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Discovering Data in Disguise

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Disclosure Statement

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Objectives

- Recognize Data Sources within the Healthcare Environment
- Identify Processes to Utilize Data and Improve Outcomes



Defining Data

Data: factual information (such as measurements or statistics) used as a basis for reasoning, discussion, or calculation



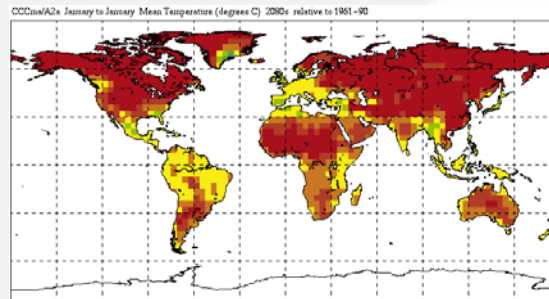
Why Data

- New mantra
 - Gather whatever data you can whenever and wherever possible.
- Expectations
 - Gathered data will have value either for the purpose collected or for a purpose not envisioned.

Why Data



Improving health care and reducing costs



Predicting the impact of climate change



Finding alternative/ green energy sources



Reducing hunger and poverty by increasing agriculture production

Why Data

Big data—a growing torrent

\$600 to buy a disk drive that can store all of the world's music

5 billion mobile phones in use in 2010

30 billion pieces of content shared on Facebook every month

40% projected growth in global data generated per year vs. **5%** growth in global IT spending

235 terabytes data collected by the US Library of Congress in April 2011

15 out of 17 sectors in the United States have more data stored per company than the US Library of Congress

Big data—capturing its value

\$300 billion potential annual value to US health care—more than double the total annual health care spending in Spain

€250 billion potential annual value to Europe's public sector administration—more than GDP of Greece

\$600 billion potential annual consumer surplus from using personal location data globally

60% potential increase in retailers' operating margins possible with big data

140,000–190,000 more deep analytical talent positions, and

1.5 million more data-savvy managers needed to take full advantage of big data in the United States

Why Data

\$300 billion
potential annual value to US health care—more than
double the total annual health care spending in Spain

- 2009 US Government- Health Information Technology for Economic and Clinical Health Act (HITECH)
- \$27 billion incentive for the adoption and meaningful use of Electronic Health Records

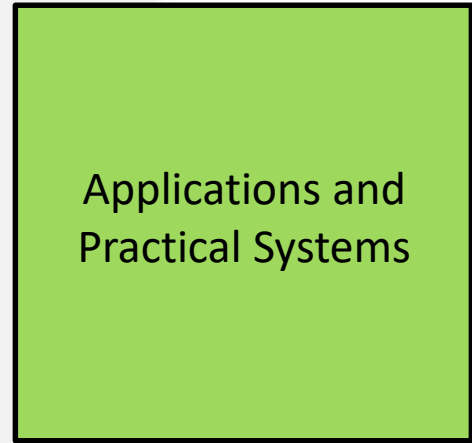
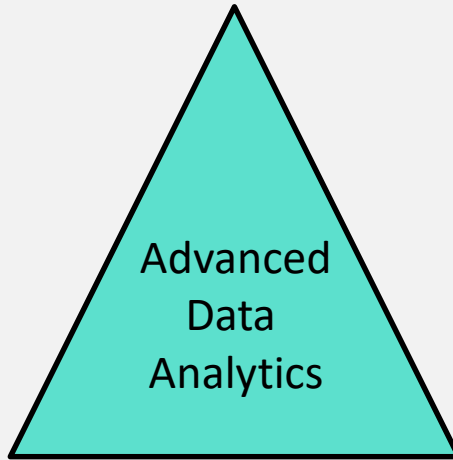
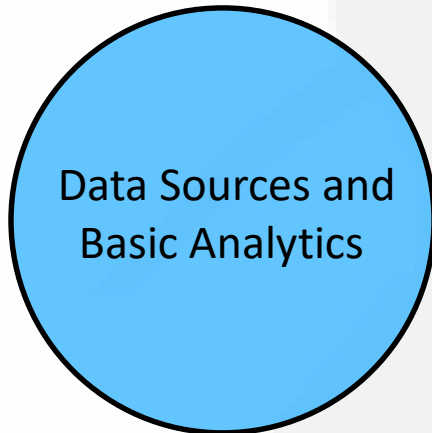


