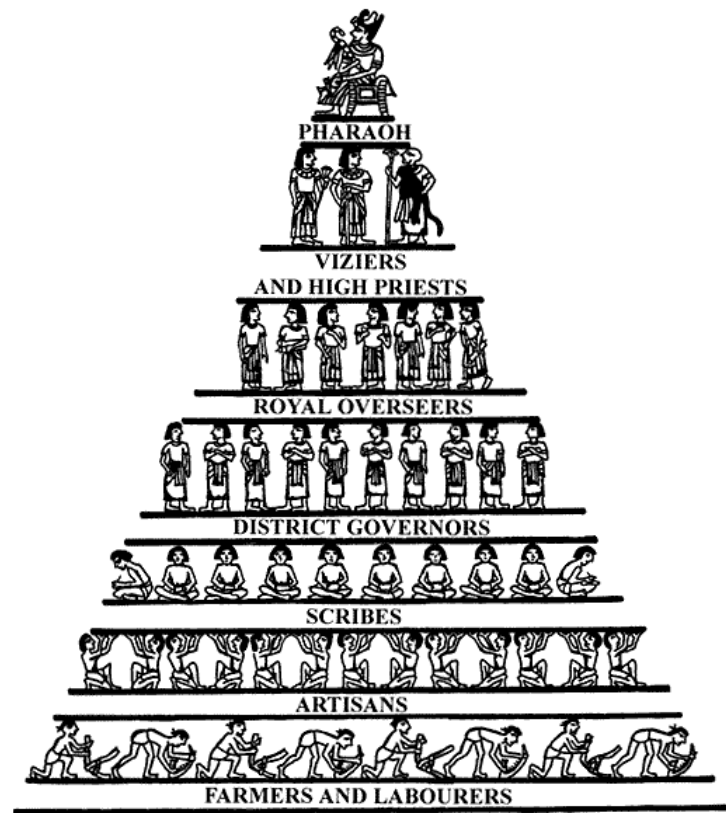# Actor Network Theory

Ketrina Yim

CS260—Human Centered Computing

4/1/2009

The Sociology of Organizations

- Where does a leader's power come from?

- How do people in positions of power stay there?

- What protects organizations from forces that might collapse them?
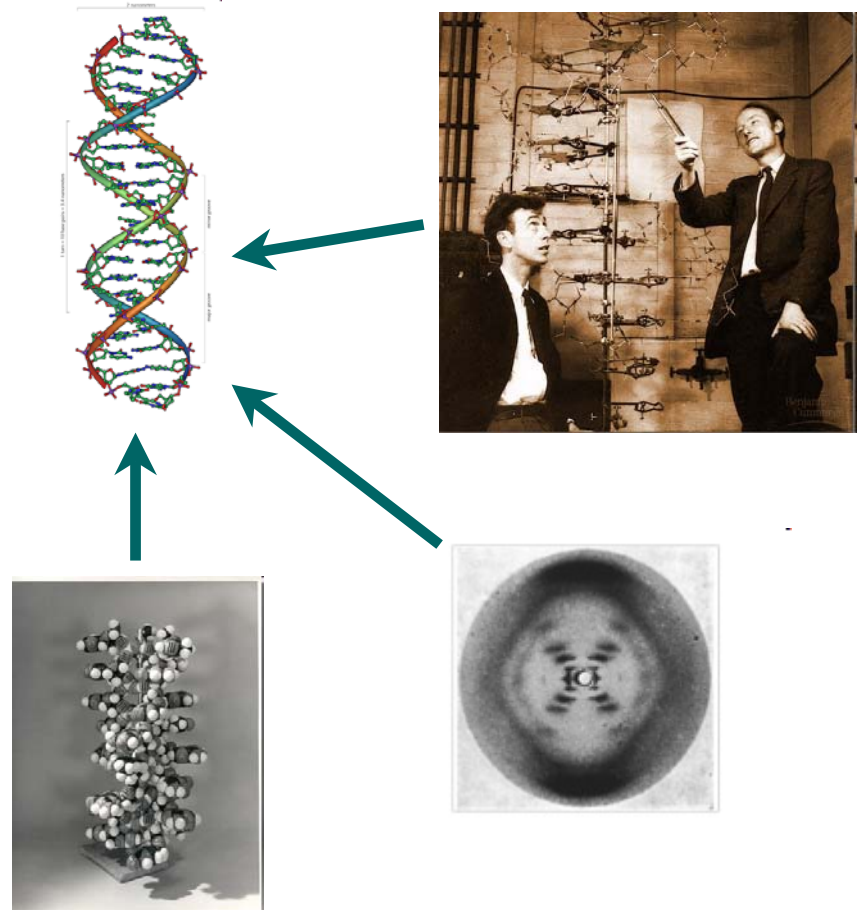
What is Actor Network Theory?

