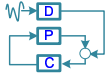
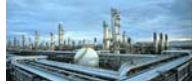


CONQUER BIG DATA IN INDUSTRIAL PLANTS USING SMART DESIGN AND CONTROL



陳榮輝 (J. Jason Chen)
中原大學化工系



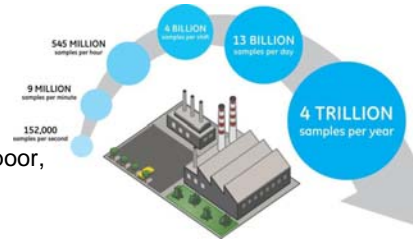
With increasing sensors and instruments, **HUGE** volumes of data are generated in the plant...

Signals and Noise

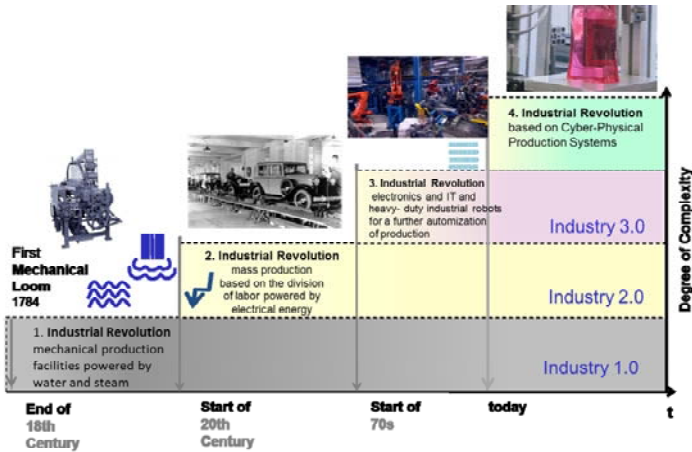


How Does Industrial Data Get "Big"?

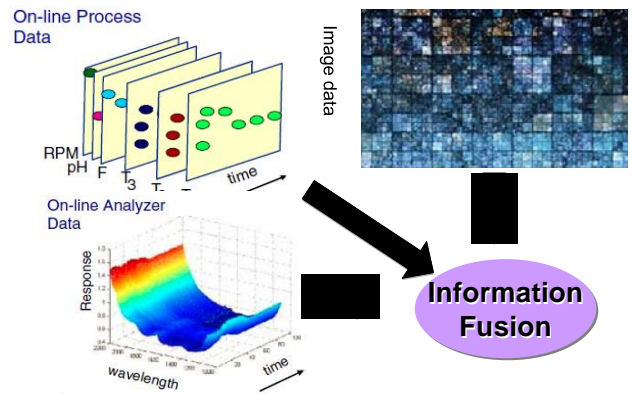
- **Volume**
Lots of data have been generated in the plant-wide process
- **Variety**
Process variables; Analytical; Image, Voice...
- **Velocity**
Fast recording speed
- **Veracity**
Data rich information poor, data quality



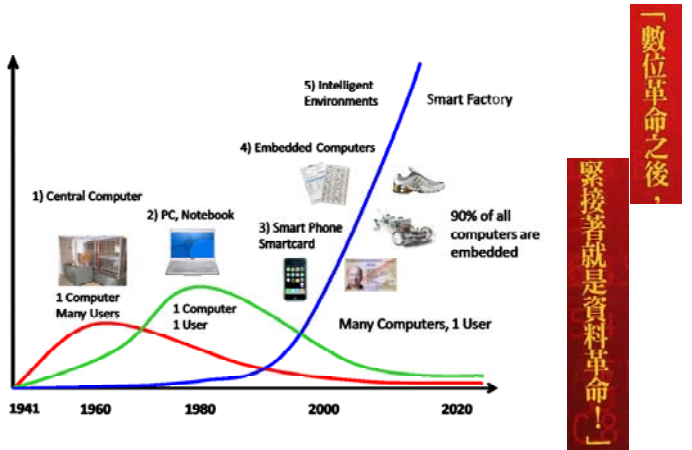
Evolution to Industry 4.0 in Production



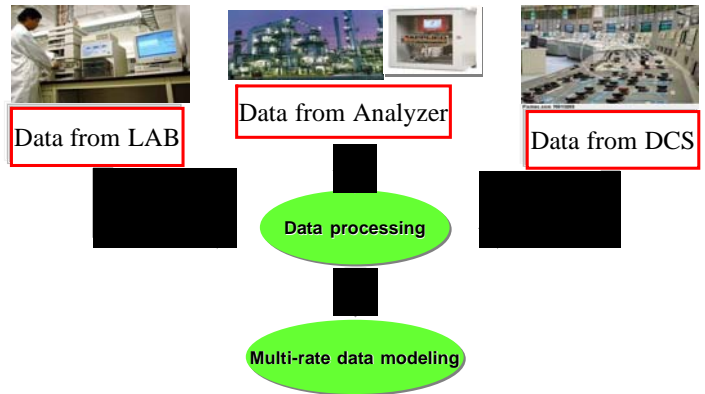
Multiple Data Types



Towards Intelligent Environments Based on Data Info



Multi-rate Data Samples



Who's Generating Big Data: Industries



But, by the ability to manage, analyze, summarize, visualize, and discover knowledge from the collected data in a timely manner and in a scalable fashion

Conquer Big Data

- Use DATA to
- Justify actions to **FIX**
 - Guide actions to **IMPROVE**
 - Prescribe actions to make **BREAKTHROUGH CHANGES**

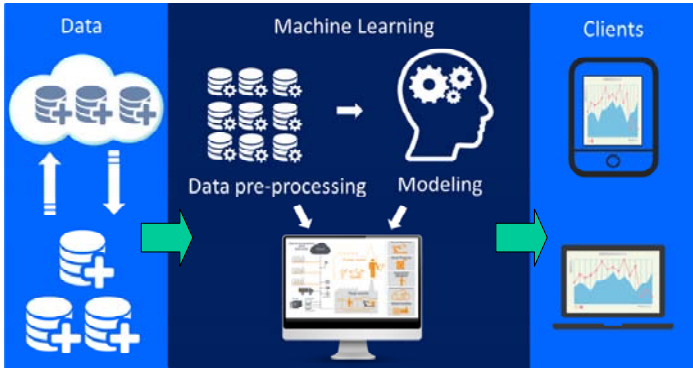
"Largest impediment to becoming more data-driven is lack of understanding of how to use analytics" *** Analytics: The New Path to Value", MIT Sloan Management Review, October 2010

What this means to us is ...

- We must learn how to better listen to the signals that our plants are sending us and how to respond to them.



Structure of Big Data Applications

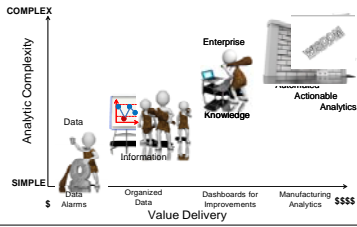


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J. Chen

Summary

- Data is a vital raw material of the information economy. It is like coal and iron ore in the Industrial Revolution.
- New directions on big data
 - Multi-levels latent variable models
 - Time series models for spatiotemporal systems
 - Robust models with uncertainty data
 - Real-time modeling structure for huge data



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