Socially Intelligent Infrastructure

Vision and Challenges in a Sociotechnical Systems Perspective

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Sociotechnical Systems

Current AI research: atomistic, single-agent decision-making focused on ethical dilemmas
Current social sciences research: Not computational in outlook
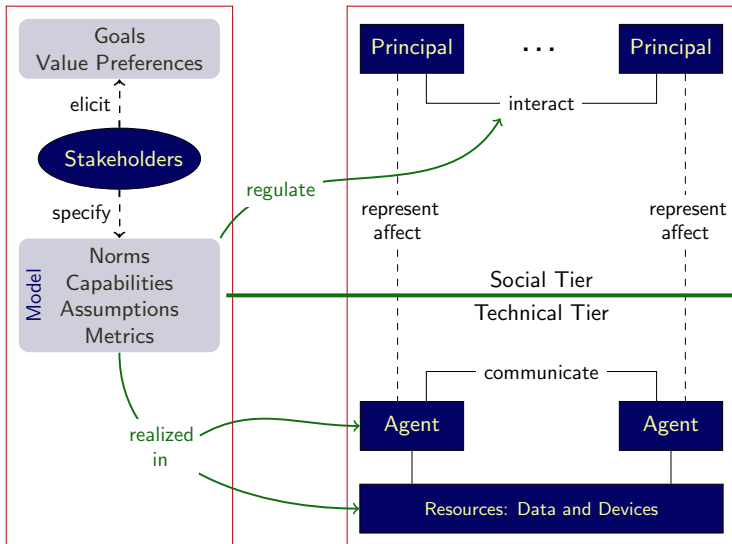
Values: Largely Universal Motivations and Goals

Values: mental representations of beliefs and goals; provide vocabulary for social interaction to achieve cooperation

Maslow's hierarchy of needs

- ▶ Biological organisms
- ▶ Coordinated social interaction
- ▶ Survival and welfare of groups

Self-Actualization

Esteem

Love & Belongingness

Safety

Physiological Needs
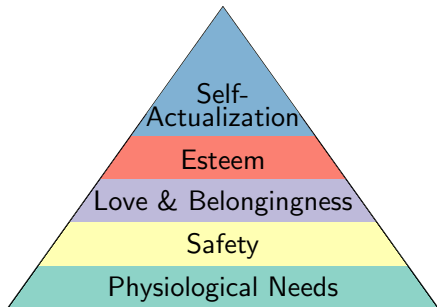
Socially intelligent infrastructure

- ▶ Embodies human values and interactions
- ▶ Treats end users as active entities
- ▶ Adapts at multiple timescales

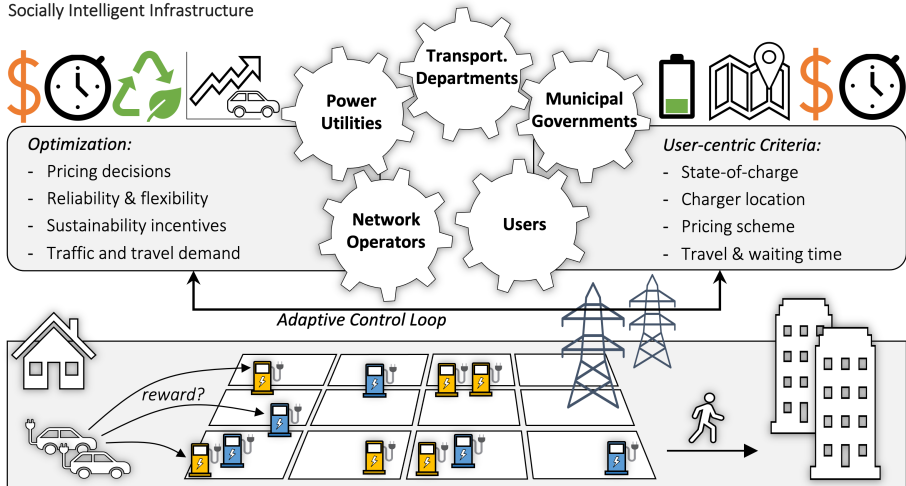# Socially Intelligent Infrastructure: Criteria
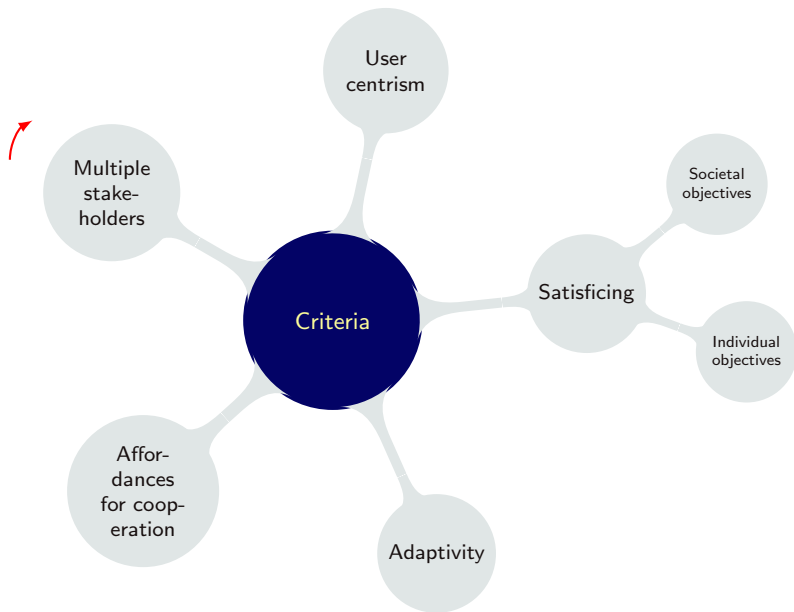
Infrastructure for Electrical Vehicle Charging