Hypothesis Testing

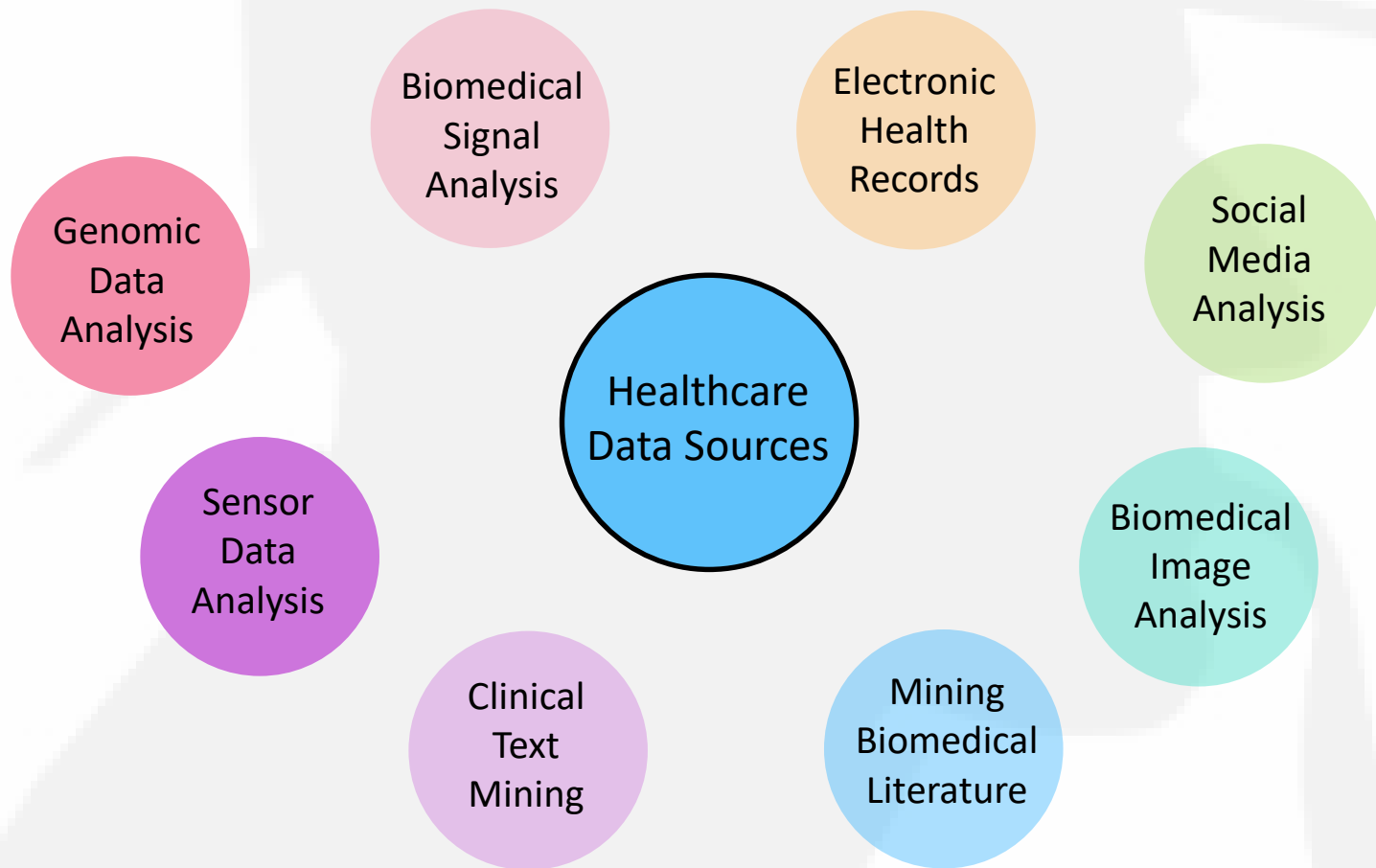
- Does the number of physical steps affect nurse satisfaction?
 - $n = 1000$ (quantitative)
 - Transform data to categorical (instead of quantitative)
 - Above and below average satisfaction
- What effect does moving a patient between units have on LOS?
 - All Patients
 - Transfer Patients



