Speaker

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ISPOR 7th Asia-Pacific Conference

Harnessing the Power of Big Data to Make Better Health Care Decisions in the Asia-Pacific Region

Convergence disruption: Current challenges for utilizing big data to improve health care decision making

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What are you afraid of?

Information is ….

http://www.netpicks.com/wp-content/uploads/2015/03/Dramatic-Repricing-of-a-Market-Three-Oil-Pumps.jpg

What do we want?

http://www.casinouk.com/wp-content/uploads/roulette-wheel.jpg

Demonstrating real value

http://www.unitedliberty.org/files/images/ParadignShift.jpg

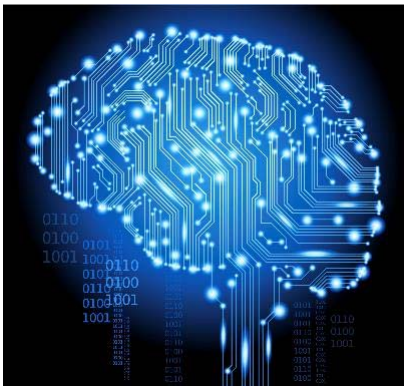
Historical view of Big Data

Copyright VB McCauley 2014

- Aggregation of information at scales that allows disruptive processing

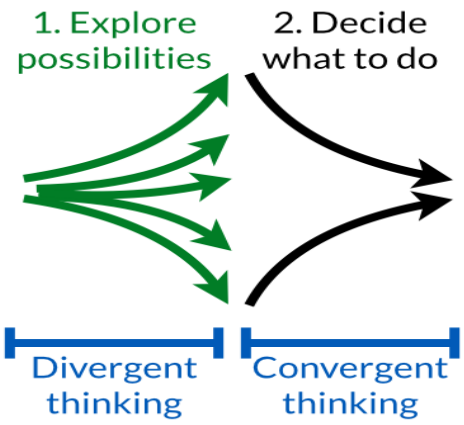
Big Data is.....

……data sets that are too large and awkward to collect, store and analyze using traditional database management tools



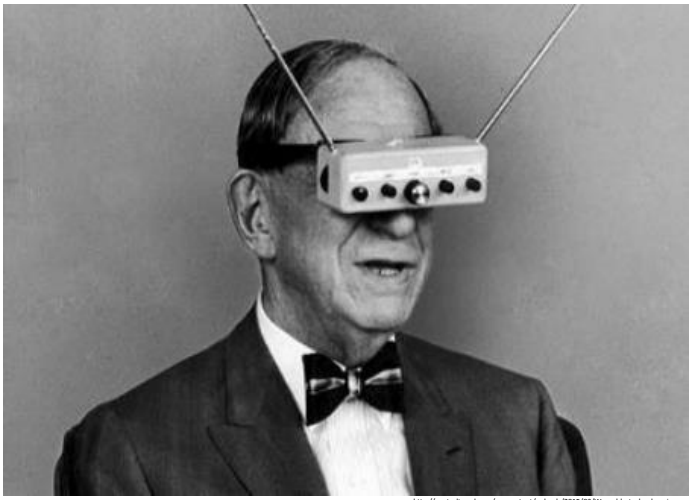
http://www.firstderivatives.com/images/data_science_2.jpg

Changing & convergent landscape



https://cucumber.io/images/blog/divergent-convergent-thinking.png

Convergence: …. of technology



http://controltrends.org/wp-content/uploads/2015/03/Wearable-technology.jpg

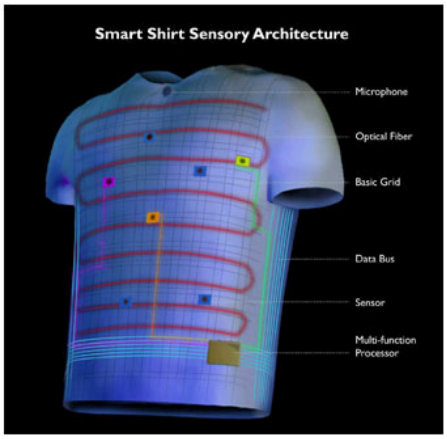
Convergence: …. of technology

- Wearable technologies & smart devices
  - 2014 = 27 million units
  - 2015 = 97 million
  - 2016 = 110 million so far
  - 2020 estimated 237 million