- An approach to social theory originating from science studies

- A material-semiotic method

- Explores <u>how</u> relations between objects, people, and concepts are formed, rather than <u>why</u> they are formed

The Three Components of ANT

- Heterogeneous Networks

- Network Consolidation

- Network Ordering

Heterogeneous Networks

- "Knowledge" emerges from networks of heterogeneous materials

- "Knowledge" takes on many forms

- "Knowledge" is a social product, instead of the result of privileged scientific methods

Heterogeneous Engineering

- In actor-network theory, this is essentially what defines science

- Science takes parts of the social, technical, conceptual, and textual and transforms them into heterogeneous scientific products

- Applies to other institutions as well

Interactions and Artifacts

- Social networks are more than just the people

- Material objects mediate interpersonal interactions
  - Define relationships and context
  - Affect individual behaviors and actions

- Preferences in interaction create patterning, which in turn creates order

ANT and Ethics

- Are the people no different from the objects in an actor network?

- ANT can be used to inform ethical questions of the human effect's special character

- Actors are heterogeneous networks, too, hence actor-networks

Network Consolidation

- Some networks aren't noticeable, until they break down

- Networks can be immensely complex, so being completely aware of all the networks around us is infeasible

- Humans consolidate networks to simplify the world around them

Punctualization

- Often occurs in widely-performed network patterns

- Punctualized networks become resources in heterogeneous engineering
  - Hides the network's complexity
  - The network may fail if resistance is encountered

Social Order

- Punctualization is an endless process

- Social structure is a verb
  - The structure is constantly changing
  - Ordering creates power, but can be contested
  - Individual preferences can cause resistance

- Order can also create devices, agents, and institutions

Network Ordering

- Effects of order, power, and organization often come from punctualized actors

- In actors and organizations, ANT considers:
    - How components are mobilized and managed
    - How resistance is handled
    - How punctualization and translation occur unnoticed

Translation and Power

- Translation is a contingent, local, and variable process

- Implies transformation, equivalence, and symbolic representation

- Translation generates order by generating agents, devices, and organizations

Durability

- Some materials are more durable than others, and thus maintain more long-lived relational patterns

- Using durable materials to embody relations ensures good ordering

- A material's effects can depend on the network that it occupies

Mobility

- Creates a spatial ordering

- Surveillance and control create centers and peripheries

- ANT explores communication materials and processes in particular, and how translation can transmit "immutable mobiles"

- May still be subject to relations and networks

Calculability

- Anticipating the responses of materials to be translated is key to effective translation

- Calculation is a method of anticipation, and the result of certain innovations

- Calculation is a set of social methods and relations, and works only on material representations
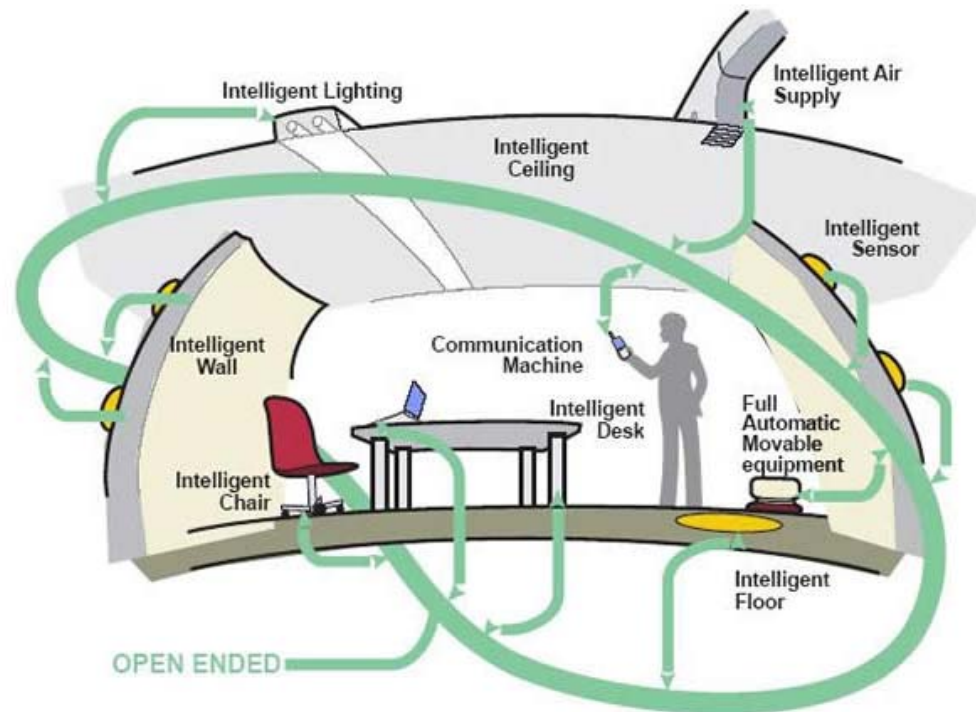
Scoping