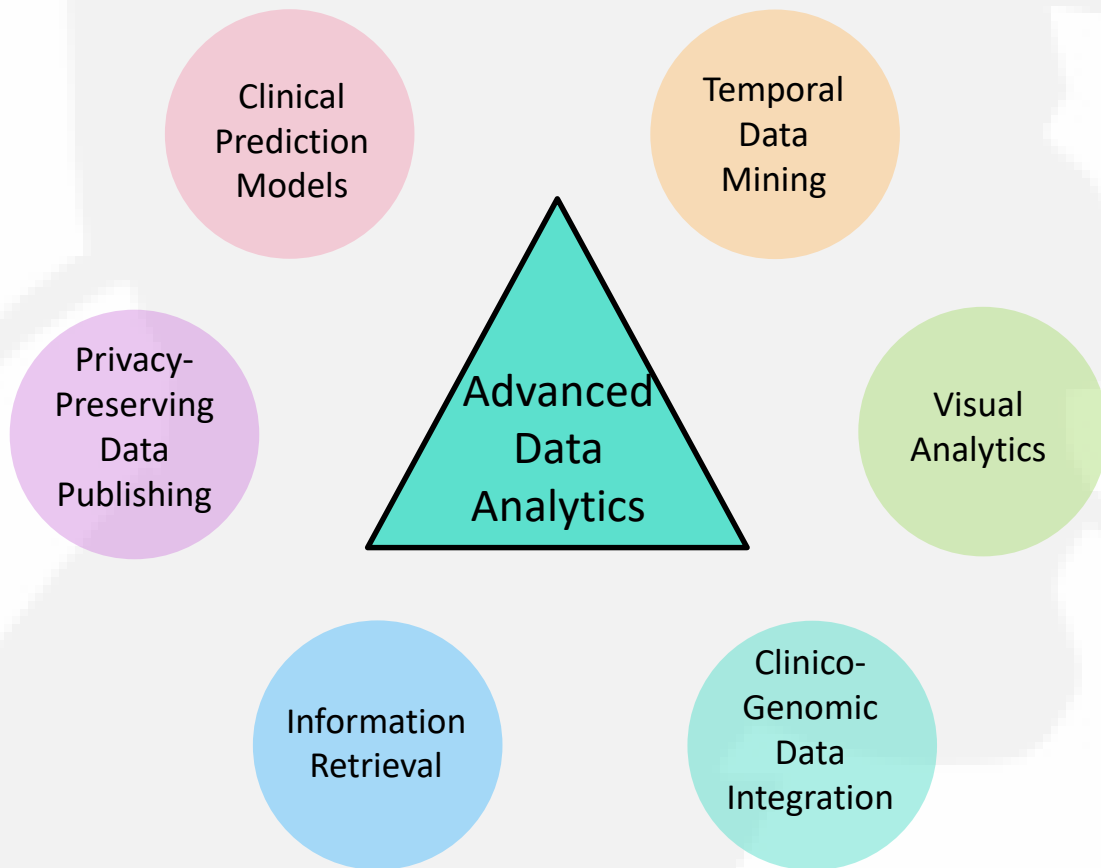
Data Analytics in Healthcare



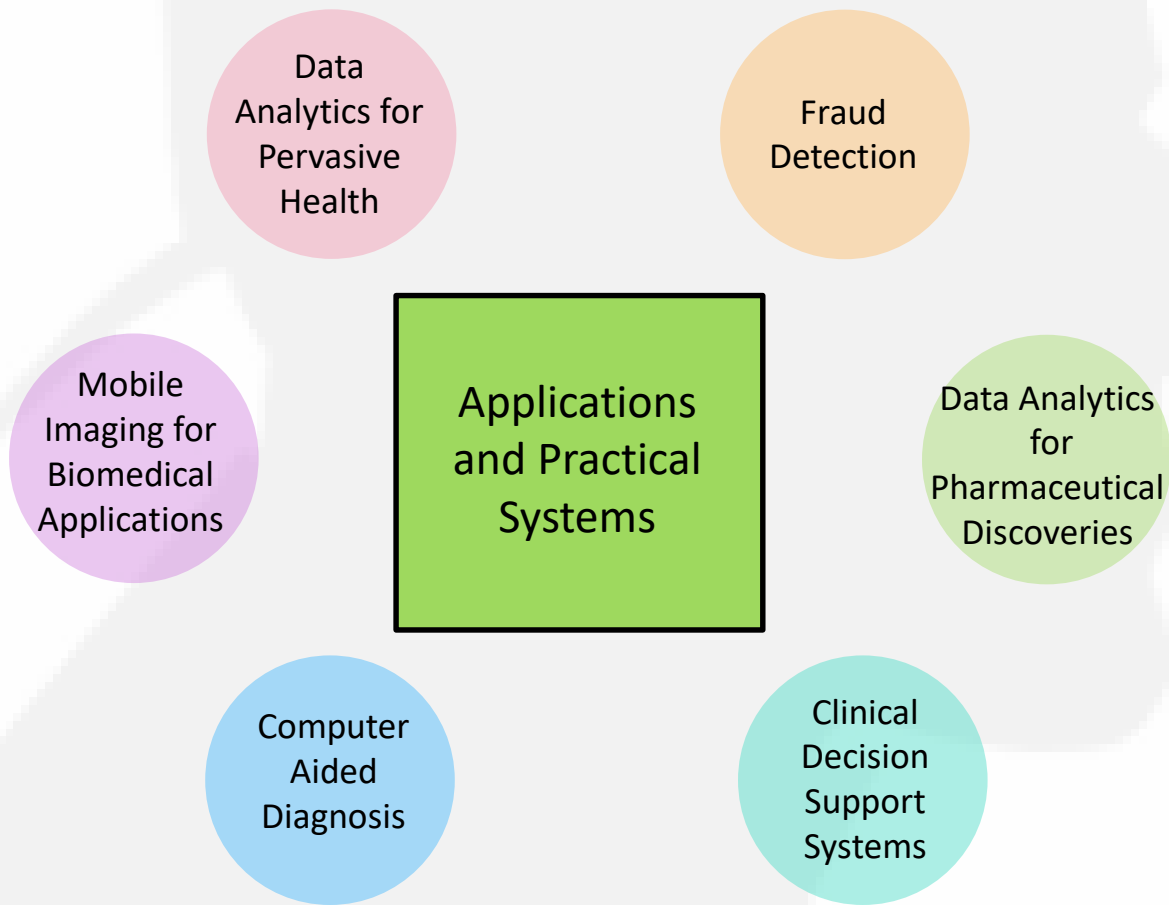
Data Sources in Healthcare



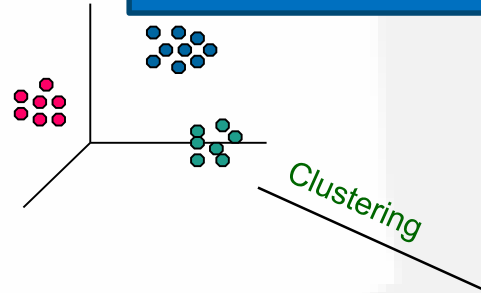