http://files.itproportal.com/wp-content/uploads/2014/11/Ear-o-Smart-header.png

Convergence: …. of technology – creating data

http://3tech.org/wp-content/uploads/2016/05/Jawbone.jpg



http://ldt.stanford.edu/~jeepark/jeepark+portfolio/sensory_architecture.jpg

Convergence: Software as a medical device

Clinical monitoring

Standards

FDA

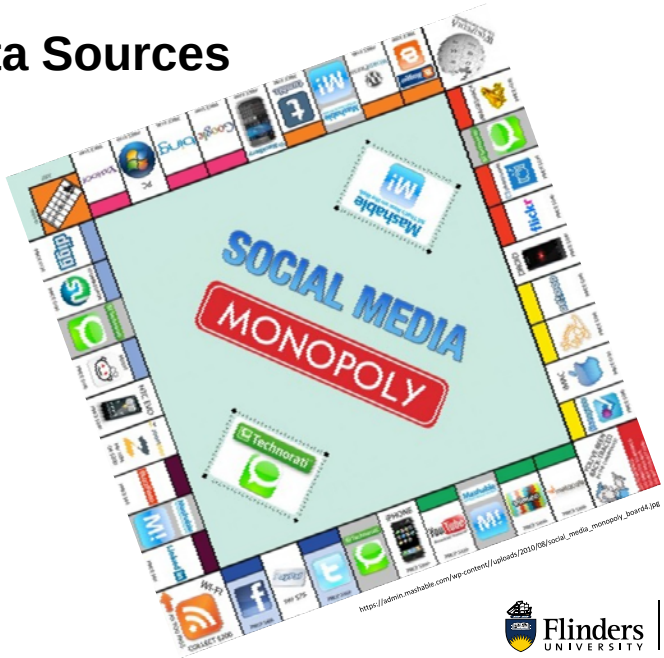
https://joshuabrett.files.wordpress.com/2011/04/mobilehealthcareimage-300x286.jpg

Convergence of data and data sources

- De-identified linkage data …..
- ……to specific larger sources of granular data (clinical information systems)……
- …to opportunistically collected data…
- ….to ?????

http://doctorsmedicenter.com/primary-care-physician/

Data Sources



Challenges -aka the things to be worked out to make the outcomes practical

1. Size
2. Digital convergence
3. Collection from diverse sources (HIoT / monitoring)
4. Analysis – Skill in analytics and semantic understanding in health
5. Presentation
6. Integration - Information flow and clinical workflow
7. Security and privacy

Challenge 1: Size matters !

In 2010 we humans generated more bits of information than there are stars in the knowable universe.

In 2009 humanity created more data than we have in all of human history.

http://scienceblogs.com/startswithabang/files/2013/02/2xcluster.jpg

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Challenge 1: …byte-sized

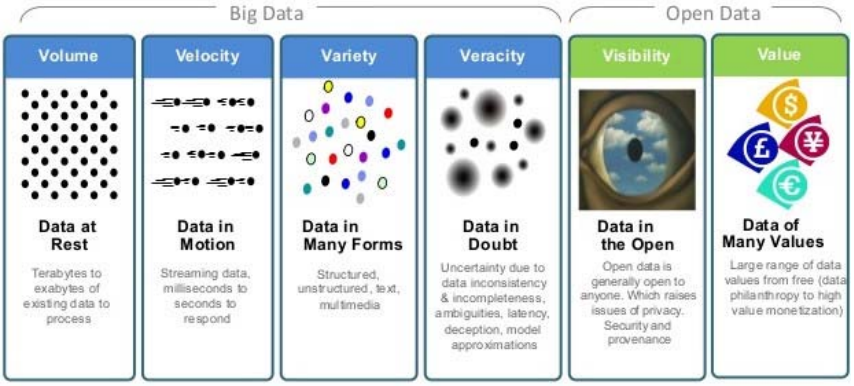
Today data scientist uses Yottabytes to describe how much government data the NSA or FBI have on people altogether.

In the near future, Brontobyte will be the measurement to describe the type of sensor data that will be generated from the IoT (Internet of Things)

https://pbs.twimg.com/media/CYRqxhPVAAAxL6B.jpg

http://videojournalisttoday.com/newsmakers/Journalism-Dying-by-thousand-cuts-or-being-reinvented%3F

Challenge 2:....Digital Convergence



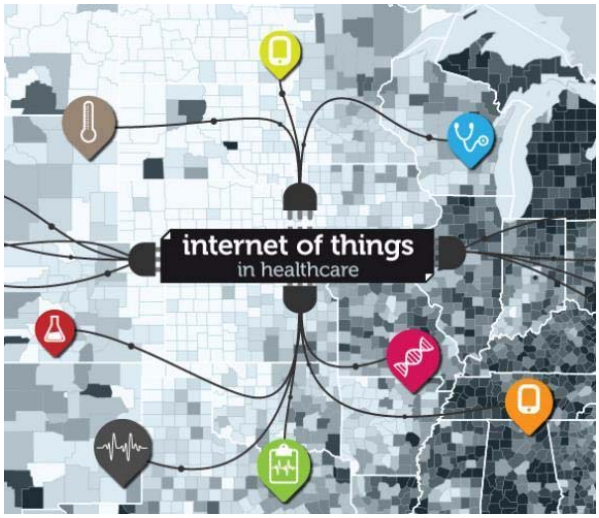
Adapted from http://www.slideshare.net/AndersQuitzaulbm/big-data-analyticsin-energy-utilities

Challenge 3: Collecting & integrating

- Duplication of data
- Discoverability, Integration, Interoperability
- Data quality, reliability, and completeness
- Data heterogeneity

- Structured data found inside databases and
- Unstructured data flowing from new sources like social networks, mobile device sensors, radio-frequency identification (RFID) etc..