Multiple stakeholders with partially aligned objectives
Understanding both user and societal objectives

Socially Intelligent Infrastructure

Power Utilities

Transport. Departments

Municipal Governments

Network Operators

Users

Optimization:
- Pricing decisions
- Reliability & flexibility
- Sustainability incentives
- Traffic and travel demand

User-centric Criteria:
- State-of-charge
- Charger location
- Pricing scheme
- Travel & waiting time

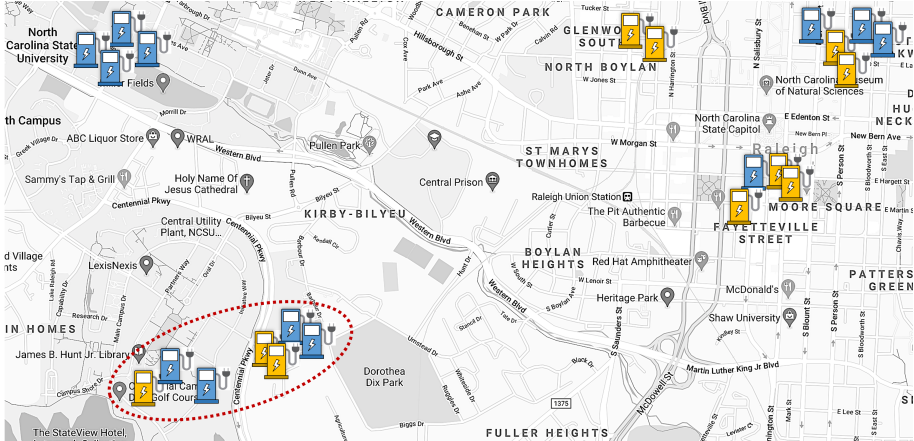*Adaptive Control Loop*

reward?

Lika Charging App: A Conception

Possible screen for user request entry
Transparency and explanations to the user
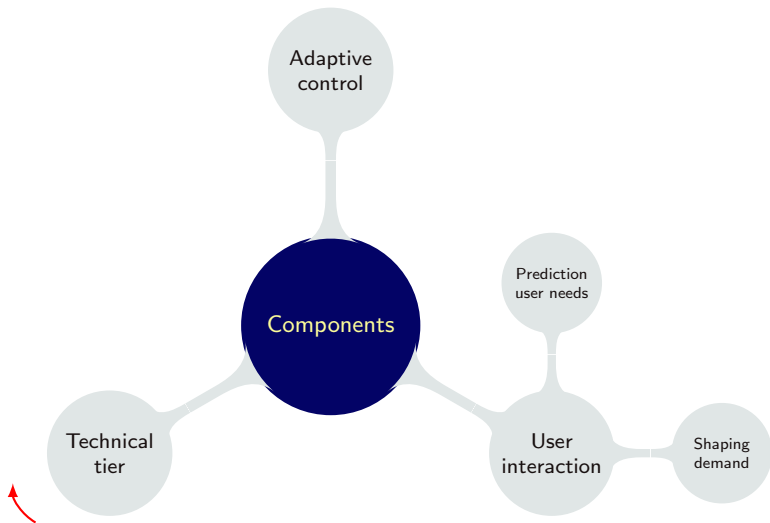Ability to nudge users toward prosocial choices to shape demand