Data Sources in Healthcare



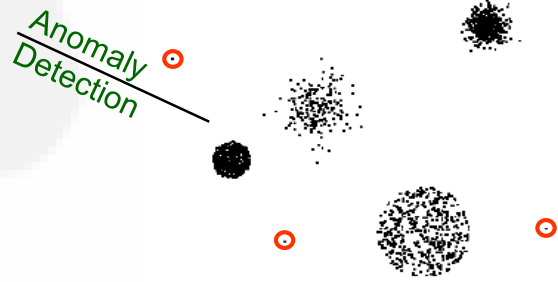
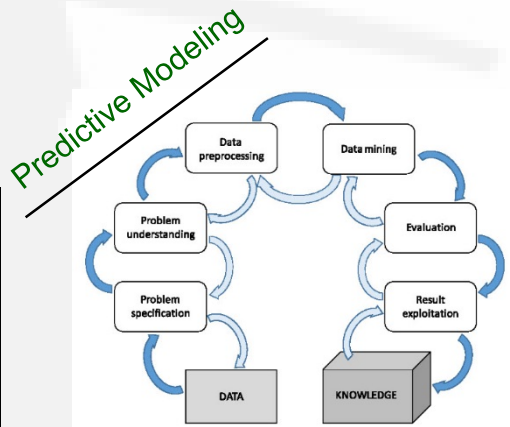
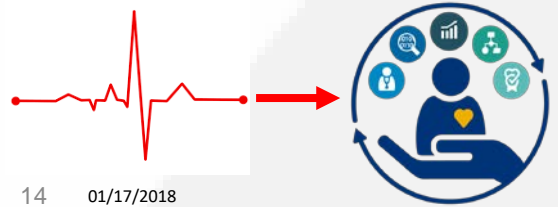
Data Sources in Healthcare