HIoT and monitoring



http://www.healthwareinternational.com/blogpost/the-internet-of-things-in-healthcare-106

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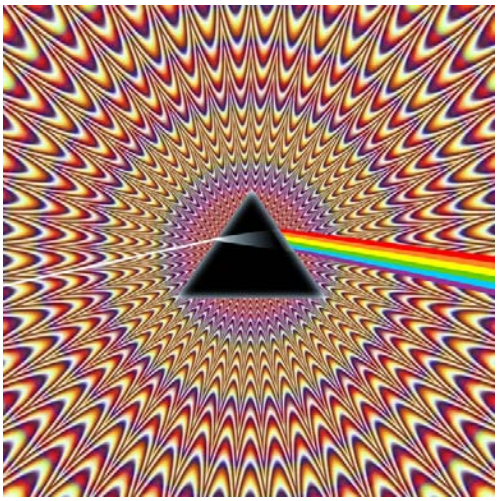
Challenge 4: Analysis



https://dotwe.wordpress.com/2014/11/26/illusion-the-design-life/

- Uncontrolled data collection
- Reliability of inferences
- Algorithmic illusion
- People skill (lack of) -> false conclusions

- …it really is like…….

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Big Data and Analytics for Health - skills

http://irez.me/wp-content/uploads/2012/11/Needle-in-a-Haystack.jpg

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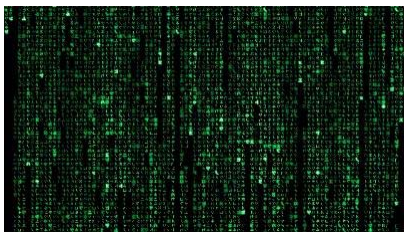
Challenge 5: Presentation



http://image.slidesharecdn.com/2014-14051320110 6-phpapp02/95/human-genetics-big-data-sans-ethics-1-638.jpg?cb=1400073164

http://www.vosizneias.com/57720/2010/06/13/new-york-a-decade-later-genetic-map-yields-few-new-cures/

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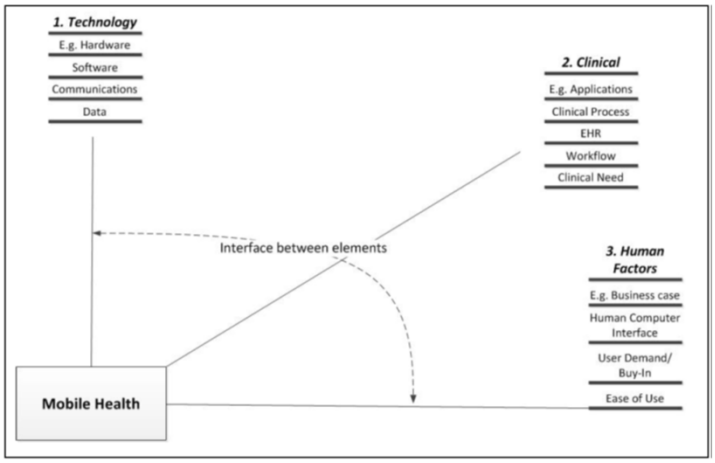
Challenge 6: Integration
- Information flow and clinical workflow



Williams, P.A.H., Maeder, A., (2013), A conceptual framework for secure use of mobile health. *Journal of the International Society for Telemedicine and eHealth*, 1(1), 44-51.

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Challenge 7: Security and privacy

- In using big data:
  - Correct clinical correlations for decision making.
  - Does aggregation go over the line of personal privacy?
  - Erosion of trust?
  - Data provenance
- In providing big data:
  - geo-location information
  - intriguing inferences
    - inferred or derived information?
  - Misuse and abuse?

http://www.itbusinessedge.com/imagesvr_ce/itbe/ss/PonemonHealthCareSecurity00.jpg

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Waves of possibility – convergence disruption

http://www.noupe.com/wp-content/uploads/trans/wp-content/uploads/2010/02/waves_3.jpg

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Future – your part…..

http://www.brewer-garrett.com/intelligent-efficiency-a-paradigm-shift-for-the-energy-services-industry/

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