Socially Intelligent Infrastructure: Examples
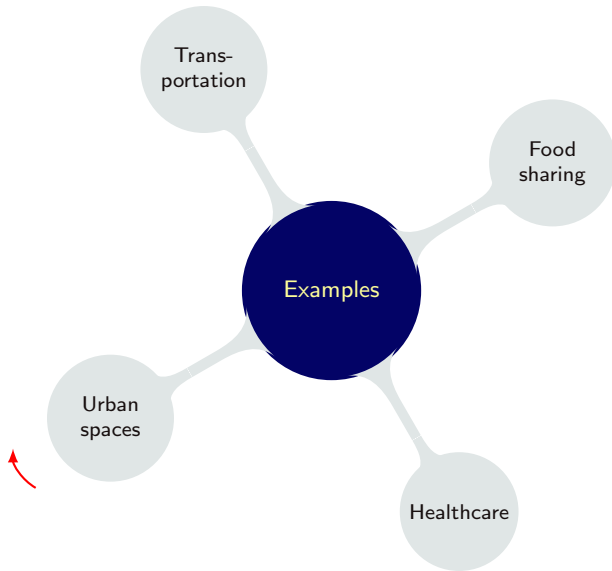
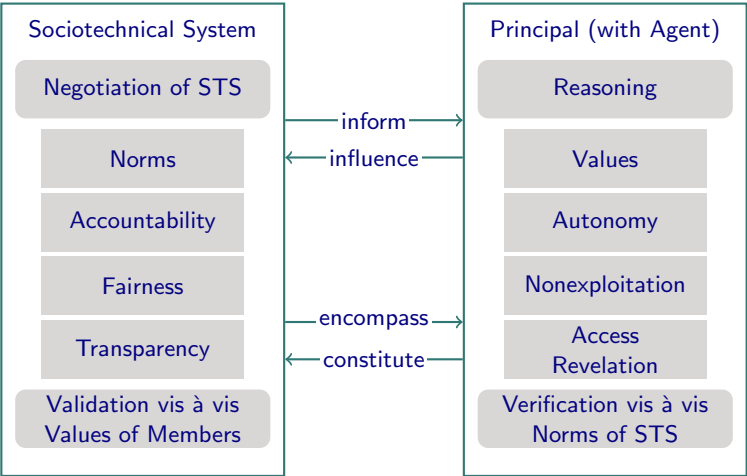# Socially Intelligent Infrastructure: Ingredients

Challenge: Governance of Socially Intelligent Infrastructure

Continually align sociotechnical systems and principals
Judgments of ethicality of STS: Relative to principals' values
Judgments of compliance by principals: Relative to STS

Challenge: Accountability for Resilience and Innovation

Accountability: ≥ 2 parties: one to call another to account for its actions

Alternatives vary on accountability

X will arrive before Y			
Global constraint	X commits to Z	Y commits to Z	W commits to Z
Accountable: no one	Accountable: X to Z	Accountable: Y to Z	Accountable: W to Z
Enforce it globally	X arrives early?	Y arrives late?	W persuades X or Y?
Constraint fails	X may violate it	Y may violate it	W may violate it
Out of luck?	Social control	Social control	Social control

▶ Explanations and arguments to override prima facie expectations

▶ Not blame and sanction: subsequent to accounting

▶ Not traceability: a supporting mechanism

Challenge: Ethics in the Infrastructure

Values, outcomes, and accountability from a sociotechnical perspective
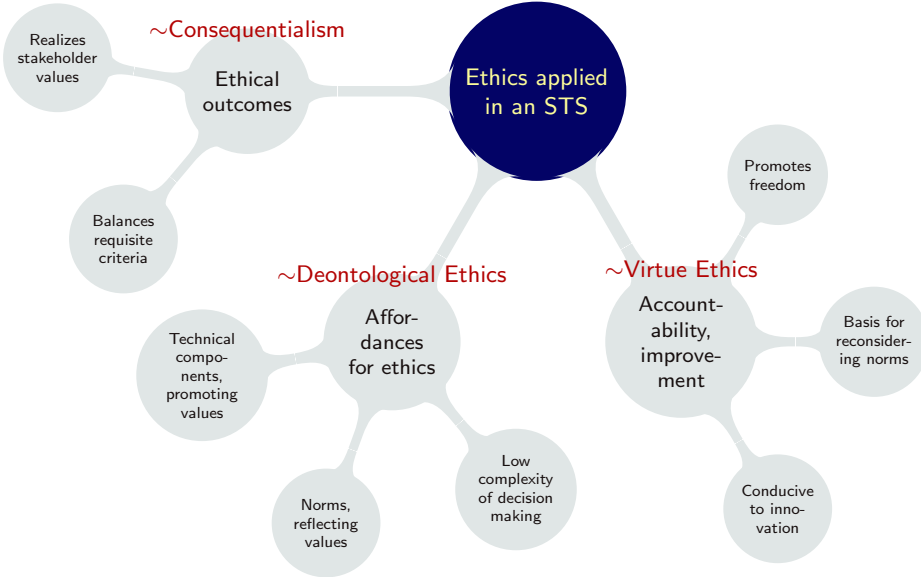
Thanks!

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