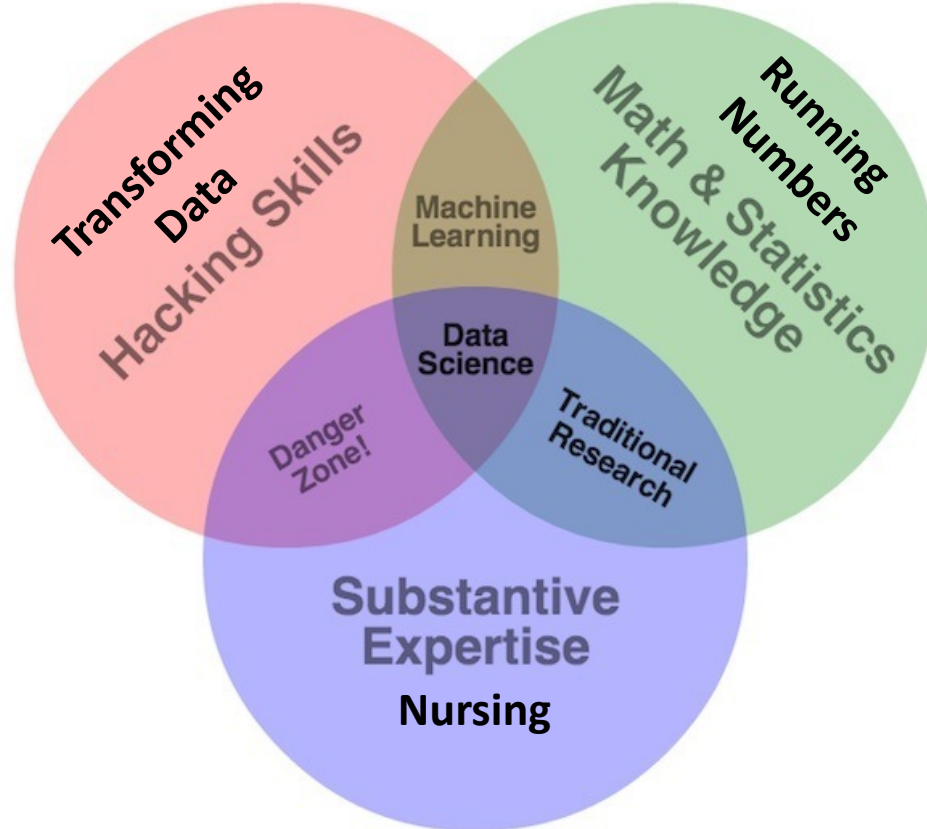
Data Mining



Association Rules



Challenges of Data in Healthcare



Computer Scientists are not trained in domain-specific medical concepts

Medical Practitioners and researchers have limited exposure to the mathematical and statistical background required for data analytics



Matter of Context

Two hospitals are seeking experienced registered nurses for full-time positions in their facilities.

Both are approximately 450 bed acute care hospitals that provide high quality care to patients of all ages.

Average salaries are...



Disney Hospital

\$101,429

Universal Hospital

\$60,000



Matter of Context



\$60,000



\$60,000



\$60,000



\$60,000



\$60,000



\$60,000



\$350,000

What is the (Average) Salary?

\$101,429

\$60,000



How do We Look at Data

- Ethics
- Bias



Hypothesis Testing

- Does the number of physical steps affect nurse satisfaction?
 - $n = 1000$ (quantitative)
 - Transform data to categorical (instead of quantitative)
 - Above and below average satisfaction
 - **Potential Result: New unit designed in circular formation**
- What effect does moving a patient between units have on LOS?
 - All Patients
 - Transfer Patients
 - **Potential Result: Extended wireless capabilities throughout hospital and employed universal bed concept**



Chapman & Hall/CRC
Data Mining and Knowledge Discovery Series

HEALTHCARE DATA ANALYTICS

Edited by

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Free Image on Pixabay - Heart Rate, Bpm, Ecg, Ekg. (n.d.). Retrieved from <https://pixabay.com/illustrations/heart-rate-bpm-ecg-ekg-1375324/>

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A large, light blue thought bubble containing the text "Thank You!". It has several smaller, lighter blue bubbles trailing off to the right and bottom.

Thank You!

