Introduction to Web Science

406.534 Industrial Information Technology

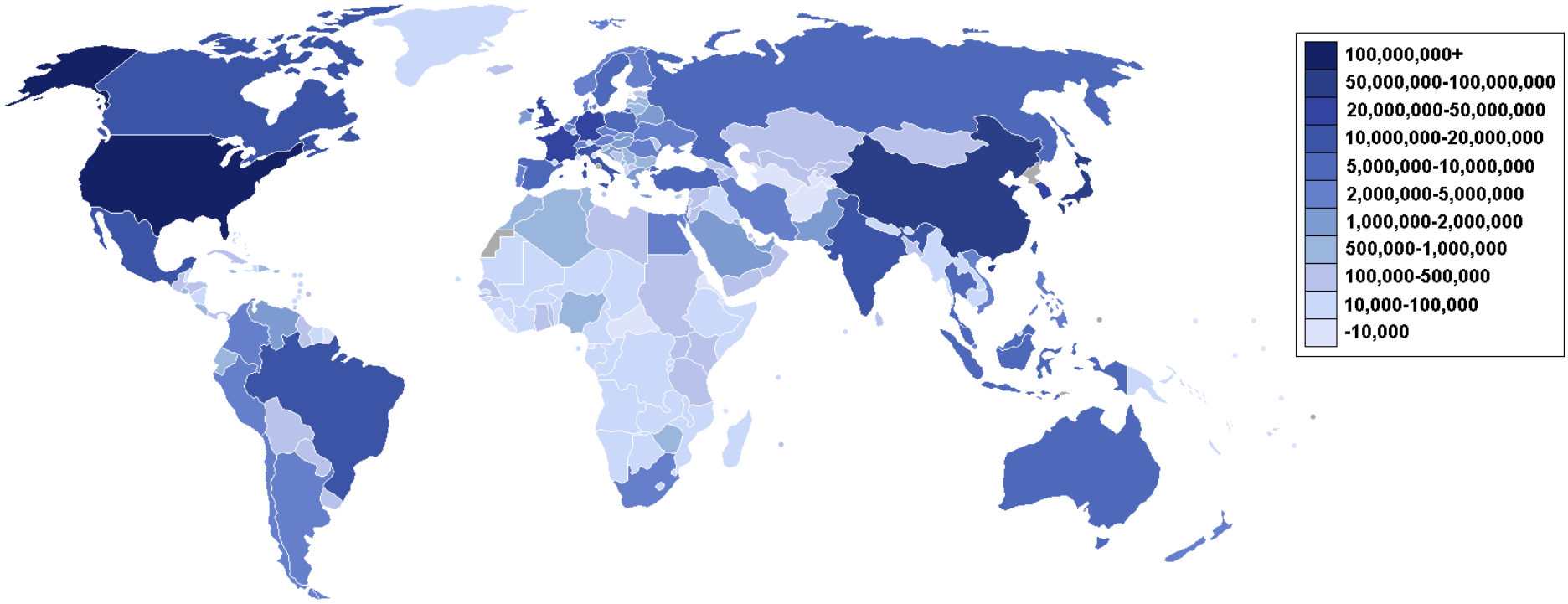
Jonghun Park

jonghun@snu.ac.kr

Dept. of Industrial Engineering

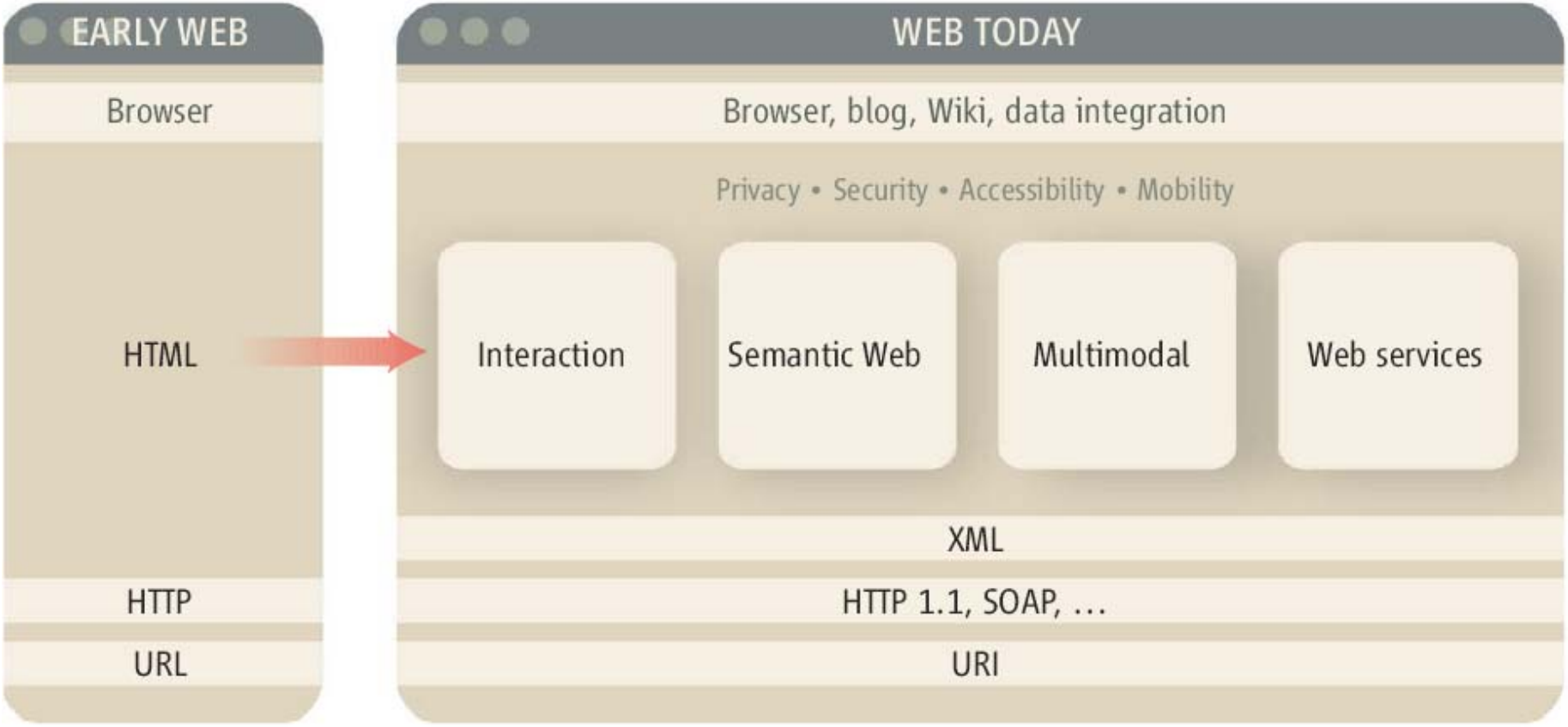
Seoul National University

internet users



web: the largest human information construct in history

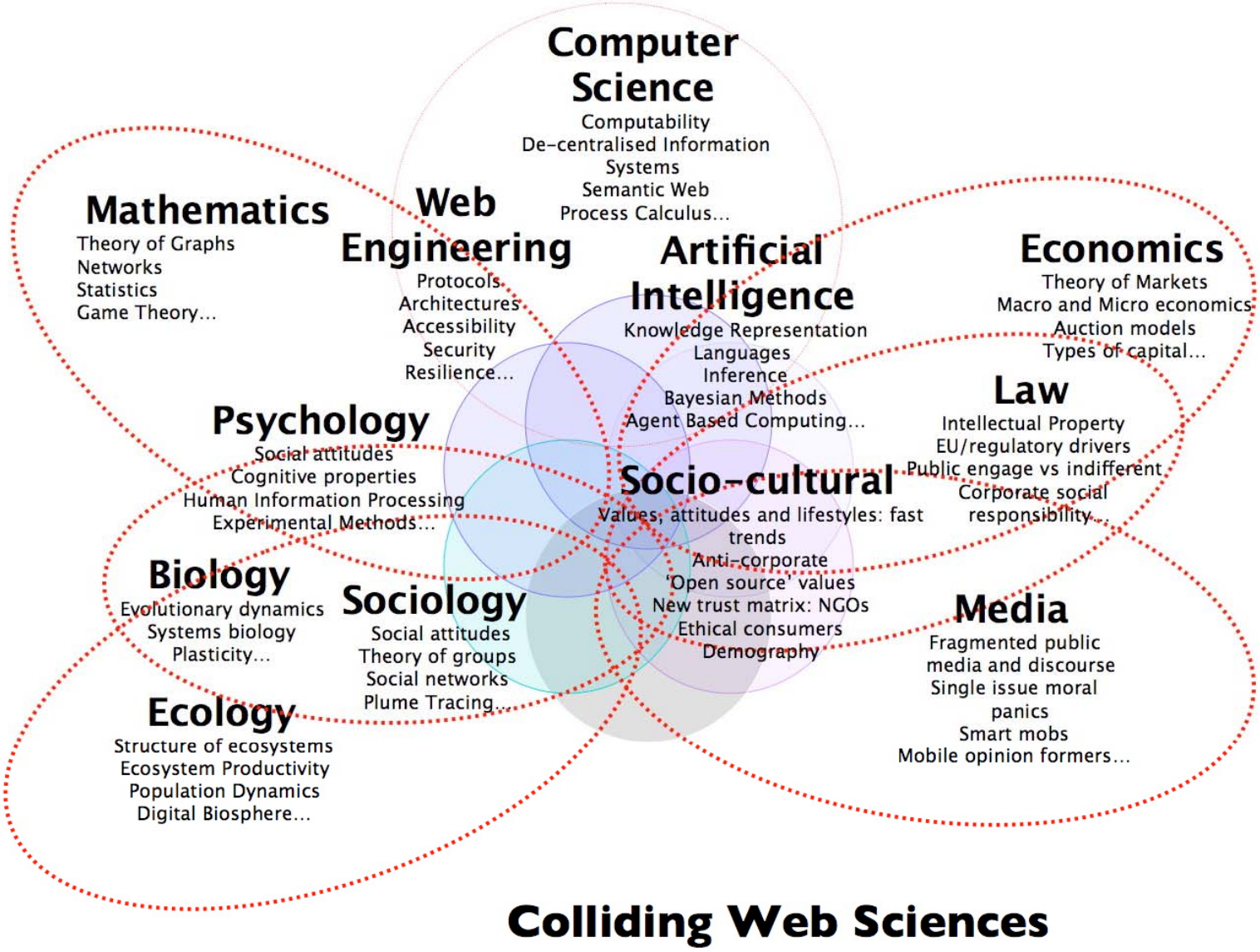
the web yesterday and today



web science

- web science research initiative (www.webscience.org): led by Tim-Berners Lee
- the web as a technology is socially embedded
  - emergence of social computing
- inherently **interdisciplinary**: CS, OR, statistics, library science, social science, MIS, economics, communication, entertainment, ...
- Tim Berners-Lee, et al., “Creating a Science of the Web”, Science, Vol. 313, 11, Aug. 2006
