, 2004)
Some Results  (Chatterjee & Marshall, 2004)

1. If $U_2$ follows a fixed term contract, $U_1$ deviate to a tenure contract. Thus a tenure contract is the best response to a fixed term contract.

2. Tenure is the unique, symmetric perfect Bayes equilibrium contract.

3. Investment and expected output are higher in the symmetric perfect Bayes equilibrium where both universities offer tenure contracts than in the sub-game in which they both offer fixed term contract.
Tenure is better for the employer and no worse for the employee

[Assumption: employer has the bargaining power when proposing contracts.]

Tenure gives the professor a better outside option in the event of renegotiation

Without competition and the sense of “mission”, tenure would be a very bad contract
師者，
所以傳道、授業、解惑也。

是嗎 ？？？

(Not any more!)
Research is Changing
Knowledge Discovery in Sciences

- **Deduction** (演繹)
  - Physics
  - Mathematics

- **Induction** (歸納)
  - Biology
  - Chemistry

- Statistics is more powerful/useful in empirical study & experience accumulation, namely “induction” type.
Where have all the Data gone?

- No need for data (Theoretical Development)
- Survey Sampling and Design of Experiment
- Computer Simulation
- Data from Internet
  - On-line auction
  - Search Engine
Obtaining a good problem is harder than obtaining a good solution

Problem-Base Learning (R.A. Wysk)
DL’s recent presentations

- Industrial Statistics (Design, Reliability & Control Chart)
- BIG Statistics (Business, Industry & Government)
- Statistical Data Mining & Machine Learning
- RFID
- Quality Assurance & Six Sigma
- Search Engine & Citation Analysis
- Response Surface Methodology renew
- What’s Research All About
- Stat Education
葵花寶典
九陽真經
是給武林盟主練的

我們還是規規矩矩把基本功夫練好再說

根本問題在於
做與不做 又做的徹不徹底
[在整個（催眠）過程中]...
你不停的對自己說
我當然可以做這個，做那個，
我只是不想那樣做而已
那卻等於說
你做不到

---- Richard P. Feynman
STILL QUESTION?
Send $500 to

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(Customer Satisfaction or your money back!)
Lin, Chin-Feng (林勤豐)
Google之PageRank值

假設有T₁---Tₙ的網頁超連結至網頁A，d為介於0至1的參數，通常採用d值為0.85。C(A)則定義為由A網頁超連結至其他網頁的次數，因而網頁A的PageRank值定義為：

PR(A)
= (1-d) + d (PR(T₁)/C(T₁) + ... + PR(Tₙ)/C(Tₙ))
PageRank 值示例

PageRank 計算範例一

PageRank 計算範例二
PageRank 值計算示例一

\[
\begin{align*}
A & \quad 0.4507 \\
B & \quad 0.4507 \\
C & \quad 0.4507 \\
D & \quad 0.4507 \\
E & \quad 2.8297 \\
F & \quad 0.15 \\
G & \quad 0.15 \\
H & \quad 0.15 \\
I & \quad 0.15 \\
J & \quad 0.15 \\

\text{Outbound} & \quad 0.15 \\
\text{Inbound} & \quad 0.15
\end{align*}
\]
PageRank值计算示例二

\[
\begin{align*}
A & \quad 0.4459 \\
B & \quad 0.4459 \\
C & \quad 0.4459 \\
D & \quad 0.6355 \\
E & \quad 2.7852 \\
F & \quad 0.15 \\
G & \quad 0.15 \\
H & \quad 0.15 \\
I & \quad 0.15 \\
J & \quad 0.15 \\
\end{align*}
\]
PageRank 值之聯立方程式

範例一方程式
\[ \begin{cases} \sum_i d_i = 1 \\
\sum_j d_j = \sum_i d_i \end{cases} \]

範例二方程式
\[ \begin{cases} \sum_i d_i = 1 \\
\sum_j d_j = \sum_i d_i \end{cases} \]

\[ \begin{cases} \sum_i d_i = 1 \\
\sum_j d_j = \sum_i d_i \end{cases} \]

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