- The scope in which ordering takes place must be considered

- Generally local, though there may be translation strategies applying to a wider range of networks and locations

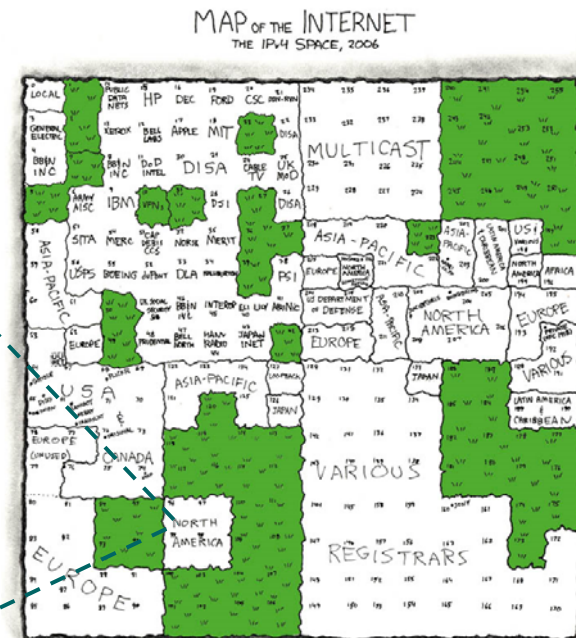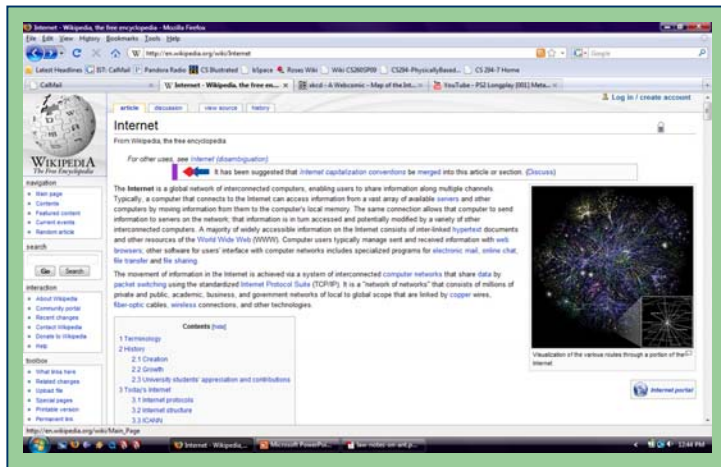- Centers of translation required for explicit calculation

Applicability in Computing

- Ubiquitous computing and wireless devices

Applicability in Computing

- The Internet

MAP OF THE INTERNET
THE IPv4 SPACE, 2006

THIS CHART SHOWS THE IP ADDRESS SPACE ON A PLANE USING A FRACTAL MAPPING WHICH PRESERVES GROUPING -- ANY CONSECUTIVE STRING OF IPs WILL TRANSLATE TO A SINGLE COMPACT, CONTIGUOUS REGION ON THE MAP. EACH OF THE 256 NUMBERED BLOCKS REPRESENTS ONE /8 SUBNET (CONTAINING ALL IPs THAT START WITH THAT NUMBER). THE UPPER LEFT SECTION SHOWS THE BLOCKS SOLD DIRECTLY TO CORPORATIONS AND GOVERNMENTS IN THE 1990's BEFORE THE RIRs TOOK OVER ALLOCATION.

Applicability in Computing

- Computer games (especially MMOs)

Conclusion

- Actor Network Theory studies society in terms of the relationships between people and objects, all of which are networks of relations in themselves

- Networks produce patterns, generating and reproducing hierarchies, organizations, agents, and order

- It is a sociology demanding consideration of machines and architecture as well as the humans that create and use them

Discussion

- Think about some actor-networks that you might be a part of. What are these networks composed of? What do they generate? What resistances do they face, and how do they protect themselves from it?

- Can a person's identity be defined without the objects he or she regularly interacts with?