  - it is about engineering new infrastructure protocols and understanding the society that uses them, and it is about the creation of beneficial new systems
  - ethos: **decentralization** to avoid social and technical bottlenecks, **openness** to the reuse of information in unexpected ways, and **fairness**

colliding web science



computer science vs. web science

Computer Science	Web Science
Metrics	
Moore's Law	Page views
Order (n) algorithm analysis	Unique visitors/month
Gigabytes	Number of songs or videos
Topics	
Computer networks	Social networks
Packet switching	Voice over IP, music sharing
Information	Relationships
Programming languages	Wikis, blogs, tagging
Databases, operating systems, compilers	E-commerce, e-learning, e-government, medical informatics, financial analysis
3D graphics, rendering algorithms, computational geometry, object modeling	Creating and sharing video, animation, music, photos, maps
Focus	
Technology	Applications
Computers	Users
Supercomputers	Mobile devices
Proficient programmers	Universal usability

some representative problems in web science

- web graph
- web crawling
- web search
- link analysis
- automated recommendation
- information extraction
- clustering
- classification
- social network analysis
- web usage mining
- opinion mining

“... because humans are the creators of web pages and links between them, their interactions form **emergent patterns** in the web at a macroscopic scale...”

- Tim Berners-Lee, et al., “Creating a Science of the Web”, *Science*, Vol. 313, 11 (Aug. 2006)